Information Technology Strategic Plan – Enterprise Architecture (ITSP-EA) Update – Year 2017

The following Information Technology Strategic Plan (ITSP) and its separate but related key document, the Enterprise Architecture (EA) has been in use since their original date of adoption in 2006. They were and still are the official guiding documents for most major Information Technology or Information Systems (IT/IS) planning, and are usually referred to as the ITSP-EA. The majority of milestones related to technology planning since 2006 up to the present, or about 97.5%, of the ITSP's strategic goals has been achieved.

From 2006 and by 2014, 50% of the ITSP's strategic goals were institutionally prioritized and accomplished through funds dedicated and allocated out of the college's overall annual appropriated budget. Also, revenue from the Student Technology Fee, as a Non-Appropriated Fund, greatly contributed to the accomplishment and the maintenance of achieved goals every academic year since the fee was started. This practice of prioritization and dedicated funding continues to today, resulting in much more accomplished after 2014, or up to 97.5% completion of the ITSP's strategic goals by 2017.

Much of the credit goes to the ITSP-EA documents and the support received from the college's administrators, staff, faculty, and students in first achieving the majority of goals, but also in sustaining them while still progressively making improvements to the technology landscape. The College Technology Committee and MIS were most instrumental in overseeing and implementing the ITSP-EA. But the ITSP, at 97.5% completion, is nearing another major update along with the Enterprise Architecture document.

Although the majority of goals from the initial strategies of 2006 were met, upgrades to the hardware, software, and network technology is always ongoing, along with updated training to all stakeholders. The new major initiatives underway, as of this writing, include: GCC's Enterprise Resource Planning (ERP) system's upgrade to Ellucian's BANNER 9/XE (Extensible Environment); the migration of the ERP to a Cloud-Base Infrastructure As A Service (CBIAAS) platform; in-classroom and expansion of WiFi (wireless) implementation; improved WiFi authentication; more installations and expected upgrades in multimedia projectors; and, the expansion of Distance Education offerings. Also, the CTC's last recommended policy was on Digital Resources. This policy recommendation is to allow for more use of computer, mobile and other web-based educational resources such as e-books, e-textbooks, mobile apps, web tools, and web resources. Digitally accessed materials and/or programs are primarily to gain benefits of convenience, flexibility, currency and cost effectiveness in providing learning resources. The policy is also for the college to support the use of open source materials in classroom delivery to lower costs for students and the college, and to ensure access of web-based tools and resources in the classroom is secured, unfettered and immediate. As an update, the CTC was replaced in Fall 2017 by the Technology Working Group (TWG) with a very similar role, but now with the oversight of the MIS Systems Administrator, who formally forwarded this policy recommendation to the CGC Chair.

Before going to the ITSP-EA documents (last updated in 2012 and consolidated here with the Activities Matrix), immediately below is the latest assessment report.

ITSP-EA Technology Master Plan Assessment Report

Show how the college addressed the concerns expressed by the visiting team in 2012 regarding resources under "Standard III.C. Technology".

Two key planning documents that were used in the 2012 visit: ITSP or Information Technology Strategic Plan and EA or Enterprise Architecture. The main issue raised in the 2012 Team Report is that these two documents did not address, or were not directly linked to student learning. Here's what was in the report:

Standard IIIC – Technology
1. The self evaluation does not address the staff or student competency levels with respect to technology nor is there recognition of what training is available for those constituencies. There is no evidence of student requirements of the IT infrastructure as it relates to instruction except that it appears to be dependent on the competency of the faculty. Hence there is no clear assessment of the needs from the student perspective and what resources would be needed to meet any deficiency.
2. The self evaluation describes the modernization of its infrastructure as evidenced by the increase in bandwidth and the number of network routers. However, the self evaluation is lacking in description and evidence as to service to students.
3. Lack of funding has impacted the training of the MIS staff and the faculty. The self evaluation focuses on how technology plans affect the administrative and instructional infrastructure. There appears to be little linkage between the ITSP and student learning.

The existing EA/ITSP document is the Technology Master Plan that guides and supports the institution's mission and technology needs by identifying goals and objective, strategies, and standards for the on-campus and distance learning environment that promote student learning outcomes and employee training and productivity.

The original EA/ITSP documents were created and adopted on 04/12/2006. Subsequent revisions were made on 09/01/2006, 12/14/2007, 3/18/2009, 11/1/2011, and 2/2/2012, as stated in the document when it was appended to the 2014 ISMP.

Original STRATEGIC GOALS

In the first version of the EA/ITSP plan, the CTC brainstormed an extensive list of initiatives needed to fulfill its technology vision. These initiatives were then combined, simplified, clarified, and rephrased as goal statements to produce CTC's strategic goals list. These old goals in priority order were:

Old Strategic Goal 1: GCC will develop and implement a target Enterprise Architecture.

Old Strategic Goal 2: GCC will develop policies, procedures, and processes to analyze and acquire the components (hardware, software, applications) of the Enterprise Architecture.

Old Strategic Goal 3: GCC will acquire the funding needed to implement the Enterprise Architecture.

Old Strategic Goal 4: GCC will expand the use of technology in education by the College faculty.

Old Strategic Goal 5: GCC will enhance the governance process to provide timely and efficient integration of users' needs into decisions on investments in technology.

Old Strategic Goal 6: GCC will build partnerships with external business and government organizations to expand business, educational, and funding opportunities.

Updated STRATEGIC GOALS

Noting the concerns of the 2012 Accreditation visiting team, the old EA/ITSP's six strategic goals were updated to be more student-centered as listed below:

New Strategic Goal 1: GCC will develop and implement a target Enterprise Architecture reflective of up-to-date technology and services to improve and promote better accessibility and availability to students.

New Strategic Goal 2: GCC will develop policies, procedures, and processes to analyze and acquire the components (hardware, software, applications, and services) of the Enterprise Architecture to increase security, integrity, and protection of student and employee privacy and confidential information.

New Strategic Goal 3: GCC will acquire, allocate, and dedicate sufficient funding needed to implement, maintain and continuously update the Enterprise Architecture to better facilitate student learning and teaching.

New Strategic Goal 4: GCC will expand the use and training of technology in education by the college faculty, staff, and administrators to improve student learning outcomes, student support, and administrative services.

New Strategic Goal 5: GCC will enhance the governance process to provide timely and efficient integration of students' needs into decisions of technology investments.

New Strategic Goal 6: GCC will build partnerships with external businesses and government organizations to expand educational and career opportunities for students.

This EA/ITSP became the college's only Technology Master Plan and its goals and objectives continue to include: 1) installations of new labs to address student and instructor needs and demands; 2) upgrades or replacement of existing instructional, open, and testing computer labs to stay up-to-date with curriculum and to accommodate academic program needs; 3) upgrades of the wired and wireless networks for greater student and faculty access to networked and online resources; 4) upgrades of Internet services to ensure optimal and sufficient bandwidth and response time for learning, teaching, and operations; 5) optimal operational maintenance of existing Enterprise Architecture to ensure 100% student-centered success. Funding is allocated under the non-appropriated funds on an annual basis from recalculation of the College Technology Fees collected. Additional funding at departmental level for technology replacement is requested through the annual budget process.

The approach to meeting objectives and strategies in the implementation of the ITSP/EA Technology Master Plan from its inception to the current, is to accomplish as much as possible with the resources available and as long as progress or improvements are being made, regardless of whether efforts are fragmented or cohesive. The point is to keep improving proactively while having the flexibility to adjust and react to the constraints of resources, especially the budget.

Status of Updated STRATEGIC GOALS

New Strategic Goal 1: GCC will develop and implement a target Enterprise Architecture reflective of up-to-date technology and services to improve and promote better accessibility and availability to students.

UPDATE STATUS: The actual primary target Enterprise Architecture was initiated in 2006 and was achieved by 2008, when the implementation of all the necessary hardware, software, network, Internet links and bandwidth, as well as technical support were finally in place signaling 24/7/365 days access for our students and employees. The Ellucian's Banner System which was formerly called Sungard's Banner has been in place since and has gone through major upgrades in hardware, software, and support. Hardware systems first began with physical IBM blade servers in 2006, then later upgraded to DELL servers with VMWare virtualized servers in 2012. With all the advances in networking, database, and Internet technologies, Cloud Computing and Infrastructure has now become GCC's next target Enterprise Architecture for 2018 surpassing the goals established in the latest ITSP/EA planning documents. The Enterprise Resource Planning (ERP) system, Ellucian's Banner, has also gone through major upgrades starting with Banner version 7 and LUMINIS version III in 2006, then to Banner 8 and LUMINIS IV in 2012, then LUMINIS V in 2013, and now Banner 9/XE in 2017. This strategic goal's initial plan can be considered 85% completed since more expansion and upgrades in WiFi implementation is being planned in order to increase and improve accessibility by students and teachers in the classroom and throughout the enterprise. Additionally, application upgrades and/or replacements will always be expected and planned as a necessary process and are usually dictated by software manufacturer de-support timelines.

New Strategic Goal 2: GCC will develop policies, procedures, and processes to analyze and acquire the components (hardware, software, applications, and services) of the Enterprise Architecture to increase security, integrity, and protection of student and employee privacy and confidential information.

UPDATE STATUS: Continuing with the information provided in "Strategic Goal 1" many policies, procedures, and processes were initiated and introduced into the picture starting in year 2006 and continue to be updated, adjusted, added, and improved to increase and ensure the Enterprise Architecture's security, integrity, and protection of students' and employees' privacy and confidential information. Single sign-on (SSO) technology with the use of usernames and passwords were put in place before the ERP system can be accessed. BANNER functional modules and database access requires each area's administrator's approval before access can be granted to users. User training in the use of the ERP and compliance to Data Standards, FERPA, HIPPA, and general data security continue to be enforced. Other compliances in place include CIPA (Children's Internet Protection Act) in GCC's high school programs, and PCI (Payment Card Industry) / DSS (Data Security Standards). The GCC BANNER Core Group members continue to meet to also discuss user and system policies, student and faculty issues and resolutions, upgrades planning, as well as systems testing, cloning, and other ERP-related topics. Online and offline system backups and storage are in place and mostly automated, and with an off-island Disaster Recovery (DR) system for continuity of operations procedures. The DR site is tested on a quarterly basis. There is also an Enterprise Antivirus system in place, and we have been using Google's platform for Gmail to take advantage of its online automated antispam, antivirus, and anti-malware systems. Email policy is enforced and recognized as official communication. Policies are also in place for Distance Education, Online computing (Internet), and Social Media. There is also an active Email presidential directive and a new Digital Resource policy being considered. The college's use of other technology security mechanisms such as VPN (Virtual Private Network) access, VLANs (Virtual Local Area Network), SSH (Secure Shell), SFTP (Secure File Transfer Protocol), SSL (Secure Socket Layer) certificates for websites, and password encryption, etc. also add to a more secure environment. The college has also done at least two outsourced network penetration and vulnerability testing, first in 2011 and the latest in 2016, and with both resulting in medium to low risk status and appropriately mitigated and improved where needed. Upcoming security measures being planned include a more robust and efficient WiFi (wireless) and LAN (wired) authentication system. The initial setup of this strategic goal can be considered completed 100%, but due to the nature and vulnerabilities of technology and information security, as well as the future and evolution of cyber threats, this goal will never truly be finished.

New Strategic Goal 3: GCC will acquire, allocate, and dedicate sufficient funding needed to implement, maintain and continuously update the Enterprise Architecture to better facilitate student learning and teaching.

UPDATE STATUS: Despite overall government budget constraints and the island's economic challenges, the college has continued over the years to acquire, allocate, and dedicate reasonably sufficient funding for the implementation, maintenance, updates, upgrades, and improvements of the Enterprise Architecture, as well as making the financial commitments to annual obligations in the renewal of software licensing, services subscriptions, critical outsourced technical support, and the hiring of technical personnel for MIS. Funding for upgrades, continued maintenance, and urgent or emergency repairs has always been made available for the cooling systems of the server room, the UPS, generators, networking equipment such as firewalls, routers, and switches. Collected Student Technology Fees, received government appropriations, and awarded grants continue to be the main financial resources to allow the college to maintain and improve its technology. The college has completed this strategic goal's initial plan 100%, but will always continue to provide the critical funding needs of the Enterprise Architecture. This is definitely necessary in order to allow all its technology resources, facilities, and infrastructure to facilitate better student learning and teaching.

New Strategic Goal 4: GCC will expand the use and training of technology in education by the college faculty, staff, and administrators to improve student learning outcomes, student support, and administrative services.

UPDATE STATUS: Numerous training has taken place not just for MIS technical personnel, but also for many other employees throughout the college. Trainings, workshops, webinars, on and off island, especially by MIS, has allowed the section to better support students and faculty members, staff and administrators with their technology services requests. Efficiency has improved in the deployment, installation, maintenance, and repairs of technology hardware and software troubleshooting and resolution. Old labs are upgraded according to the inventory replacement cycle of 3-5 years and the college has created many new computerized open and instructional labs since the first version of the ITSP/EA. Internet bandwidth has been increasing to accommodate demands and WiFi has been and continue to be expanded throughout the campus, encouraging and increasing access to online and networked resources by students and employees. The ERP system training since BANNER 7 to now BANNER 9 has been ongoing and also always available with the ODSL (On-Demand Subscription Library) from Ellucian. MyGCC (LUMINIS) portal use and navigation training continue to be conducted by Academic Technologies with technical assistance from MIS. Cengage's online tools for learning, as a supplemental resource of textbooks, GCC's Moodle Learning Management System, Course Sites out of MyGCC Portal, IBM's Academic Initiative, CISCO Academy, etc. allow faculty and students to use technology more and more. New and upgraded multimedia projectors, WiFi systems, and network equipment are also now very valuable resources on campus and in many classrooms, thanks to the expanded use of the Technology Fee. This strategic goal is always ongoing or a work in progress, but the initial goal can be considered met by 100%.

New Strategic Goal 5: GCC will enhance the governance process to provide timely and efficient integration of students' needs into decisions of technology investments.

UPDATE STATUS: The CTC and many other official committees or formal working groups within the college has allowed for student and faculty concerns to be heard as part of the governance participatory process. COPSA, as well as the faculty and staff senates has been instrumental and cooperative in ensuring participation and in having a voice for students, faculty, and staff. Agendas and minutes of committee meetings and working groups provide evidence in integrating student needs into decisions of technology investments. This strategic goal has been met 100% and will continue to be met as more student participation is formalized in committees and working groups, with the CTC as the primary working group for students, or their representative to voice their concerns. Unfortunately, since the replacement of the CTC by the new working group, membership commitment in the TWG is very low and we have yet to have a student present in recent meetings.

New Strategic Goal 6: GCC will build partnerships with external businesses and government organizations to expand educational and career opportunities for students.

UPDATE STATUS: GCC's successful Apprenticeship Program can be considered most evident in directly showing that this strategic goal has been met 100% and will continue into the future. Other areas this has been touched is in the establishment of good relationships with most island vendors and organizations the college work with. This strategic goal is not necessarily limited to information technology; however, technology is now more widespread in many different industries including the culinary arts, visual communications, automotive technology, criminal justice, health, marketing, etc.. The other evidence is in GCC's close relationship and in providing services with the island's military veterans. Additionally, since the island is also the college's campus, the true impact and success in

meeting this goal is made by the students who are currently in the workforce, applying what they've learned or are learning, and in those graduates who are newly employed.

Overall Percentage Completion of Updated Strategic Goals

New Strategic Goal 1: 85%

New Strategic Goal 2: 100%

New Strategic Goal 3: 100%

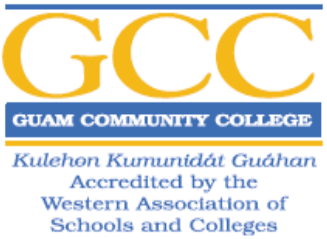
New Strategic Goal 4: 100%

New Strategic Goal 5: 100%

New Strategic Goal 6: 100%

Total Average Percentage: 97.5%

GUAM COMMUNITY COLLEGE



INFORMATION TECHNOLOGY STRATEGIC PLAN (ITSP)

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Created and adopted on 04/12/2006. Subsequent revisions on 09/01/2006, 12/14/2007, 3/18/2009, 11/1/2011 and 2/2/2012.

Guam Community College
Information Technology Strategic Plan (ITSP)

1. INTRODUCTION

Guam Community College is a multi-faceted public vocational educational institution, created by Public Law 14-77 in 1977 to strengthen and consolidate vocational education on Guam. The college operates secondary and postsecondary vocational programs, adult and continuing education, community education, and short-term, specialized training. These programs are delivered both on and off-campus, in satellite programs and on-site at businesses as needed. The college also serves as the State Board of Control for vocational education under the United States Vocational Education Act of 1946, 1963, and subsequent amendments.

The college offers over 50 courses of study which are job related and prepares students for transfer to four-year colleges and universities with advanced standing in professional and technical degree programs. The college offers a variety of community service and special programs to prepare students for college experiences including English-as-a-Second Language, Adult Basic Education, General Education Development (GED) preparation and testing, an Adult High School Diploma program, External Diploma Program and Apprenticeship.

The administration and operation of the college are under the control of a nine-member Board of Trustees appointed by the Governor with the advice and consent of the Legislature. Law states the purposes of the college are to:

- Establish technical, vocational and other related occupational training and education courses of instruction aimed at developing educated and skilled workers on Guam
- Coordinate vocational-technical programs in all public schools on Guam
- Establish and maintain short-term extension and apprenticeship training programs on Guam

- Expand and maintain secondary and postsecondary educational programs in the vocational-technical fields
- Award appropriate certificates, degrees, and diplomas to qualified students
- Serve as the Board of Control for vocational education for purposes of the United States Vocational Education Act of 1946 and 1963 and subsequent amendments thereto

2. BACKGROUND

For over 34 years, Guam Community College (GCC), like most other organizations, has acquired an assortment of technologies. Since 2006, GCC has had enterprise architecture or a technology strategic plan to guide its acquisition and implementation of emergent technologies and applications. Since the institution of their 2006 Enterprise Architecture document, GCC has established technology standards and has made forward progress in planning and expanding its network capacity to meet an ever-growing student population and trend toward providing student offerings through web-based applications such as Distance Education (DE).

A consequence of expanding and adding new technologies often involves incompatible or stovepipe technology, various components become obsolete, and a replacement strategy is often driven by funding availability, rather than business needs or architectural considerations.

The college is both a business enterprise and an educational institution. These two facets of the enterprise often have conflicting technological needs, expectations, and priorities. The business side wants stable, robust systems that have proven themselves over time and place. The educational side frequently wants 'state-of-the-art' tools and techniques that allow it to be at the forefront of the technological world. Yet both parts of the college must work together to establish a technology infrastructure that meets both sets of needs and delivers the college an effective, efficient, and responsive system.

To make maximum use of its limited technology resources and funding, GCC decided to develop an information technology strategic plan and enterprise architecture to guide its technology investments. The enterprise-wide strategic plan defines how technology will be used to achieve the college's educational and business goals, while the enterprise-wide target architecture establishes information technology (IT) standards and design guidelines. The Information Technology Strategic Plan (ITSP) and Enterprise Architecture (EA) are companion documents that detail what the IT environment of the future will be (the Enterprise Architecture) and how GCC will achieve this future environment (the ITSP). The architecture and strategic plan cover all areas of information, communication, building, and academic systems technology that have any effect on the operations of the college.

What is an ITSP?

The ITSP is a top-down enterprise-wide strategic plan created to achieve GCC's strategic educational and business goals. The plan details how to:

1. Implement the Enterprise Architecture
2. Develop staff skills needed to manage GCC's IT resources
3. Establish processes and structures to manage information technology as an enterprise resource
4. Transition from the current environment to the desired future state

This future environment requires technology that can communicate, interoperate, and share data and resources while reducing the costs associated with training, maintenance, and support through the implementation of the Enterprise Architecture.

The ITSP is not intended to limit or constrain creativity among GCC users, but to provide a stable, robust, modern infrastructure and environment in which to solve business problems and allow departments to collaborate on significant cross-departmental efforts. The plan is built on an IT model of management which employs the best features of both centralized and decentralized IT management, support, and decision-making.

Created and adopted on 04/12/2006. Subsequent revisions on 09/01/2006, 12/14/2007, 3/18/2009, 11/1/2011 and 2/2/2012.

Why develop an ITSP?

The ITSP provides a focus for GCC and its departments to discuss and come to agreement on the application of information technology to the college's business needs. It serves as a framework for budgeting, planning, and managing GCC's IT resources. The plan provides direction, establishes IT management processes, and documents the desired future state of IT in GCC.

What do we do with the ITSP?

The ITSP is used to implement the Enterprise Architecture and achieve GCC's IT vision. By following the plans contained in the ITSP, GCC can develop the technical environment it needs, the human resource skills necessary to manage the new environment, and the oversight and leadership mechanisms for fulfilling its strategic goals.

The ITSP and the Enterprise Architecture (EA)

The Enterprise Architecture and ITSP are complementary documents. The EA describes the current IT environment, the desired target architecture, and the actions needed to transition from the current to the target architecture. It focuses primarily on the technical issues involved in changing the IT environment. The ITSP takes a broader perspective on the transition process. It identifies the strategic goals that must be achieved for GCC to provide leadership and oversight of its IT resources. It addresses the management, budget, and governance challenges facing the transition and develops specific action plans to resolve the issues. Implementing the EA and ITSP together, GCC can provide both the technical and organizational leadership needed to fulfill its IT mission.

3. APPROACH TO DEVELOPING THE ITSP

The development of the ITSP was a collaborative effort involving GCC faculty

administrative staff, and executives. Participants in the development effort considered the needs, interests, and concerns of all departments and users throughout the process.

Scope

The EA and ITSP apply exclusively to all components of GCC. The architectural principles and standards apply to all IT products, systems and projects. At this time, the ITSP addresses governance and staffing issues relevant to GCC.

Methodology

Staff selected from GCC faculty and administration developed the ITSP with facilitation support from consultants in the private sector. GCC's College Technology Committee (CTC) provided oversight and direction to the development process. It then discussed guiding principles for the IT environment of the future and technological trends that will affect that environment. The ITSP is a living document and requires periodic updating and revising as required by GCC, or as major IT enterprise systems are deployed, and IT policies are affected which change the strategic direction of the college.

Building upon the April 2009 ITSP, the team described the current IT environment and envisioned the future IT environment for the college. The team then generated a list of goals which, if achieved, would fulfill the college's vision. These goals were consolidated and prioritized to produce the final strategic goals.

For each strategic goal, the ITSP team described the goal, the current situation, the desired future state, and how to reach the future state. They also developed performance measures to indicate whether the future state had been reached. Finally, the team prepared action plans to achieve each strategic goal.

4. ANALYSIS OF GCC's IT NEEDS

In assessing GCC's needs for information technology, the ITSP team developed certain core principles to form the foundation for guiding the development of the Enterprise Architecture and desired future state of IT in the college. The team also analyzed trends

in technology to ensure its EA and desired IT future were consistent with and supportive of the direction of the industry and profession. Using this information as a start, the team described the current IT situation in GCC, the desired future state, and the migration path that leads the college from where it is to where it wants to be.

Guiding Principles

The ITSP team articulated a set of overarching guiding principles that would drive both the architecture and the vision of GCC's desired future IT environment. These guiding principles, determine many of the characteristics of the EA and the IT future state. They affect decisions, or in some cases, determine decisions, at every level of the architecture and throughout the definition of the future IT state. These principles are:

- GCC will stay true to its mission
- GCC will keep the student first
- Information technology, IT staffing and the IT budget are enterprise resources
- Information exists to support the educational and business objectives of GCC
- Technology and technology investments must be viewed from an enterprise perspective
- The educational, business priorities, and functional requirements of the college will determine investments in information technology
- Information is an enterprise strategic resource
- GCC must provide electronic access to information and services while maintaining security and privacy
- GCC's data must be accurate and collected only once in a timely and efficient manner according to life-cycle standards
- GCC and its information technology must become an integrated enterprise

Trends in Technology

Many trends in technology affect the decisions IT organizations make and determine the directions they take. It is difficult, if not impossible to fight the trends, but planning to

take advantage of them, makes the IT function vastly more effective while reducing costs. Some of the trends in technology that will affect GCC's IT future are:

- Rapid creation of emergent technologies may shorten technology life-cycles
- The growth of internet-based commerce and customer service will result in an increasing focus on security and privacy
- The Internet will drive technical standards for applications and network computing.
- The rapidly expanding use of Internet technology will be used to redesign and redefine business processes
- There will be a shortage of qualified IT staff
- The performance of computer hardware will continue to grow exponentially, while costs continue to decline
- The convergence of voice, data, and video has begun and will accelerate
- New ways to connect to the computing environment are emerging
- Application delivery will be increasingly component based
- Market forces will continue to dominate over superior technology
- Data warehousing applications and uses will experience high growth
- The drive for interconnectivity and interoperability will blur traditional boundaries
- Collaborative computing environments are enabling organizations to better marshal and focus their intellectual resources
- Enterprises are using new technologies to reduce administrative costs and establish a unified system management approach for corporate computing

Current State of Information Technology Resources in GCC

GCC has a fully staffed MIS department of 10 people and has maintained this level since 2006. The GCC technology inventory includes more than 1500 personal (desktop and laptop) computers and nodes. These computers run everything from Macintosh Operating Systems, to Windows 98 up to Windows 7. There is a growing number of

MAC computers used primarily for instruction of digital media courses. The College also possesses lab spare computers, monitors, and other equipment on campus should the need arises to replace any down or malfunctioning equipment in the specific labs, which are mostly IBM PC compatible systems.

The campus has numerous servers, one AS400 and the rest primarily Dell and IBM Blade servers. Most servers are under MIS control and housed in a centralized server room. Most servers are also dedicated to a single application. The BANNER/LUMINIS Enterprise System or the Integrated Database Management System is now in a new DELL VMware-virtualized server environment. Incremental and full backups are performed on each server daily but there is no schedule for testing the restoring of a server, and are only conducted when the need arises or to restore specific file systems. This needs to be included in their SOP for daily, incremental and full back-up policy. This SOP will also include testing to test back-ups at all levels, daily, incremental and full. There is little if any redundant capability. If the Integrated Database Management System goes down, there is no immediate way to continue operations in another backup electronic environment. There are spare servers, however, they are not in use or serve in a backup capacity. By mutual arrangement, a few servers are in the faculty area outside of MIS' control. It's recommended to consolidate all servers under the MIS department except when and where restricted by either Program Agreements, grants' conditions and requirements, or if resources and the expertise to maintain them are unavailable in MIS.

All main campus computers are networked on the centralized LAN, with the exception of those on wireless connections, and can gain access to the internet via one 10 megabit per second line and a separate 20 megabit per second line provided by a partnership and paid services with MCV, a local cable TV company, and GTA, a local analog phone and digital cable company. There is a concern about the adequacy of the bandwidth available, particularly when new applications become a requirement for instruction or operations. Monitoring of bandwidth usage is a constant activity in order to determine if sufficient bandwidth is available to support current operations. Currently, MIS has stated they are running at 90-percent and with Wi-Fi coming online, they will reach

maximum capacity. This is not sufficient to run GCC's network and an upgrade to their network infrastructure is underway to meet projected bandwidth demands. There were also at least three DSL lines on campus, but each is separate from the LAN and is used to provide localized wireless access points. Early this year a change occurred with Internet Service Providers (ISP) that has since change the number to one DSL line with the other wireless access bridged into the wired network. The previous ISP was no longer able to provide the services and transferred GCC's accounts to the new ISP. As an update, there is now a campus wireless project pending bid award to the vendor and the project is scheduled for completion in Spring 2012.

The current Integrated Database Management System (IDMS) allows for a more efficient operation in Human Resources, Business and Finance, Registrar's and Development and Alumni Relations Offices, and the rest of the college.

GCC is becoming a 24x7 operation. More students are taking classes where tests and other materials are online. These students often work jobs during GCC's normal business hours and attempt to gain access to GCC servers outside normal business hours. Access to the College's servers are available except during IT maintenance activities that require downtime, which are usually done late at night and only when necessary. MIS runs two operational shifts and has staff available between 8am and 11pm on weekdays in an effort to reduce downtime and be more responsive to the demands of the College. MIS also has certain individuals accessible only for emergencies around the clock which include the Systems Administrator, a Teleprocessing Network Coordinator, and one Systems Programmer.

All PC computers are open use computers; no individual user-id and password are required to use a computer. There is no means of tracking user activities back to a specific user. This lack of user authentication is non-standard practice, especially since the rest of the controls on the network are so robust.

The current Integrated Database Management servers are protected from unauthorized

access through the use of firewalls, Secure Socket Layer (SSL) certificates from VeriSign, and through unique username and passwords.

Desired Future State of Information Technology Resources in GCC

GCC will have a unified enterprise architecture and all IT resources will be compliant with this architecture. Standards will be established using industry best practices and adhered to for all IT resources. At a minimum, these standards will address security, data and data sharing, communications, compatibility, contingency plans and disaster recovery, and back-up/recovery. Systems will interface easily, seamlessly, effectively, and cost-efficiently. GCC-wide IT resources will be applied effectively and cost-efficiently. All IT resources will be current and life-cycle management schedules will be developed and funded. GCC will have sufficient qualified IT staff and resources. GCC's IT budget and annual spending plans will be developed and managed to maximize the value to the college overall.

GCC will create and operate services on-line that are accessible 24 hours a day, seven days a week. It will deliver integrated enterprise information systems and infrastructure that improve public access to GCC functions and information, streamline business processes to simplify college-public interactions and reduce costs, and meet the legal and business needs of the college. The technology will enable departments to continually improve their efficiency and effectiveness, while also allowing applications to be developed more rapidly, easily, and inexpensively as business needs change.
Education will no longer be time and place dependent. All students will have laptops and classrooms will be fully equipped with multi-media, computers, and LAN access. GCC courses will teach the most up-to-date technology and offer certifications in the IT field. End users will be adequately computer literate and proficient. The educational community will communicate its needs to the technology community with sufficient lead time for them to provide the needed support/services. GCC will establish a model classroom with state-of-the-art technology

GCC technology will be 'invisible' to the user and always available when it is needed. The GCC campus will be completely wireless and secure, with no viruses, spam, or system breaches. All satellite sites will be connected. Users and their applications will not be impacted by limited bandwidth. Campus safety and security equipment (fire alarms, smoke alarms, security camera systems, etc.) will be fully integrated and the phone system will be significantly improved at a lower cost.

GCC will be a leader in the Pacific region in the application of technology. The college faculty and staff will anticipate the skills needs of the local business community and provide training and certification to deliver and develop skills needed in the work force. GCC will establish a technology center where new technology of any type can be prototyped and tested. GCC will provide a 'computer store' where students repair and upgrade systems for both work experience and income. GCC will develop cost-effective means for providing 'niche' training and services, and for providing training and education not in the college curriculum.

The college will establish formal, fully accepted processes for IT budgeting, decision-making, resource allocation, project sponsorship, and priority setting. GCC will also have an effective process for integrating and reconciling users' needs with technology capabilities. GCC will have formally adopted a target enterprise architecture (EA) and standards that establishes a broad set of boundaries within which everyone agrees to stay, yet allows flexibility to safely experiment with new tools and technology (one size does not fit all). The target EA will support multiple operating systems.

Migration Path from Current State to Desired Future State

GCCs environment is in constant state of planning for future growth and is almost never static. As demonstrated since the last EA in 2006, major infrastructure improvements have taken years to plan, approve, budget, and execute. Transitioning from the current state to the future state will involve constant minor infrastructure improvements, policy reviews, and managing and validating changing requirements. Major initiatives such as DE and VOIP will take years to implement. The migration path will involve periodic and

affordable minor improvements in accordance with the EA. Major IT capital improvements involves long-term tracking and forecasting as outdated infrastructure systems and end- of-cycle milestones approach and are planned and integrated into the college's capital improvement process plan to be selected and prioritized into the college's business and educational goals and objectives. Although major aspects of the transition can be planned, scheduled, and implemented according to planned milestones, many transition components occur as external events allow them. For instance, it's difficult to impose EA standards and design features on legacy systems that existed years prior to the EA. However, as these legacy systems are replaced or upgraded, they should be required to conform to the EA.

5. STRATEGIC GOALS

The CTC brainstormed an extensive list of initiatives needed to fulfill its technology vision. These initiatives were then combined, simplified, clarified, and rephrased as goal statements to produce CTC's strategic goals list. These goals in priority order are:

Strategic Goal 1: GCC will develop and implement a target Enterprise Architecture.

This goal defines and implements the technical, business and educational environments GCC wants to have in five years. **Enterprise Architecture** is the practice of applying a comprehensive and rigorous method for describing a current or future structure for an organization's processes, information systems, personnel and organizational sub-units, so that they align with the organization's core goals and strategic direction. Although often associated strictly with information technology, it relates more broadly to the practice of business optimization in that it addresses business architecture, performance management and process architecture as well.

Where are we now?

GCC has made progress toward where we would like our technology to be. It has a topology (network) and an organizational chart and structure. It has an Integrated

Database Management System (IDMS) which integrates HRO, Business, Student, and Financial Aid, and Development and Alumni Relations Offices. Other databases exist that do not talk to each other and have restrictive and specialized functionality that are hard-coded and difficult to update. These are legacy systems that eventually will be planned for replacement or removed from the production environment as operational requirements change.

Some of the college's hardware, operating systems, and applications are obsolete. A minimal number of applications require old operating systems (Windows 98). System security is not where we would like it to be although we are moving toward compliance with all federal and local requirements such as the American Disabilities Act (ADA). The college is working with security consultants to conduct ethical hacking vulnerability assessment of our network environment. An enterprise anti-virus system is in place to address the large number of spam and to manage and reduce the number of legitimate messages that are either intentionally or inadvertently blocked.

The college has approved new computer standards to promote more user flexibility. There are charters detailing the level of support to be expected and provided; however, service and support expectations vary, often leading to dissatisfied users. Technical support is inadequate and users need to be more computer literate.

Where do we want to be?

Since 2006, GCC will have successfully implemented its target Enterprise Architecture and the Information Technology Strategic Plan. The college will continue to improve on its integrated database and set of applications with the web portal, providing access to students, faculty, staff and the public at anytime from anywhere. Users will have access to the information they need, when they need it, and where they need it. The college will have approved standards for information, databases, hardware, software, security, access, networks, business processes, and all other aspects of the technical and educational environment.

College systems will be secure and comply with all federal and local requirements. There will be adequate bandwidth so that no users or applications are adversely affected by lack of bandwidth. GCC will be less reliant on vendors for changes and enhancements to its systems.

GCC will have defined processes and procedures that are understood and complied with by all its users. Faculty and MIS will have improved communications and negotiate service and support agreements to meet the needs of both constituencies. Standards will be developed, approved and adhered to by all users. All users will sign users' agreements after an initial training and familiarization program. Within the approved standards, EA, and support agreements, faculty will be able to 'experiment' with innovative technology and applications. An MIS help desk will be fully operational.

Faculty, staff and students will be trained on the technology and be proficient at a level appropriate for their job duties or educational needs. For each college position GCC will articulate the required technical skills and levels of proficiency. The college will establish minimum annual training standards and plans for staff for each department.

How do we get there?

GCC will develop and implement an Enterprise Architecture and establish, implement, and enforce policies supporting the EA. The college will continuously assess its progress in implementing the EA. It will also procure a fully integrated information system to meet community, administrative, and educational needs. GCC will obtain additional bandwidth and monitor the need for additional for growth. The college and its users will make more effective use of its bandwidth.

How do we know we did it?

- Percentage of bandwidth used (AP 1.4, 1.5, 1.6)
- Number of stand-alone systems (AP 1.3)
- Number of servers (AP 1.3)
- Number of packets dropped (AP 1.4, 1.5, 1.6)

- Customer satisfaction survey (AP 1.1 – 1.6)
- Number of Work Orders (AP 1.1 – 1.6)
- Number of signed service/support agreements (AP 1.1 – 1.6)
- Number of requests for additional training outside "core" curriculum (AP 1.2)
- Cycle time for closing Work Orders (AP 1.2)

Strategic Goal 2: GCC will develop policies, procedures, and processes to analyze and acquire the components (hardware, software, applications) of the Enterprise Architecture.

GCC needs a formal, structured process for defining user requirements, assessing system capabilities against the requirements, and acquiring the technology that best meets the users' needs. The process would use systems analysis tools and techniques to define needs and/or problems, research options for meeting the needs or solving the problem, develop alternative solutions, test the possible solutions, and select the best solution within budgetary or other constraints. Decisions about technology will be based on reviews of what works and why, and what does not work and why. The technology community will be constantly learning and growing based on its experiences, research, and testing. This approach to acquiring and using technology will ensure GCC makes the best use of its limited resources and technology.

Where are we now?

- Active College Technology Committee (CTC) body that meets regularly
- Bylaws updated and charters finalized
- Completed minimum computer standards to be reviewed every six months
- Integrated database in place
- Campus community is becoming more aware that technology issues and policies must be presented to the CTC
- Adequately trained personnel not in place to support current and future EA
- Highly externally trained MIS, however all skills set levels are outdated in all areas of networking, PC/Macintosh maintenance and repair, systems and network

security, database management systems, and on server-grade and server-based operating system tools and utilities (UNIX, Windows Servers, VMware, etc.)

- College-wide technology literacy proficiency levels need improvement
- Standards and policies in place for information technology products and tools
- Need updated technology user agreement

Where do we want to be?

- College community informed and aware of CTC's role and responsibility
- Standards and policies are in place to address technology products and tool use campus-wide
- Appropriate technology training relative to current and future EA
- Every department establish individual training plans based on institutional needs
- Sufficient personnel to support EA
- Annual technology user-agreement signed

How do we get there?

- Approved and updated charters
- Communicate to campus community via website of CTC's role, responsibilities and accomplishments
- Create and revise current standards and policies to address evolving technological needs
- Assess technology training needs
- Assess technology staffing needs
- Update current technology user agreement and establish annual signing date (post/secondary, employees)

How do we know we did it?

- Effective policies and procedures published (AP 2.1 & 2.4)
- Departmental technology training plan in place (AP 2.4 & 2.5)
- Standards and policies are adhered to (AP 1.2 & 2.4)
- CTC website is updated weekly (AP 2.3)

Created and adopted on 04/12/2006. Subsequent revisions on 09/01/2006, 12/14/2007, 3/18/2009, 11/1/2011 and 2/2/2012.

- Campus-wide technology survey indicates committee awareness (AP 2.3)

Strategic Goal 3: GCC will acquire the funding needed to implement the Enterprise Architecture.

Implementation of the target EA is a long-term effort requiring a significant amount of funding. Once the target EA is defined and approved by the governance process, the governance entity needs to develop a multi-year budget that matches funding needs to the technology needs of the migration path from the existing architecture to the target architecture. To fund these budget needs, GCC will explore all possibilities—lobby the GCC Foundation and Legislature for additional funds, use GCC's 315 acres of land to generate revenue, apply for grants to fund technology enhancements and meet federal and local regulatory requirements, such as the Americans with a Disability Act, and create 'pockets of entrepreneurship' in which specific components of the college provide products and/or services to the public, businesses, and government agencies on a fee basis.

Where are we now?

- Continuous budget challenges
- Assigned resource for generating income to support college upgrades
- Pursuing funding from nontraditional sources for IT capital improvements through public/public partnerships and through grants and donations/contributions from public and private sources
- Funds generated out of CE, our largest pocket of entrepreneurship, go back to support departments needs or fall to the bottom line and help keep up with financial obligations
- We have the technology fee
- We have Memorandum of Understanding (MOU) and Memorandum of Agreement (MOA) with our ISP (reduced fees)
- Incorporating site licenses as opposed to individual licenses
- Develop partnerships with vendors such as Cisco and 3M

Where do we want to be?

- Financially stable
- To be technology leaders with a secure infrastructure
- To plan IT upgrades proactively, not reactively
- To have a stable architecture
- To build trust and confidence with the needs of the "experts"
- Appropriately trained and staffed technology team
- Financially self-sufficient

How do we get there?

- Request additional funding from the legislature
- Continue to aggressively pursue grants
- Build internal relationships that are win-win so trust can be established
- Cross-utilize internal resources for assistance since external consulting is cost-prohibitive
- Include limited IT roles and responsibilities with internal resources to assist with the overall EA
- Develop cost centers for certain programs (e.g., Electronics for repairs and installation, Business (Accounting) for taxes, Automotive for oil changes, tire replacement, Internet Café, Electronic games)
- Establish Kinko-like center
- Have vendors pay college for intern students
- Lobby for taxes to support education

How do we know we did it?

- When users are able to download, install and access needs such as podcasts, movies and programs without interruption (AP 1.4, 1.5, 1.6)
- Through network traffic data collection used by MIS (AP 1.4, 1.5, 1.6)
- When users experience reduced latency with the internet or Banner (AP 1.4, 1.5, 1.6)

- When students, faculty and staff are able to access the system 22/7 as opposed to 24/7 to enable MIS to do backups and technical maintenance (AP 1.4, 1.5, 1.6)
- When upgrades can be made as planned and scheduled and are not delayed until events drive a forced replacement (AP 3.1, 3.5, 3.6)
- Reduce dependency on legislative appropriation (AP 3.2, 3.5, 3.6, 3.7)

Strategic Goal 4: GCC will expand the use of technology in education by the College faculty.

Technology is used in many ways in GCC's educational and business settings. The technology offers many more opportunities than are currently being used, however. GCC needs to challenge its faculty and staff to creatively design their work environments and practices to more fully take advantage of the power and flexibility of the technology. For this expansion of the use of technology to be successful, GCC employees need to be trained and fully proficient with the technology available to them and the educational and business practices that maximize the use of technological tools. GCC will also need to recruit more students to the college and into the technical fields at the College by increasing its marketing efforts, providing more training and certification programs, and offering additional services to local businesses and government agencies. To meet this anticipated demand to recruit more students, GCC is planning to deploy a robust Distance Education (DE) platform and complete a Three-Phase Network Infrastructure upgrade currently underway.

Where are we now?

The faculty is at widely varying levels of using technology in the educational process, they are 'all over the map'. Some instructors are heavily into using technology in the classroom, while others prefer a non-technical classroom environment. Instructors use a variety of products (much of it freeware) obtained on-line. There are no standards for these products or tools used in the classroom.

Many users, when needing assistance, don't know what questions to ask, to find new tools, or to discover what technology can do for them. No list of resources is available to

instructors, staff or administrators. This places the technology staff in a challenging position to balance their limited resources in supporting enterprise-wide, standard infrastructure systems and applications. Assigning limited MIS resources to assist non-standard, non-enterprise classroom applications with no training or familiarity with the functionality is difficult and discouraged.

In July 2010, GCC adopted a Distance Education policy to deliver educational services either through instruction or support services to students who are not physically co-located with the individuals providing the service. The platform GCC currently utilizes to support DE is the Moodle Course Management System, a course management system designed to help educators deliver quality online courses. Moodle is open-source software and is used all over the world by universities, schools, companies and independent teachers. The current technology used varies widely, from computers to multi-media.

Where do we want to be?

Distance Education is a major endeavor and moves GCC into another dimension of providing off-campus student offerings and perhaps, inter-islands offerings. DE can be a convenient, flexible, and effective means of providing education since nearly half of all college students in the country are of the age group once thought of as nontraditional. They are working adults or adults seeking first educational credentials or retraining. Many working adult students with multiple demands on their time find DE to meet their needs better than campus-based education. GCC envisions expanding its current DE offerings and capturing this growing student market.

To support DE, all faculty will be able to put courses on-line with minimal constraints. The faculty will have the knowledge and skills necessary to use technology in the educational process. Instructors will be required to receive proactive 'technology certification'. 'Early adopters' will continue to test new technology and new applications of technology in the classroom. Faculty will be so skilled in using technology in the classroom that they will be able to showcase their application of technology in education at professional conferences and meetings.

The college infrastructure will support the faculty in applying technology in course work and will establish and adopt standards for applying technology in course work. To promote faculty innovation for introducing technology in course work, the college will work with the MIS staff to remove barriers and constraints such as funding, managing expectations for non-standard technology, and limited MIS staff.

How do we get there?

Faculty will be encouraged to try technology in their courses in as many ways as possible. GCC needs to put professional training on technology into individual faculty plans and use it as a component of the performance appraisal process. The MIS staff can identify "power users" in each department to start applying technology in education and help other faculty try using technology in the classroom. GCC needs to provide more training and more "hands-on" support for faculty reluctant to try using technology in their instructional methodology. Each department can be requested to identify specific courses that can be available on-line. Similarly, each department can be asked to identify opportunities to use technology in its curriculum. To support these emerging technologies and provide the path for them to traverse, GCC has in place an existing Three-Phase Network Infrastructure Upgrade project to increase bandwidth. Additionally, to establish a roadmap to achieve a more robust DE offering, a Three-Phase approach is also recommended. The Three-Phase Network and DE strategies are complementary to each other. Any advancement in the Network Infrastructure Improvement project positions GCC to acquire and deploy a far-reaching DE infrastructure.

How do we know we did it?

- Number and percentage of courses using technology (AP 4.1, 4.2, 4.3)
- Number of syllabi integrating technology into course (AP 4.2 & 4.5)
- Number of students enrolling in classes using technology (AP 4.2 & 4.5)
- Number of students enrolled exceeds number of students on campus (others are online)

- Number of instructors using technology in class (AP 4.5)
- Program assessments can be used to encourage use of technology (AP 4.2 & 4.5)
- Provide adequate technology and bandwidth for instructors and classrooms (AP 4.5)

Strategic Goal 5: GCC will enhance the governance process to provide timely and efficient integration of users' needs into decisions on investments in technology.

Governance is the set of rules, processes, and structures by which IT resources are managed. Studies have shown that an effective governance structure is the single most important factor in maximizing the value of IT investments. The governance process covers the creation and implementation of the target enterprise architecture, management of the Information Technology Strategic Plan (ITSP), and decision-making for IT budgets and investments. The governance structure also establishes processes for the entire life-cycle of integrated enterprise projects—project planning, project initiation, project management, configuration management, systems development, systems implementation, maintenance, ongoing enhancements, support, project monitoring and evaluation, project/system termination, and project accountability.

The governance process comprises the information sharing, data collection, stakeholder involvement, agency-wide communication, and decision making activities involved in creating and implementing the target enterprise architecture. The process includes configuration management of the current architecture as it evolves into the target architecture. It requires a continuous dialogue among technology users, GCC stakeholders, and the IT community regarding changes or upgrades in the technology environment. The governance process typically addresses budgeting to meet technology needs, assimilating users' needs, prioritizing needs within budget constraints, making decisions affecting the technology environment and the architecture, and providing oversight for project initiation and implementation.

Where are we now?

Created and adopted on 04/12/2006. Subsequent revisions on 09/01/2006, 12/14/2007, 3/18/2009, 11/1/2011 and 2/2/2012.

The College Technology Committee (CTC) is comprised of representatives from the faculty and the administration. The CTC is an advisory body responsible for making policy recommendations related to technology and technology issues. The CTC reports to the College Governing Council, which makes its recommendations to the College President.

The CTC makes policy recommendations, but the MIS function also has some influence in the decision making process. MIS can disapprove an acquisition by stating the selected technology does not meet the standards or support is not in place. In addition to the CTC, there are also working groups established to address functional and operational issues related to the integrated database management system and website.

Where do we want to be?

The IT governance structure and processes are formalized, recognized, clearly defined, and actively used in the decision-making process for all IT issues. The governance structure manages and directs the Enterprise Architecture, the ITSP, and IT planning, budget, and funding processes. The governance structure also establishes and oversees the processes for the entire life-cycle of integrated enterprise projects—project planning, project initiation, project management, configuration management, systems development, systems implementation, maintenance, ongoing enhancements, support, project monitoring and evaluation, project/system termination, and project accountability.
The governance process will be simplified, responsive, proactive, effective, timely, and results-oriented involving all stakeholders (or representatives of all stakeholders).

How do we get there?

Since 2006, the governance process has continually evolved with organizational changes and policies which impact the IT technological environment. The current governance process is operational, active, systemic, and constantly monitors organizational dynamics for process improvement and decision-making. The various groups within GCC's governance structure have active charters, membership, and authority to execute their assigned roles and responsibilities. As the governance structure and process continually

matures, the college can respond and adjust as needed to transition and support to its desired future state. All paths to the desired future state converge and go through the CTC. The CTC will monitor and advise on the strategic direction and status of GCC's ITSP transition plans.

How do we know we did it?

- Number of technical issues identified needing policies (AP 5.3)
- Percentage of these issues for which the CTC issues policies (AP 5.3)
- All department charters signed, approved (rules of engagement) (AP 5.2)
- CTC recommendations are perceived in high regard (AP 5.1)

Strategic Goal 6: GCC will build partnerships with external business and government organizations to expand business, educational, and funding opportunities.

To expand its technology opportunities, GCC needs to build strong partnerships with business, government agencies, and the local community. As with all partnerships, these arrangements would provide benefits to both partners. GCC would benefit by obtaining additional technology, funding, students, teachers, and opportunities for its graduates. The business and government partners would receive well-trained and/or certified graduates as potential employees, access to the skills of the GCC faculty and staff, and facilities to prototype and test their technology before acquisition or implementation.

Where are we now?

- Partnership with FAA for student interns leading to fulltime employment
- Partnerships with online testing organizations such as PAN, HOST, PROMETRIC, and Pearson Vue.
- Good relationship with employers, DOL, AHRD, and GCA Trades Academy
- Partnership with MCV for internet bandwidth resource
- Training activities with NCTAMS and Andersen AFB Communications Unit.
- Active Advisory Committees

- On-going direct relationships with construction companies with highly technical training requirements

Where do we want to be?

- Continue to improve current partnerships
- Number one training facility on Guam for Government of Guam, federal government, private, and military sectors
- Expand partnerships on Guam and in the regions
- Establish partnerships that will provide for research, development, and testing of new technology
- Increase more national certificate testing opportunities and certification courses

How do we get there?

- Utilize the Office of Development and Alumni Relations and Continuing Education to assist with outreach efforts
- Encourage Departments to become more entrepreneurial
- Encourage diverse memberships on advisory committees representative of local businesses and needs on Guam
- Increase publicity so the community is truly aware of what GCC is doing and is capable of doing

How do we know we did it?

- Increased number of partners
- Greater number of testing options
- Use advisory committee comments to generate course and/or program changes

6. Transition Plans

The Guam Community College Enterprise Architecture (GCC EA) is the highest level planning and objectives document. It communicates the current situation and also the desired vision of the future. The Information Technology Strategic Plan (ITSP) will address specific challenges and objectives spelled out in, or derived from, the GCC EA. It then assigns each approved initiative to a project manager who creates a project plan, acquires the necessary stakeholder support, resources, and establishes a time frame for completion.

What is needed at this point is to identify those parts of the current architecture which are the most critical to the college. These should be addressed first by the ITSP. In this way, from the GCC EA to ITSP, to individual project plans, GCC will integrate into its planning, funding, acquisition and implementation processes to transition its' IT environment from the present to the future.

The Transition Plans are presented in a rough order of priority. Those listed first have the highest probability of saving staff hours and/or improving GCC efficiency. The CTC will decide on the final disposition of each and make recommendations through the Faculty Senate to senior management.

Transition Plan 0 – CTC:

1. CTC meets with the Faculty Senate to present its charter. Gains approval.
2. CTC updates and presents MIS, ED, Academic Technology Departments (CSD, Electronics, etc) and ADMIN charters to Faculty Senate for approval.
3. CTC presents an overview of the IT Strategic Plan and Enterprise Architecture to the Faculty Senate.
4. CTC gains approval from the Faculty Senate for the Transition Plans, as appropriate.

Transition Plan 1 – GENERAL:

1. Identify all current projects.
2. Suspend work on those projects that are not yet financially obligated or committed.
3. Ascertain the goal of all the projects and the architecture and standards being used.
4. Re-instate all projects in alignment with the GCC EA.
5. Determine the best course of action for all projects in conflict with the GCC EA.
6. Review, validate, prioritize, and select desired projects in the GCC EA "One to Five Year Initiatives" section.
7. Submit selected projects into GCC's out-year budgeting and funding process.
8. Develop DE implementation plan and targeted milestones.
9. Perform DE applications market analysis to select DE application best suited for GCC's needs.
10. Develop DE hardware acquisition plan to support selected DE application.
11. Submit DE hardware acquisition costs into GCC's out-year budgeting and funding process.
12. Develop DE functional training requirements based on selected DE application.
13. Submit training requirements into GCC's out-year budgeting and funding process.

Transition Plan 2 – SUNGARD: Done, but continuously patched and upgraded when de-supported or when required.

1. Train the staff to be able to do this type of work.
2. Establish SUNGARD project team, project plan, quality plan and other documents.
3. Implement the SUNGARD system.
4. Determine the business functions each tool performed.
5. Determine whether SUNGARD provides this function automatically or the capability to add it to SUNGARD functionality.
6. Incorporate the business function into SUNGARD.

Transition Plan 3 – NETWORK:

1. Complete Phase 3 of the Network Improvement Project
2. Plan and integrate Distance Education network improvements with Phase 3
3. Train the staff to be able to do this type of work and/or contract for services.
4. CTC will review the policies, procedures, and practices surrounding the current network, its topology, traffic volumes, and monitoring capabilities.
5. MIS creates a new Network Requirements Definition document defining a double-ring topology with three high-speed internet connections and load balancing software, plus other pertinent design features.
6. Conduct a Technical Options Study on the feasibility and opportunities of implementing the new network.
7. Report findings to the CTC for further action.
8. CTC recommends to senior management the creation of a project to procure and implement the Network Requirements Definition.
9. CTC selects a project manager who creates a project team, project plan and schedule, quality plan, product selection criteria.

Transition Plan 4 – IMAGING:

1. Train the data staff to be able to do this type of work and/or contract for services.
2. CTC will review the policies, procedures, and practices surrounding PC imaging.
3. CTC creates a new PC Imaging Requirements Definition document.
4. Conduct a Technical Options Study on the feasibility and opportunities of automating any and all Imaging requirements and activities.
5. Report findings to the CTC for further action.
6. CTC recommends to senior management the creation of a project to implement the PC Imaging Requirements Definition.
7. CTC selects a project manager who creates a project team, project plan and schedule, quality plan, product selection criteria.

Transition Plan 5 – EMAIL ADMIN: Done and ongoing.

1. Train the data staff to be able to do this type of work and/or contract for services.

2. CTC will review the policies, procedures, and practices surrounding Email Administration.
3. CTC creates a new Email Admin Requirements Definition document.
4. Conduct a Technical Options Study on the feasibility and opportunities of automating any and all Email Admin requirements and activities.
5. Report findings to the CTC for further action.
6. CTC recommends to senior management the creation of a project to implement the Email Admin Requirements Definition.
7. CTC selects a project manager who creates a project team, project plan and schedule, quality plan, and product selection criteria.

Transition Plan 6 – STUDENT LOGINS:

1. Train the data staff to be able to do this type of work and/or contract for services.
2. CTC will review the policies, procedures, and practices surrounding Student Logins.
3. CTC creates a new Student Logins Requirements Definition document.
4. Conduct a Technical Options Study on the feasibility and opportunities of automating any and all Student Login requirements and activities.
5. Report findings to the CTC for further action.
6. CTC recommends to senior management the creation of a project to implement the Student Logins Requirements Definition.
7. CTC selects a project manager who creates a project team, project plan and schedule, quality plan, and product selection criteria.

Transition Plan 7 – IT SKILLS TRAINING:

1. CTC identifies the new or enhanced skills needed to implement the EA.
2. CTC reviews the current skills matrix against the new skills.
3. CTC tasks each organization to create individual training plans for the acquisition of these new skills.
4. CTC creates a master IT Skills Training Plan.

5. CTC recommends to senior management that training funds be provided in accordance with the master IT Skills Training Plan.
6. CTC administers and monitors each organization's compliance with the master IT Skills Training Plan.

Transition Plan 8 – RECORDS MANAGEMENT:

1. Train the data staff to be able to do this type of work and/or contract for services.
2. Identify all paper forms currently in use.
3. Identify all other documents received and stored.
4. Determine which paper forms could be replaced with an online data entry form within SUNGARD.
5. Report findings to the CTC for further action.
6. Establish a project to permanently replace these paper forms with online data entry forms.
7. Determine which documents must be stored in their original paper form for legal reasons.
8. Establish a project to design and build an electronic documents storing solution that will allow paper documents to be scanned into electronic format and stored on a computer.
9. Establish cataloging and storage requirements and procedures for those documents which are not allowed to be stored electronically.
10. Scan and store all documents.
11. Destroy all paper documents that are not legally required to be kept.

7. Information Technology or Instructional Technology

Although the title and the use of the word technology in this plan is referring to information technology (IT), it does not address the other type of IT which is instructional technology. The college must be made aware that there are primarily two main types of technology (IT) in use here at GCC and should be addressed and perhaps merge with this ITSP document and change the title to simply be called the Institutional Technology Strategic Plan (ITSP):

1) Information Technology (IT)

a. The acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunications.

Source: http://en.wikipedia.org/wiki/Information_technology#cite_note-0

b. MIS is primarily in charge of Information Technology

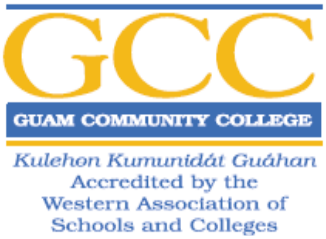
2) Instructional Technology (IT)

a. In education, instructional technology is "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning," according to the Association for Educational Communications and Technology (AECT) Definitions and Terminology Committee.

Source: http://en.wikipedia.org/wiki/Instructional_technology#cite_note-0

b. Different departments or programs here at the college use different types of Instructional Technology (Examples: Automotive Technology, Office Technology, Construction Technology, Fire Science Technology, Civil Engineering Technology, Diesel Technology, Surveying Technology, Waterworks/Wastewater Technology, etc.)

GUAM COMMUNITY COLLEGE



ENTERPRISE ARCHITECTURE

(GCC EA)

Version 2.0

November 1, 2011

TABLE OF CONTENTS

[a1]DOCUMENT REVISION HISTORY

Version Number	Change Description	Date of Change/Update	Date Inserted
1.0	First Edition	September 1, 2006	September 1, 2006
2.0	Second Edition	November 1, 2011	

GUAM COMMUNITY COLLEGE
VISION AND MISSION STATEMENTS

GCC Vision Statement

Guam Community College will be the leader in the Pacific region in the application of technology. The college will anticipate the needs of the local and regional community and provide training and certification to deliver and develop workforce skills. GCC will have a unified enterprise architecture encompassing various platforms and infrastructure.

GCC Mission Statement

The mission of Guam Community College is to be a leader in career and technical workforce development by providing the highest quality education and job training in Micronesia.

Sinangan Misión

I misión i Kulehon Kumunidå't Guåhan, guiya i gé'hilo' i fina'che'cho' siha yan I kinahulo' i mamfáfa'che'cho' ya u na'guáguåha nu i manákhilo' yan manmaolek na tiningo' yan fina'nå'guen cho'cho' siha gi iya Maikronisiha.

Introduction

Guam Community College (GCC) is located on a 40-acre campus in Mangilao, Guam and offers 17 Certificate programs and 20 Associate Degree programs, and over 50 trades in the Apprenticeship Training Program. Since the last accreditation visit in 2006, GCC has added several new programs either through re-institution of archived curriculum or through substantive change. These include Certificate and AS in Emergency Management, Certificate in Medium/Heavy Truck Diesel Technology, Certificate and AS in Surveying Technology, AS in Pre-Architectural Drafting, Certificate in Computer Aided Design and Drafting, Certificate in Pre-Nursing, AS in Civil Engineering Technology and two new concentrations in AS Criminal Justice: Forensic Lab Technician and Forensic Computer Examiner.

The College was created by the Community College Act of 1977 (Public Law 14-77) with a four-fold purpose: (1) to consolidate and strengthen many of the existing manpower training programs administered by the government of Guam under one governing board; (2) to expand and strengthen career education within the territory; (3) to expand short-term and extension programs in skill training; and (4) to strengthen the formal secondary and post-secondary education program in the vocational-technical fields. With a strong presence in the five public high schools offering ten career and technical education programs, the College also operates postsecondary career and technical education programs, adult and continuing education, community education, and short-term, specialized training. These programs are delivered both on and off campus, in satellite programs, and at businesses locations as needed. The College also serves as the State Agency for Career and Technical Education, and provides instructional support to the Apprenticeship Training Program of the US Department of Labor. Likewise, the College offers a variety of community service and special programs to prepare students for college experiences including English-as-a-Second Language, Adult Basic Education, General Education Development (GED) preparation and testing, and an Adult High School Diploma program. Though all these program initiatives are delivered within the Mangilao campus, the College also owns 314 acres of land in a nearby location, and is presently finalizing plans to develop the property, which will generate renewable sources of energy in partnership with another government entity.

In September 2006, GCC completed Version 1 of its Enterprise Architecture (EA) document, since then, GCC has invested millions of dollars in capital improvement facilities and has seen student enrollment increase three years in a row with 2011 being an all-time high with 2,536 students registering for the Fall semester. This is the highest student enrollment in the school's 34-year history. With new campus facilities and an increasing student enrollment trend, GCC's technology demand to deliver courses and support business operational systems will increase exponentially and drive the need for a more systemic and strategic approach in technology planning to accomplish its mission of "providing the highest quality education and job training in Micronesia."

See Appendix A – GCC Organizational Chart.

EA PURPOSE

The purpose of the EA sets the roadmap for documenting all aspects of the organization to ensure services, processes, applications, information, data, technology, locations, people, events and timelines are all aligned with the college's strategic goals and objectives reflected in the GCC Institutional Strategic Master Plan (ISMP[1]).

The EA is foremost, an agreed to definition of what GCC's information technology (IT) environment will look like, and is agreed upon by all GCC departments and governing bodies. Information technology architecture and a related set of standards are necessary to ensure the compatibility of the current IT environment with all future IT initiatives. For the purpose of this document, IT includes instructional technology whenever it is incorporated into the enterprise architectural environment.

This technology will encompass all of GCC's Information (data, records, documents, etc.), Equipment (computers, networks, cameras, etc.), Applications (operating systems, software, etc.), Support (staffing, skills training, service, etc.) and Management (command, control, and communication). The EA defines the technology environment, for today and for the next 5 to 10 years in support of student learning outcomes.

The EA is not a static document, but in fact, is a living document that should be reviewed periodically and updated as needed to meet changing organizational goals and objectives, policies, evolving technology, changing business processes, and growth and expansion of GCC's student population.

The EA provides a blueprint for the deployment of new information technology all of which must fit within the architecture and the standards.

- The architecture is a description of GCC data and applications as well as the technical environment required to run them, including hardware, supporting software, and networks.
- The standards are prescribed means of doing data modeling, programming, project management, system engineering and testing, documentation, and training.

To realize benefits from GCC's EA, the internal governance structure must use the EA in setting college priorities, technology planning, developing budget forecasts, securing funding, and is in alignment with the college's Vision and Mission statements.

ORGANIZATIONAL GOVERNANCE

GCC established a governance structure which incorporates numerous constituent-based advisory committees, a central Faculty Senate, and a College Governing Council (CGC) that

[1] GCC Institutional Strategic Master Plan (2009-2014)

advises the college president. Within this management framework, a College Technological Committee (CTC) representing a cross-section of GCC's academic, business, administrative, and MIS support stakeholders was formed. The CTC derives its authority and responsibility from GCC's Article XII, Participatory Governance. Committee members are appointed in writing by GCC's President and each member serves no less than three years on the committee. Responsibilities of the CTC include setting the strategic roadmap for IT standards and processes. The committee maintains currency in computer technology and academic applications of computer technology for both students and faculty and also addresses technology planning and distance education needs. The committee recommends action plans to support technology needs and technology users of the college in promoting student learning outcomes. The CTC chair is elected by the committee members and the composition of the committee consists of two post-secondary instructional faculty, a non-instructional faculty and a secondary faculty. If needed, a non-secondary faculty may represent the interests of the secondary faculty. GCC has vested the CTC with responsibility for all IT matters and is designed to serve as the college's primary means of discovering, evaluating, planning, and implementing new and enhanced information technology (IT) tools and solutions. Faculty Senate approved CTC recommendations are presented to the College Governing Council. The Council passes the recommendation to the college president for final disposition. This governance structure is a positive step toward GCC pursuing future organizational certifications and standards and enhances collaboration across all organizational lines.

See Appendix B – Article VII Participatory Governance

EA OBJECTIVES

The overall objective of the enterprise architecture is to promote the values and provide the benefits inherent in a single, cooperatively defined, information technology architectural standard. It is not the intention of the enterprise architecture to impose restrictions. Rather, it is the stated objective to serve the needs of all students, of each participating department, and of all employees. It is believed that enterprise architecture is the best way to leverage scarce information technology resources for the greater good. It is also believed that the efficiencies and cost savings inherent in such enterprise architecture will ensure that all stakeholders will continue to enjoy the benefits of staying abreast of the latest developments in information technology.

EA SCOPE

The intent of this document is to define the terms, enumerate the current state and status of all IT assets such as data, application, technological, and staffing, and to propose a preferred future state for each. The future state of the GCC EA will one day be the current enterprise architectural environment. As that happens, the GCC EA must be revised to consider emerging technologies, college policy changes, student trending populations, and other internal and

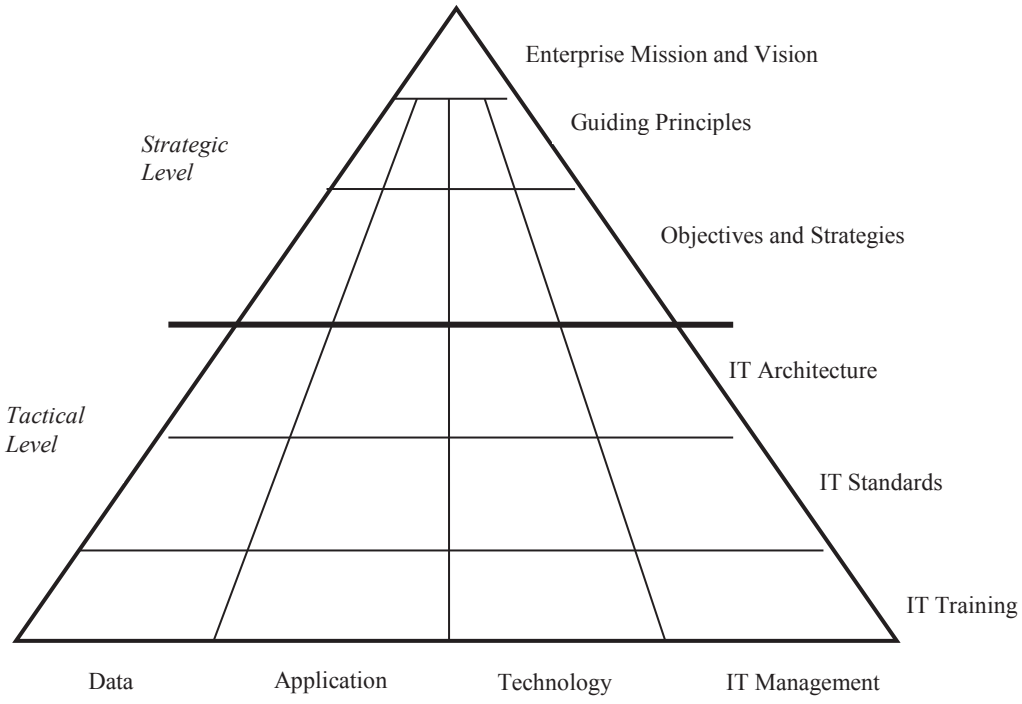
external variables to remain and in continuous alignment with the college's Integrated Strategic Management Plan (ISMP).

The EA is not intended to provide detailed product or configuration information, cost estimates, staffing requirements, project plans, or projected timelines. However, the EA is the basis for the development of all of these follow-on deliverables. The scope of the EA includes all GCC's IT systems regardless of location.

EA METHODOLOGY

The Enterprise Architecture Methodology is pictured in the figure below. The methodology is to divide the EA into two levels: strategic and tactical. Both levels are contained in this document. The strategic level starts with an Enterprise Vision and then explains the general Guiding Principles, Objectives, and Strategies. The tactical level drills down into the specifics of the current architectural environment and proposes the future environment.

The detailed current and future architecture is divided into four aspects: Data, Application, Technology, and IT Management. These, in turn, are addressed by three separate disciplines: IT Architecture, IT Standards, and IT Training. The detailed future vision of the enterprise architecture is articulated in each of the cells created by the matrix. All of these details are contained in this document.



The pyramid is a top-down view of the decomposition of the architecture starting from the Enterprise Mission and Vision.

GUAM COMMUNITY COLLEGE EA GUIDING PRINCIPLES

GENERAL OVERVIEW

Architecture principles are a foundation for the development of enterprise architecture (EA). The architecture principles define the spirit of the EA in that they are an attempt to capture the thinking behind it. Principles have a timeless quality because they define a value system. While methodologies and technology frequently change, organizational values and culture as a rule do not.

GUIDING PRINCIPLES

GCC's overriding EA guiding principle and shared value is unity - Unity of vision, purpose, and practice.

A guiding principle is to avoid the use of custom built software. The most common type of custom-built software is something that bridges data between two databases or applications. While the initial interface is perhaps easy enough to create, it must have been built with the highest standards for design, documentation, and testing. GCC will own the software and have to maintain it with its own or contracted resources. Such interfaces invariably need change overtime, thus the importance of having them well documented. Whenever either side of the interface changes, whenever a change is made to either database, the interface must change also. It is highly preferable to procure systems that support the other systems already present in the architecture.

ENTERPRISE GUIDING PRINCIPLES

1. Promote a holistic or "college-wide" approach while respecting the unique roles within the institution.

   Rationale
   - To promote a holistic approach will assist all by promoting trust and cooperation throughout the extended enterprise.
   - To reduce redundancy and associated complexity
   - To design IT infrastructure with a "college-wide" approach, making its adaptation to facilitate changing business processes easier and quicker.

   Implications
   - Must spend a little more initially to obtain long-term goals, at an overall cost savings.
   - Consistency will make things work better together and ease integration.
   - Must accept that decisions could take longer to make, and solutions could require more time to implement.

- Divisions and departments must occasionally concede their own preferences for the greater benefit of the entire college. Trust will be critical to success.
- A holistic approach will assist all by promoting trust and cooperation throughout the extended enterprise.
- Must ensure the participation, input, and feedback from all levels of the college within the extended enterprise.

2. Business requirements and processes (administrative and academic) must drive the development, adoption, and acceptance of the EA.

   Context
   To ensure the viability of the EA, the EA must accommodate the perspectives of all IT stakeholders (to include but not limited to students, staff, administrators and faculty).

   Rationale
   - To improve productivity, student outcomes and business processes through the combined perspective of an IT system
   - To promote the change of business and instructional processes, in relation to a new technology
   - To avoid the costs of implementing technology for technology's sake.

   Implications
   - Requires good communication between business, academic, and IT professionals.
   - Must interact frequently and at multiple levels throughout the institution.
   - IT investments will be student-focused and aligned with enterprise/business strategic goals.

3. IT systems should be designed for adaptability and flexibility, so they can be responsive to changes arising from curricular requirements, business processes, community needs, accreditation requirements or legislation.

   Rationale
   - To enable the infrastructure to support the changes that often occur in business and academic processes within the enterprise
   - To make the infrastructure more adaptable to IT changes and IT market forces
   - To enable business and academic process improvement
   - To make integration of systems easier, and faster, with less process overhaul
   - To enable systems to evolve to meet business and academic needs/changes

Implications

- Systems may initially require more time to design and more systemic thinking as transactions cross traditional system boundaries
- Must expect higher initial costs, but less costly integration
- System will have a longer life-cycle; therefore, a higher system return on investment
- A system could be sub-optimal in the short term in order to gain long-term optimization
- Must define performance metrics for flexibility and adaptability

Challenges

- The CTC does not convene during the summer months which make collaborative decision-making difficult and non-responsive.

4. To ensure fiscal responsibility with respect to information technology (IT), the college will adopt a formal investment strategy for IT acquisitions.

Context

This investment strategy will clearly articulate the expected life of an IT system. It will consider all phases of an IT system life cycle, including acquisition, support, benefits and associated costs for GCC stakeholders, the diverse communities of Guam, Micronesia, and the Asia-Pacific Rim.

Rationale

- To lead to higher quality solutions
- To enable improved planning and budget decision-making
- To lead to realistic budgeting
- To lead to appropriate system quality decisions (right-sizing)

Implications

- Requires the development of a formalized investment strategy.
- Requires an annual budget, and capital finance planning, processes, and procedures that quantify, audit, and monitor IT allocations and expenditures at the college.
- Must consider what will be the actual lifetime of the system.
- Must create methods for linking IT investments to business and academic needs and aligning with the college's strategic goals.
- Must create methods for linking the IT investment to the strategic planning process.
- Requires more planning and resources to do a formalized investment process.
- Must change the business and academic view of technology to include IT investment strategies.

5. Convergence towards the EA will be encouraged with timing consistent with investment strategy for the enterprise.

   Context
   Convergence towards the EA will take place as new applications are built, technologies are deployed, and old systems are refreshed or retired. Exceptions to the EA may be endorsed in specific cases, where the benefits of consensus for a specific technology solution outweigh the adoption of the EA.

   Rationale
   - For EA to be adaptive and to be able to evolve to accommodate changes in business, academic and technology requirements
   - To avoid abrupt and reactionary conversions, which are very expensive
   - Convergence over time preserves investment while promoting the benefits of the EA.

   Implications
   - Delayed convergence can reduce the benefits of the EA.
   - Requires a realistic and attainable approach to migration to the EA.
   - Requires an explicit transition strategy for existing systems once a target technology is identified.
   - Allows for premature termination of a system, where it makes sense.
   - Does not allow for waiting forever.
   - Requires a business case for exceptions, an exception process, and an exit strategy.
   - Must define temporary or permanent exceptions, and exit strategies for temporary exceptions.
   - Requires funding to get out of obsolete technology.

6. The EA may identify more than one target technology solution, as a single solution may not be applicable or feasible in all situations. When more than one target technology solution is endorsed by the EA, one bundled solution or program should be designated as the primary target for convergence.

   Context
   The EA should reflect the desire to achieve convergence within the college. However, there may be limitations towards convergence of a single solution. Alternatives may be necessary to meet business and academic needs. Therefore, endorsing primary and secondary technology choices may be necessary to fulfill the need.

   Exceptions to the EA may be endorsed in specific cases, where the benefits of consensus for a specific technology solution outweigh the adoption of the EA. In some cases, a lighter-weight solution may be a primary solution, preferable to an alternative, more robust solution.

Rationale

- To reduce technology solutions from many to two or significantly fewer, when a single solution is not feasible
- To avoid forcing higher cost when one size does not fit all
- To reduce complexity but fulfill a business or academic need by using primary and secondary solutions

Implications

- Requires the development of impartial rules and decision criteria to distinguish when unique requirements should take precedence over the college-wide approach.
- Must recognize that it is generally more costly to support two systems rather than one.
- Must recognize that designing a repeatable methodology for endorsing primary and secondary technologies may be difficult.
- Must recognize that migration strategies are more complex when primary and secondary technology choices exist.
- Must focus investment on primary technology choices.
- Need to address the impact to the business, academic and IT areas.

MANAGEMENT AND ORGANIZATION PRINCIPLES

1. The management of the EA will be open and transparent to all stakeholders within the enterprise.

   Context
   The College Technological Committee (CTC) is a vital and important component in the development and management of the EA. Communication needs to be open, honest, frequent, and bi-directional between stakeholders and CTC.

   Rationale

   - To engender trust between all parties
   - To encourage buy-in from the stakeholders, resulting in faster and more complete adoption of the EA

   Implications

   - Must have buy-in and support from the College Governing Council and from the established working groups and technology domains chartered by CTC
   - Requires a communication plan that must be followed
   - Open review periods will be built into the EA processes

2. The processes for selecting technology must be open and transparent.

   Context
   IT technology decisions must consider input from stakeholders and be open, transparent, and well documented. This requires allowing time for necessary consideration of issues by

stakeholders, technical staff, and management. Once a decision has been reached, unnecessary, unproductive debate should not continue.

Rationale

- To lead to decisions being made in an open manner that will stand up to later scrutiny and audit
- To allow stakeholders and technical staff sufficient opportunity to identify important information regarding potential technology investments
- To ensure that decisions are made according to appropriate investment strategies
- To encourage the necessary analysis of issues without becoming bogged down in details
- To avoid unproductive heckling and back-biting after decisions are made
- To avoid playing favorites with particular vendors or technologies
- To promote a healthy IT culture where the best overall solutions are identified and implemented

Implications

- Decisions must employ and be guided by EA principles
- Decision-making processes must allow ample time and opportunity for productive debate
- Decisions must be well documented so that all parties know when the time for debate has ended

3. Promote formal methods of IT systems engineering.

Context

Systems engineering includes all aspects of IT - application projects, infrastructure projects, and hardware projects. However, GCC's current MIS staff and capabilities defer IT systems engineering to industry. Systems analysis and design activities are developed through out-sourcing. GCC will require vendors to utilize an industry-standard, Systems Life Cycle (SLC) or Systems Development Life Cycle (SDLC) methodology by which systems being developed for GCC can be monitored, tracked and measured.

Rationale

- To lead to measurement points that, in turn, lead to benchmarks
- To enable improved quality assurance
- To enable repeatability and consistency
- To lead to right-sizing

Implications

- Must minimize impacts upon the college
- Must agree on system engineering practices and methods
- Must identify the formal methods for particular areas of technology
- Must follow up for quality assurance
- Must confirm that ROI is what was expected
- Must use a disciplined, repeatable approach to development

- Need a resource that will identify and document principles
- CTC must develop the formal processes

4. As new contracts and outsourcing agreements are established, these contracts and agreements will reflect and incorporate EA principles.

   Context
   This is one of the mechanisms by which we keep EA aligned with operations. Outsourced work should not lead to exceptions to the EA just because they are outsourced. The EA should drive the standards expected in an outsourced effort. The EA is a living-document and should be updated on a recurring basis. As industry and technologies evolve, the EA should be updated to reflect current industry standards and hold true to its principles.

   Rationale
   - To be successful, the EA must be integrated with all facets of IT system design, planning, and acquisition.

   Implications
   - Requires EA training for non-IT professionals in areas such as procurement.
   - Need partnerships and good communications between program areas, procurement, contract management, and IT departments to obtain the benefits of EA.
   - Must include EA-based requirements when IT procurements are part of non-IT contracts.
   - Must change the view of institutional investments to include IT requirements.
   - Must audit IT procurements and provide feedback mechanisms for EA.
   - Must include EA-based requirements in procurement documents and contracts.

5. The success of the EA will depend upon consensus and trust among the stakeholders within the enterprise.

   Rationale
   - To have a balance: divisions must be ready to act unselfishly, and the enterprise must mitigate the burdens that solutions impose on divisions.
   - To be fair: divisions that bear the costs for major initiatives that benefit the enterprise ought to be compensated in some manner.

- **Implications**
- Achieving consensus will require collaboration to satisfy stakeholders when they are negatively affected by the implementation of the EA for the greater good of the enterprise.
- Must identify what the compensation will be, and how it will be funded and factored into the total cost of the project.
- Must manage costs and benefits so that overall equity is achieved across the enterprise.
- The return on investment (ROI) for each project must identify its costs and savings.

6. The EA will promote technology equalization among stakeholders, as not all entities within the enterprise are funded at the same level.

   Rationale
   - Information technology automation often reduces program costs and provides rapid service delivery mechanisms; however, not all new programs have adequate funding for information technology
   - When collaboratively constructed to reflect the vision and mission of the institution, project and programs in support of GCC's IT infrastructure are justified for the purpose of seeking funding and support

   Implications
   - Must develop funding mechanisms to support this type of initiative
   - Must develop processes to promote cross-division sharing of technical expertise
   - Must perform gap analysis to find opportunities for technology equalization

7. Training programs and consulting services must be provided to stakeholders to promote convergence and the effective application of the EA

   Context
   Consulting services may take the form of mentoring staff, assisting project teams in defining their business/academic and technical requirements; providing project management guidance; and providing procurement, acquisition, or contract/vendor management support.

   Rationale
   - A well-trained organization is critical to the success of the EA
   - Every effort should be made to ensure technology training is provided to maintain and support GCC's ever-growing and more complex IT environment
   - Training and an internal outreach campaign to promote GCC's EA and its purpose will make for more informed long-term IT decisions
   - Train and promote the EA as a roadmap

   Implications
   - Requires the development of a comprehensive training program
   - Must foster mentoring
   - Must identify how training and consulting will be funded and managed

8. The EA should encourage professional development for permanent, full-time equivalent, (FTE) staff.

Rationale

- Staff is our greatest resource
- To reduce dependence upon long-term contracted staff

Implications

- Must ensure that funding designated for technical training is not eliminated in times of fiscal crisis
- Must include professional development plans in annual performance reviews
- Must make a commitment to staff to provide opportunities for professional growth
- Must ensure access to cost-competitive training alternatives
- Must ensure that succession and knowledge transfer plans are developed and implemented for both permanent and contract staff
- Must have greater opportunities for combined training

TECHNOLOGY PRINCIPLES

1. EA technology choices will be based on criteria including extensibility, interoperability, flexibility, adaptability, portability, and appropriate scalability.

Context

The principle applies to how GCC selects a target technology for the EA.

Rationale

- To more quickly adapt to changing business and academic requirements
- EA technology choices will promote the integration of technologies based upon interfaces that utilize open standards where available

Implications

- Criteria for the selection of EA target technologies will require evaluation with respect to extensibility, interoperability, flexibility, adaptability, portability, and scalability.
- EA technology selections must balance division versus enterprise interests and needs

2. Reduce complexity and enable integration as much as possible to realize business process improvements within the enterprise.

Context

Customization taken too far increases cost and reduces adaptability.

Rationale

- Complex application systems with many data and transactional functions are difficult to manage, making change risky
- To avoid dependency failures resulting from applications that are tightly coupled

- To implement applications that are accessible, perform well, and account for network and other dependencies

Implications

- Must promote and facilitate component-based applications
- Must keep to a minimum the number of vendors, products, and configurations, allowing for maximum flexibility in implementing changes
- Must avoid overly complex configurations of components and discourage undue custom tuning, or customization of hardware and software based on transient, local, or other conditions
- Must maintain configuration discipline, sacrificing performance and functionality in some instances.
- Must account for resource constraints

3. Support pervasive standards and technologies under appropriate conditions.

Context

Using pervasive standards makes sense if:

- Reliance upon a single vendor is proactively managed
- Market forces are considered
- Cost of a pervasive proprietary standard is balanced with the cost to migrate to an open standard in the future
- The cost to migrate to interfaces that employ open standards is considered

Rationale

- To avoid dependence on weak or under-performing vendors
- To allow the enterprise to influence and stay current with industry standards and trends
- To encourage flexibility and adaptability in product replacement
- To avoid dependence on proprietary standards that become isolated

Implications

- Must establish criteria to identify weak or under-performing vendors and products.
- Must assess the architectural fit of proposed solutions.
- Modify work practices and business workflow to increase standards compliance.
- Must manage dependencies on proprietary vendor technologies.

4. In order to maximize integration throughout the enterprise, systems should incorporate standards that promote system interoperability.

Context

Where applicable, incorporate best practices based upon open standards, best practices from like organizations, or pervasive standards based upon a vendor's or provider’s market position.

Rationale

- To have systems that include application interfaces based upon open standards
- To promote application module reuse
- To support leveraging innovations developed by other enterprise entities

Implications

- To avoid reinventing the wheel, must research what is currently within the marketplace and how others approach similar business issues.
- Must define what we consider to be an open standard application interface.
- Must be careful not to constrain innovation.
- Must have a component repository in order to identify opportunities for application module reuse.
- Must look for alternative funding sources that will foster innovation.
- Must write modules that are reusable.

5. Use open source where a sound decision model and investment strategy is present.

Rationale

- Open source is a viable alternative to commercial, off-the-shelf technology products and should be considered when making a technology selection.
- Open source applications can provide innovations that are not available in the commercial marketplace.

Implications

- Training and documentation may be limited, thereby increasing costs.
- Product technical support may be limited, thereby increasing costs.
- Must consider whether the migration cost might be high even though initial costs might be low.
- Must consider how well supported a solution is in the industry.

6. Approach the development of systems from a cross-functional, horizontal institutional perspective and implement systems in such a way that promotes technology reuse.

Rationale

- If institutional services are thought of at a higher level, systems can be designed with reduced complexity and designed to promote technology reuse
- To achieve high-efficiency development and to lower costs of support, training, and testing through the creation and reuse of standard elements

Implications

- Requires a different level of abstraction than what government traditionally uses
- Might run into "turf" issues
- Might find difficulty funding something from a functional rather than an agency perspective
- Implementation requires a high degree of communication and integration across the enterprise
- Must create incentives for participation in the component repository
- Must make contributions to and use of the component repository easy

APPLICATION DELIVERY PRINCIPLES

1. Promote application consolidation, standardization, and integration where significant benefits can be realized through the sharing and reuse of data, information, and applications.

Rationale

- To avoid the creation of additional silos of data and applications.
- To avoid redundant efforts within the enterprise.

Implications

- Requires communication and knowledge of activities within the enterprise.
- Requires a shared application portfolio.
- Requires a component repository.

2. Embrace a formal methodology for IT portfolio management within the enterprise.

   Context
   IT portfolio management comprises a number of sub-disciplines, including IT asset management (ITAM), application portfolio management (APM), project portfolio management (PPM) and application component management.

   Rationale
   - To have an accurate inventory of systems applications and data within the enterprise
   - To identify opportunities for sharing and reuse
   - To strengthen management of IT investments

   Implications
   - Must view IT portfolio horizontally and vertically for opportunities

3. The goal for the design and implementation of systems should be of adequate technical quality to meet the business and academic requirements, and not excessively more.

   Context
   Systems should be designed and implemented to be good enough to meet the need, without superfluous features and capabilities, lest more effort be spent on the extra functionality than was required for the necessary functionality. Systems should be designed with sufficient foresight into future use of the system so as to provide adequate flexibility and adaptability to changes.

   Rationale
   - To avoid unjustified complexity and cost

   Implications
   - Must determine how to know when a system is good enough.
   - May require business process reengineering.
   - Requires scope management.
   - Must develop a good business case before designing a system.

USER INTERFACE PRINCIPLES

1. The enterprise information technology systems must be accessible to all GCC constituencies.

   Rationale
   - The enterprise entities have a responsibility to provide services to all users and address their specific access requirements.
   - To be responsive to the increasing diversity of the college.

Implications

- Must pursue "universal design" within the context of technology, which includes the design of products, systems, processes, and environments.
- Services must be widely accessible without being cost-prohibitive.
- Must comply as necessary with Section 508 of the Americans with Disabilities Act (ADA).

2. Support appropriate client delivery channel preferences for accessing enterprise services.

Context

Systems must be designed with the knowledge and understanding of the population the system will be serving.

Rationale

- To ensure that guidelines for user interfaces are not constrained by narrow assumptions about location, language, systems training, or physical and cognitive capabilities

Implications

- Products and services may be accessed in a variety of ways, but must be available to users in a consistent, accessible fashion.
- Strive for a common look and feel, and consistent service, regardless of choice of delivery channel.
- Must comply with standards for privacy and security.

SECURITY PRINCIPLES

1. IT systems must be implemented in adherence with government security, confidentiality, privacy policies, and laws.

Rationale

- To enhance public trust
- To protect government assets
- To enable compliance with requirements for public funding and grants
- To protect privacy of students, GCC employees, and other partners

Implications

- Must identify, publish, and keep applicable policies current.
- Must periodically audit/follow up on IT systems such as Health Insurance Portability and Accountability (HIPAA).
- Must formulate minimum standardized security policies.
- Must allot sufficient time and resources for security policy development.
- Must consider indirect implications of security policy, for example, staffing to perform audits or check for vulnerabilities

2. Data must be protected against unauthorized access, denial of service, and both malicious and accidental modification.

   Context
   Data includes paper records, scanned images, printouts, microfiche, as well as digitally stored information. Sensitive and confidential information should not be accidentally provided or published.

   Rationale
   - To minimize improper use or loss of data, either of which can have serious business and legal consequences
   - To minimize security violations, which impair integrity and jeopardize the viability of government
   - To limit opportunities for unauthorized access, so that people are less likely to do inappropriate things

   Implications
   - Must implement approaches/policies to minimize improper use of data.
   - Must implement approaches/policies to minimize security violations.
   - Must establish follow-up procedures for security alerts.
   - Must regularly examine logs and alerts and execute follow-up procedures.
   - Must not secure data to the point that responding to open records requests becomes prohibitively expensive.
   - Must consider implications of defining a Resource Description and Access (RDA).
   - Must design and account for Open Records requirements.
   - Must provide staffing and resources to perform the functions and duties outlined above.

3. There must be accountability for security, which includes the appropriate design and use of audit functions and system monitoring tools.

   Rationale
   - To enhance public trust
   - To have accountability, there must be auditing
   - To avoid data loss or data corruption
   - To ensure data is credible
   - To identify inappropriate access
   - To prevent security breaches, which have harmful and expensive consequences

   Implications
   - Require monitoring compliance.
   - Must design audit functions and cross-checks into systems.
   - Must provide resources to monitor. Monitoring is resource-intensive.

- Must define processes for following up if potential security problems are found.

4. A well-defined security policy promotes sharing by removing uncertainty.

   Rationale
   - To enhance public trust
   - To provide a clearly articulated policy for use of information
   - To prevent destruction of and avoid mishandling of security information, for example, demonstrating chain of custody for evidence

   Implications
   - Must make security, confidentiality, and privacy requirements clear
   - Additional expenses may be required
   - Need training to comply with policies
   - Must consider implications of defining an RDA
   - Must obtain advice from legal counsel as appropriate
   - Must institute policies that ensure appropriate background checks for employees
   - Must provide education for staff that works with sensitive or confidential information

SYSTEM MANAGEMENT PRINCIPLES

1. IT must plan, design, and construct appropriately for growth and expansion of services across the enterprise.

   Rationale
   - To be more cost effective
   - To reduce maintenance costs
   - To enable quicker response to growth and change

   Implications
   - Must make a culture shift towards planning for adaptation
   - Must develop processes to collect information and ways to predict growth from historical trends
   - Must promote capacity planning
   - Must recognize the tradeoffs between the increasing high costs of labor and decreasing costs of technology

2. Formal methodologies for IT change management must be established and followed.

   Rationale
   - To improve the quality and availability of our systems
   - To ensure repeatability and consistency of system management processes

Implications

- Minimizes negative impact upon partners
- Must agree on practices and methods and follow them
- Must develop and document well-defined system management processes
- Must develop a process to monitor for compliance and follow that process
- Following system management processes may be cumbersome and slower in the beginning
- System management requires advance planning

3. Promote the use of common systems for IT problem resolution.

Rationale

- To enable improved quality assurance and system availability
- To enable the development of a knowledge base for problem resolution
- To provide communication to our users when problems occur

Implications

- Staff must use problem resolution systems.
- Problem resolution systems must be efficient for the staff to use.
- A view of the problem resolution system should be available to users.
- Must establish and monitor performance metrics for IT problem resolution.
- IT problem resolution has to be more general than would be appropriate for any individual division. (For example, rights management services [RMS] would need improvements if it were to be an enterprise solution for IT problem management/resolution.)

4. Implemented infrastructure must be robust, responsive, and reliable with appropriate redundancy.

   Context
   Infrastructure must be appropriately scalable and services must be structured appropriate to the differing needs of divisions. Appropriate redundancy requires balancing the investment made for high availability against the defined business/academic needs (i.e., to seek right-sizing). Robustness means that the infrastructure design must take into consideration likely points of failure and provide backup and redundant components where required.

   Rationale
   - To adequately protect against system failure while not wasting resources
   - An enterprise approach would be the best way to leverage the necessary IT capital investments to ensure high availability.
   - To avoid excessive infrastructure and support service costs
   - To leverage economies of scale where appropriate

   Implications
   - Need to consider cost, risks, time redundancy, and the context, for example, disaster recovery is different from business continuity
   - Must define and discover business requirements for system availability and successfully test against those requirements.

5. Service providers must address and facilitate business continuity, security, and disaster recovery. These services should be provisioned in a manner appropriate to the criticality of the data and applications involved.

   Rationale
   - The enterprise provides many essential services that, especially in times of crisis, must continue to be available upon demand, and recovery must occur within a compressed timeframe.

   Implications
   - Must identify and prioritize critical business/academic functions.
   - Must ensure that communications systems are available, especially in times of crisis.
   - Must define acceptable recovery times.
   - Must develop and test disaster recovery and business/academic continuity plans.
   - Must periodically review and update test disaster recovery and business/academic continuity plans.
   - Must balance costs against risks.
   - Must promote awareness in order to provide funding.

DATA MANAGEMENT PRINCIPLES

1. Each individual data item has a single steward or authoritative source, clearly defined locations, and is accessible. Authoritative data must be accessible and available for reuse by any entitled systems or business/academic processes.

   Rationale
   - Reducing duplication requires that there be an authoritative source for information about that data
   - More effective decision-making requires increasing the integrity and relevance of data, which requires having an accurate inventory of where the data is stored.
   - Data is a strategic asset that must be shareable and accessible to gain maximum value.

   Implications
   - Must have time and resources to identify and specify authoritative sources.
   - Must establish institution wide procedures to manage data access and ensure data security and integrity.
   - Must define stewards and their role.
   - Need a consolidated metadata repository for the enterprise.

2. Data stored in information repositories within the enterprise should be widely available and accessible by all entities within enterprise.

   Rationale
   - Information that is shared will maximize the effectiveness of business/academic decision-making.

   Implications
   - Must create and define standards and processes for unifying data and information management.
   - Must establish data warehouses to facilitate information availability for decision-making.
   - Need a consolidated metadata repository for the enterprise.
   - Must provide resources to establish and maintain a single metadata repository.
   - Must have an access mechanism for information repositories.

3. Data is an asset that must be managed for the benefit of the enterprise. Data must be shared to the maximum degree possible, without jeopardizing security and confidentiality.

   Rationale
   - The value of information is not always realized when it remains in isolated pockets.
   - Required security and privacy cannot be sacrificed and may sometimes result in the inability to publicly share information.

   Implications
   - Must restructure data for easy access and management.

- Must organize business/academic systems and databases according to subject matter, not by department, division, or unit.
- Must maintain data in its most appropriate format.
- Can share data by integrating systems rather than by sharing data directly.
- Data warehouses must be multimedia-capable to access and manipulate all forms of data stored in them.
- Must design network infrastructure to efficiently and cost-effectively transmit all forms of data adequately to meet business and performance requirements.
- Must make data and applications accessible via a variety of media.

4. Data is collected, protected, and maintained in accordance with appropriate standards and guidelines.

   Rationale
   - The enterprise must comply with applicable policies, statutes, and federal requirements, for example, Family Education Right to Privacy Act (FERPA)
   - Data is more likely to be shared when the standards and guidelines for sharing and protecting that data are documented and understood.

   Implications
   - Must provide training and education so that individuals are aware of standards.
   - Must have communication plan to build awareness.
   - Must define and document the appropriate standards and guidelines.

5. Records in electronic format must be preserved and maintained, and remain accessible for their designated retention period.

   Context
   Records must be appropriately disposed of once the designated retention period has expired.

   Rationale
   - Proper record maintenance is statutorily required.
   - Keeping records longer than required is costly and wastes space and resources.

   Implications
   - Must provide resources for records identification and disposition.
   - Must establish policies for record retention.
   - Must establish systems to automate the record retention processes.
   - Must establish an audit process.
   - Must establish a process to destroy records in an appropriate manner.
   - Must define and implement a process for monitoring records handling.

- Must create a communications plan to promote awareness of policies for records retention and disposition.

GUAM COMMUNITY COLLEGE EA OBJECTIVES AND STRATEGIES

General Overview

GCC's information technology objectives are to fully support the college's mission statement of:

"Guam Community College is to be a leader in career and technical workforce development by providing the highest quality education and job training in Micronesia."

- It will deliver integrated enterprise information systems and infrastructure that improve public access to GCC functions and information, streamline business processes to simplify college-public interactions and reduce costs, and meet the legal and business needs of the college.

- GCC will create and operate services on-line available to the diverse communities of Guam and Micronesia

- GCC will develop cost-effective means for providing 'niche' training and services, and for providing training and education not in the college curriculum.

- GCC will provide a unified, secure, efficient and reliable IT infrastructure to address current and future needs.

- GCC will provide sufficient and cost-effective bandwidth to meet current and future needs.

THE PRESENT

CURRENT GCC ARCHITECTURE ASSESSMENT

CURRENT DATA ENVIRONMENT

General Overview

The current picture of the Data Environment is now mostly integrated. While there is some data existing in separate systems such as the COMPASS, Simply ID, Library's Symphony, TracDat, and specialized academic systems (PLATO MATH, CHOICES, CASAS) the real problem is in fully integrating all and in maintaining the Integrated Database Management System (IDMS) with considerably insufficient resources in manpower, overall system capacity, and in money for desperately needed hardware and software upgrades and maintenance.

Manual Data Entry

Manual data integration and sharing is continually being addressed due to the implementation of the Sungard BANNER system and the MyGCC portal in which most critical operational or administrative and academic activities are now using an integrated system. The MyGCC portal, through its single-sign-on feature, allows students and employees to access the database for self-service applications such as registering for a class or checking a departmental budget. This system now allows for greater accuracy and consistency of the data being used that comes out of an integrated database versus the fragmented systems of previous years.

Pseudo-Applications

A former concern that is no longer a major issue is in regards to the risk of using other data gathering and reporting tools or applications in the fulfillment of an office's mission. More so now than ever, many standard internal and external reports are coming out of the IDMS with the use of ORACLE Discoverer and ODS (Operational Data Store) than from other forms such as those created and maintained using applications like Microsoft Excel, DBASE, Quattro Pro, or even Microsoft Word.

Information can now be gathered in the usage of the portal by individual student logins and their activities; however, this only relates to portal activities. Lab workstations are still not issued unique accounts and are not being captured. Discussions with the College Technological Committee (CTC) continue with regards to this practice and may change in the future as stricter security policies are implemented or become necessary, especially as it relates to becoming more compliant with the Payment Card Industry (PCI) or federal mandates.

Records Management

The college has institutionalized a document scanning and capturing system as part of the overall solution to address the paper-based driven process into a more paperless environment. Together with the implementation of the all-in-one XEROX scanning-printing-copying-faxing solution, GCC now has in place the SCAN XTENDER and WEB XTENDER Banner Document Management System (BDMS) that allows different users and sections of the college to electronically archive documents for safe-keeping, storage, sharing, and retrieval. Despite the

training provided to key personnel, mainstream usage of this system is not yet realized, but more and more users are discovering the benefits of moving into or using this solution.

Data Formats:

- **Additional formats not previously included:**
    - Video
    - Audio other than voice
    - Film/Negatives
    - Online Contents

Data Users:

- **Additional users not previously included:**
    - Board of Trustees Members
    - Foundation Board Members
    - Anonymous Patrons
        - Library
        - Online visitors on GCC websites
        - Guest and customers at functions and events
        - Bloggers
    - "Artificial Users"
        - BOTS (automatic or programmed content/data "harvesters")
        - Spammers / Phisers
        - Hackers
        - Drones / Hoverers
        - Scanners/Sniffers (Wired & Wireless Network prowlers)

Data Architecture and Standards Justification

These areas of improvement support the need for the architecture and standards recommended in this document.

Opportunities	Comment
Most databases are not integrated, cannot directly share information or store common data in a single place.	SUNGARD addressed most of this finding.
Manual entry of duplicate data from one database to another is diminished.	Manual data entry is prone to error and means that the data is not only stored in two places but was entered twice.
Not capturing data from IT users (via unique individual logins) on their usage patterns.	This is vital important that is necessary for a properly functioning IT environment.
Official data is derived from the databases but not stored in the databases.	Official databases become repositories of data but cannot provide the final answers.
Duplication of data in different media within the same organizational unit has been reduced. BDMS addresses most of these issues.	BDMS addresses most of these issues. More on-line forms are becoming more prevalent.
Records Management: Wide spread use of paper forms to capture data that then must be entered into a database.	Need to eliminate the use of paper forms and use data entry forms that are accessible to the originating person.
Records Management: Those paper documents which must be retained and stored should be digitized and stored electronically.	By imaging/scanning the original paper documents they can be stored electronically. Then, with legal authorization, the paper copies may be discarded.

CURRENT APPLICATION ENVIRONMENT

General Overview

Guam Community College has a large investment in applications primarily in the Academic Affairs and Finance and Administration Departments. It is noteworthy the college has very few applications custom built for the college. However, many of the applications are very old in technological terms and in need of significant enhancement or replacement.

SUNGARD

SUNGARD replaced GCC's two largest applications, NIAS and Dynalogic and provides a suite of software and processing applications for financial services, higher education and the public sector. This new system effectively addressed challenging problems associated with NIAS and Dynalogic. SUNGARD provides advanced query and reporting capabilities in a single integrated database application combining NIAS and Dynalogic functionality into a single repository and eliminated the need for user-built tools. The SUNGARD application is built upon the latest hardware and operating systems using state-of-the-art system and database design architectures should serve the college well for the next three to five years. The current portfolio of SUNGARD applications currently in use at GCC are:

SCT Banner Financial Aid	SCT Banner Employee Self-Service
SCT Banner Advancement Self-Service	SCT Banner Advancement
SCT Banner Self-Service for Finance	SCT Banner Finance
SCT Banner Unified Digital Campus	SCT Luminis Content Management Suite 3.1
SCT Banner General	SCT Banner Student
SCT Banner Student Self-Service	SCT Banner Faculty & Advisors Self-Service
SCT Luminis Product Family Bundles	SCT Luminis Product Family Packaged Offerings

IT Applications

Another finding is how few applications are available to Administrative Services and MIS. In the case of MIS, four important and time consuming tasks are being performed manually. This manual effort could be greatly reduced if MIS were provided with proper software tools.

The need for MIS staff involvement with this activity should be minimal and on an exception basis. Likewise, the administration of unique student logins is hampered by the absence of a robust software application to automate this requirement. Third, the complex GCC network does not enjoy the benefits that load-balancing software would provide. Finally, the work of creating PC hard-drive images and re-imaging, or cloning, PC's in offices and labs is a highly manual process. Yet, mature software applications exist that could greatly automate the process and greatly improve staff efficiency.

The adoption of any new applications is not a simple matter of procurement and installation. The introduction of new applications mandates more user and technical training, new policies and procedures, revised job assignments and skills requirements. The replacing of old applications or the incorporation of new ones must be a thoroughly planned undertaking. Each new or replacement system implementation is a major project undertaking that will require the active support of all those involved.

Distance education (DE)

In July 2010, GCC adopted a Distance education policy to deliver educational services either through instruction or support services to students who are not physically co-located with the individuals providing the service *(See Appendix C- Distance Education Policy).* The platform GCC currently utilizes to support DE is the Moodle Course Management System, a course management system designed to help educators deliver quality online courses. Moodle is open source software and is used all over the world by universities, schools, companies and independent teachers.

DE includes the use of computer and Internet-based educational services as well as video and audio services. Institutions use Internet technologies to bring students educational programming in either synchronous (students and the service provider are interacting on line at the same time) or asynchronous modes (students and the service provider not interacting on line at the same time). Educational interactions delivered through these means may occur on campus as well as off campus. DE can be a convenient, flexible, and effective means of providing education. Nearly half of all the college students in the country are of the age group once thought of as nontraditional. They are working adults or adults seeking first educational credentials or retraining. Many working adult students with multiple demands on their time find DE to meet their needs better than campus-based education and is also an opportunity for the college and the students to contribute to environmentally friendly practices. Courses that run through DE reduce the use of paper and copying, as resources are available digitally. In addition, students commute to campus less frequently than traditional courses, lessening the use of gas and related emissions

into the environment. In addition to working adults, the traditional-aged college students come to campus with extensive experience using digital technologies in their personal and school lives. For these students, DE involves the use of Internet, web casts, text messaging, and other digital media is comfortable and familiar. As technology continues to expand world-wide, participation in DE assists students in preparing for the workforce.

GCC currently delivers limited courses through DE using a hybrid of several applications illustrated in the table below:

ed2go extend your reach	Easy-to-use instructor-led courses and certificate programs that is informative, fun, convenient, and highly interactive. Accounting, Business, Computer, Grant Writing, Test Prep, and more.
CAREER TRACK TRAINING 650+ for online	Career Track Training – Online Certificates and Courses in Customer & Technical Support Training, Technical Writing, Functional Specialties in Human Resource Management, and more.
GATLIN Education Services www.gatlineducation.com	Gatlin's online career training courses are designed to provide the workforce skills necessary to acquire professional caliber positions for many in-demand occupations. Gatlin offers over 79 online certificate programs in the Allied Health, Computer-Internet, Business, Technical and Construction industries.
UGotClass Online certificates and courses	LERN-Get skills for the 21st century. Demonstrate your knowledge. Boost your productivity and your organization's bottom line.

Application Architecture and Standards Justification

These areas of improvement support the need for architectural standards recommended in this document.

Opportunities	Comment
Existing systems do not combine or present information in the way necessary to satisfy many reporting and management requirements.	This drives users to create MS Excel and MS Access reports. Unfortunately, there is important additional and derived information that then only resides in pseudo-application and not on the parent systems.
There are several useful applications not currently in use: • Automated email administration system • A highly automated network/PC User Login system • A network load-balancing application • PC-cloning application	With the addition of these automated systems, GCC will enjoy additional functionality for all of its users, reduced workload in MIS, increased efficiency of existing resources (personnel and technology).
There should be, as much as possible, a single login application for GCC. Users should be able to access their applications without having to login to each one separately. The application should allow for the capture of information in one place and shared throughout.	A single login procedure should be developed (perhaps through the use of portal software). Additionally, a student's name and address should only be entered at one point in the virtual application rather than once per application. Progress has been made in the wireless environment.
Applications should be treated the same as PC hardware and have their own replacement plans.	Application lifecycles are typically longer than PC hardware lifecycles, but either they must be constantly kept up to date or replaced after a reasonable length of time
Many different types of user interfaces such as Windows 98, Unix, MAC, and Windows 7.	Increased end-user support costs in the area of training due to diversity of interfaces.

CURRENT TECHNOLOGY ENVIRONMENT

General Overview

The current Guam Community College technology environment is typical for the size and complexity of the functions it serves. To its credit, all systems are on currently available and supported hardware, software, operating systems, and networking protocols. Much work has been done over the past several years to improve technological connectivity on campus and to the internet. The primary hardware platform in use is the Windows-based PC computer. There is evidence of many state-of-the-art technologies in use on campus. Devices such as Electronic Whiteboards, Video and Audio Teleconferencing, Digital Cameras, and multimedia presentation devices are in common use.

Technology Replacement Plans

Commendably, there is a plan for the orderly replacement of aging hardware. Each piece of new equipment, for example, has an expected lifecycle, a length of time before it is obsolete. This lifecycle is on the order of five or more years for a server computer, but three to five years for a PC. Printers and other peripheral devices have even shorter lifecycles. Each year, the plan calls for the replacement of the oldest equipment and software. With this yearly replacement plan in place, the users are assured of always being supplied with current technology. Some will be newer than others, but all will be replaced in accordance with a plan instead of as an emergency procurement.

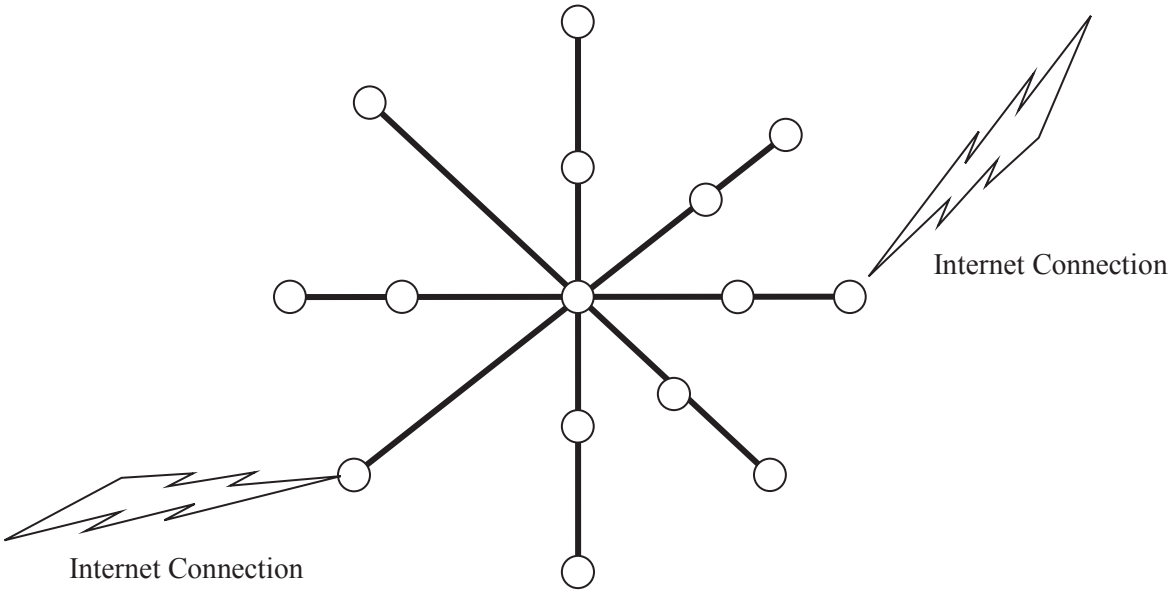
However, even in the midst of these positive outcomes, there are many different technologies in use with more being added. Each of these technologies requires specialized training to be able to use and support, may require separate maintenance contracts, and skilled staff.

Technology Support

There are two types of technology in use on campus. There is technology intended to (1) serve the needs of GCC employees be they faculty, staff, or student and (2) technology specific and unique to a class or curriculum. While the more prevalent GCC-wide technology is carefully controlled, the opposite is true of technology used to support a particular class or curriculum. The benefit of this arrangement is that teachers have the latitude to introduce new tools and technologies into a classroom setting without having first to place it under the strict controls of the enterprise architecture. However, the teacher in this case is fully responsible for the installation, use, and removal of these ad-hoc technologies. In this way, course instruction is best served without adding new burdens to the rest of the IT structure. Of course, should a class or curriculum need a new technology as a standard part of all future classes, then it must first be placed under the appropriate controls in the infrastructure.

Networks

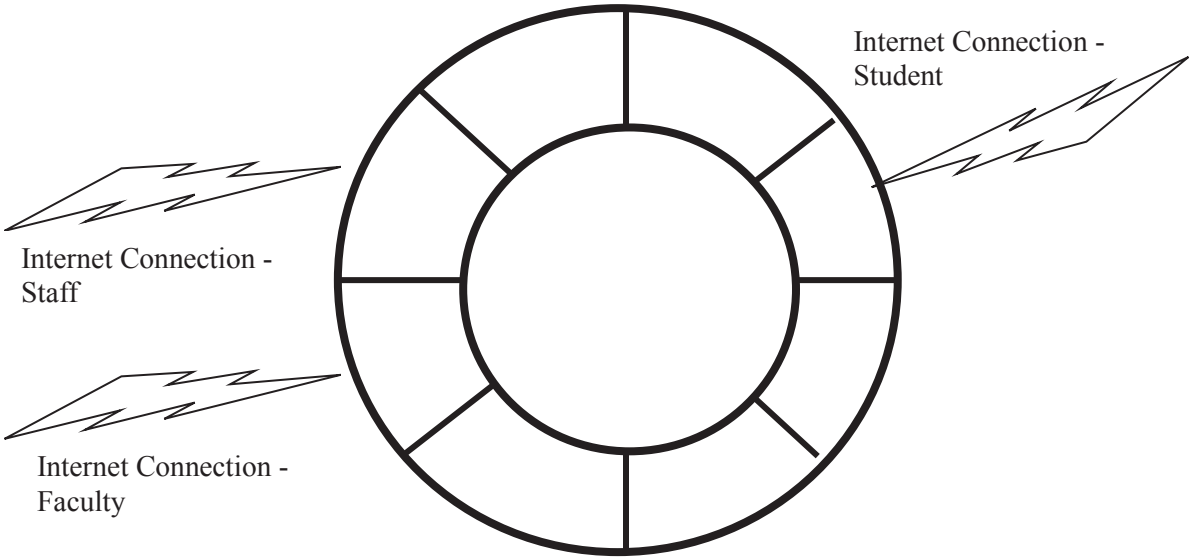
The present networking topology is a Star design. It is an easy to create network and all that is needed is cable running from an existing node. There is no redundancy of connections for the nodes. Should one node be removed from the network, all nodes further down the network from the removed node, are also removed from the network.



STAR Topology
With 2 Internet Connections

The best advantage for such a design, aside that it's easier, quicker, and less expensive to implement, is very little effort is expended when a more sophisticated design is desired.

That better design is a Double Ring design. Building upon the existing network, a Double Ring network will provide a vital redundancy for the network users. Lines currently running between nodes are utilized. The difference is that each line does not begin at a single point but begins with a ring. The same is true for the end of each line, as is shown in the drawing below. Now when a node is off-line for whatever reason, all other nodes remain on-line. Should even a cable be damaged in a portion of the network users will continue to have access via this redundant capability. Additionally, should certain portions of the network be slowed by traffic flow, the network can still provide adequate serve to the rest of the users.



Double Ring Topology
With Three Internet Connections

While a Double Ring design is a much preferred solution for GCC, two other technology improvements are necessary in order to make it the highly efficient foundation of the college's infrastructure of the future.

Presently, GCC has two high-speed internet connections. One is a 20 Mbps line through GTA and then to the internet service provider. The other is a 10 Mbps fiber-optic cable directly to internet service provider, MCV. It would be beneficial to have a dedicated line for each of the major user groups on campus: Faculty, Staff, and Students. With this third additional capability, each constituency is assured of the best possible responsiveness from the internet service provider. Should one of the internet connections fail for any reason, GCC would be able to effectively share the remaining two.

The other necessary addition to the current network is Load Balancing software. This software monitors and manages the network automatically. It keeps track of problems, bottle-necks, outages and such and automatically reroutes traffic to keep the network operating as efficiency as possible. Not only is it impractical to attempt to do this manually but it is not cost effective to do so. Trained IT staff should be doing only those things which automated tools cannot do.

With the implementation of a Double Ring network design with three internet connections and the presence of Load Balancing technology, no longer would a problem in one area of the network have any detrimental impact upon the other areas.

PC Imaging

The number of PC's and the variability of their hardware configuration pose a significant challenge. There are 1,500 PC's in the environment. New ones are added regularly to replace obsolete ones, in accordance with a planned replacement schedule. Occasionally, new PC's are added to the total number. For each of these PC's there is a standardize hard-drive configuration of software and settings that must be applied. This standardized configuration is known as an "image." PC's used for different purposes have different images. Those used by staff differ from those that are setup for students in a lab. Therefore, there are numerous standard images.

What makes the process more cumbersome is the variety of hardware configurations. A slight difference in one of the PC's internal components can mean a revised image must be created. Thus, there are standard images for each functional use but scores of additional versions of these images caused by hardware differences. A conservative estimate is that there are upwards of 150 different images. It requires approximately 20 to 80 labor hours to create new images and to image and re-image computers. This process occurs every semester and is very time-consuming.

There are several factors as to why this imaging process exists. One of the factors is a policy which states all software that comes with a purchased computer is replaced with site-licensed software. Rather than tracking the software licenses on each computer, the extra step is taken to remove these licensed products. Once imaged, all PC's are covered under site-licenses. This makes it easier to know what computers are licensed but at a considerable cost.

What must be addressed is the creation and maintenance of 150 different images. Currently, it takes about a calendar week to create and install a new image on a new PC. This is a time consuming process for someone who just wants a computer for MS Office and Internet Explorer. Additionally, the process of re-imaging computers should be highly automated over the network.

The current suite of software on a lab image is:

Certiport (Loaded on I.T. Academy labs TC1106 & TC1221 only)	Micropace Pro 2
CheckPro	Office 2007 SP2
DDC315o03	PAN (TSA, CBP, USPS, FBOP, FBI, GPO, Qwest, Jones-NCPI, JC Penney) Web base TC1106A only)
Dreamweaver 4 (Loaded on D8 lab only)	Pearson VUE application (Loaded on testing lab TC1106A only) Off-site connection to process tests.
GradeKeeper	Power DVD 6
Hill Crest Medical Center	Prometric application (Loaded on testing lab TC1106A only) Off-site connection to process tests.
Impatica	Quickbooks 2009
Integrated Pro	VH Dissector Lite (Loaded on AH3114 systems only)
Keyboarding	VH Dissector Pro (Loaded on AH3114 systems only)
KRYTERION/HOST, AMP, WGU (Web base on TC1106A only)	Visual Basic 6
LaserGrade (Loaded on testing lab TC1106A only)	Visual Basic Express 2010
Plato Math (Web base)	Windows XP SP3
Medical Terminology	Word Perfect Office 12

Email

Users are assigned 50-100 megabytes of space to store their email on the web-based server. However, users are required to stay within this storage range to avoid over-quota mail conditions and risk not receiving their emails. Outlook is provided at their desktop and users are encouraged to download their server email to their Outlook. The future vision is to provide unlimited web-based server space.

Student User IDs

Likewise, the administration of unique student logins is hampered by the absence of technology to automate this requirement. The need for MIS staff involvement with this activity should be minimal. Through the use of the proper technology user accounts can be added, modified, and removed more easily. Student accounts can be created by faculty or staff, depending upon circumstances. The lack of technology should not preclude or limit the implementation of this service. Currently, guest accounts in the Novell network remain unprotected.

Technology Architecture and Standards Justification

These areas of improvement support the need for the architecture and standards recommended in this document.

Opportunities	Comment
The GCC network is unable to adequately serve the needs of the college.	The network is now more robust and can support more web-based applications.
The GCC network is not equipped with load balancing software. Currently has a 100 mbs – 1GB backbone.	MIS staff must constantly monitor the network and upgrade to remedy problems.
Heterogeneous computer hardware configurations make it difficult to maintain hard-drive "images" for ease of restoring corrupted computers.	It takes upwards of a week for a newly arrived PC to be ready for deployment. While there are many reasons for this, a principle cause is the variability of hardware components.
There is a mixture of old and new operating systems because certain applications will not run on the latest OS or because of employee reluctance to change. (Windows 98, Windows XP, Windows 7)	The number of outdated technologies support on campus must be reduced. The definition of "outdated" should be, at a minimum; the vendor no longer supports the product. GCC should not be carrying on business functions on unsupported technologies.
GCC is well equipped in many of the latest technologies.	Thanks to the initiative taken by MIS, CTC, and other faculty related groups.
Student Login IDs are not provided for instructional and open labs. Portal access will facilitate gathering statistics on student usage.	Being able to track technology utilization is necessary for future planning. Student logins would greatly enhance policy enforcement.
Technology at the high school level leaves room for improvement. Classes are being offered in technology skills or using PC's and the internet; however, the reliability of the infrastructure is inadequate.	Determine realistic goals and objectives for courses offered at the high schools and then take necessary steps to meet those goals.

CURRENT IT MANAGEMENT ENVIRONMENT

General Overview

The current Guam Community College Information Technology (IT) Management environment has been steadily improving over the past five years. However, the size of the MIS organization has remained at ten full-time employees. This fixed number of ten employees has barely kept pace with the expansion of the overall IT environment and the level of centralized control undertaken. The number of computers and other IT technologies on campus has grown at a more rapid pace than MIS has been able to match. It has insufficient expertise in some technologies while being well positioned in others, particularly in the number of people trained in networking. This lean toward network skills is illustrative of the types of problems most often encountered. When a single PC or printer has a problem, only a few people are impacted. When the network is down, this has the potential to impact large segments of the college population or in a catastrophic network outage, the entire college is impacted. Therefore, MIS has justifiably focused considerable attention on preparing and responding to networking problems.

Low Tech

Unfortunately, this growth in the size and complexity of the IT environment is now causing a new set of problems. With MIS staff virtually consumed by networking, PC troubleshooting, and PC imaging issues, it does not have the capacity to delve into new issues of critical importance to GCC, or to address lingering problems. For example, MIS lacks the capacity to undertake important GCC issues such as creating and maintaining individual student logins, developing a more robust means of creating PC hard-drive images and of maintaining these images on the 1500 PC's, implementing an automated rather than a manual administration of campus email, and taking over management of the MAC labs. The industry standard ratio for estimating the size of an IT staff is one resource for every 100 computers. However, MIS needs to more fully automate many of its tasks before planning to request increased staffing. This will release MIS staff from tedious work and allow them to gain and use more advanced technical skills.

Decision-making

Operational Decisions

The MIS manager has decision-making authority to conduct day-to-day operational matters with a pre-determined spending limit to make necessary purchases for the maintenance, operational up-time, and reliability of assigned IT assets. For example, MIS should continue to provide oversight and guidance on the hardware and software standards for PC procurement. MIS should continue to maintain centralize control over the GCC infrastructure. An infrastructure is the bedrock suite of technologies and standards upon which the rest of GCC can add the technologies it needs. What is important to have in place is a means whereby necessary changes to the infrastructure are planned with sufficient lead-time to accommodate the addition of new technologies. For decisions outside the MIS manager's authority, the governance structure and

process previously mentioned establishes a review process and makes recommendations to higher governing bodies within the GCC organization.

Strategic Decisions
Decisions outside the authority of the MIS manager are deferred for CTC review and action. This formal review ensures an initiative or requirement is thoroughly reviewed and validated as a benefit to the college to support, fund, and implement. For example, MIS should not arbitrarily decide whether MS Word will be the GCC standard. Establishing an enterprise functional standard that crosses all disciplines should be decided by the CTC. Decisions above the CTC group are elevated to College Governor's Council, Faculty Senate and ultimately the college president for decision.

Project Management

Prior to the decision to implement the SUNGARD system, there was perhaps, little need for a commitment to project management. The assessment of IT skills shows that even those who are now tasked with project management responsibilities have received insufficient project management training. Project management, or rather the lack of it, is also the single most important cause for project failures. Project management is a skill upon which other technologies can build and be successful. GCC should permanently adopt project management training, methodologies, standards, and tools as part of its core values and a key component of its infrastructure. The practice of project management must become pervasive. Therefore, staff and faculty members who are assigned to work on a project must be trained in this discipline. It is not enough to have a trained project manager, project team members, likewise, need to understand the methodologies and their role in achieving project objectives.

IT Management Distribution and Staffing Level Table
GCC's MIS staff of ten individuals is challenged with over 325 different systems, applications, databases, and servers, to maintain, monitor, upgrade, and replace. To efficiently utilize and track the proficiency of the MIS staff, a MIS Tasks, Roles and Responsibilities matrix is used to track individual specialties and identify areas for training opportunities.

Ten years ago, GCC had a MIS staff of less than ten individuals maintaining approximately 300 PCs in its inventory. Today, the inventory of PCs has increased to over 1500 while the MIS staff level has remained at ten for the past five years. In 2006, MIS was augmented with IT personnel from other departments; however, those staffing levels dropped off as a result of reorganizations. However, there are personnel within the college who are not part of the MIS staff that do assist in keeping some computerized areas operational. For example, MIS does not handle computerized areas where instructors are supposed to maintain their own environment and MIS only gets involved when these locations require network or other resources and expertise beyond the instructor's realm or level. The computerized labs for the CISCO Academy, Microsoft IT Academy, VISCOM (Mac Lab), and Lab Room D7 for the Computer Science Department are

handled by certain instructors with IT knowledge. The primary MIS support for these locations is making sure they have network and Internet access and approving technology purchases. While this is an admirable gesture on behalf of these individuals with IT backgrounds, the IT work they perform is outside the normal scope of their duties and responsibilities. MIS will ultimately be held responsible for all IT support in these areas if these individuals choose to defer this work to the MIS department.

This table shows the IT Management distribution and staffing level situation.

Department	# of IT Staff	# added in last 5 years	# lost in last 5 years
MIS	10	0	0

IT Management Architecture and Standards Justification

These areas of improvement support the need for the architecture and standards recommended in this document. The term "staff" does not mean only MIS personnel but staff fulfilling IT roles regardless of organization.

Opportunities	Comment
Applications and technology continue to proliferate.	IT staffing levels and skills are not keeping pace.
New applications and technology are more complex.	IT staff training is not keeping pace.
Insufficient training in critical skill areas.	Many IT staff members have not been formally trained in the important skills required of them.
Level of Service Agreements not established between IT support staff and users.	Users are not assured of a timely resolution to their work request. A charter was created; however, not all departments have signed this document.
Insufficient capture and control of MIS customer service and support work.	No true IT Help Desk function in place that specifically receives, assigns priorities, assigns resources, monitors and tracks each IT incident and closes out the incident. IT trouble calls are currently tracked with E-Maint, a database used primarily for facilities work orders.
Analysis of work requests is not conducted.	Unable to identify systemic problems but rather continue to address each problem individually.
GCC should be allocating budget and resources in accordance with performance measures.	The easiest place to begin this discipline is with IT. The ability to measure performance and equate it to dollars is an important tool that will enable more accurate budgeting.
The MIS staff is too heavily relied upon for even the simplest technology problem.	Users need to be trained to handle a defined set of routine problems in their workspace.
Communication between IT staff and users is unstructured.	Users should be made aware of upcoming IT staff activities in their areas before the work begins and should be notified of the outcome of the work. All such communication should be in writing.
Little if any IT strategic planning has been done. Most decisions are tactical and reactive.	The adoption of the EA and ITSP are major organizational breakthroughs for developing strategic planning and processes. The roadmap and governance is in place.
GCC should greatly expand the use of work-study students, part-time employees, volunteers, and third-party providers.	Most of the most tedious, low-level, reactive technical support issues can be done by these types of individuals, freeing up full-time employees to work more complex issues.
IT staff should be trained in all of the common disciplines and not only in those that cause the	GCC should invest in training people in the areas of systems analysis and design, quality

most problems. IT staff will never be able to lead in technology innovation if they do not have the training and skills of these other disciplines.	assurance and testing, customer service and support, database administration, applications specialist, and project management.
All IT staff should be involved in planning sessions about the future of technology at GCC.	Such involvement will provide more and better ideas and will help communicate GCC's IT goals to the employees.
The College Technological Committee must be given sufficient influence over IT decisions to be effective. If the majority of its decisions are ignored or overturned, the CTC will cease to be effective.	The CTC must have several early successes. It must demonstrate that it is respected and its recommendations are taken seriously.

THE FUTURE

FUTURE GUAM COMMUNITY COLLEGE ARCHITECTURE

INTRODUCTION

The future architecture will be described in four areas used in the current assessment sections of this document: data, application, technology, and IT Management. For each area, the IT Architectural boundaries and constraints will be spelled out, as will the new supporting IT Standards and IT Training.

- Where there is considerable redundancy of data, the future will show an environment where Data is stored once, in one location, and shared by all.
- Where there is a problem with the proliferation of technology or applications, the future will show a world where there is widespread commonality, or at least a severely limited number of choices.
- And where the staffing levels, training, skills, and expertise of the IT Management function is dangerously at risk, the future vision will show an organization that is properly staffed, adequately trained, highly motivated, and expertly managed.

As is obvious from the above, it is nearly impossible to completely separate Data from Application, or Application from Technology, and, of course, IT Management must be involved in all three. Therefore, in order to maintain a clear view of the way ahead, recommendations for the future of each of the four components will be expressed as three types of requirements: IT Architecture (Data, Application, and Technology), IT Standards, and IT Training. In the end, the GCC EA will identify the future Architectural constrains, the future Standards in force, and the future Training (and staffing) requirements.

IT Standards are documents that spell out policies, guidelines, checklists, procedures, rules and regulations, roles and responsibilities, accountabilities, lists of Do's and Don'ts, requirements, processes, methodologies, and programming protocols. These standards also may be supported by tools that help to implement and/or evaluate compliance.

IT Architecture is the hardware, software, networking, operating systems, communication protocols, tools, devices, and the like that will make up the Guam Community College Enterprise Architecture. The components of architecture are those things that usually require a purchase order to obtain. The IT Architecture mainly speaks to those things that will have part numbers, serial numbers, licensing agreements, and user manuals. The IT Architecture in this document does not provide this level of detail, of course, but it is the necessary guidance for selecting the appropriate types of these products.

IT Training means formal training. It is training on components making up the IT Architecture: software, hardware, applications, and technologies. It is training on IT Standards so individuals are aware and know how to be in compliance. And lastly, it is training in the principles and disciplines of IT Management proper.

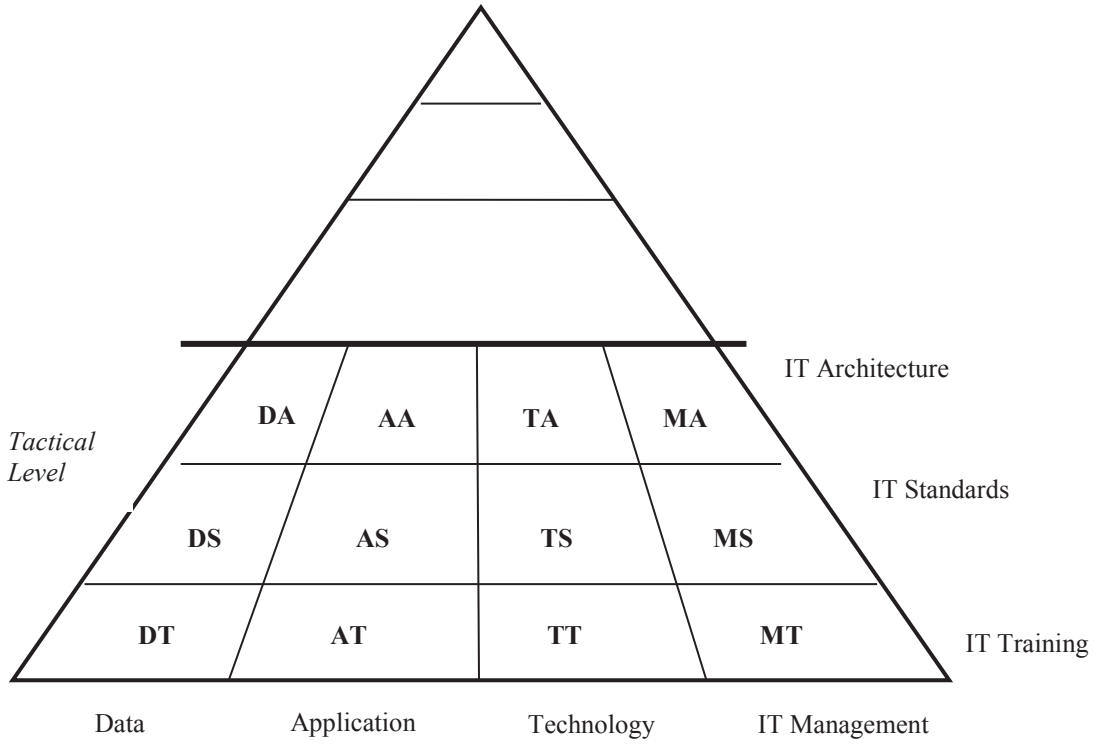
With the future expressed in these three planes, it will be a simple matter to move forward with the necessary implementation plans. Of course, each implementation will require detailed planning, staffing and funding, agreement with all stakeholders, strong project and configuration management, and a long-term commitment.

The GCC EA is a diagnostic document, identifying the problems facing Guam Community College. It is a justification document, spelling out the potential impacts of the problems left unresolved. Finally, the GCC EA is a prescriptive document, showing which problems must be addressed immediately.

In the prior sections, the problems were clearly identified. In the remaining sections of this document, their solutions will be defined in terms of IT Architecture changes, IT Standards changes, and IT Training changes. Also, the relative severity and priority of the problem will be judged. With this information, informed decisions can be made about how best to implement the new solutions that the Guam Community College Enterprise Architecture needs.

Future GCC EA Reference Labels:

Each Future requirement will use a referencing system. For example, the reference for those requirements that have to do with the Data IT Architecture will start with a "DA" and those for Technology IT Standards will start with a "TS."



FUTURE DATA ENVIRONMENT

Data IT Standards (DS)
In the future, the Data Environment will comply with these standards.

DS001	**Ownership**	All data is owned by Guam Community College. Therefore, it need only be captured once and stored at one location, but shared with the rest of Guam Community College. The place at which the data is first captured and stored will be called the Data custodian.
DS002	**Custodianship**	A Data custodian will be the most logical department for the capture and preservation of a type of data. This will mean that only the assigned data custodian may change, add, or delete the data assigned to them. It also means that access to this data will be available to all who need it. There will be more than one Data custodian due to the nature of the data.
DS003	**Formatting**	All Data will comply with a data formatting standard. These standards will include such things as data type, data length, data display format, and data validation rules.
DS004	**Collection**	Data will be captured once, as close to the source as possible, then shared. This collection point will most often be with the Data custodian.
DS005	**Sharing**	Data will be accessible by all authorized users, both internally and externally.
DS006	**Duplicating**	Data will be stored once. The duplication of data will be allowed only under the most pressing of circumstances and will be allowed only until the circumstance can be resolved. The long-term duplication of data is a serious matter that will not be tolerated.
DS007	**Storage**	All data that can be stored electronically will ONLY be stored electronically. It is a violation of the Duplicating standard to maintain duplicate copies of data in any form, including filed hardcopies.
DS008	**Security**	Data security is the highest priority and the prime standard. No other standard shall be used as grounds for jeopardizing the security, integrity, and privacy of data.
DS009	**Business vs. Technology**	Data will be managed in accordance with business needs and not technology constraints. Decisions as to whether and when to dispose of old data or to archive it will be based solely upon the dictates of the business. This also means that data will be disposed of or archived as soon as there is no longer a business need for it.
DS010	**Safety**	All Data will be properly protected from loss and corruption. At a minimum, regular backups will be made of all data regardless of its location (server or desktop). All backups will be conducted in accordance with an approved Data Safety and Recovery procedure that will stipulate the frequency and type of backups performed. The procedure will also describe the frequency for testing the recovery of a database after a simulated failure.

Data IT Architecture (DA)

The following architecture is not in place. In the future, all databases and repositories will comply with these standards.

DA001	**Data Security**	Nothing is more important than the security, integrity, and privacy of the data contained within the Guam Community College Enterprise. Yet, consolidating data and making it highly available presents some architectural challenges. While the data must be easy to access and use it also must be completely secure and private. Only the proper person should be able to view or change their own personal data. Yet, this person should be able to view and change their personal data when relative ease. This level of functionality and accommodation will require a considerable investment in the Data Security Architecture.
DA002	**Relational Database**	The way data is stored, managed, and accessed electronically is an important cornerstone to the information architecture. The information models are characterized by the use of relational database technology to facilitate the deployment of several architectural models, client/server, data warehousing and decision support models. Data will be stored in a relational database which has tabular or matrix structures. The data is grouped into tables with rows and columns that have a relationship to each other. Relational approaches to data provide better performance, flexibility, security and management opportunities.
DA003	**Enterprise Data Dictionary**	The data being collected within Guam Community College is plentiful and varied, but at the same time there is a substantial amount of duplication. To help reduce the duplication of data or allow for access (sharing), an enterprise data dictionary will be developed to establish and maintain data standards for data at the enterprise level. This means defining how data is captured, stored, and presented. For example, is there a single Student Name field or several fields (First Name, Middle Name, Last Name, Suffix, or Prefix)? How long should the Last Name field be (20 or 50 characters)? Once the Enterprise Data Dictionary is in place then all applications will be able to use the shared data (See DA004), knowing where to find it and how to use it.

DA004	**Enterprise Database**	Some types of data are extremely common and therefore duplicated within every stand-alone system in the GCC Enterprise. The obvious example of this is the Personal Name and Address data. There is no reason for this duplication other than convenience for the various applications using it. Yet, the storing of this common information, everywhere, wastes costly resources. Further, the existence of these many redundant sources of same data causes confusion. When someone changes their address, they must tell the change to each application they come in contact with. In short order, the various databases have different information about the very same person. Should one application wish to reference the person in another application, the disjointed data causes problems. The existence of a single Enterprise Database, as defined by the Enterprise Data Dictionary, accessible by all applications, solves this problem. There may be other domains of data than Personal Name and Address data that would benefit from incorporation into the Enterprise Database as well.
DA005	**Data Location Transparency**	With the future direction of greater access to governmental information via the web, it becomes important to address the Data Location Transparency issue. What is needed is a simplified access application that provides a "view" of a financial data, for example, while also showing other pertinent information without having to gain access to several applications. A simplified view of data is possible with a Data Location Transparency architecture. It shields the user from having to know where data comes from. Any web-based solution that does not provide this must be considered an obsolete solution from the very start.
DA006	**Data Availability**	There is a risk in having an Enterprise Database which contains vital information that all other applications need. That risk is to its constant availability. A single Enterprise Database is also a single point of failure that must be addressed as part of its initial creation and implementation. What is needed is an instantaneous or near instantaneous fault recovery architecture. If the computer housing the Enterprise Database should suddenly loose power or its network connection, the architecture must be able to sense this failure and immediately route to a backup Enterprise Database. This type of survival architecture ensures that the gains won by implementing the Enterprise Database are not lost the first time there is a catastrophic failure of that database.
DA007	**Safety**	All Data will be properly protected from loss and corruption. Database backups will be accomplished via the network at prescribed times of lowest user activity. The backup media shall be stored in a remote physical location away from the college.

Data IT Training (DT)

The following training requirements are not in place. In the future, all data staff will be fully trained and highly skilled in these areas.

DT001	**Data Security**	Data staff shall be highly trained at securing, preserving, safeguarding the integrity of, and protecting the privacy of all data.
DT002	**Data Modeling**	Data staff shall be highly trained in understanding the data needs for all GCC applications, their inter-relationships and dependencies, and able to model the most logical and efficient data structures.
DT003	**Database Design**	Data staff shall be highly trained in designing and implementing self-validating, space efficient databases that still offer high performance, impeccable security, and easy access.
DT004	**Data Performance**	Data staff shall be highly trained in implementing databases that perform well, able to satisfy the conflicting needs of rapid access with robust security safeguards.

PRESENT APPLICATION ENVIRONMENT

Application IT Standards (AS)

The following standards are not in place. In the future, all applications will comply with these standards.

AS001	**Simplicity**	All new and modified applications will be easier to use, support, and maintain than their predecessor.
AS002	**Common User Interface**	All new and modified applications will present a common look and feel to avoid confusion and reduce user training. To the greatest extent possible, the user interface of choice will be a web browser.
AS003	**User Focus**	All applications will be of the highest quality, responsive to user demands, adaptable to changing user needs and easy to use. The purpose for the application is to make the user more productive. Therefore, all new and modified applications will place a premium on the user's needs.
AS004	**Methodology**	A common application selection and implementation methodology will be used throughout GCC to manage the selection, procurement, and implementation of new applications. In the rare case when GCC undertakes to build a custom application on its own, a common system development methodology will be used.
AS005	**Openness**	All applications will adhere to industry standards for Openness. Overly proprietary applications will be avoided.
AS006	**Security**	Data security is vital but not enough. All applications will also be protected from unauthorized use while still being user friendly and easily accessible by authorized users.
AS007	**Buy versus Build**	The preference will be to Buy rather than Build any new applications. The preference will be to buy vendor produced enhancements and improvements in existing applications rather than to build custom ones.
AS008	**Office Automation and Utility Services**	GCC will select and mandate a single set of office automation applications such as word processing, spreadsheets, query/reporting and graphic tools, as well as common utility services, such as electronic mail, messaging, and file transfer throughout the technology infrastructure for streamlining operations support.
AS009	**No Early Adopter**	GCC will not be an early adopter of new, emerging applications or technology. The standard shall be to never purchase anything newer than the 2nd version or release of a product. While the college as a whole is limited by this standard, the EA does not preclude research and development activities or restricts experimentation in a classroom setting. As Early Adopters, the academic arena desires "academic freedom" and will not be subjected to these exemptions.

Application IT Architecture (AA)

The following architecture is not in place. In the future, all applications will comply with this architecture.

AA001	**Primacy of the GCC EA**	The GCC Enterprise Architecture is the foremost determiner of what applications may be added into the architecture. The availability of special funding or grants to procure specific applications does not mean that it will be approved for use. All new applications must be compliant with the GCC EA.
AA002	**Access Portals**	As much as possible, the preferred method for full compliance with the standards shall be to provide access to existing applications through web-based portals. This will leave the individual applications undisturbed while still enabling the realization of the future architecture. As applications become obsolete they can be replaced without significant changes to the user interface (i.e. the portal).
AA003	**Wireless**	All new or modified applications shall incorporate wireless technology to the fullest extent possible.
AA004	**Portable**	All new or modified applications shall be compliant with, and take full advantage of, the portable workstation technology requirement.
AA005	**Single Solution**	No applications shall be purchased/built (to include MS Excel and MS Access programs and reports) to improve functionality without first determining that an acceptable solution does not already exist in a GCC application.
AA006	**Openness**	All new applications shall have the capability of being accessed via the web by any authorized user.

Application IT Training (AT)

The following training requirements are not in place. In the future, all application staff will be fully trained and highly skilled in this area.

AT001	**Requirements Definition**	Application staff shall be highly trained at defining application requirements that can be used for procurement purposes or for application designs.
AT002	**Web Programming**	Application staff shall be highly trained at programming websites using skills such as HTML, DHTML, XML, MySQL, PERL, PHP, ASP, JAVA, CGI.
AT003	**Connectivity**	Application staff shall be highly trained at analyzing, designing, and building database and application connectivity and interface software.
AT004	**Portal Development**	Application staff shall be highly trained at developing information access portals, via the web, to allow all users access to applications and authorized data.
AT005	**Wireless & Portable Development**	Application staff shall be highly trained at developing and defining (for procurement purposes) applications that take full advantage of portable and wireless computing devices.
AT006	**Programming**	Application staff shall be highly trained at designing application solutions that will be modular, shareable, and re-useable to the greatest extent possible.
AT007	**Application – IT Interface**	Application staff shall be highly trained in the business functionality and capabilities of GCC applications and not just in the underlying infrastructure. They will know how the users do their jobs so as to reap all the benefits of the application.

FUTURE TECHNOLOGY ENVIRONMENT

Technology IT Standards (TS)

The following standards are not in place. In the future, all technology will comply with these standards.

TS001	**Connectivity**	All GCC facilities, offices, and locations shall be interconnected via the GovGuam Wide Area Network.
TS002	**Security**	All technology assets shall be physically protected from unauthorized access or loss.
TS003	**Network**	The GCC network shall be highly available and reliable, responsive, redundant, and transparent to the user.
TS004	**Automation vs. Manual**	GCC shall maximize the use of automated tools for performing routine tasks. A premium shall be placed on the IT staff's skills and time. Whenever a task can be done with an automated tool it shall be.
TS005	**Policy vs. Technology**	GCC shall strive to have no policy that causes undue manual work on the part of the IT staff. It shall be policy to adopt technology wherever it can help eliminate routine and/or tedious manual work.
TS006	**Hardware Standards**	The standard PC and server shall be current industry standard.
TS007	**Operating System Standards**	The standard operating systems shall be Windows and SCO-Unix, but Redhat/Linux, MAC OS, and AS400 are authorized within the limits of their current use.
TS008	**Openness**	Technology purchase decisions shall be biased toward those products that comply with industry standards, with a preference for vendor-neutral components.
TS009	**Availability**	GCC technological assets shall be highly available. Availability means having information accessible and having a means of accessing it. Availability also means a high percentage of "uptime." An application or network connection that is functional only 80-percent of the time is not available. The goal shall be 95-percent availability. Striving for 100-percent is unrealistic and too costly to attempt.
TS010	**No Early Adopter**	GCC shall not be an early adopter of new, emerging technology. The standard shall be to never purchase anything newer than the 2nd version or release of a product. While the college as a whole is limited by this standard nothing in this standard precludes research and development activities or restricts experimentation in a classroom setting.

Technology IT Architecture (TA)

The following architecture is not in place. In the future, all technology will comply with this architecture.

TA001	**Power**	The architecture will assume that main power will be lost every day. The architecture will provide for the routine continuation of operations regardless of the source of power.
TA002	**Servers**	Servers with current industry standards are the standard platform for all GCC applications and databases. While the college as a whole is limited by this architecture, the architecture still fully supports research and development activities, experimentation in a classroom setting, and the use of other platforms for instructional purposes.
TA003	**Portable PC Workstation**	The preferred workstation of the future will be a Wi-Fi enabled laptop. This laptop workstation will provide all of the speed and disk storage capabilities of today's desktop without the need for cables, special desk space, UPS.
TA004	**PC Configuration**	Each PC shall have a standard configuration. This "image" shall be stored on the network. Automated software tools shall be used to periodically evaluate the status of each PC on the network. If a PC is in need of "re-imaging" it will be scheduled for an appropriate time and handled via the network. (See TA0012)
TA005	**Laptop Configuration**	Each Portable PC Workstation shall be procured with an extra hard-drive. Both hard-drives are imaged at the same time. When it is necessary to re-image the laptop, the extra hard-drive will replace the corrupted one. The corrupted one will then be re-imaged and stored for future use.
TA006	**Primary and Secondary Servers**	To protect against the loss of an application server, for each primary application server there will a secondary server. A single secondary server may shadow or mirror one or more applications. All applications will be hosted on one server and seconded on another. In the event of the loss of the primary server the secondary server will be able to resume operations within an acceptable timeframe (hours not days).
TA007	**Networks**	The network is as important to the operations of the college as electric power, running water, and air conditioning. It shall be of the highest quality, impeccably secure, and extremely durable. The network will be transparent to the user. They will be able to do what they need to do, when they need to do, 99-percent of the time.

TA008	**Dedicated Labs**	The Computer Science Department shall be provided with dedicated instructional labs, no longer using shared labs. Due to the nature of computer science courses these labs will need to be more readily isolated from the rest of the network. Likewise due to the nature of computer science instruction, these labs will be under the day-to-day control of the Computer Science Department. In this capacity, the Computer Science Department is accountable to the CTC. (See MA006)
TA009	**e-GCC**	The architecture will no longer be geared solely for internal users and purposes. It will be equally important to provide government data to outside users – in particular the general public. This will mean secure firewalls, virus protection, and high levels of security (PINS, passwords, help desk). It also will mean that normal operations cannot interfere with or impede access and response times for outside users. The outside user community will be viewed as a critical partner who has the same rights to access as any other member of GCC.
TA010	**Planned Obsolescence**	Each piece of technological will have a replacement plan that reflects that technologies lifecycle (the number of years a technology may be used before it becomes obsolete). Each year, the plan will replace the oldest pieces of technology with the newest. In this way, the entire technology architecture will remain current at all times.
TA011	**Smart Devices**	Proliferation of smart devices and the need for training and familiarity.
TA012	**Mirrored or COOP Site**	The need to develop a mirrored site and Continuity of Operations (COOP) concept.
TA013	**Virtualization**	Servers should be virtualized using Virtual Desktop Infrastructure (VDI)

Technology IT Training (TT)

The following training requirements are not in place. In the future, all technology staff will be fully trained and highly skilled in this area.

TT001	**Engineering**	Technology staff shall be highly trained at analyzing and designing technology solutions using the appropriate (system, network, database) engineering disciplines, methodologies, and tools.
TT002	**Research & Development**	Technology staff shall be highly trained at performing emerging technologies research and development.
TT003	**Wireless**	Technology staff shall be highly trained at analyzing, designing, and implementing wireless technologies.
TT004	**Survivability**	Technology staff shall be highly trained at analyzing, designing, and implementing system backups, recovery techniques, hot swapping, mirroring, and other survivability protocols.
TT005	**Portability**	Technology staff shall be highly trained at taking full advantage of portable computing and communication technologies.
TT006	**All Assets**	Technology staff shall be highly trained at using, troubleshooting, and teaching the proper use of all of GCC's technology assets.
TT007	**eCommerce**	Technology staff shall be highly trained at analyzing, designing, and implementing eCommerce solutions appropriate to fulfill the e-GCC requirements.
TT008	**Networks**	Technology staff shall be highly trained at analyzing, designing, and implementing local area networks.
TT009	**PC Troubleshooting**	Technology staff shall be highly trained at analyzing, designing, and implementing solutions to PC and PC peripheral equipment problems.
TT010	**Customer Service & Support**	Technology staff shall be highly trained at providing, recording, analyzing, and measuring Customer Service and Support activities (i.e. Help Desk).
TT011	**Application Support**	Technology staff shall be highly trained in the fundamental usage of GCC applications so as to better assist users with application problems.
TT012	**Classroom Support**	Technology staff shall be highly trained in the various technologies used in the classroom so as to better assist faculty and students with in-classroom problems.
TT013	**Smart Devices**	Technology staff shall be highly trained for the proliferation of smart devices
TT014	**Mirrored or COOP Site**	Technology staff shall be highly trained in site mirroring technology, disaster recovery,

		redundancy systems, and Continuity of Operations (COOP) concept.
TT015	**Virtualization**	Technology staff shall be highly trained in servers virtualization and Virtual Desktop Infrastructure (VDI).

FUTURE IT MANAGEMENT ENVIRONMENT

Customer Service and Support

Technology users value two things most highly. They want the ability to use technology without having to worry about its availability. And they want to receive help when they need it. So long as things are working smoothly, users would rather not have to think about how or whether technology works. They just want to use it. When the technology stops working they want immediate help.

Customer Service and Support (CSS) has become a discipline in recent years with a set of guidelines and standards established. Best practices have been developed that satisfy the user's needs in ways that are cost effective to the supporting organization. Principle among these best practices is the use of automated control and tracking systems. These systems are indispensable to a properly run CSS mission. They enable and enforce problem capture, prioritization, assignment, accountability, trends analysis, and feedback.

An important characteristic of a mature CSS environment is the existence and adherence with a Service-Level Agreement. Each person calling for assistance should know how quickly their problem will addressed. Not all trouble calls are of the same priority. Some are critically important to the operations of the college while others are less critical. The Service-Level Agreement defines different thresholds of importance and assigns a priority to each trouble call. This priority drives the decision-making, response time, and assignment of critical resources to address and resolve the trouble call. With this best-practice agreement in place, users can be assured of timely resolutions to their problems.

GCC should adopt two such systems. First is a Help Desk system used by dedicated MIS technicians providing first and second echelon support to users with problems. GCC has an IT Help Desk Standard Operating Procedure that helps establish end-user roles and an escalation process for requesting MIS support. Second, is a management tracking system used by the College Technological Committee (CTC).

Performance Management

GCC should implement these CSS best practices for one other important reason; performance measuring. As the college moves closer to performance based budgeting it is incumbent upon each functional unit to identify measurable outputs from its work processes and to equate these outputs to budget dollars. What is needed most is a way to measure (count) process outputs. These counts are a

natural byproduct of systems such as the Help Desk system. All work must be measured. When all work is tracked in a database the measures are automatically captured.

The MIS department has evidence of establishing and capturing performance measurement data through their Unit Assessment Report. Through the use of an assessment management tool, TracDat, the MIS department can enter information on their technology programs, to include assessment plans, program outcomes, assessment methods, evidence and data measuring those outcomes, data utilization and decisions made, and follow-up actions into the next assessment cycle. This provides a systemic approach which helps the MIS staff understand how well they are meeting their performance goals. Areas of improvement are assigned an Administrative Unit Outcomes (AUO) number and tracked. Each AUO is measured in percentages against established criteria and documented on the Unit Assessment Report.

IT Management IT Standards (MS)

The following standards are not in place. In the future, IT Management will be fully trained and highly skilled in these standards. **The term 'IT Management' means the person or persons responsible for a particularly portion of the architecture. It does not signify MIS only.**

MS001	**Roles & Responsibilities**	IT Management personnel shall abide by the IT-related organizational charters which delineate the roles and responsibilities of all those charged with managing portions of the GCC EA.
MS002	**Supervising & Leading**	IT Management personnel shall be highly skilled in leading and supervising other members of their staff, employees from other offices, and vendors/contractors.
MS003	**Team Building**	IT Management personnel shall be highly skilled in building and motivating teams.
MS004	**Customer Service & Support**	IT Management personnel shall be highly skilled in providing high quality customer service and support to the users of the systems for which they are responsible. They shall be highly skilled in Interest-based Bargaining and other negotiation skills.
MS005	**Help Desk**	IT Management shall provide a robust Help Desk function. It shall have a single contact phone number and email address; it shall be staffed by trained Help Desk technicians and shall operate in accordance with the IT Help Desk Standard Operating Procedure.
MS006	**Systems Management**	IT Management personnel shall be highly skilled in the principles, disciplines, techniques, and tools used to manage complex computer and network systems.
MS007	**Risk Management**	IT Management personnel shall be highly skilled in identifying and assessing risks, devising mitigation strategies and contingency plans, and effectively communicating potential risks to senior management.

MS008	**Project Planning and Scheduling**	IT Management personnel shall be highly skilled in scoping a project, identifying the resources required by the project, developing project plans and building project schedules based upon the availability of resources.
MS009	**Project Management**	IT Management personnel shall be highly skilled in managing projects so that they are delivered in accordance with the agreed to requirements, on schedule, and within the budgeted amount of resources.
MS010	**Configuration Management**	IT Management personnel shall be highly skilled in controlling the configurations of the myriad software, hardware, and documentation under their control to ensure that updates, releases, and patches are properly introduced into the architecture.
MS011	**Strategic Planning**	IT Management personnel shall be highly skilled in planning for system needs and opportunities up to 5 years into the future.
MS012	**Performance Management**	IT Management personnel shall be highly skilled in measuring their workloads, adjusting workloads and staffing to ensure the most cost-efficient operation, and then requesting budgets in accordance with these workloads.

IT Management IT Architecture (MA)

The following architecture is not in place. In the future, IT Management will be compliant with this architecture. **The term 'IT Management' means the person or persons responsible for a particularly portion of the architecture. It does not signify MIS only.**

MA001	**Remote Access**	IT Management shall have full, remote, access to every database, application, directory, and operating systems that make up the GCC Enterprise Architecture. With this access they shall be able to perform their duties without having to physically relocate to the site of the problem.
MA002	**Full Authority**	IT Management shall have authority to debug, fix, monitor, and perform other necessary duties throughout the GCC architecture.
MA003	**Tools**	IT Management shall have all the tools (software applications, test equipment) necessary to perform all routine maintenance, troubleshooting, and future planning on every component within the architecture.
MA004	**Enforcement**	IT Management shall constantly monitor the architecture and shall have the right to disallow, deactivate, confiscate, and remove any unauthorized additions to, or modifications of, the approved architecture.
MA005	**Accountability**	IT Management shall be accountable for its decisions and actions to the CTC.
MA006	**Delegation**	IT Management shall distribute and delegate authority as it deems appropriate. There shall be no centralized owner of the GCC except the CTC.
MA007	**Licensing**	IT Management shall be responsible for maintaining all licensed software media (diskettes, CD/DVD's) for tracking the location of each use of licensed software; and for ensuring that licensed software is either renewed or replaced before it expires.

IT Management IT Training (MT)

The following training requirements are not in place. In the future, IT Management will be fully trained and highly skilled in this area. **The term 'IT Management' means the person or persons responsible for a particularly portion of the architecture. It does not signify MIS only.**

MT001	**Supervising & Leading**	IT Management personnel shall be highly trained in leading and supervising other members of their staff, employees from other offices, and vendors/contractors.
MT002	**Team Building**	IT Management personnel shall be highly trained in building and motivating teams.
MT003	**Customer Service and Support**	IT Management personnel shall be highly trained in providing high quality customer service and support to the users of the systems for which they are responsible.
MT004	**Systems Management**	IT Management personnel shall be highly trained in the principles, disciplines, techniques, and tools used to manage complex computer and network systems.
MT005	**Risk Management**	IT Management personnel shall be highly trained in identifying and assessing risks, devising mitigation strategies and contingency plans, and effectively communicating potential risks to senior management.
MT006	**Project Planning and Scheduling**	IT Management personnel shall be highly trained in scoping a project, identifying the resources required by the project, developing project plans and building project schedules based upon the availability of resources.
MT007	**Project Management**	IT Management personnel shall be highly trained in managing projects so that they are delivered in accordance with the agreed to requirements, on schedule, and within the budgeted amount of resources.
MT008	**Configuration Management**	IT Management personnel shall be highly trained in controlling the configurations of the myriad software, hardware, and documentation under their control to ensure that updates, releases, and patches are properly introduced into the architecture and applications.
MT009	**Strategic Planning**	IT Management personnel shall be highly skilled in planning for system needs and opportunities up to 5 years into the future.
MT010	**Performance Management**	IT Management personnel shall be highly skilled in measuring their workloads, adjusting workloads and staffing to ensure the most cost-efficient operation, and then requesting budgets in accordance with these workloads.

ONE-TO-FIVE YEAR INITIATIVES

Redundant Network and Systems

Introduction

As it stands today, the college is in a very vulnerable and precarious position due to the lack of a compatible facility to conduct systems, applications, and data recovery, as well as business continuity procedures. There is currently no Information Technology or Information Systems strategy in place within or outside of GCC to allow us to continue with operations in case of disasters to mission critical systems. With GCC's high dependency on the new SunGard BANNER Integrated Database Management System (IDMS) for operational, administrative, and instructional tasks, every effort must be made to safeguard or mirror this valuable resource. Any major disaster occurring in the existing computer server room facility or on the campus' network infrastructure will seriously paralyze the college and interrupt services until the site or the network is repaired, rebuilt, or another suitable location is identified to host recovery efforts. This addresses our inability to immediately recover and restore all systems to full normal operational status from most major disasters. In order to make sure we are prepared for the worst contingencies, we need to build redundancy into our network and in our systems. GCC should build the network infrastructure, identify a suitable facility, procure and install the redundant and failover systems that can be readily accessible when it is needed. This long-term forecast will put in place the network, server systems, and use a data hosting facility that will allow the college to continue business operations despite natural or manmade disasters of its primary communications and file servers' location. This also addresses data, network, and communications security compliance while creating a mirror of the primary and secondary locations' critical information and instructional technology. This outlook will safeguard the college's vital digital data assets and allow GCC to continue to operate and meet internal or external federal and local reporting requirements, while complying with mandatory data protection regulations. More specifically, this will provide the technology and the means to recover from disaster and equip all employees with necessary resources to continue servicing our students. In short, the college's system's hardware, software, network, and Internet connection needs will be there when it is most needed after any major catastrophe or as an emergency backup.

Minimum Technical Requirements

The following specifications define the minimum requirements for GCC's Redundant Network and Systems Project to support the main campus in Mangilao and its mirrored remote site.

GCC's Mangilao Campus Redundant Network link to Existing Network

- Remote Site with Mirrored Servers' Located at the Data Hosting Facility, Linked with High Speed Network Lines to GCC's Mangilao Campus' Redundant Network

Five-fold Project Description

This future environment envisions a five-fold approach

1. Design a redundant network
2. Putting in place a redundant network
3. Connected to an off-campus mirrored site of primary data and applications systems
4. Linked via high-speed fiber-optic network
5. Located and utilizing an on-island data hosting facility

This infrastructure will be capable of linking and synchronizing the main Mangilao campus systems to a remote, secure and safe data hosting facility housing a mirrored systems environment. In case of disasters or emergencies, the redundant network along with the data hosting facility will be capable of quickly deploying existing systems applications and networked data services back and forth to GCC's main campus. The configuration of the redundant network and systems at the data hosting facility, will act as a backup infrastructure that is fully self-sufficient with redundant power, communication links, and air conditioning and air-quality control systems, as some of the basic requirements. The facility must be hardened and able to withstand major disasters, such as typhoons and earthquakes. The facility must have fire detection and suppression systems, security camera surveillance, and 24 hours, 7 days a week, 365 days a year manned security.

The servers and network hardware to be procured and housed in the primary Mangilao campus location and in the data hosting facility must be fully fault-tolerant and be able to provide 99.999-percent uptime with zero to very minimum loss of business operations. The systems in place at both the primary and at the data hosting facility must have an automated monitoring and alert system that will be triggered depending on the seriousness of the problem or the overall health status of the network, database, or file server resources. The remote data hosting facility will also have onsite technical personnel to assist GCC's internal technical support staff with problem resolutions between the primary and remote hosting facility.

This future environment should cover a redundant network and systems (server hardware & software) configuration and construction for the main Mangilao campus with failover capability to the mirrored site at the data hosting facility. This environment must be able to work in and not be in conflict with GCC's existing network infrastructure, and in a multi-network protocol, multi-network operating systems, and in multi-operating systems environment that include the following:

- Windows NT/2000/2003/2008 Network Operating System
- UNIX, REDHAT, LINUX, FEDORA, OS/400, Novell NetWare
- Windows 98/VISTA, and Macintosh Operating Systems
- 3Com Hubs and Switches
- 3Com 100mbps and Giga Switches
- CISCO Routers
- CISCO ASA Firewalls
- TRENDNet, NetGear, Nortel Routers

- Symantec Firewalls
- Ethernet Hub Topology
- Private/public TCP/IP Protocol
- Others

New environment should not conflict with GCC's broad range of desktop and specialized academic and operations applications, network monitoring solutions, and its enterprise systems that include the following:

- Microsoft Office
- WordPerfect Office
- InterMapper
- SolarWinds
- Symantec AntiVirus
- TracDat
- Banner Integrated Database Management System
- Luminis (MyGCC Portal mygcc.guamcc.edu)
- Moodle/Joomla (www.guamcc.edu)
- WorkFlow
- Banner Document Management System
- Operational Data Store
- iPlanet Messaging Server
- Oracle Database Management System
- Xerox Printing/Copying/Scanning System
- Others

Redundant, Reliability, Failover, and Mirrored Capabilities: Redundant network and systems must not have a single point of failure and must have multiple automatic failover systems for optimum continuous use and operation; allow outbound and inbound network traffic to the mirrored site at the data hosting facility when primary network and/or servers are down and offer 24-hour by 7-day reliability/availability. The main Mangilao campus location must maintain connectivity and processing to the mirrored remote site in the event an outage occurs to the primary network and/or primary servers. In the event of a total systems failure or power failure of the main servers or the primary site, the proposed mirrored systems' site must be at least accessible from the designated redundant or secondary network of the main campus. All start and end points of key network segments of this setup must include continuous power and power protection. This operation must be automatically provided by the system and not require GCC or vendor staff to make any configuration changes to the system or to start and end point equipment, in order to allow for this capability to occur upon outage or failure. Redundancy and mirroring capability must be set to have continuous synchronization between the primary network systems and servers. All updates to the primary network's servers must occur immediately with the mirrored site servers at the data hosting facility and vice versa. For technical specifications of servers to be proposed please see appended "Technical Bid Specifications for Blade Servers, Storage Area Network (SAN), and Software". Proposed servers and other items on this hardware section of the bid must meet all

minimum specifications and must include the service component, inclusive of copying, imaging, or virtualizing existing servers at the main Mangilao campus to these new servers. This is a critical and mandatory requirement in the event the on-campus systems become unavailable for whatever reason. If the on campus systems become unavailable, it is also mandatory for the mirrored remote site's database, files, and information systems applications to be as up-to-date, synchronized, running, and accessible to our users. Once the on-campus systems come online and before it is accessed by the users, it must synchronize first with all the updates that occurred at the mirrored remote site.

Quality and Industry Standards: Systems must be to industry standard for terminating connectors, terminating equipment, copper and fiber optic cable, for system redundancy, reliability, failover, mirroring, and data hosting facility. Network efficiency must be at optimum level to meet current demand and be capable of upgrades without significant costs in equipment or cabling replacement. All fiber cabling implementations must meet or exceed industry standard. All network backbone segments must at least support 10gbps bandwidth capacity.

Remote GCC Locations: The design of this system must utilize the existing connectivity implementations for the remote GCC high school satellite sites to access network resources located at GCC's Mangilao campus. In the implementation, users from any remote GCC high school location or GCC Internet users outside the main Mangilao campus must have access to the servers residing in the primary network. However, in case of a connection or access failure to these systems, outside users must be rerouted to the mirrored site at the data hosting facility until the connection and/or access failure is resolved and the servers at both Mangilao and mirrored remote sites are synchronized.

- Data Hosting Facility: Data Hosting Facility must be equipped and constructed with:
- Standby generators and backup AC power systems
- 24x7x365 Uninterruptible power sufficient for proposed servers and communications equipment at full load
- Fire suppression and detection
- Air conditioning and air quality control system
- Typhoon-proof and earthquake protection structure
- 24x7 Network Operations Center and Security
- Customizable cabinets

Existing Network, Redundant: Network, Cabling and Inside Wiring: GCC's requirement is to utilize the existing LAN (Local Area Network)/CAN (Campus Area Network) in place at the main Mangilao campus to design, build, implement and link to a new redundant network infrastructure. The redundant network must link to one or both of GCC's existing Internet Connections/Lines AND must also have a separate Internet connection(s) and/or connectivity to the data hosting facility, independent of the two existing Internet lines. This independent connection(s) will be necessary to satisfy all other remaining and related technical requirements of redundancy for this bid. The main Mangilao campus is currently connected to two Internet Service Providers via dedicated 10mbps fiber/Ethernet line from MCV, and another dedicated 10mbps Metro Ethernet

line from GTA. The campus LAN/CAN is made up both 100mbps (copper/fiber) and 1gpbs multimode fiber backbone lines. CISCO routers and 3COM switches and hubs make up most of the networking equipment all linked by fiber optic cable and/or CAT5 (or greater) cabling. Pure wireless (DSL) connections are limited with only a few hotspots and some wired-to-wireless implementations are in place. The redundant network along with its new line to the data hosting facility can also optionally use and/or expand either one or both existing Internet connections, as long as all related technical requirements are satisfied. The redundant network should be designed, built, implemented, and linked in such a way that any physical break or equipment failure anywhere on the network will not result in an extended interruption or discontinued operation for the whole of GCC (please see Redundant, Reliability, Failover, and Mirrored Capabilities). All hardware, software, tools, equipment, materials, supply, construction, permits, connection lines, and/or services (inclusive of one-time charge, and annual and monthly maintenance) must be clearly detailed and included in the proposal.

Systems Administration: A secured and authenticated device and administrator login management console from any point or from any GCC-designated point on the network for all and any component of the redundant network and systems must be provided and supported. GCC's network coordinators, systems programmers, and administrator must be able to conduct work through a secured access either via a standard browser-based interface or vendor-provided control console. Any required server(s) for systems administration, must be based on industry standard server-grade hardware/appliance and use Microsoft Windows Network Operating System or any of the latest and common UNIX operating system (RedHat, LINUX, FEDORA, IBM AIX), and must be able to work in and not be in conflict with GCC's existing network infrastructure, multi-network protocol, multi-network operating systems, and multi-operating systems environment, and various desktop applications, enterprise, and specialized systems (see list provided above). On-site or on-island off-site systems administration technical training must be provided for all pertinent technical GCC IT/MIS personnel.

Scalability: Capable of modular, cost-effective growth in service, hardware and software inclusive of equipment and systems applications over the next five years. Recommended system should be expanded or configured with increased efficiency and robustness (as examples, more bandwidth throughput, more routing options, increase security, adaptation to new technologies, IPv4/IPv6 changes) without substantial investment in or replacement of systems components such as cabling, switches, servers, and routers/gateways.

Enterprise Security: Include an enterprise security component that will work with a multiplatform / multivendor environment such as Windows, Mac, Novell NetWare, and LINUX/UNIX. Users accessing the network must be allowed to at least authenticate and register the (1) device(s) they are using, (2) their personal credentials such as username, login account, and password, or (3) a combination of both "1" and "2". For more details of the Enterprise Security technical specifications please see the appended "Technical Specifications for Enterprise Security".

Voice-over-Internet-Protocol (VoIP) Telephone System

Introduction

GCC spends over $100,000 per year on telephone utility costs, not including all expenses for telephone instruments, long distance charges, telephone system reprogramming, cabling/wiring, and other related services costs. The college is currently installed with over 200 telephone lines with most of the numbers going through a PBX/Centrex phone system and all services provided by Guam Telephone Authority (GTA). The last FY09 telephone utility budget was at $132,000 and is expected to increase in the following years if the college does not act now to adopt new technology that can significantly reduce this cost. There are now different types of technology in the market that can meet the college's telephone communication needs without the high cost associated with GCC's current telephone system. Voice-over-Internet-Protocol, or VoIP, is technology that has proven itself over the recent years and different types of this technology are implemented throughout the world by various system manufacturers and phone service providers. This is a proven phone system that can provide the college with lower cost of ownership, is easy to manage and can grow with the college, as needed. Many installations of similar VoIP systems, within the first two years of use, are known to have paid for its self with all the cost-savings from paying standard telephone services.

The following specifications define the minimum requirements for the new IP based (VoIP) Phone system that GCC is interested in procuring to support the main campus in Mangilao and its remote office/classroom operations at the Guam public high schools:

- GCC's Mangilao Campus Buildings, Offices, Classrooms, and Conference Rooms
- High school sites below are optional and are not part of the requirements:
- GCC Only Offices/Classrooms at Simon Sanchez High School
- GCC Only Offices/Classrooms at Southern High School
- GCC Only Offices/Classrooms at Okoodo High School
- GCC Only Offices/Classrooms at George Washington High School
- GCC Only Offices/Classrooms at John F. Kennedy High School
- All types of existing telephone lines inclusive of
    - Voice
    - Fax
    - DSL/Modem

Project Description

The college will be looking at procuring necessary services, hardware, software, network, and Internet lines that can provide VoIP telephone services to the college. The system installation will be for the main Mangilao campus. The college may choose to these services, over the Internet, to GCC's remote satellite classrooms and employee offices.

The system can be either entirely housed in the primary Mangilao campus server room, located throughout strategic points on the network, and/or be at a vendor's facility. Any combination of this system's configuration, as far as its location(s), is acceptable. This system must be redundant and fully fault-tolerant and be able to provide 99.999-percent uptime with zero to very minimum

loss of business operations. The system in place must have an automated monitoring and alert system that will be triggered depending on the seriousness of the problem or its overall health status.

VOIP system must be scalable and able to incorporate up to 300+ lines/end users. Configuration of phone systems must be for all main campus employees at their designated office space, classrooms, and conference rooms. Proposal must include in the bid all necessary items. Any and all additional items that are not required or are deemed as extras must be clearly labeled as "optional". This system must be able to work in and not be in conflict with GCC's existing network infrastructure, and with a multi-backboned, multi-network protocol, multi-network operating systems, and in multi-operating systems environment that include the following:

- Windows NT/2000/2003/2008 Network Operating System
- UNIX, REDHAT, LINUX, FEDORA, OS/400, Novell NetWare
- Windows 98/Windows VISTA, and Macintosh Operating Systems
- 3Com Hubs and Switches
- 3Com 100Mbps and Giga Switches
- CISCO Routers
- CISCO ASA Firewalls
- TRENDNet, NetGear, Nortel Routers
- Symantec Firewalls
- Ethernet Hub Topology
- Others

Distance Education (DE)

Introduction

GCC explored Hawaii's Distance Education (DE) system as a potential model or benchmark to assess the college's ability to deliver DE on Guam and outlying island. Hawaii deploys an inter-island system called the Hawaii Interactive Television System (HITS), a line-of-sight technology microwave system that involved the installation of towers and antennas throughout the State of Hawaii. The line-of-sight restriction meant the towers and antennas had to be in key locations where they that could see each other. In June 1990, Hawaii delivered its first classes via a two-way video format. In 2001, HITS2 was installed. This was a digital upgrade of the analog video system with an IP system using Internet multicast over digital microwave. As a result, the intercampus network links jumped from T1 to OC3. In 2002, the inter-island connectivity was enhanced with cable-franchise-based submarine OC3 links with Cisco routers used to connect the sites. At the present time, fiber links between the campuses are being upgraded to 10G and high-definition, and H.323 Internet-based videoconferencing equipment is being installed. Hawaii still uses Cisco routers between campuses and for external connections, they use Juniper routers.

Limitations of the HITS2 system are:

- Only able to see two sites simultaneously

- Uses a third party RAT audio system to receive other sites which causes variable audio levels and echo issues
- Complex switching system
- Uses proprietary mpeg2 stream and encoders/decoders are no longer being manufactured
- Scan conversion have poor picture quality
- Cost to build a site is expensive
- Can only record one site

While there are many DE applications available, what is common across the DE community is the ability of the educational network infrastructure to meet the bandwidth demands of a robust DE environment. GCC's network, in its present state, is incapable of delivering DE at the same broadband-level as Hawaii. Therefore, a strategic Three-Phase approach to planning a network infrastructure is recommended. The phases depicted here are a guide which can be considered a road map towards GCC's DE vision. Future planning with GCC staff, faculty, CTC, and the MIS department are paramount to the success DE.

Before DE can be successful, GCC, MIS, and CTC will need to look at what application will be used to deliver and support the DE program. Several program applications exist in the market that supports DE and selecting the right application to support GCC's needs should be the first step for DE.

Phase I: Infrastructure Upgrade

GCC's current Infrastructure will require upgrades of their existing cabling from Network Operations Center (NOC) throughout the campus, not to include newly planned or constructed building within the campus. Current cabling exist to support requirements in existence today; however, DE requirements will require a support base for high-speed and volume.

Category (CAT) 5, 5e, 6, and 7 Cable

Today's industry standard requires these rated cables, which are dependent on a number of factors:

- Distance, in comparison vary from CAT 5 – CAT 7, the lower the number, the shorter the distances
- GCC's requirements within the NOC and throughout the network can be supported, at a minimum, with CAT 5e
- Cat 5e is enhanced cabling that carries signal strength and bandwidth at gigabit speeds and supports high speed Ethernet and video
- Patching and switching from within the NOC, if external CAT5e is used, then requirements for additional hubs to support lengths in excess of 328 feet will be needed
- CAT 6, and 7 can be used, but a complete overhaul of all buildings on campus will have to be achieved
- Fiber is another solution, this method will not require back haul support from hubs, but will require the right purchase of equipment to support fiber

Phase II, Network Infrastructure

Network Infrastructure, this requirement is necessary to insure proper support throughout GCC network and the way forward to DE. Today's hardware comes with reliable energy efficient and resourceful solutions. GCC's current Access Router inside the network is in need of replacement, it is at end of sale and end of support. Planning the next upgrade will require network engineering which your MIS department has that ability.

The following should be considered when selecting hardware replacement for your network:

- Distance Education
- Target market now and the next 5 – 10 years
- Phases of this target to support financial requirements
- Engineered specific requirements to support new technology
- Bandwidth requirements:
  a. Current Bandwidth 30M Metro E
  b. Wi-Fi launch will increase nodes from 500 – 1000, this will be supported with 10M
  c. Current Utilization is at approximately 90-percent
  d. Without Wi-Fi launched, 80-percent is received and 10-percent transmit
  e. With these numbers, Wi-Fi will have to be monitored closely before and during Phases I and II
  f. Additional 30M recommendation for DE prior to end of Phase II, this will increase the number of nodes to support DE for the first 500 to 1000 nodes while maintaining a 70 – 80-percent utilization
  g. Utilization monitoring will be important at this stage to insure reliable bandwidth to sustain DE in the future as GCC grows the network and DE capabilities
- Access Routers to support security inside and outside the network
- Switches to support network within
- Configuration Management (Network Administration)
- Disaster Recovery Plan, Exercise Plan, schedule and un-scheduled
- CTC involvement with current DE applications, what works, what does not?
- Training of MIS Staff

Phase III, Launch Distance Education

- Launch DE with selected departments taking the lead with launch
- Continue to train instructor course requirements and build application processes as required
- Continued support for services and maintenance for DE application

Security and Vulnerability Testing

NETWORK SECURITY

GCC is taking steps to institute safeguards against security breaches in its network. To identify areas of weaknesses and vulnerabilities in a network, a network vulnerability and penetration test is a method used to evaluate the security of a computer system or network by simulating an attack from malicious outsiders and insiders. The process involves an active analysis of the system for any

potential vulnerabilities that could result from poor or improper system configuration, both known and unknown hardware or software flaws, and operational weaknesses in process or technical countermeasures. This analysis is carried out from the position of a potential attacker and can involve active exploitation of security vulnerabilities.

In December 2011, an External Vulnerability Assessment of GCC's network involving ethical hacking produced findings of Medium-to-Low risks and Low Exploit vulnerabilities. The security and protection of GCC's infrastructure, from an external perspective, assessed the network with an overall low-risk rating. This assessment validates the security confidence in GCC's network as a result of security practices, disciplines, and policies in place. A secured network gives GCC the confidence and trust in protecting student records and other sensitive data from being compromised. GCC should continue to leverage external assessments as they move forward in fulfilling their goals, objectives, and mission in providing the best educational benefit for its students.

Reasons to perform a network penetration test:

- A penetration test helps organizations to understand their current security posture by identifying gaps in security. This enables organizations to develop an action plan to minimize the threat of attack or misuse.

- A well-documented penetration test helps managers in creating a strong business case to justify a needed increase in the security budget or make the security message heard at the executive level

- Security is not a single point solution, but a process that requires due diligence

- Security measures need to be examined on a regular basis to discover new threats. A penetration test and an unbiased security analysis enable organizations to focus internal security resources where they are needed most

- Meeting regulatory and legislative requirements are a must for conducting businesses today. Penetration testing tools help organizations meet these regulatory compliances

- A well-executed penetration test and security audits help organizations find the weakest links in this complex structure and ensures all connected entities have a standard baseline for security

- A well-executed penetration test and security audits help organizations find the weakest links in this complex structure and ensure that all connected entities have a standard baseline for security

- Once security practices and infrastructure is in place, a penetration test provides critical validation feedback between business initiatives and a security framework that allows for successful implementation at minimal risk

Security issues uncovered from a penetration test are presented to the system owner. Effective penetration tests will couple this information with an accurate assessment of the potential impacts to the organization and outline a range of technical and procedural countermeasures to reduce risks. Penetration tests are valuable for several reasons:

- Determining the feasibility of a particular set of attack vectors

- Identifying higher-risk vulnerabilities that result from a combination of lower-risk vulnerabilities exploited in a particular sequence
- Identifying vulnerabilities that may be difficult or impossible to detect with automated network or application vulnerability scanning software
- Assessing the magnitude of potential business and operational impacts of successful attacks
- Testing the ability of network defenders to successfully detect and respond to the attacks
- Providing evidence to support increased investments in security personnel and technology
- Recommended penetration testing of GCC's network should include each of the following:
- Internet/DMZ Servers
- CGI abuse scans
- SQL Injection testing
- IDS Evasion and testing
- Firewall Penetration
- Email account harvesting
- Internet Information Gathering
- HTTP and HTTPS Scanning
- Custom scripting attacks
- Man-in-the-Middle attacks
- Denial-of-service emulation
- Open Source Search
- Application and Banner Grabbing

Three-Phase Network Improvement Project

In the Fall of 2007, GCC implemented Banner and committed to a 24/7 operational environment. However, the state of the network infrastructure was insufficient to carry the increase data and placed GCC in emergency mode to remediate the network shortfall. As a result, a Three-Phase strategy approach to improve the network was approved by the College Technological Committee to implement a more robust network infrastructure to meet current demands and plan for future growth.

See Appendix D – Three Phase Network Improvement Project.

Phase One

Phase One is completed. With one router serving over 1000 computers, this created one large broadcast domain which is susceptible to broadcast storms and contributes to network outages. Broadcast traffic traverses entire network, wasting bandwidth. IP addressing scheme had four subnets scattered throughout the entire campus. Endpoints on separate subnets must communicate through a router, even if they are physically adjacent to one another. This was an inefficient use of internal bandwidth and tied up resources on the edge router, which should only handle traffic destined for the internet. The existing network design utilized four public IP address blocks. This costs money and can be averted by switching to private IP addresses. Public addresses are only required for publicly accessible servers. (i.e. website and mail server)

Phase Two

Phase Two is approximately 90-percent completed. Network is no longer one large broadcast domain. Each router contains its own broadcast domain, and this will limit any possible broadcast storm to their respective area. Network is behind a firewall which adds security from external threats. Private addresses are being utilized. We can stop wasting over a thousand public IP addresses. All local (internal) traffic will no longer need to use the edge router. This allows bandwidth to be more efficiently utilized. Edge router will only handle traffic destined for the internet.

Phase Three

Specific objectives to achieve are:

- Add redundancy throughout GCC network to ensure maximum uptime
- Create a legitimate DMZ to bolster security
- Apply to APNIC for a multi-homing assignment. This allows GCC's servers to not be reliant on IP address schemes from MCV or GTA connections. Website will be accessible through either ISP.
- Remove public IP addresses from servers that do not require public access. This is an added security measure to protect our servers
- Implement secure VPN solutions when access to sensitive applications is required off campus

Virtualization of all Legacy Servers, Upgrades to BANNER 9/XE and LUMINIS 5

<u>Second-Half of Virtualization Hardware Upgrade Project</u>

- Back-up Solution
    - Dell PowerVault TL2000
    - PS4000 (13TB Useable)
    - Symantec 2010 Backup Exec with Data Dedup

- Increase Server Capacity by adding two additional Blade Servers
    - Two additional VMware ESXi vSphere 4.1 Enterprise Licenses for each blade servers

- Increase storage capacity by adding 2nd Tier PS4000 SAN to have an increase of 3TB of useable storage capacity

Wireless Network and Access Point Solution

GCC's Wireless Network and Access Point Solution project is currently under review. The following specifications define the minimum requirements for GCC'S Wireless Network and Access Point Solution:

Quality, Industry Standards, and Access Point Specifications: Systems must be to industry standard for wireless systems. Wireless network efficiency must be at optimum level to meet current demand and be capable of upgrades without significant costs in equipment. All implementations must meet or exceed industry standard. Other specific requirements for the access point are:

1. Access Point

a. Coverage

1) Supports all 802.11a extended channels
2) Can utilize additional channels in 5GHz (802.11a/n)
3) Supports 802.11 a/b/g/n radios simultaneously
4) Have integrated or external high gain antennas (to achieve greater range and coverage)
5) Have the ability to precisely define RF coverage boundaries by way of per-radio power control (for privacy)

b. Capacity

1) Have Sectored or beam-forming antenna architecture for higher data rates and longer ranges
2) Wi-Fi network must support simultaneously a minimum of 500 to a maximum of 1000 associated devices.

c. Bandwidth, Channels Compliance, and Supports

1) 802.11a
2) 802.11b
3) 802.11g
4) 802.11n or be fully upgradeable to 802.11n
5) Supports wireless mesh networking.
6) OPTIONAL: Have two Ethernet uplinks for built in redundancy and the ability for future expansion with the WLAN utilizing voice, video, emergency services

d. Power Source supports

1) Direct AC power
2) POE (Power Over Ethernet) 802.3af
3) POE over Gigabit connections
4) AC/DC redundancy (AC and Power over Ethernet/Gigabit Ethernet)

e. Distributed Design

1) Switching performed at the access point

2) 802.1p,Q and QoS tagging applied at access point
3) Filtering/Firewall Policies applied at access point
4) Onboard or remote controller for the access point

f. High Availability, Redundancy, Failover, and Reliability

1) Available Radio-to-Radio failover in case of interference, channel and/or radio failure
2) Have active service health checks and self-correction or self-healing
3) Have configuration auditing and backup
4) Reliable and available despite normal noise interference from surroundings

g. Supports Voice over Wi-Fi

1) Solution is VIEW certified (Spectralink's Voice Interoperability for Enterprise Wireless)
2) QoS Support (IEEE 802.1p, 802.11e, CAC)
3) Fast Roaming (IEEE 802.11r)
4) Layer 2 or Layer 3 tagging
5) End to end QoS capability all the way through the wired/wireless network
6) Supports hundreds of clients and voice clients roaming across layer 3 boundaries and VLANs
7) Ability to identify available Wi-Fi resources for Call Admission Control

h. Supports Video over Wi-Fi

1) Supports conversion of multi-cast to unicast streams
2) Provides access control to the RF medium for subscription to a video feed

i. Rogue Access Point and Wi-Fi Threat detection

1) Detects rogue access points
2) Management system can remedy rogue access points
3) Can identify by OEM of discovered rogue access point's BSSID, SSID, Manufacturer, Channel, RSSI, Security, Type (IBSS, ESS), Last Active status
4) Accurate Location Tracking System that is capable of pointing out where Rogue APs or where Interfering devices are located on a floor plan
5) Wi-Fi Threat sensor, capable of detecting Man-in-the-Middle attacks and other commonly seen attacks

j. Optional Spectrum Analyzer/ Interference

1) OPTIONAL: Spectrum analyzer capable of classifying interfering devices such as Bluetooth, Microwave ovens
2) OPTIONAL: Be able to correlate and classify interferers through spectrum analysis. For example, when an interferer is heard by multiple APs, the system should report this as a single interferer
3) OPTIONAL: Be able to locate multiple interferers simultaneously on a map and be able to show the zone of impact on a map for interfering devices
4) OPTIONAL: Use spectrum analysis to identify non-802.11 sources of interference like Bluetooth headsets, video cameras, etc. while simultaneously servicing clients and performing Intrusion Detection

5) OPTIONAL: Ability to change channels based on detected interference patterns to improve network performance

k. Overall Solution and Standards

1) Standards-based solution
2) Supports Wired Prioritization (802.11e) QoS differentiation for wireless medium
3) Performs Automatic Channel Assignment
4) Support all standard LAN and WLAN standards without proprietary solutions or protocols that will limit the ability to expand the Wi-Fi network
5) Supports external antenna connection via SMA/TNC or N connectors
6) Has Multi-radio Wi-Fi Meshing
7) Have automatic user load balancing among radios and between access points.
8) Have both automatic and manual control of area coverage
9) Have fast and seamless roaming
10) Capable of outdoor deployments and includes environmentally controlled outdoor enclosures to ensure no moisture, fibers or dirt can enter AP, potentially causing a failure
11) Provides automatic or manual meshing between Access Points to provide a fully redundant Mesh network with multiple routes for sending packets

l. Product Installation

1) Securable, drop ceiling/surface mount indoor enclosures wherever necessary and according to site survey
2) Provide installation time required per access point based on per location, onsite inspection and site survey
3) Equipment required to deliver service to a specific area can be mounted externally on campus buildings and rooftops
4) Existing conduits and raceways may be used, provided such use does not exceed network standards conduit fill ratios
5) Additional infrastructure may be installed; however, installation will be subject to MIS and Facilities & Maintenance approvals and/or coordination
6) When dealing with structural entry, provide reasonable efforts to maintain the structural integrity and weather resistance of such entry
7) Wire molding for cable security must be kept to a minimum

2. **Existing Wireless and Local Area Network:** GCC's requirement is to put in place the access points and tie in the new wireless network infrastructure to the existing LAN (Local Area Network)/CAN (Campus Area Network) at the main Mangilao campus, and to assess and take action on either removing, replacing, or simply linking existing wireless spots in an effort to improve the overall wireless service network. It is understood that some integration between existing campus network and programming will be required to marry the Wi-Fi to the campus "wired" network. The bid awardee should prepare VLAN implementation plans for best practice in parallel with standard bid processing and/or requirements. The main Mangilao campus is currently connected to two Internet Service Providers via dedicated 10mbps

fiber/Ethernet line from MCV (Marianas Cable Vision), and another dedicated 10mbps Metro Ethernet line from GTA (Guam Telephone Authority). The campus LAN/CAN is made up both 100mbps (copper/fiber) and 1gpbs multimode fiber backbone lines. CISCO routers and 3COM switches and hubs make up most of the networking equipment all linked by fiber optic cable and/or CAT5 (or greater) cabling. Current pure wireless (DSL) connections are limited with only a few hotspots and some wireless-to-wired implementations are already in place. The new wireless network should be designed, built, implemented, and linked in such a way that any physical break or equipment failure anywhere on the network will not result in an extended interruption or discontinued operation for the whole of GCC.

3. **Systems Administration, Management, and Control:** A secured and authenticated device and administrator login management console must be provided and supported from any GCC-designated point on the wireless or wired network for monitoring, managing, and controlling all and any installed wireless network component. GCC's network coordinators, systems programmers, and administrator must be able to conduct wireless-related systems administration work through a secured access either via a standard browser-based interface or vendor-provided control console application. On-site or on-island off-site systems administration technical training must be provided for all pertinent technical GCC IT/MIS personnel. Other requirements for the access point are:

   a. System Administration, Management, and Control Tools

      1) Local processing/control must be at the access point and/or management system
      2) Must be able to support traffic prioritization in each Access Point
      3) Common local and centralized management
      4) Have asset identification and tracking based on location
      5) Stores multiple software images with rollback ability
      6) Have restore set to factory default feature
      7) Have and leverage system management Tools via:
         - Serial/CLI (command line interface)
         - Syslog
         - Centralized SNMP
         - Web based / browser based
         - Management over the air
         - Secured access (SSH, HTTPS)
         - Can be disabled on all interfaces
      8) Have RF management tools with
         - Integrated Wi-Fi RF Analyzer (similar to standalone spectrum analyzers, but integrated within the access point)
         - Must be able to scan Wi-Fi frequencies and identify any interference and/or noise within these frequencies
         - Auto Cell sizing
         - Auto load balancing
         - Auto channel selection

- he system should automatically monitor and change the transmit power and channel settings of specific access points to achieve a uniform (optimal) configuration to minimize co-channel interference and contention within each location
- Access Points should support beam-forming functionality for non-802.11n clients to improve downlink performance metrics ensuring maximum lifecycle management of legacy Wi-Fi client devices and smart phones
- Access Points should allow variable transmit power control so as to limit signal bleed in specific areas
- The system should provide for load balancing between the radios of an Access Point and between different Access Points

9) Provides detailed remote client trouble shooting tools

10) Provides detailed info of client status, authentication process status, and automatic remediation of client issues

11) OPTIONAL: Provides real-time spectrum analysis information such as power over frequency graphs, duty cycle, interference, and interferer classification

12) OPTIONAL: Provides graphical diagram of both indoor and outdoor mesh deployments.

13) The system should support implementation of Voice over WLAN

14) Integrates map tool for wireless deployment planning to show AP placement, AP Heat maps and other pertinent information in graphical and quantitative view

15) Provides system-level management information on device configuration, security policies, and RF parameters

4. **Scalability and Upgradeability:** Solution must be capable of modular, cost-effective growth in service, hardware and software inclusive of equipment and systems applications over the next five years. The system can be expanded or configured with increased efficiency and robustness without substantial investment in or replacement of systems components. Other requirements for the access point are:

   a. Scalability and Upgradeability

      1) AP's must have upgradeable controller (internal or external) memory inclusive of packet RAM for QoS, System RAM for new features and better performance, and flash for local file and image storage
      2) Designed for 802.11n today or be upgradeable and expandable to support other wireless technologies
      3) Platform(s), firmware and software upgradable to support future evolution of the 802.11 standard (i.e. 802.11n, 802.v, 802.11w)

5. **Enterprise Wireless Security:** Solution must include an enterprise security component that will work with a multiplatform environment such as Windows, Mac, and LINUX/UNIX. Users

accessing the wireless network must be allowed to at least authenticate and register their personal credentials such as username or login account, and password via a browser-based interface such Internet Explorer. The wireless system needs to be easily accessible for students. GCC is looking to utilize a captive portal. The captive portal will be tied into the integrated database system which already contains user accounts. The system, however, should be flexible enough to allow for a RADIUS server authentication in certain areas on campus in the event encrypted wireless network is deployed on top of the open captive portal WLAN. Provisioning method will require a solution to be able to integrate with the GCC Banner/Luminis database system. Users should be able to login to the wireless using their MyGCC account. Other security-related requirements are:

a. Security services and features supported or have

1) WEP, WPA, and WPA2
2) Authentication: Open, MAC Address, and 802.1X
3) Integrated/onboard Stateful Firewall
4) Integrated RADIUS server and authentication with WPA2 encryption
5) Integrated/onboard IDS/IPS sensor and service
6) Embedded/onboard Wi-Fi Threat Sensor inside the Access Point
7) Embedded Spectrum Analyzer inside the Access Point
8) Proactive threat mitigation
9) Station-to-station traffic blocking
10) The following certifications - PCI, HIPPA, and FIPS-140-2
11) Traffic Encryption/decryption at the access point
12) Multi-AP or multi-radio mesh support in the Access Point
13) Reports on Guest access showing Guest Count, Sessions, account status, and the number of association
14) Provides Consolidated Security Summary of real-time assessment Wireless LAN security posture
15) Can drill-down into Security Summary for detailed information on security events on Wireless LAN and recommend resolution
16) Support of Protected Management frames (802.11w)

b. Guest User Access

1) Guest User Management System that is fully integrated into the controller or Management System that is accessible to administrators
2) Guest access solution should provide a sponsorship ability for employees in order to eliminate the need for IT staff to create guest credentials, which will enable them to log into a web portal with their credentials, enter the details of their guest (name, email, phone number, length of access required), and provide their guest with the credentials the sponsorship portal generates (newly created guest credentials should be automatically provisioned in the system)
3) Guest web authentication: The guest user must be able to associate to the wireless network, obtain an IP address, be redirected to a web authentication page in their browser, and enter their credentials to gain guest access. Guest traffic should be

completely segmented on the network from any internal resources and traffic (solution must provide an ability to encapsulate guest wireless traffic from the Access Point until outside the Internet firewall to ensure network security)

6. **Uninterruptible Power Source for Access Points:** Provide all access points with UPS (uninterruptible power source) for at least 2 hours at normal use.

Additional Open Labs

See Appendix E - Labs Upgrade Schedule

Biometric-based Physical/Digital Security (PLACEHOLDER)

GCC TV/Radio Station (Compliments DE, Marketing, Viscom) (PLACEHOLDER)

Asset Management vs. Replacement Cycles (PLACEHOLDER)

One-Stop Technology Kiosk/Cafe (PLACEHOLDER)

GAP AND IMPACT ANALYSIS

The purpose of capturing GCC's current IT environment and projecting a desired and optimum IT environment is to identify the gaps which need to be addressed. Identifying the gaps sets the stage for finding potential solutions and alternatives, reprioritization of college objectives, and inserting these action plans into GCC's budgeting life-cycle. Ultimately, it will take individual projects to implement the specific pieces of the future environment. As predicted, there are gaps between the current environment and the future architecture. What follows is a manageable list of the most pressing ones.

DATA

There is a sizable gap between the current data architecture and the proposed future architecture.

1. The first initiative is already underway. The acquisition and implementation of the new SUNGARD integrated database addresses many of the current Data shortcomings. Once SUNGARD is fully stable smaller tasks should be undertaken to eliminate as many of the MS Office pseudo-applications as possible. And the other smaller applications which share data with SUNGARD need to provide the means of sharing data directly with little or no manual processing or data entry.

2. A second initiative yet to be scoped is the institution of Student Login Ids. This initiative will give birth to others as well. Once we can identify an individual user, what else can we provide that user in terms of services and features? No doubt users could be granted differing levels of authority with their login. What should those levels be and who should have them? From a capacity planning perspective, we will have volumes of information to study. How can this information be used to get ahead of approaching risks and looming problems? Both of these opportunities will become available once we have Student Login Ids implemented.

3. A third important initiative is to conduct an analysis of the Records Management situation. The goal is to drastically reduce the amount of paper being generated and stored. Two solutions to this problem are 1) replace paper forms with online forms, and 2) store the electronic image of a document but not the physical document. The first solution should be the primary focus for addressing this problem, not the continued storing of paper forms and documents that duplicate online data. Only those original documents which must be stored shall be stored. All others will be scanned and stored electronically.

4. The fourth initiative is to more fully automate the administration of GCC's email accounts. An automated system should provide this capability and free up human resources for more important tasks.

5. A fifth initiative is to provide DE Services to deliver the classroom environment off-campus, either instruction or support services to students who are not physically co-located with the individual providing the service. This technology utilizes internet-based educational services as well as video and audio services. Many of the current variables that drive data storage requirements will apply when implementing a DE service. For example, federal and Guam laws, regulations,

statutes, policies regarding education records and how long they are kept and maintain will impact data storage capacity planning. The current baseline of data storage requirements per student can be used to forecast data storage requirements for a fully implemented DE environment. Introducing DE outside the physical constraints of the educational campus has the potential to see a large increase in student enrollments; and therefore, a demand for increased storage capacity. Awareness in student record storage laws and statutes and projected student enrollment, as a result of DE, should be shared with the MIS department to facilitate their capacity planning for future data storage.

APPLICATION

1. The plan to fill the gap with Applications is already underway. The acquisition and implementation of the new SUNGARD integrated database addresses many of the current Application shortcomings. Once SUNGARD is fully stable smaller tasks should be undertaken to eliminate as many of the MS Office pseudo-applications as possible. And the other smaller applications which share data with SUNGARD need to provide the means of sharing data directly with little or no manual processing or data entry.

2. A second initiative is to procure a robust Help Desk system to satisfy the needs of the IT Help Desk Standard Operating Procedure. This could be an open source system, like Moodle is, that would be supported by a world-wide community of IT professionals. It should be web-based with significant reporting capabilities.

3. A third initiative is to procure a robust Issues Tracking system to satisfy the needs of the College Technological Committee - Tracking System (CTC-TS) Standard Operating Procedure. This could be an open source system, again like Moodle. It should be web-based with significant reporting capabilities.

4. A fourth initiative worthy of consider is the replacement of the Cougar Mountain application. The new application should be compatible with SUNGARD. It should be bookstore software that tracks sales and inventory.

5. A fifth initiative is the identification, analysis, and selection of a DE application that will support GCC's vision to deliver DE. This is a critical step and decision that will impact the design, development, implementation, and long-term life-cycle management of the DE system. The application choice will determine hardware platforms and network bandwidth requirements. GCC should consider forming a small committee chartered to perform only one function – to analyze current DE applications in use today, narrow down the choices to no more than three and perform a very thorough and detailed product analysis. Create a weighted selection criterion that makes the application selection and final decision more objective than subjective. Criteria for example, can be derived from existing GCC action plans and stated objectives in support of the overall DE goal. Only after a final application has been selected can a more accurate implementation and training plan ensue.

TECHNOLOGY

The gap between the current technology architecture and the proposed future technology architecture is nearly as great as the gap in IT Management. This is where some significant funds will be needed. To move into the future state of the technology these gaps must be filled.

1. The most pressing issue is the overhaul of the network. It needs to be modified from its current topology into a robust double--ring topology. Additionally, a third high-speed internet connection should be brought onto campus. Then, this new network needs to be fitted with powerful load balancing software to deliver on the promise that all of this new technology holds. Not only will all users benefit from this modernization but existing MIS resources will be able to begin tackling other important issues.

2. Email administration is the second issue to undertake. Users should be able to create and administer their own email accounts. A technician need not be involved in this process except to handle problems. This means the acquisition of some new technology to replace the manual process currently in place.

3. Imaging takes up an inordinate amount of staff time. First, the policies surrounding imaging need to be reconsidered. Primarily, does GCC wish to continue to insist that all PC's be under one site license for the operating system? What are the costs associated with this decision? What are the risks of other options? In any case, imaging is a reality. Therefore, technology will be procured to more fully automate the image/re-imaging process. Rather than use CDs images will be housed on the network and re-imaging accomplished via the network. Software exists that constantly monitors the images of PC's on the network and re-images them automatically when necessarily.

4. Administering Student User Ids manually is an onerous task that MIS is not staffed to provide. Current resources are fully utilized on networking, PC troubleshooting, PC imaging, and supporting the SUNGARD implementation. However, there is much good that can come from requiring students to login before using GCC equipment. The lack of user ids causes its own set of problems but more importantly precludes GCC from implementing an even more capable IT environment. (See discussions in earlier sections of this document.) It is in GCC's best interests to require Student User IDs but only if their administration can be supported with substantial technology and tools.

5. Technology selected to support DE is ultimately linked to the final DE application selected. The technology suite to support DE will include the use of interactive audio or video conferencing that can provide real time face-to-face, computer conferencing or electronic mail to send messages, assignment feedback, and other targeted communication to one or more class members. Pre-recorded video can be used to present class lectures and visually oriented content.

IT MANAGEMENT

The gap between the current state of IT Management and the future environment is the largest, and by far the most serious gap of all. The IT Management function suffers from understaffing, miss-placed staffing, under-trained staff members, and too much responsibility. Centralized IT management is appropriate for infrastructure (procurement, networking, licensing) but is not appropriate for every aspect of the IT environment.

1. New Governance policies and structures are already being implemented. In the very near future, the College Technological Committee (CTC) will replace MIS as the entity in overall control of the IT environment. While committees do not manage day-to-day operations well, they are effective at

guiding the activities of other organizations who can manage operations. The CTC will be able to reach consensus decisions. CTC will be able to present recommendations to senior management. CTC will be able to handle grievances against IT-related policies and procedures. In the future, representatives from all areas of GCC will make all major IT decisions.

2. Likewise, MIS will have new responsibilities. MIS will no longer have final decisions in IT matters. The CTC will be ultimately held responsible for the IT environment, thus lightening MIS' load. Certain organizations, such as the Electronics Department, will be responsible for portions of the IT architecture – the parts they are the most involved in. This new responsibility matrix, as outlined in the various IT-related organizational charters, will take some time to learn and fine tune. In the short-term, however, users will be better served by IT management. In the long-term, GCC will have a single IT vision and voice.

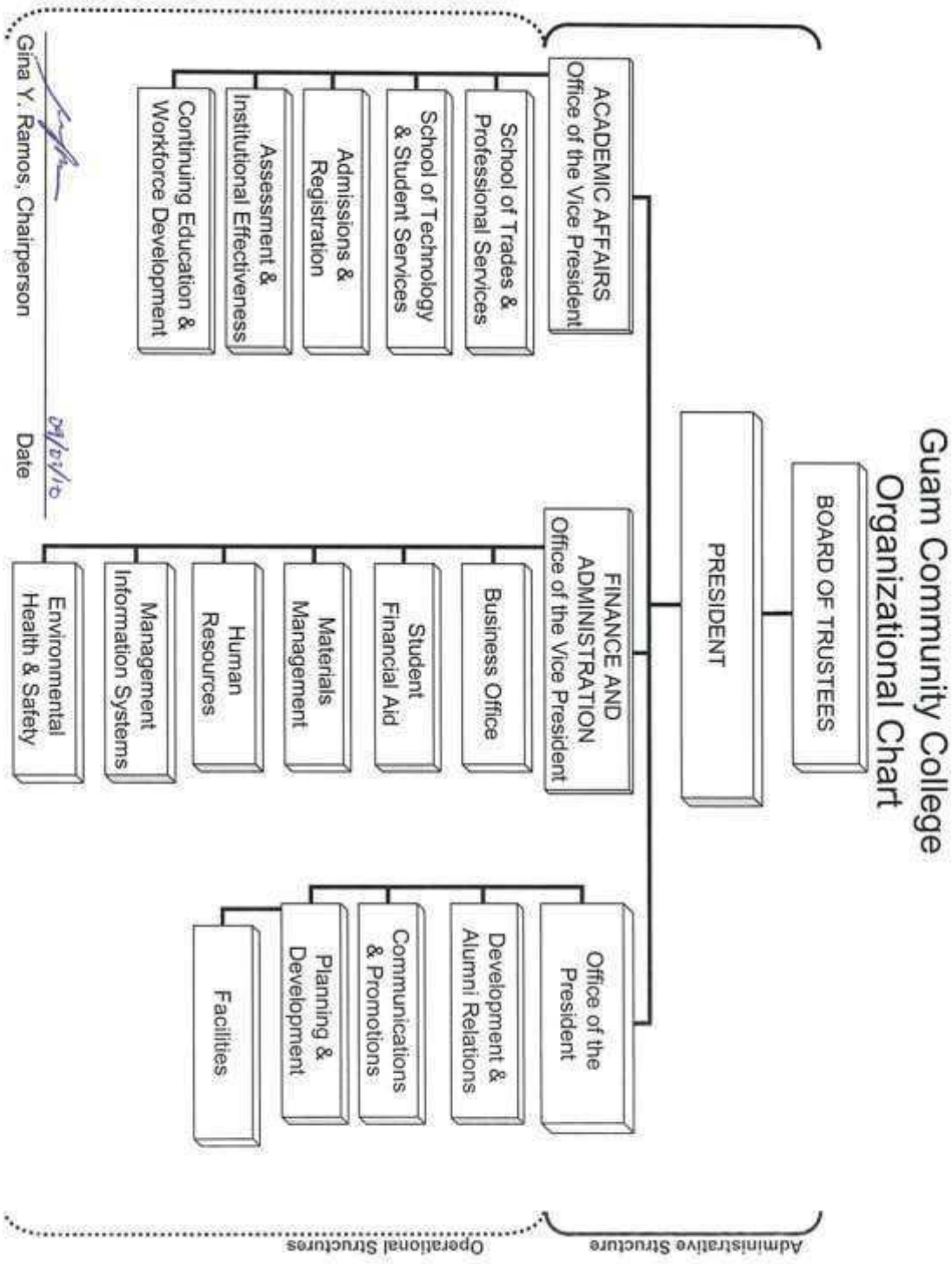
3. As MIS in particular is relieved of some of its responsibilities, it will want and need to learn new skills so as to better serve users' needs. The most pressing new skill to be learned is Project Management. Not far behind, however, are other complex skills such as system and database design, capacity planning, customer service and support, performance measuring, and others. MIS is not the only organization in need of acquiring new skills. As organizations embrace new responsibilities over portions of the IT architecture, they will need to acquire similar technical skills to become self-reliant and accomplish their objectives.

4. Another IT management challenge is the initiative to deliver DE services to Guam and other outlying islands. GCC currently faces a network that has limited bandwidth to deliver DE when compared to schools in Hawaii who have a mature DE program. With the Three-Phase Network Improvement project, the MIS network is on the path to preparing and supporting GCC with a robust DE system. However, facing the improved network is a DE application which has not been addressed or identified. IT management must anticipate and participate in the selection of the DE application. This decision will impact future funding projections, hardware, network, and software life-cycle cost projections and training. The development of a GCC approved Concept of Operations (CONOPS) is recommended prior to the design, development and implementation of DE. Designers and developers involved in DE planning, acquisition, and implementation of GCC's DE will have and appreciate the operational vision of how DE is to be delivered from the instructor to the student. The CONOPS should address operational concepts, for example, "will all enrolled students be issued a laptop for course duration? Will this be a near 24-hour environment since DE has the potential to deliver courses outside Chamorro Standard Time? Will GCC require immediate Helpdesk response for technical issues? How does GCC expect to respond or assist off-island students who require technical assistance?"

ACRONYMS

ADA	Americans with Disabilities Act
APM	Application Component Management
BDMS	Banner Document Management System
COOP	Continuity of Operations
CTC	College Technological Committee
DMZ	Demilitarized Zone
EA	Enterprise Architecture
FERPA	Family Education Right to Privacy Act
FTE	Full-time Equivalent
GCC	Guam Community College
HIPAA	Health Insurance Portability and Accountability
IT	Information Technology
ITAM	IT Asset Management
MIS	Management Information Systems
PPM	Project Portfolio Management
RDA	Resource Description and Access
RMS	Rights Management Services
ROI	Return on Investment
ISMP	Integrated Strategic Management Plan

APPENDIX A – ORGANIZATIONAL CHART



APPENDIX B – PARTICPATORY GOVERNANCE

ARTICLE VII - PARTICIPATORY GOVERNANCE

A. PURPOSE

The intent of this Article is to establish and implement a means for providing broad participation by faculty, staff, administrators, and students in the decision-making processes that support student learning programs and services and improve institutional effectiveness, while acknowledging the designated responsibilities of the Board and the College President. In keeping with the Accrediting Commission's standard on Leadership and Governance (Standard IV), the College recognizes and utilizes institution-wide contributions for continuous improvement.

The Board and the Union agree that the faculty shall join in participatory governance of the College through the Faculty Senate and Governing Council. Committees for this purpose are defined in this Article.

B. THE FACULTY SENATE

The Faculty Senate represents the Faculty of the College in academic and professional matters. The Senate may delegate its authority to specific committees or to individual faculty members for limited duration and purposes. This provision shall not conflict with the Board/ Union Agreement, Personnel Rules & Regulations, or existing laws. The Faculty Senate is comprised of the Faculty Senate President, The Faculty Senate President-Elect, the Past Faculty Senate President, and two (2) at-large senators. All senators must be dues paying members of the Union elected by members of the Bargaining Unit.

For senators who are post-secondary instructional faculty: instructional hours are reduced to 180 per semester. For the Senate President who is a post-secondary instructional faculty: instructional hours are reduced to 135 per semester. For the Senate President who is a post-secondary non-instructional faculty: release from specific professional responsibilities will be reflected in the workload as mutually agreed upon. Secondary faculty participation will be reflected on their evaluation.

C. THE COLLEGE GOVERNING COUNCIL

This Council serves to provide broad participation by faculty, staff, administrators, and students in the decision-making processes regarding institutional issues. This Council will also serve as a conduit to this process by facilitating dialog where issues are clarified between the Council and relevant constituencies. Further the Council promotes participatory college decision-making processes and supports the Faculty Senate's role in making recommendations related to academic and professional matters. The Council, with the input from its respective constituencies, shall make and/or forward recommendations for action to the College President. The Council shall consist of a total of nine (9) members which shall be comprised as follows: three(3) members shall be appointed from the College Administration by the College President; three (3) members shall be the members of the Faculty Senate, specifically, the Senate President, the Senate Past President, and the Senate President-Elect of the Faculty Senate; two (2) members from the Staff of the College appointed by the Staff Union Chair, and one (1) member shall be a representative of the Student Body appointed by COPSA with one (1) vote on the Council (the student member shall not be employed by the College in excess of twenty (20) hours per week).

D. COMMITTEES

1. Committees at the College are composed of constituency representatives and consider matters pertaining to a designated charge or subject. A committee reports its recommendations to appropriate representative bodies.

    a. Committee work shall be reflected on the Faculty Load Schedule (Appendix B) or on the faculty member's evaluation for each academic year based on the conditions identified in Articles XVI, XVIII, and XX for each faculty member's workload.

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b. No other committees shall be formed by the College to conduct the same or similar functions as those committees formed by this Agreement. In the event it is determined other committees are needed to address institutional issues, the requester will complete the Council/Committee Request Form Appendix J and submit to the respective Chief Negotiators of this Agreement for review and action.

c. The charge of these committees shall in no way be cause for interference in the normal day-to-day operations of the college.

d. Committee Chairpersons must identify their membership for the next academic year by the last meeting day of the Spring semester and shall update membership no later than the first (1st) duty day of September. Committee membership shall be forwarded by the Faculty Senate President to the Vice President for Academic Affairs by the last meeting day of the Spring semester. Below are the list of committees:

(1) Committees with collateral duty workload assignments. The only exception to this is the Chairperson for the Council of the Department Chairs. These include:

i. Calendar Committee
ii. Council of Department Chairs
iii. Resources, Planning, and Facilities Committee

Calendar Committee	
Charge	This Committee proposes the academic calendar based on thorough analysis of relevant information and will include a Calendar that encompasses the work year of non-instructional faculty, post-secondary instructional faculty, and secondary non-instructional and instructional faculty. The proposed Academic Calendar is reviewed by the Faculty Senate and their written comments and/or recommendations are appended to the proposal. The Committee presents the proposal to the College President via the Vice President for Academic Affairs on or before April 1. If the College President does not concur with the proposal, then the proposal is returned to the Committee for revision. If the College President concurs with the proposal, then the proposal will be presented to the Board for adoption. The Committee shall also populate an electronic institutional calendar on MyGCC with activities and events and evaluate consistency of published calendars to provide current information.
Chair	Chairperson and/or Chairperson-Elect to be elected from among the membership.
Composition	Deans of each School, Coordinator for Registration and Admissions, Faculty Senate President, a Faculty Senator, and a third faculty member to be appointed by the Faculty Senate President.
Workload	Collateral Duty

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Council of Department Chairs	
Charge	This Council of Department Chairs discusses any issue directly related to departmental/academic discipline functions to include: budgets, College events and promotions, scheduling, advising, and other issues determined as necessary by the Council. The Council shall establish By-Laws, keep minutes, and set a meeting schedule reflective of the needs of the committee. The Council shall make recommendations to the Faculty Senate, respective Deans, and Faculty Union President as determined by the action needed to be taken.
Chair	Chairperson and/or Chairperson-Elect to be elected from among the membership.
Composition	Chairperson of each department.
Term	Monthly during the academic year.
Workload	Collateral Duty for all Department Chairpersons. Chairperson for the Council: participation to be reflected in faculty evaluation rubric.

Resources, Planning and Facilities Committee	
Charge	This committee reviews the Facilities Master Plan and recommends the priority of capital improvement projects for the College and those projects that have great impact on student learning outcomes. It is the forum for discussion of any available or needed resources and facility issues or concerns. The committee may forward issues or concerns directly to the College Governing Council.
Chair	Two (2) Chairpersons: Faculty Senate President and Vice President of Business & Finance.
Composition	Faculty Senate President, Senate President-Elect, Past Senate President, Faculty Union President, Vice President Business & Finance, Facilities & Maintenance Coordinator, TPS Dean, TSS Dean, two (2) staff Union representatives, and a student representative.
Term	Monthly during the academic year or at the call of either Chairperson.
Workload	Collateral Duty

(2) Committee where composition of faculty membership is selected. This includes:

i. Faculty Job Specification/Evaluation Committee

Faculty Job Specification/Evaluation Committee	
Charge	The Union President and the Vice President for Academic Affairs will convene the Committee yearly to review the Faculty Job Specifications and/or Faculty Evaluation process (see Article X Performance Appraisal) as needed. The Committee will prepare written recommendation to the Board who shall act upon the recommendations in order to be effective the following Fall semester.
Chair	Elected by the Committee.
Composition	Up to five (5) faculty members selected by the Union President (inclusive of the Union President), two (2) Deans, the Human Resources Administrator, and two (2) members to be appointed by the Vice President of Academic Affairs.
Support	Administrative support provided by the College.
Workload	**A)** For post-secondary instructional faculty: instructional hours reduced to 180 per semester. **B)** For all secondary and non-instructional faculty: participation to be reflected in faculty evaluation rubric.

(3) Committees where composition requires at least one (1) faculty member from a specific department. These include:

i. College Technology Committee
ii. Learning Outcomes Committee

College Technology Committee	
Charge	This Committee recommends action plans to support the technology needs and technology users of the College in promoting student learning outcomes. This Committee maintains currency in computer technology and academic applications of computer technology for both students and faculty. The Committee also identifies needs of technology planning, distance learning, and appropriate training.
Chair	Elected by the Committee.
Composition	Four (4) faculty – one (1) of whom shall be from a technology-related department, an equal number of members appointed by the College President and one (1) additional voting member selected by the Committee.
Term	No less than three (3) years.
Workload	**A)** For post-secondary instructional faculty: instructional hours reduced to 180 per semester. **B)** For all secondary and non-instructional faculty: participation to be reflected in faculty evaluation rubric.

Learning Outcomes Committee	
Charge	This Committee ensures and regulates, through quality control, a curriculum that reflects the mission of the College and that is academically sound, comprehensive, and responsible to the evolving needs of the community. In addition, this committee reviews, explores, and assesses the effectiveness of General Education policies and procedures, making recommendations to the Faculty Senate, Departmental Chairpersons, Committee Chairpersons, and administrators as appropriate. The Committee will involve administrators, faculty, staff members, and students in efforts to guide and continually improve the institutional and student learning outcomes.
Chair	Chairperson and Chairperson-Elect to be elected by the members of the Committee.
Composition	Twelve to fifteen (12-15) faculty members preferably to include faculty members representing each of the following disciplines: English, Math, Science, Social Science, and Career/Technical Education. Other members may be assigned by the Faculty Senate President if requested by the Chairperson after all other committees are filled.
Term	Annual.
Workload	**A)** For post-secondary instructional faculty: instructional hours reduced to 180 per semester. **B)** For all secondary and non-instructional faculty: participation to be reflected in faculty evaluation rubric.

(4) Committees where composition requires faculty members to meet certain criteria and to be elected by faculty members of the Bargaining Unit. These include:

i. Promotions Committee
ii. Professional Development Review Committee (PDRC)

Promotions Committee	
Charge	Refer to Article VIII, Advancement-in-Rank.
Chair	Chairperson and/or Chairperson-Elect to be elected from among the membership.
Composition	The Promotions Committee shall be elected by the members of the Bargaining Unit and consists of six (6) elected faculty members who at the time of the election hold the rank of Assistant Professor or higher, who have been employed by the College for a minimum of three (3) years, and are dues paying members of the Union.
Term	Two (2) years with staggered terms. Members may not serve two (2) consecutive terms.
Workload	**A)** For post-secondary instructional faculty: instructional hours reduced to 180 per semester. **B)** For all secondary and non-instructional faculty: participation to be reflected in faculty evaluation rubric.

Initials RDS BLM
July 28, 2010

Professional Development Review Committee (PDRC)	
Charge	Refer to Article IX, Professional Development Initiatives.
Chair	Chairperson and/or Chairperson-Elect to be elected from among the membership.
Composition	The PDRC shall be elected by the members of the Bargaining Unit and consists of six (6) elected faculty members who at the time of the election hold the rank of Assistant Professor or higher, who have been employed by the College for a minimum of three (3) years, and are dues paying members of the Union.
Term	Two (2) years with staggered terms. Members may not serve two (2) consecutive terms.
Workload	**A)** For post-secondary instructional faculty: instructional hours reduced to 180 per semester. **B)** For all secondary and non-instructional faculty: participation to be reflected in faculty evaluation rubric.

(5) Committees where members' institutional knowledge is valuable and critical. These include:

i. Committee on College Assessment
ii. Standard 1 Self Study, "Institutional Mission and Effectiveness"
iii. Standard 2 Self Study, "Student Learning Programs and Services"
iv. Standard 3 Self Study, "Resources"
v. Standard 4 Self Study, "Leadership and Governance"

Committee on College Assessment (CCA)	
Charge	This Committee guides and assists campus constituents to fulfill their assessment requirements through the careful review and feedback of assessment plans, reports, and program review. This Committee ensures that an assessment report review process, with meaningful input from faculty, Vice President for Academic Affairs and/or ALO, and other key constituents, becomes an integral part of the preparation of institutional assessment documents for accreditation purposes.
Chair	One (1) elected post-secondary faculty member, Co-Chaired by the Assistant Director of AIE.
Composition	No fewer than four (4) faculty. Other members may be assigned by the Faculty Senate President if requested by the Chairperson after all other committees are filled. Members from the administration and staff shall be appointed by the Vice President for Academic Affairs of the College.
Term	No less than three (3) years.
Workload	**A)** For post-secondary instructional faculty (CCA Chairperson): instructional hours reduced to 135 per semester. **B)** For post-secondary instructional faculty (CCA members): instructional hours reduced to 180 per semester. **C)** For all secondary and non-instructional faculty: participation to be reflected in faculty evaluation rubric.

Standard 1 Self Study, "Institutional Mission and Effectiveness"	
Charge	Utilizing the ACCJC template, this Committee gathers, organizes, and analyzes quantitative and qualitative data that promotes the College's efforts in meeting its mission statement, and the effectiveness by which the mission is successfully achieved. This Committee writes the report, with the assistance and support of the Self-Study Coordinator, and ensures that the end product is reviewed by faculty, Vice President for Academic Affairs, and other key constituents before it is finalized for Board approval.
Chair	The Chairperson shall be a post-secondary faculty member elected by the faculty members of the Committee.
Composition	No fewer than two (2) Faculty members and an equal number of members appointed by the Vice President for Academic Affairs of the College. Other members may be assigned by the Faculty Senate President and the Vice President for Academic Affairs if requested by the Chairperson.
Support	Administrative support provided by the Self-Study Coordinator.
Term	No less than three (3) years with staggered terms.
Workload	**A)** For post-secondary instructional faculty (Standard 1 Chairperson): instructional hours reduced to 180 per semester. One (1) semester prior to the midterm report and three (3) semesters prior to the ACCJC comprehensive visit the instructional hours will be reduced to 135 per semester. **B)** For post-secondary instructional faculty (CCA members): instructional hours reduced to 180 per semester. **C)** For all secondary and non-instructional faculty: participation to be reflected in faculty evaluation rubric.

Initials RDS BLM
July 28, 2010

Standard 2 Self Study, "Student Learning Programs and Services"	
Charge	Utilizing the ACCJC template, this Committee gathers, organizes, and analyzes quantitative and qualitative data that demonstrate the achievement of student learning outcomes (SLOs) in instructional programs and student services, including library and other learning support services. This Committee writes the report with the assistance and support of the Self-Study Coordinator, and ensures that the end product is reviewed by faculty and other key constituents before it is finalized for Board approval.
Chair	The Chairperson shall be a post-secondary faculty member elected by the faculty members of the committee.
Composition	No fewer than two (2) Faculty members and an equal number of members appointed by the Vice President for Academic Affairs of the College. Other members may be assigned by the Faculty Senate President and the Vice President for Academic Affairs if requested by the Chair.
Support	Administrative support provided by the Self-Study Coordinator.
Term	No less than two (2) years with staggered terms.
Workload	**A)** For post-secondary instructional faculty (Standard 2 Chairperson): instructional hours reduced to 180 per semester. One (1) semester prior to the midterm report and three (3) semesters prior to the ACCJC comprehensive visit the instructional hours will be reduced to 135 per semester. **B)** For post-secondary instructional faculty (CCA members): instructional hours reduced to 180 per semester. **C)** For all secondary and non-instructional faculty: participation to be reflected in faculty evaluation rubric.

Initials RDS GLM
July 28, 2010

Standard 3 Self Study, "Resources"	
Charge	Utilizing the ACCJC template, this Committee gathers, organizes, and analyzes quantitative and qualitative data that provide support to the College's human, physical, technology, and financial resources to meet its broad educational goals, including SLOs, and overall institutional improvement. This Committee writes the report with the assistance and support of the Self-Study Coordinator and ensures that the end product is reviewed by faculty, Vice President for Academic Affairs, and other key constituents before it is finalized for Board approval.
Chair	The Chairperson shall be a post-secondary faculty member elected by the faculty members of the committee.
Composition	No fewer than two (2) Faculty members and an equal number of members appointed by the Vice President for Academic Affairs of the College. Other members may be assigned by the Faculty Senate President and the Vice President for Academic Affairs if requested by the Chair.
Support	Administrative support provided by the Self-Study Coordinator.
Term	No less than two (2) years with staggered terms.
Workload	A) For post-secondary instructional faculty (Standard 3 Chairperson): instructional hours reduced to 180 per semester. One (1) semester prior to the midterm report and three semesters prior to the ACCJC comprehensive visit the instructional hours will be reduced to 135 per semester. B) For post-secondary instructional faculty (CCA members): instructional hours reduced to 180 per semester. C) For all secondary and non-instructional faculty: participation to be reflected in faculty evaluation rubric.

Initials RDS BLM
July 28, 2010

Standard 4 Self Study, "Leadership and Governance"	
Charge	Utilizing the ACCJC template, this Committee gathers, organizes, and analyzes quantitative and qualitative data that evaluate how the College's governance process facilitates broad participation in decisions that support student learning programs and services, while acknowledging the designated responsibilities of the Board and the College President. This Committee writes the report, with the assistance and support of the Self-Study Coordinator, and ensures that the end product is reviewed by faculty, Vice President for Academic Affairs, and other key constituents before it is finalized for Board approval.
Chair	The Chairperson shall be a post-secondary faculty member elected by the faculty members of the Committee.
Composition	No fewer than two (2) Faculty members and an equal number of members appointed by the Vice President for Academic Affairs of the College. Other members may be assigned by the Faculty Senate President and the Vice President for Academic Affairs if requested by the Chair.
Support	Administrative support provided by the Self-Study Coordinator.
Term	No less than two (2) years with staggered terms.
Workload	**A)** For post-secondary instructional faculty (Standard 4 Chairperson): instructional hours reduced to 180 per semester. One (1) semester prior to the midterm report and three (3) semesters prior to the ACCJC comprehensive visit the instructional hours will be reduced to 135 per semester. **B)** For postsecondary instructional faculty (CCA members): instructional hours reduced to 180 per semester. **C)** For all secondary and non-instructional faculty: participation to be reflected in faculty evaluation rubric.

APPENDIX C – DISTANCE EDUCATION POLICY

Policy 340

Guam Community College
Board of Trustees

Distance Education Policy

WHEREAS, distance education (hereinafter referred to as DE) refers to the practice of offering educational services – either instruction or support services – to students who are not physically co-located with the individuals providing the service. DE includes the use of computer and Internet-based educational services as well as video and audio services. Institutions use Internet technologies to bring students educational programming in either synchronous (students and the service provider are interacting on line at the same time) or asynchronous modes (students and the service provider not interacting on line at the same time). Educational interactions delivered through these means may occur on campus as well as off campus, and

WHEREAS, DE can be a convenient, flexible, and effective means of providing education. Nearly half of all the college students in the country are of the age group once thought of as nontraditional. They are working adults or adults seeking first educational credentials or retraining. Many working adult students with multiple demands on their time find DE to meet their needs better than campus-based education, and

WHEREAS, DE is also an opportunity for the College and the students to contribute to environmentally friendly practices. Courses that run through DE reduce the use of paper and copying, as resources are available digitally. In addition, students commute to campus less frequently than traditional courses, lessening the use of gas and related emissions into the environment, and

WHEREAS, in addition to working adults, the traditional-aged college students come to campus with extensive experience using digital technologies in their personal and school lives. For these students, DE that involves the use of Internet, web casts, text messaging, and other digital media is comfortable and familiar. As technology continues to expand world-wide, participation in DE assists students in preparing for the workforce.

NOW, THEREFORE, BE IT RESOLVED, that this document serves as a policy for the College to support the policy on distance education and correspondence education of the Western Association of Schools and Colleges (WASC), Accrediting Commission for Community and Junior Colleges (ACCJC) (Revised January 2010).

BE IT FURTHER RESOLVED, that a manual will be developed based on this policy. The manual will include specific forms, and other detailed processes that are necessary to ensure the policy is implemented.

Adopted: July 7, 2010

Resolution No: 7-2010

Definitions

- An Online course is defined as one in which all regularly scheduled classroom time is replaced by required activities completed at a distance and managed online. Online courses allow students to take courses from geographically remote locations, without any need to come to campus (for instance, while deployed in the military).
- Hybrid online courses are taught using two instructional formats: on campus and online, combining traditional face-to-face classroom instruction with computer-based DE (e.g., 50% of the course work is electronically delivered). In a hybrid course, a significant part of the course learning is online and as a result, the amount of classroom seat-time is reduced.
- Web-Enhanced courses are traditional face-to-face classes that are augmented with course web sites. However, unlike hybrid courses, web-enhanced classes continue to hold all of their meetings on-campus. Web-enhanced courses are NOT distance education courses.

Requirements

- The College will adhere to all ACCJC policies regarding DE.
- All credited courses and programs that include or will include components of DE (online or hybrid online) must be approved through the Curriculum Approval Substantive Change Process. These will include courses offered through the regular semester cycle, special projects, or Continuing Education cycle, for as long as they include DE components.
- As per the WASC Distance Learning Policy, the College is expected to give the ACCJC advance notice of intent to offer a program in which 50% or more of the courses are electronically-delivered, through the Substantive Change process. Any request for ACCJC's approval of a DE program, must be coursed through the Office of the Academic Vice President.
- All courses and programs delivered through electronic means must have clearly defined and appropriate program/course student learning outcomes (SLOs).
- Students are responsible for accessing resources to complete all course requirements and resolving any technical difficulties outside of Guam Community College.
- All DE courses must be clearly identified as either online or hybrid online courses in the annually-published college catalog and in the class schedule published every semester.
- All online courses can only be taught during academic years where traditional courses are also offered as an alternative course, with the exception of continuing education courses. All DE courses must be electronically delivered by the course management system agreed upon by the College (in order to ensure consistency and uniformity in course delivery and eventual assessment of these courses.[1]
- Prior to teaching a DE course, individual faculty members are responsible for acquiring sufficient skills by completing at a minimum a 3-credit course (must be

[1] The platform the College currently utilizes is the Moodle Course Management System.

verified through official college transcripts) on building an online course, minor troubleshooting, and features of a course management system.

- Faculty must be able to provide minimal technical assistance to students (e.g., course enrollment into course management systems, access to online course materials, access to online examinations, etc.). The College will identify an individual person or department to provide further assistance for students and faculty.
- As per the WASC Distance Learning Policy, the College must ensure that the student enrolling in course is the same student who completes the course. Therefore, students enrolling in DE courses must present photo identification during the orientation procedure. Only those enrolled students should receive the enrollment key or password to enter the course. Students enrolled must agree, in writing, to be solely responsible for the completion of the course.
- Faculty and staff involved in DE courses will be provided with training opportunities specific to online learning.

Resources

- *Copyright*. Faculty and students must refrain from using copyrighted materials illegally and seek permission from the respective author or publisher to use copyrighted material. For more information on the U.S. Copyright Law, visit the U.S. Copyright Office's web site.

Privacy/Security

- In accordance with the U.S. Family Education Rights and Privacy Act of 1974 (FERPA), the College is committed to protecting the privacy of all faculty and students enrolled in DE courses. The information collected will only be visible to the instructor, system managers, technical support team and other pertinent personnel. In order to ensure privacy, posting personal information such as phone numbers and addresses are discouraged and should be kept confidential. Sole access to DE courses should be limited to the registered student to maintain integrity of privacy and academic integrity as well.

Support

- *Basic Student Support Services.* Each student enrolled in a DE course shall have access to all the academic support services, instructional equipment, and campus events and other non-academic activities provided to other students. Support services may include, but are not limited to, academic advising, counseling, library services, computer access, tutoring services and financial aid.
- *Library Support.* The Library shall provide equivalent, effective and appropriate support for DE courses. Library support may include, but is not limited to, access to over 7,000 different periodicals (majority of which are available full-text) and online public access of the library catalog (through the GCC Library web page) and other strategies that emphasize access to these resources.

- *Technology Support.* In order to maximize instruction in DE courses, appropriate training and support is needed in the use of DE tools, applications and systems, the design and delivery of DE courses, the development and production of online materials, and ongoing collaboration with instructional technology staff.
- *Pedagogy Support.* In order to provide appropriate instruction in DE courses, faculty should have ongoing access to pedagogy support from other faculty, staff, administrators and instructional technology personnel. Periodic training opportunities will be offered to develop and improve teaching skills and methods for DE courses.

Assessment Strategies for Distance Learning

- The Office of Assessment and Institutional Effectiveness shall provide a report on the effectiveness of DE courses to ensure comparability to campus-based courses. Distance education must also be evaluated through an institutionally standardized evaluation procedure which includes faculty self-evaluation, evaluation of online instruction by students, student retention, student satisfaction and evaluation of faculty member by the appropriate supervisor and when appropriate, determine comparability to campus-based programs. This process shall also be used to assure the conformity of DE courses and programs to prevailing quality standards in the field of DE. DE courses and programs shall be consistent with the educational missions and strategic plans of the Department and College. DE courses will follow the regular assessment cycles and will conform to established assessment groupings.
- DE courses must be of the same quality and rigor as those presented face-to face. The course syllabi should demonstrate this equity of quality. All course syllabi must be submitted to the respective Dean of each school, as stipulated in the Guam Federation of Teachers and Guam Community College Board of Trustees Agreement. DE faculty members must deliver accurate and current information. Faculty shall not include in the content or delivery of a course any information which he or she knows to constitute libel, invasion of privacy, infringement of copyright or other literary rights, or otherwise violate the legal rights of others (See the TEACH Act). Instructors must demonstrate how student work is monitored to assure integrity.

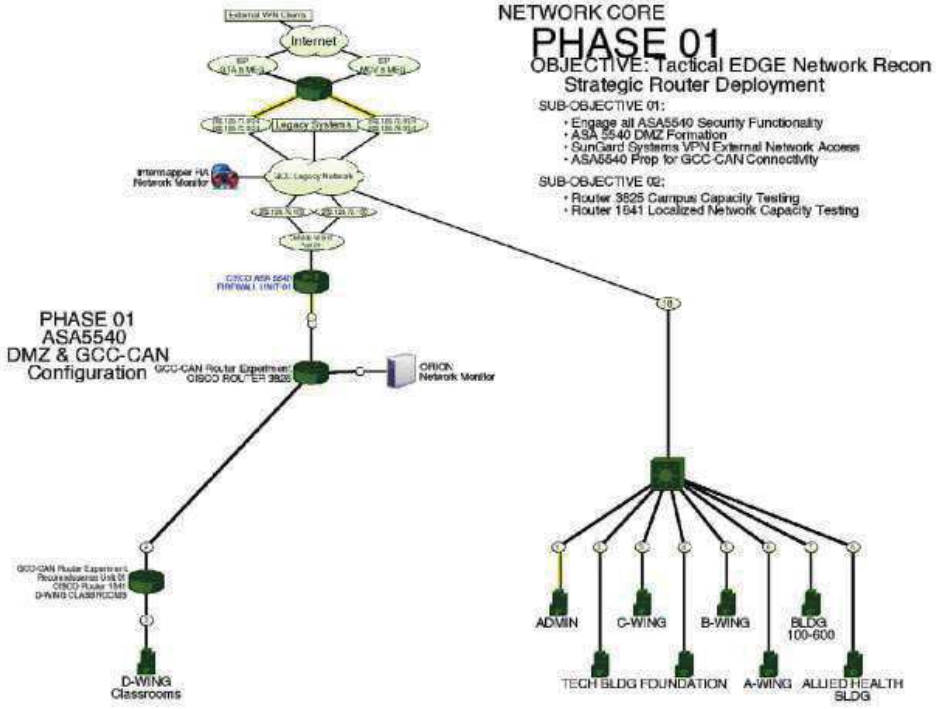
APPENDIX D – THREE PHASE NETWORK IMPROVEMENT PROJECT

Old Network Issues

- One router serving over 1000 computers. This creates one large broadcast domain which is susceptible to broadcast storms, which can cause network outages. Broadcast traffic traverses entire network, wasting bandwidth.

- IP addressing scheme had 4 subnets scattered throughout entire campus. Endpoints on separate subnets must communicate through router, even if they are physically adjacent to one another. This can waste internal bandwidth, and tie up resources on our edge router which should only handle traffic destined for the internet.

- Utilizes 4 public IP address blocks. This costs money and can be averted by switching to private addresses. Public addresses are only required for publicly accessible servers. (i.e. website and mail server)

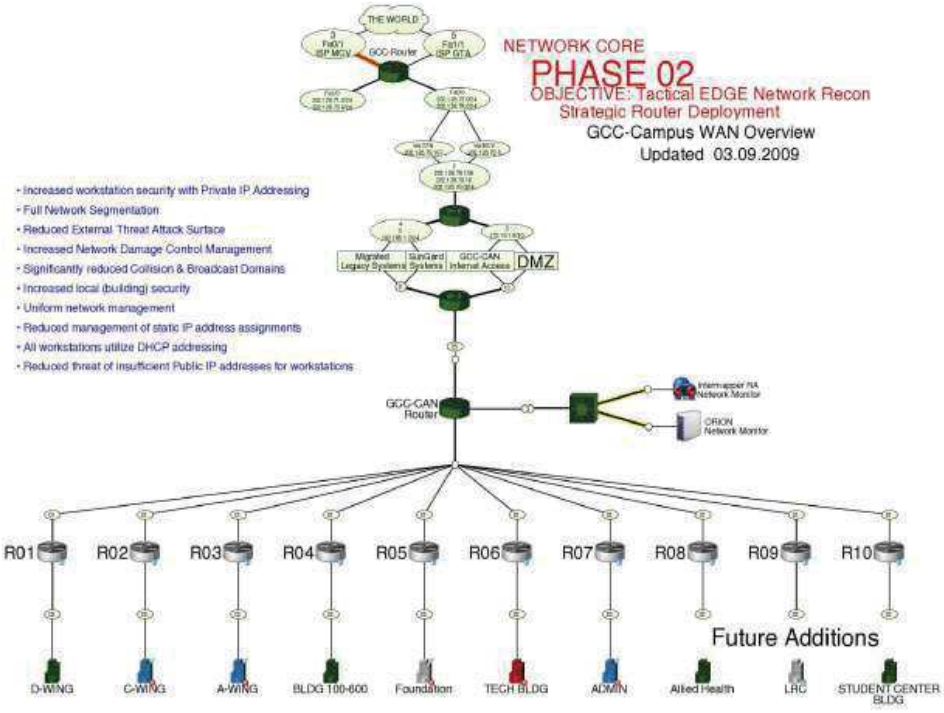

NETWORK CORE
PHASE 01
OBJECTIVE: Tactical EDGE Network Recon
Strategic Router Deployment
SUB-OBJECTIVE 01:
• Engage all ASA5540 Security Functionality
• ASA 5540 DMZ Formation
• SunGard Systems VPN External Network Access
• ASA5540 Prep for GCC-CAN Connectivity
SUB-OBJECTIVE 02:
• Router 3825 Campus Capacity Testing
• Router 1841 Localized Network Capacity Testing
Internet
Legacy Systems
Intermapper HA
Network Monitor
PHASE 01
ASA5540
DMZ & GCC-CAN
Configuration
GCC-CAN Router Experiment
CISCO ROUTER 3825
ORION
Network Monitor
D-WING
Classrooms
ADMIN
C-WING
B-WING
BLDG
100-600
TECH BLDG FOUNDATION
A-WING
ALLIED HEALTH
BLDG

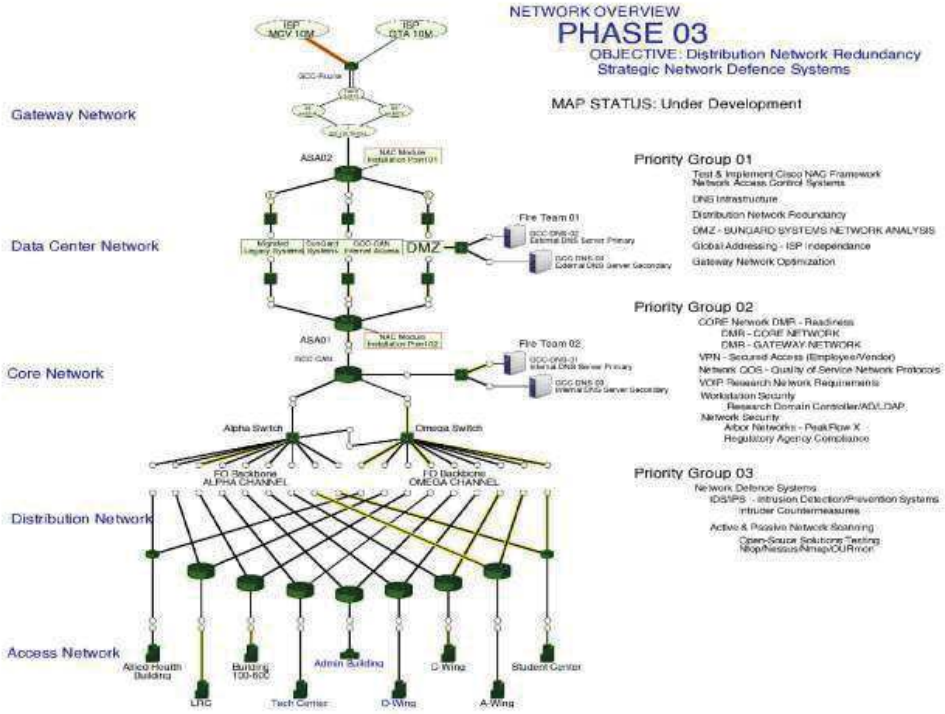
Current Network

- Network is no longer one large broadcast domain. Each router contains its own broadcast domain, and this will limit any possible broadcast storm to their respective area.

- Network is behind a firewall which adds security from external threats. Private addresses are being utilized. We can stop wasting over a thousand public IP addresses.

- All local (internal) traffic will no longer need to use the edge router. This allows bandwidth to be more efficiently utilized. Edge router will only handle traffic destined for the internet.


NETWORK CORE
PHASE 02
OBJECTIVE: Tactical EDGE Network Recon
Strategic Router Deployment
GCC-Campus WAN Overview
Updated 03.09.2009
• Increased workstation security with Private IP Addressing
• Full Network Segmentation
• Reduced External Threat Attack Surface
• Increased Network Damage Control Management
• Significantly reduced Collision & Broadcast Domains
• Increased local (building) security
• Uniform network management
• Reduced management of static IP address assignments
• All workstations utilize DHCP addressing
• Reduced threat of insufficient Public IP addresses for workstations
THE WORLD
GCC Router
Migrated Legacy Systems
StanGard Systems
GCC-CAN Internet Access
DMZ
GCC-CAN Router
Intermapper RA Network Monitor
ORION Network Monitor
R01
R02
R03
R04
R05
R06
R07
R08
R09
R10
Future Additions
D-WING
C-WING
A-WING
BLDG 100-600
Foundation
TECH BLDG
ADMIN
Allied Health
LRC
STUDENT CENTER BLDG


NETWORK OVERVIEW
PHASE 03
OBJECTIVE: Distribution Network Redundancy
Strategic Network Defence Systems
MAP STATUS: Under Development
Gateway Network
Data Center Network
Core Network
Distribution Network
Access Network
ISP MCV 10M
ISP STA 10M
ASA02
ASA01
DMZ
Fire Team 01
Fire Team 02
Alpha Switch
Omega Switch
FD Backbone ALPHA CHANNEL
FD Backbone OMEGA CHANNEL
Allied Health Building
Building 100-800
Admin Building
D-Wing
Student Center
LRC
Tech Center
D-Wing
A-Wing
Priority Group 01
Test & Implement Cisco NAC Framework
Network Access Control Systems
DNS Infrastructure
Distribution Network Redundancy
DMZ - SUNGARD SYSTEMS NETWORK ANALYSIS
Global Addressing - ISP Independance
Gateway Network Optimization
Priority Group 02
CORE Network DMR - Readiness
DMR - CORE NETWORK
DMR - GATEWAY NETWORK
VPN - Secured Access (Employee/Vendor)
Network QOS - Quality of Service Network Protocols
VOIP Research Network Requirements
Workstation Security
Research Domain Controller/AD/LDAP
Network Security
Arbor Networks - PeakFlow X
Regulatory Agency Compliance
Priority Group 03
Network Defence Systems
IDS/IPS - Intrusion Detection/Prevention Systems
Intruder Countermeasures
Active & Passive Network Scanning
Open-Source Solutions Testing
Ntop/Nessus/Nmap/OURmon

APPENDIX E - LABS UPGRADE SCHEDULE

MIS TECHNOLOGY INVENTORY SUMMARY AS OF 9/30/2008												
CAMPUS LOCATIONS SCHOOL OR DEPARTMENT	ROOM	COMPUTER COUNT	TYPE	FUNDING OR DEPARTMENT	PURCHASED OR INSTALLED	NEXT UPGRADE	STATUS	IP Type	F/W TYPES 1=XP 2=WIRELESS 3=CISCO 1, 4=OSL			
GCC CAMPUS	A-7	32	PC DESKTOP	TECH FEE	FY05	FY08/FY09	DUE	PUBLIC	1			
GCC CAMPUS	A-8	29	PC LAPTOP	ADULT ED/GED	FY03	FY05/FY06	OVERDUE	PRIVATE	1			
GCC CAMPUS	A-26	31	PC DESKTOP	TECH FEE	FY05	FY08/FY09	DUE	PUBLIC	1			
GCC CAMPUS	A-27	31	PC DESKTOP	TECH FEE	FY05	FY08/FY09	DUE	PUBLIC	1			
GCC CAMPUS	C-1	29	PC LAPTOP	BUSINESS				PRIVATE	1, 2			
GCC CAMPUS	C-4	24	PC DESKTOP	TECH FEE	FY07	FY10/FY11		PUBLIC	1			
GCC CAMPUS	C-5	11	PC DESKTOP	TECH FEE (7)/ SCIENCE	FY07	FY10/FY11		PUBLIC	1			
GCC CAMPUS	C-25	7	PC DESKTOP	TECH FEE/ SCIENCE (4)	FY07	FY10/FY11		PUBLIC	1			
GCC CAMPUS	D-2	29	PC DESKTOP	TECH FEE	FY04	FY07/FY08	OVERDUE	PRIVATE	1, 3			
GCC CAMPUS	D-3	29	PC DESKTOP	TECH FEE	FY04	FY07/FY08	OVERDUE	PRIVATE	1, 3			
GCC CAMPUS	D-4/LAB	29	PC DESKTOP	TECH FEE	FY07	FY10/FY11		PRIVATE	1, 3			
GCC CAMPUS	D-5/LAB	29	PC DESKTOP	TECH FEE	FY07	FY10/FY11		PRIVATE	1, 3			
GCC CAMPUS	D-7	29	PC DESKTOP	TECH FEE	FY04	FY07/FY08	OVERDUE	PRIVATE	1, 3			
GCC CAMPUS	D-8	29	PC DESKTOP	TECH FEE	FY04	FY07/FY08	OVERDUE	PRIVATE	1, 3			
GCC CAMPUS	D-9	29	PC DESKTOP	TECH FEE	FY04	FY07/FY08	OVERDUE	PRIVATE	1, 3			
GCC CAMPUS	D-10	29	PC DESKTOP	TECH FEE	FY04	FY07/FY08	OVERDUE	PRIVATE	1, 3			
GCC CAMPUS	F-2	11	MAC	TOURISM				PUBLIC	0			
GCC CAMPUS	F-3	15	PC DESKTOP	TOURISM				PUBLIC	1			
GCC CAMPUS	F-4	6	MAC	TOURISM				PUBLIC	0			
GCC CAMPUS	F-201 LAB+ READING RM+ F203	33	PC DESKTOP	TECH FEE (23)/ LIBRARY (10)	FY07 + FY03/FY04+ FY07	FY10/FY11		PUBLIC	1			
GCC CAMPUS	104 - Recommend move to C or A Building	21	PC DESKTOP	TECH FEE/ RECYCLED	MIX		OVERDUE	PUBLIC	1			
GCC CAMPUS	107/108	14	PC DESKTOP	PROJECT A/M				PUBLIC	1			
GCC CAMPUS	204*	17	PC DESKTOP	AUTOCAD CONSTRUCTION				PUBLIC	1			
GCC CAMPUS	501	10	PC DESKTOP	AUTOMOTIVE/ FEMA				PUBLIC	1			
GCC CAMPUS	604	9	PC DESKTOP					PUBLIC	1			
GCC CAMPUS	TC1106A Prometric Testing	18	PC DESKTOP	TECH FEE/ FOUNDATION	FY06	FY09/FY10		PUBLIC	1			
GCC CAMPUS	TC1106 Prometric Lab	21	PC DESKTOP	TECH FEE/ FOUNDATION	FY06	FY09/FY10		PUBLIC	1			
GCC CAMPUS	TC1108 IMAC Lab	19	PC/MAC DESKTOP LAPTOP					PUBLIC	1			
GCC CAMPUS	TC1109 GS Lab Vis Com	13	MAC					PUBLIC	0			
GCC CAMPUS	TC1110 ITC Discovery Lab	5	PC DESKTOP	TECH FEE/ FR:TC1106B	FY06	FY09/FY10		PUBLIC	1			
GCC CAMPUS	TC1218 CISCO Lab	13	PC DESKTOP	CISCO ACADEMY				PUBLIC	1			
GCC CAMPUS	TC1220 HS Electronics *	22	PC DESKTOP	TITLE V GRANT ELECTRONICS	FY06/FY07	FY09/FY10		PUBLIC	1			
GCC CAMPUS	TC1221 Networking Lab	21	PC DESKTOP	TECH FEE/ FOUNDATION	FY06/FY07	FY09/FY10		PUBLIC	1			
GCC CAMPUS	TC1222 G4 Lab Vis Com	16	MAC					PUBLIC	1			
GCC CAMPUS	COMPASS TESTING LAB	10	PC DESKTOP	TECH FEE COUNSELING				PUBLIC	1			
									1			
HIGH SCHOOL LABS									1			
GWHS@GCC	304	29	PC LAPTOP	TOURISM				PRIVATE	1, 4			
GWHS@GCC	601*	29	PC/MAC DESKTOP LAPTOP	MARKETING				PRIVATE	1, 4			

MIS TECHNOLOGY INVENTORY SUMMARY AS OF 9/30/2008

CANPUS LOCATIONS SCHOOL OR DEPARTMENT	ROOM	COMPUTER COUNT	TYPE	FUNDING OR DEPARTMENT	PURCHASED OR INSTALLED	NEXT UPGRADE	STATUS	IP Type	F/W TYPES 1=XP 2=WIRELESS 3=CISCO 1, 4=DSL			
GWHS@GCC	301*	29	PC DESKTOP	TOURISM				PRIVATE	1, 4			
GWHS@GCC	204*	17	PC DESKTOP	AUTOCAD CONSTRUCTION				PUBLIC	1			
JFK@GCC	301*	29	PC DESKTOP	TOURISM				PRIVATE	1, 4			
JFK@GCC	601*	29	PC/MAC DESKTOP LAPTOP	MARKETING				PRIVATE	1, 4			
JFK@GCC	TC1220 HS Electronics *	22	PC DESKTOP	TITLE V GRANT ELECTRONICS	FY05/FY07	FY09/FY10		PUBLIC	1			
SSHS	301	29	PC DESKTOP	TOURISM				PRIVATE	1, 4			
SSHS	302/311	29	PC (18)/ MAC (4) DESKTOP & PC LAPTOPS (2)	MARKETING				PRIVATE	1, 4			
SSHS	412	29	PC DESKTOP	TITLE V GRANT ELECTRONICS	FY05/FY07	FY09/FY10		PRIVATE	1, 4			
SHS	Student Center	29	PC DESKTOP (8) & LAPTOP (29)	TITLE V GRANT MARKETING				PRIVATE	1, 4			
SHS	1206	29	PC DESKTOP	ALLIED HEALTH				PRIVATE	1, 4			
SHS	6117	29	PC DESKTOP	TITLE V GRANT ELECTRONICS	FY05/FY07	FY09/FY10		PRIVATE	1, 4			
SHS	3111	29	PC DESKTOP	TOURISM				PRIVATE	1, 4			
OKOODO	D109	29	PC DESKTOP	TOURISM				PRIVATE	1, 4			
OKOODO	D107	29	PC DESKTOP	TITLE V GRANT ELECTRONICS	FY05/FY07	FY09/FY10		PRIVATE	1, 4			
OKOODO	D115	29	PC/MAC DESKTOP	MARKETING				PRIVATE	1, 4			
	* SHARED/SAME ROOM		Note: In most lab installations, MIS contributes									
	TOTAL LAB UNITS	1097	anywhere from 5% to 30% of the funding source									
	TOTAL LAN LAB UNITS	730										
OTHER ROOMS												
Automotive		2	PC DESKTOP					PUBLIC	1			
Social Science		7	PC DESKTOP					PUBLIC	1			
Maintenance		7	PC DESKTOP					PUBLIC	1			
Office of Adult Education		14	PC DESKTOP					PUBLIC	1			
Instructional Technolgy Center		8	MAC/PC					PUBLIC	1			
Project AIM		11	PC DESKTOP					PUBLIC	1			
Learning Resource Center Library		7	PC DESKTOP					PUBLIC	1			
Financial Aid Office		5	PC DESKTOP					PUBLIC	1			
Business and Finance		16	PC DESKTOP					PUBLIC	1			
Human Resources Office		5	PC DESKTOP					PUBLIC	1			
Trades and Industry		6	PC DESKTOP					PUBLIC	1			
Allied Health Education		8	PC DESKTOP					PUBLIC	1			
PND		4	PC DESKTOP					PUBLIC	1			
Student Services		7	PC DESKTOP					PUBLIC	1			
English Second Language		2	PC DESKTOP					PUBLIC	1			
English Language Institute		1	PC DESKTOP					PUBLIC	1			
Office of Continuing Education		20	PC DESKTOP					PUBLIC	1			
Computer Science Faculty		11	PC DESKTOP					PUBLIC	1			
Nurse Office		2	PC DESKTOP					PUBLIC	1			
Administrative Offices		68	PC DESKTOP					PUBLIC	1			
Math Instructor /Office		8	PC DESKTOP					PUBLIC	1			
Materials MNG/Procurement		5	PC DESKTOP					PUBLIC	1			
Faculty Office System		12	PC DESKTOP					PUBLIC	1			
Criminal Justice Office		1	PC DESKTOP					PUBLIC	1			
Assessment		2	PC DESKTOP					PUBLIC	1			

MIS TECHNOLOGY INVENTORY SUMMARY AS OF 9/30/2008

CAMPUS LOCATIONS SCHOOL OR DEPARTMENT	ROOM	COMPUTER COUNT	TYPE	FUNDING OR DEPARTMENT	PURCHASED OR INSTALLED	NEXT UPGRADE	STATUS	IP Type	F/W TYPES 1=XP 2=WIRELESS 3=CISCO 1, 4=DSL			
MIS General		7	PC DESKTOP					PUBLIC	1			
Counseling and Assessment		6	PC DESKTOP					PUBLIC	1			
	TOTAL OFFICE UNITS	252										
	TOTAL LAN LAB & OFFICE UNITS	972										
	TOTAL COMPUTERS (NON-SERVERS)	1349										
		74	Plus servers	IP Security Cameras, Web Apps, DHCP, TCP/IP Printers				1423				
		68	Plus switches					1491				
		3	Plus routers					1494				
		36	Plus printers	Novell Network Printers				1530				
		10	Plus WIFI					1540				
		5	Plus Firewalls					1545				
		3	UPS					1548				
	TOTAL COMBINED NODES	1548										
ADDITIONAL NOTE: There is now a combination or mix of 68 whole working units and disassembled systems as spare parts.												
			PERCENT					PERCENT				
	TOTAL PUBLIC IP	682	51	TOTAL PUBLIC LAN UNITS			682	70				
	TOAL PRIVATE IP	667	49	TOTAL PRIVATE LAN UNITS			290	30				
	Total	1349	100				972	100				
		Antivirus Protected										
		1365	96									
		No Antivirus										
		58	4									
	Total	1423	100									
		Firewall Protection										
	1=XP	681	51									
	1=XP, 2=WIRELESS	29	2									
	1=XP, 3=CISCO	232	17									
	1=XP, 4=DSL	377	28									
	3=CISCO for Servers	16	1									
	5=IP Tables for Servers	5	0.37									
		Unknown Firewall										
	0=Unknown	30	2									
	Total Firewalled	1340	100									
	Total Firewalled / Total Systems		94									
	Total No Firewall or Unknown		6									

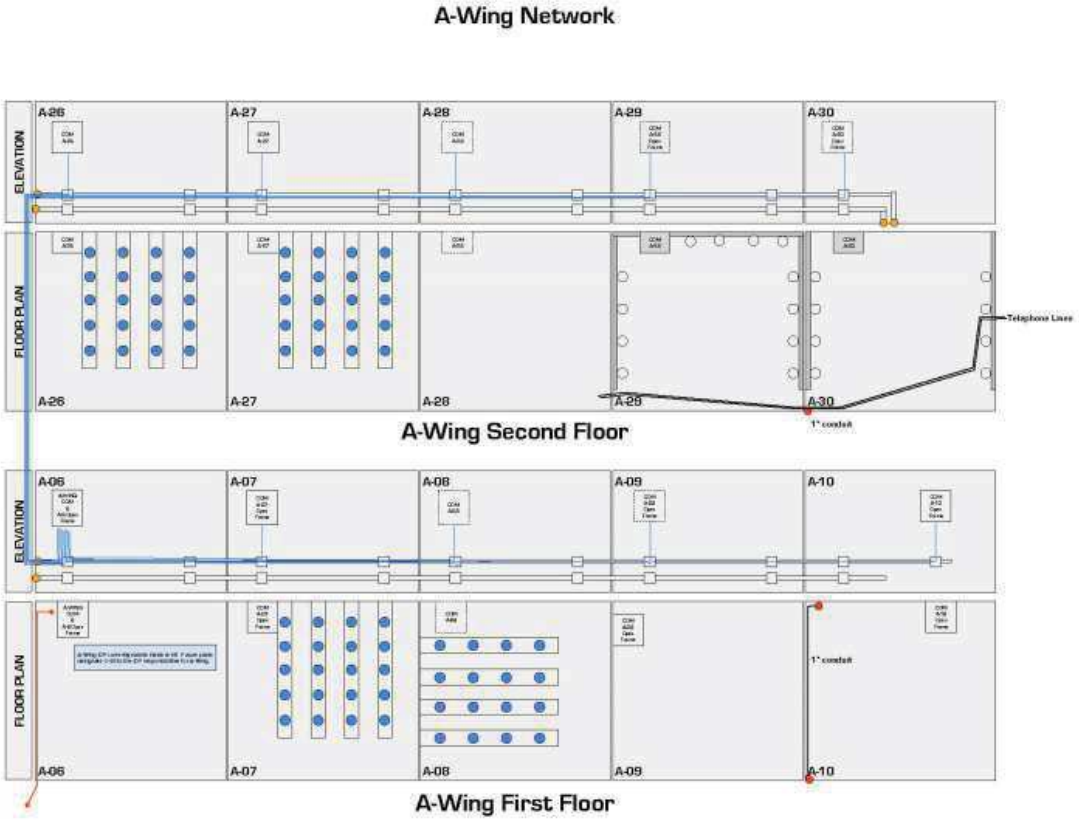
APPENDIX F – IT INVENTORY

Below is the current hardware inventory baseline since the spring of 2011. MIS staff maintains an active inventory of computer hardware assets and tracks assets by their in-service dates. These in-service dates are used for developing a replacement plan as assets approach their end of life-cycle.

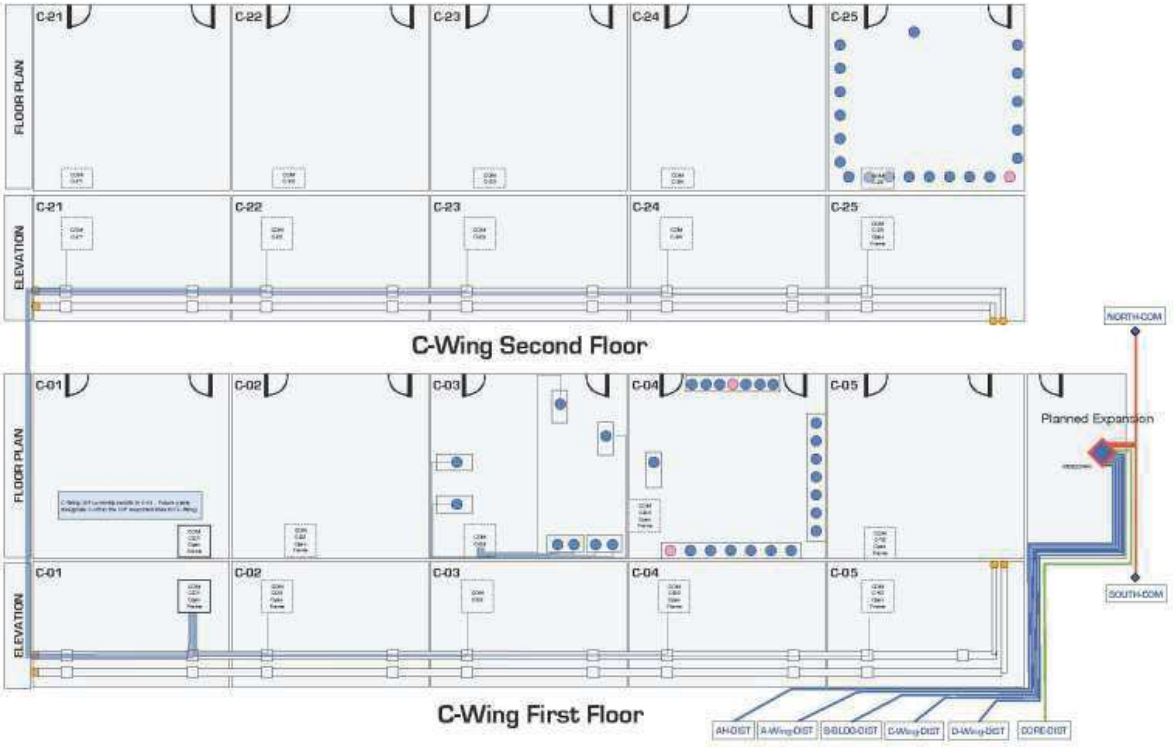
MIS Technology Inventory Summary						
ROOM	COMPUTER COUNT	TYPE	ESTIMATED COST TO REPLACE OVERDUE/DUE WITH LAPTOPS	ESTIMATED COST TO REPLACE OVERDUE/DUE WITH DESKTOPS	ESTIMATED COST TO REPLACE OVERDUE/DUE WITH SAME	ESTIMATED VALUE OF TECHNOLOGY
Adm2219	1	Desktop				1,250.00
Adm2222	2	Desktop				2,500.00
Adm2223	1	Desktop				1,250.00
Adm2225	1	Desktop				1,250.00
Adm2226	1	Desktop				1,250.00
Adm2227	1	Laptop				1,850.00
Adm2227	2	Desktop				2,500.00
Adm2228	2	Desktop				2,500.00
Adm2228	1	Laptop				1,850.00
Adm2228	1	Laptop				1,850.00
Adm2232	1	Desktop				1,250.00
Adm2233	1	Desktop				1,250.00
Adm2234	2	Desktop				2,500.00
Adm2234	1	Laptop				1,850.00
Adm2235	1	Laptop				1,850.00
Adm2235	1	Laptop				1,850.00
Adm2236	1	Desktop				1,250.00
Adm2236	1	Laptop				1,850.00
Adm2236	1	Desktop				1,250.00
Adm2237	1	Desktop				1,250.00
Adm2238	1	Desktop				1,250.00
Allied3114	40	Desktop				50,000.00
Allied3116	6	Desktop	11,100.00	7,500.00	7,500.00	7,500.00
Allied3117	5	Desktop	9,250.00	6,250.00	6,250.00	6,250.00
Allied3123	1	Desktop				1,250.00
Allied3124	1	Desktop				1,250.00
Allied3125	2	Laptop				3,700.00
Allied3125	1	Desktop				1,250.00
Allied3130	1	Desktop				1,250.00
Allied3205	2	Desktop	3,700.00	2,500.00	2,500.00	2,500.00
Allied3205	6	Desktop	11,100.00	7,500.00	7,500.00	7,500.00
Allied3210	1	Desktop				1,250.00
Allied3220	4	Desktop				5,000.00
Allied3220	2	Desktop				2,500.00
Allied3223	2	Desktop				2,500.00
Allied3229	2	Desktop				2,500.00
Allied3229	1	Desktop				1,250.00
A-10	1	Mac				1,850.00
A-10	7	Desktop				8,750.00
A-10	2	Laptop				3,700.00
A-26	31	Desktop	57,350.00	38,750.00	38,750.00	38,750.00
A-27	31	Desktop	57,350.00	38,750.00	38,750.00	38,750.00
A-7	32	Desktop	59,200.00	40,000.00	40,000.00	40,000.00
A-8	8	Desktop	14,800.00	10,000.00	10,000.00	10,000.00
A-8	15	Laptop				27,750.00

MIS Technology Inventory Summary						
ROOM	COMPUTER COUNT	TYPE	ESTIMATED COST TO REPLACE OVERDUE/DUE WITH LAPTOPS	ESTIMATED COST TO REPLACE OVERDUE/DUE WITH DESKTOPS	ESTIMATED COST TO REPLACE OVERDUE/DUE WITH SAME	ESTIMATED VALUE OF TECHNOLOGY
TC1215	1	All in one				1,850.00
TC1218	13	Desktop				16,250.00
TC1220	21	Desktop	38,850.00	26,250.00	26,250.00	26,250.00
TC1221	21	Desktop				26,250.00
TC1222	19	Intel Imac	35,150.00	23,750.00	35,150.00	35,150.00
	7	Desktop				8,750.00
TOURISM	1	Laptop				1,850.00
PROSTART	1	Laptop				1,850.00
MARKETING	1	Laptop				1,850.00
Electronic	1	Laptop				1,850.00
J102	7	Desktop				8,750.00
J103	5	Laptop				9,250.00
J104	23	Laptop				42,550.00
J112	20	Desktop	37,000.00	25,000.00	25,000.00	25,000.00
TOURISM	3	Laptop				5,550.00
PROSTART	1	Laptop				1,850.00
MARKETING	1	Desktop				1,250.00
Electronic	1	Desktop				1,250.00
301	10	Desktop				12,500.00
302	11	Laptop				20,350.00
311	15	Desktop				18,750.00
311	4	iMac Desktop				7,400.00
412	19	Desktop	35,150.00	23,750.00	23,750.00	23,750.00
MARKETING	1	Desktop				1,250.00
Allied Health	1	Laptop				1,850.00
Electronic	1	Laptop				1,850.00
TOURISM	4	Laptop				7,400.00
Student Center	36	Laptop				66,600.00
1206	13	Desktop				16,250.00
6117	23	Desktop	42,550.00	28,750.00	28,750.00	28,750.00
3111	16	Desktop				20,000.00
Tourism	1	Laptop				1,850.00
Electronics	1	Desktop				1,250.00
Marketing	1	Laptop				1,850.00
D109	14	Desktop				17,500.00
D107	19	Desktop	35,150.00	23,750.00	23,750.00	23,750.00
D115	11	Laptop				20,350.00
D115	4	iMac Desktop				7,400.00
C105E	6	Desktop				7,500.00
C106E	1	Desktop				1,250.00
				Total Value		1,927,450.00

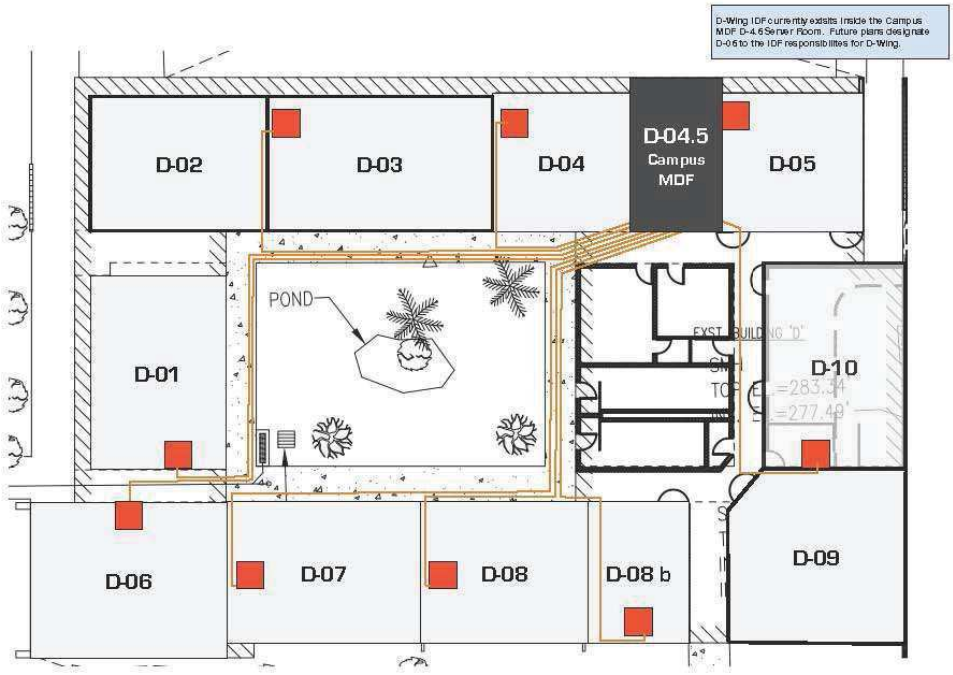
APPENDIX G - CAMPUS DIAGRAMS



C-Wing Network



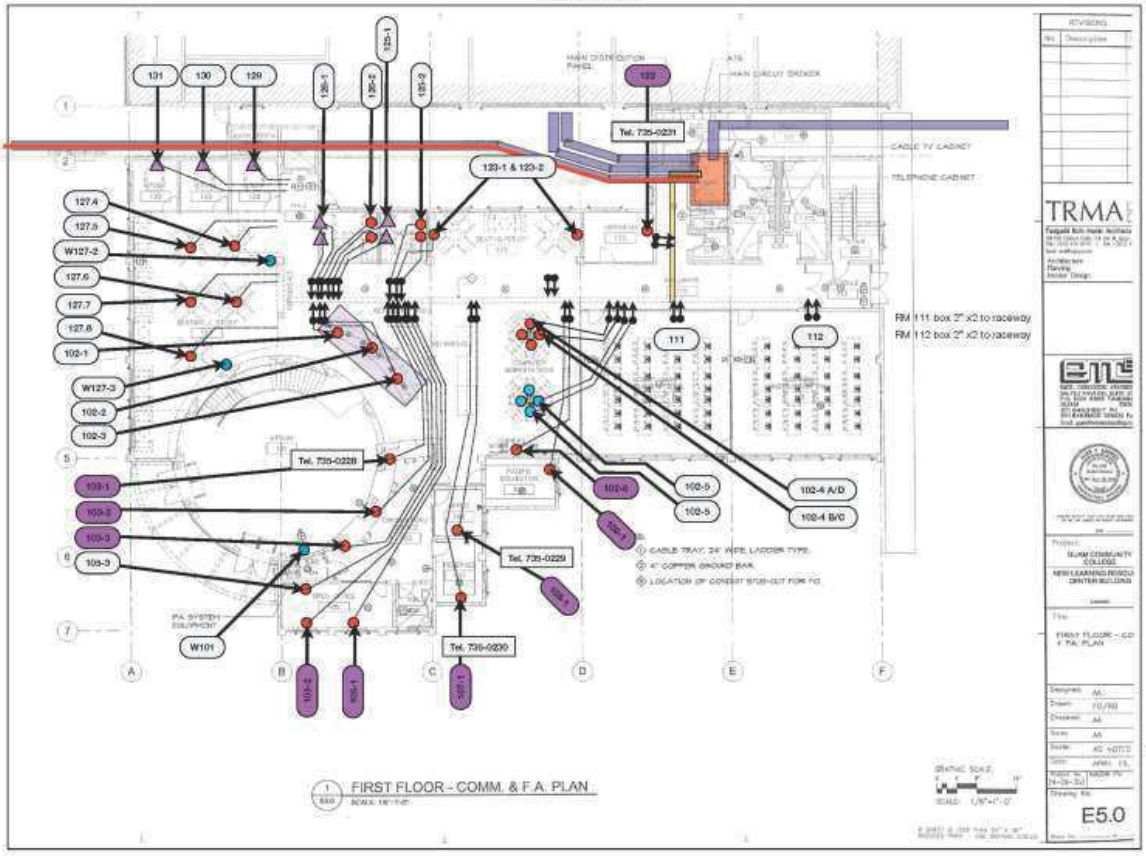
D-Wing Network




BLDG 100
BLDG 200
BLDG 300
BLDG 400

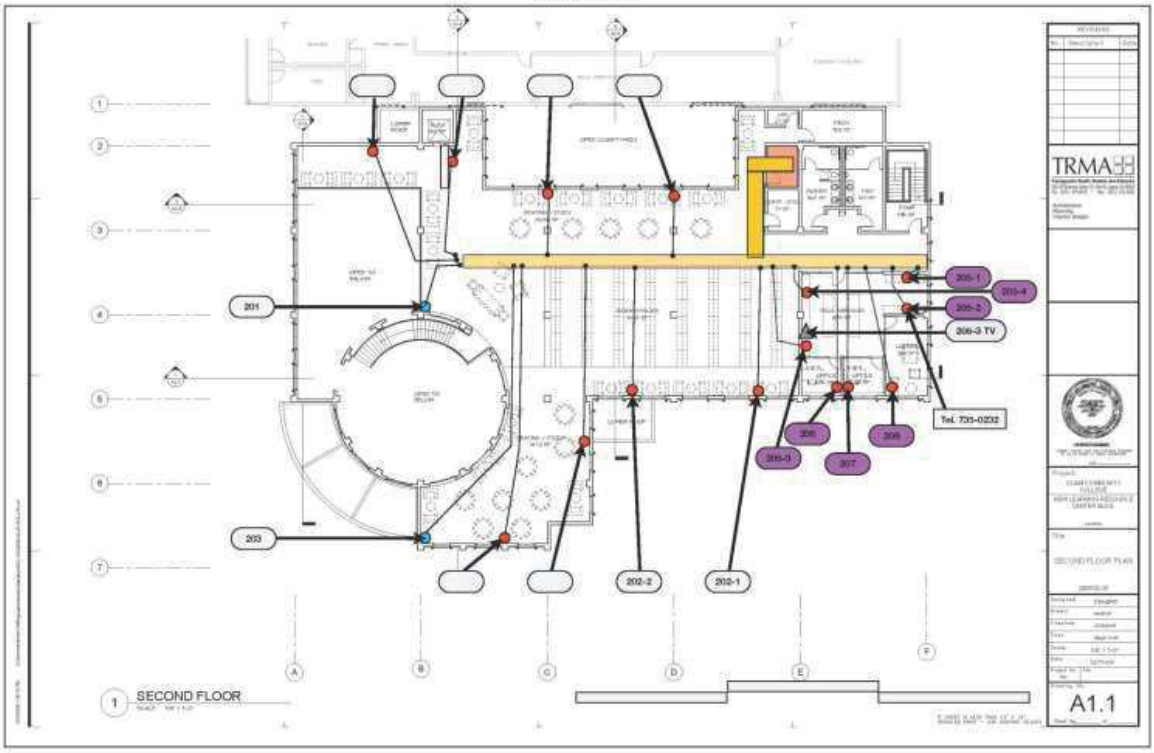
Learning Resource Center Network

CUT SHEET

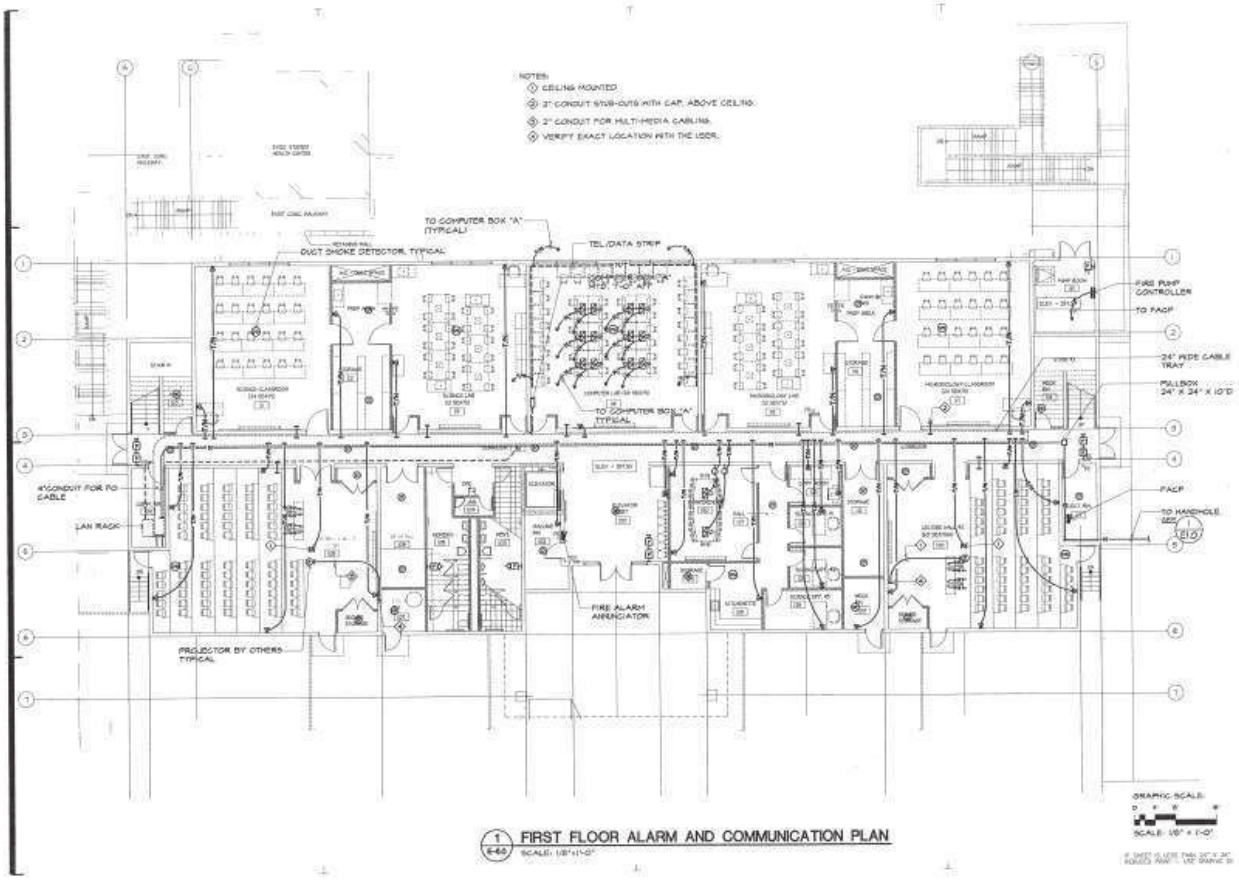


Learning Resource Center Network

CUT SHEET

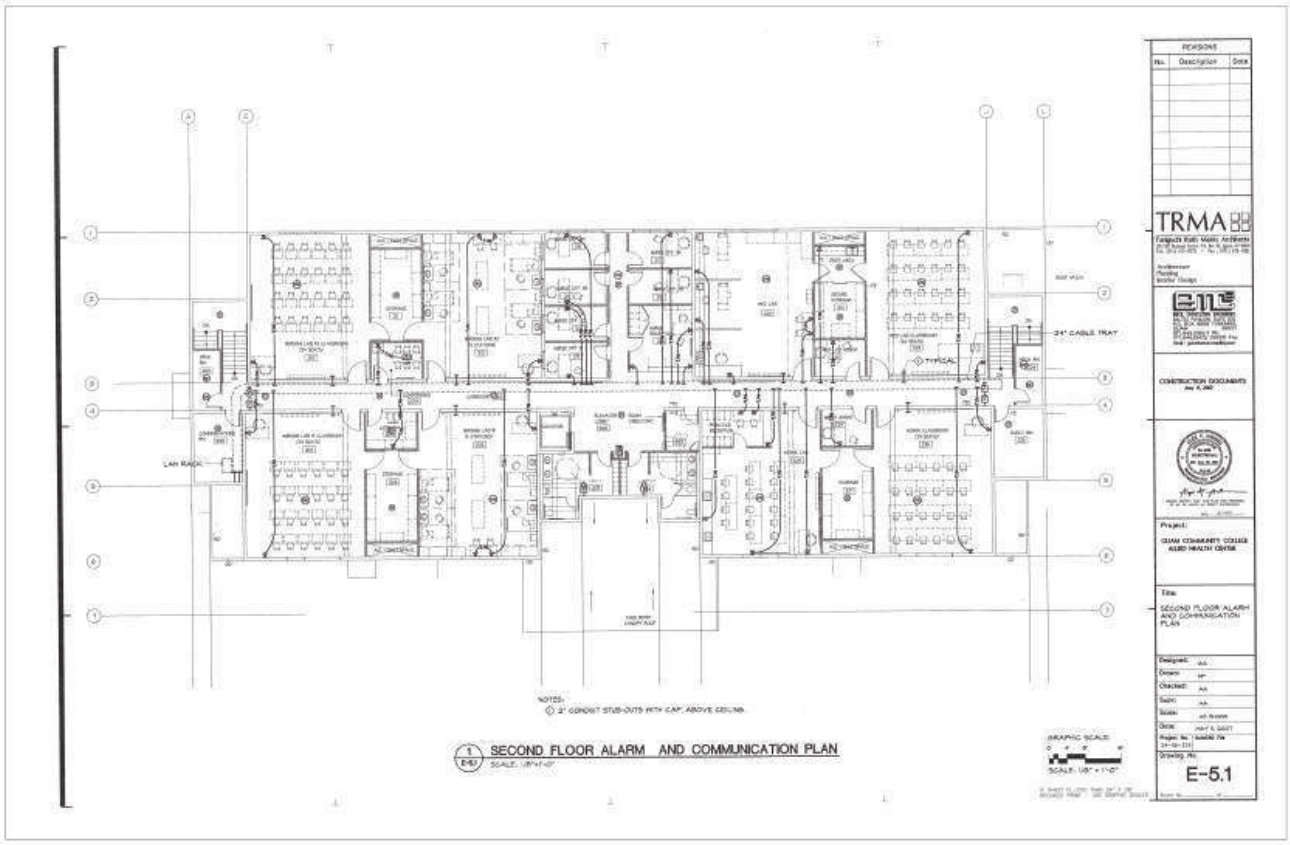


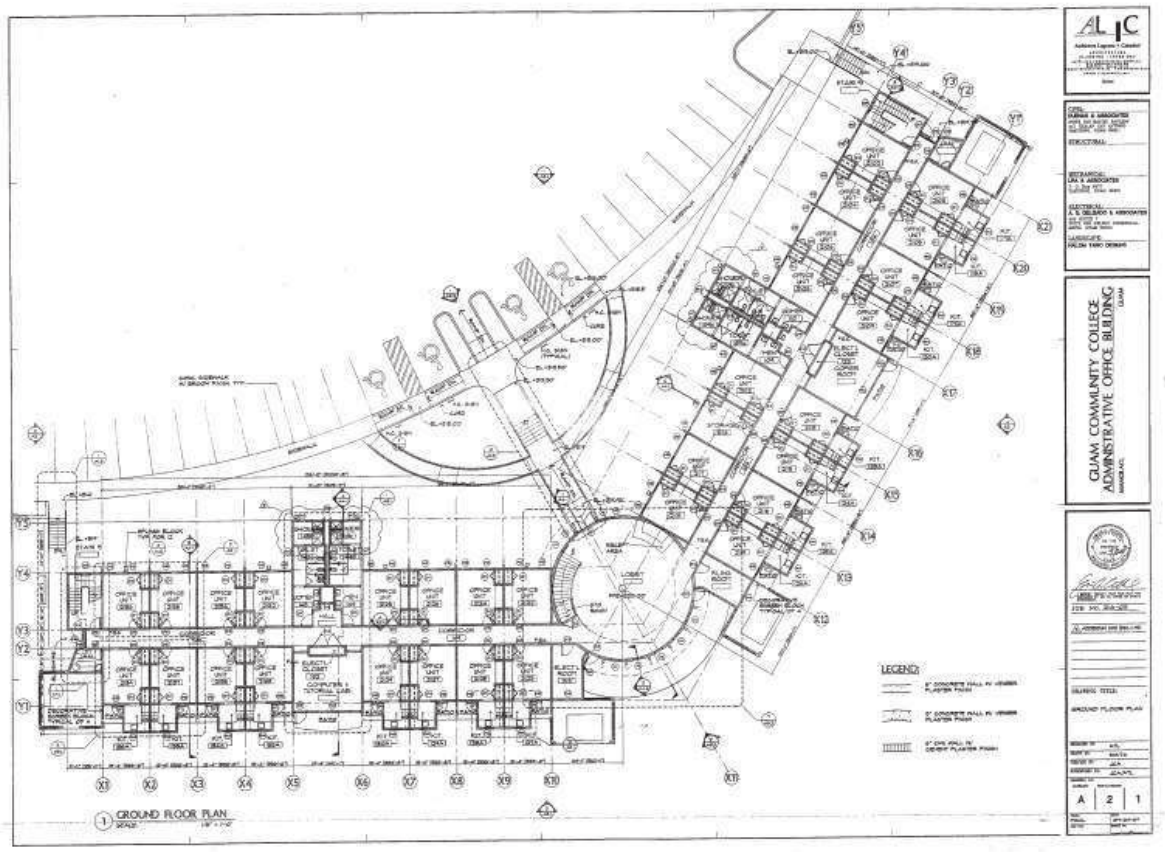
ALLIED HEALTH CENTER

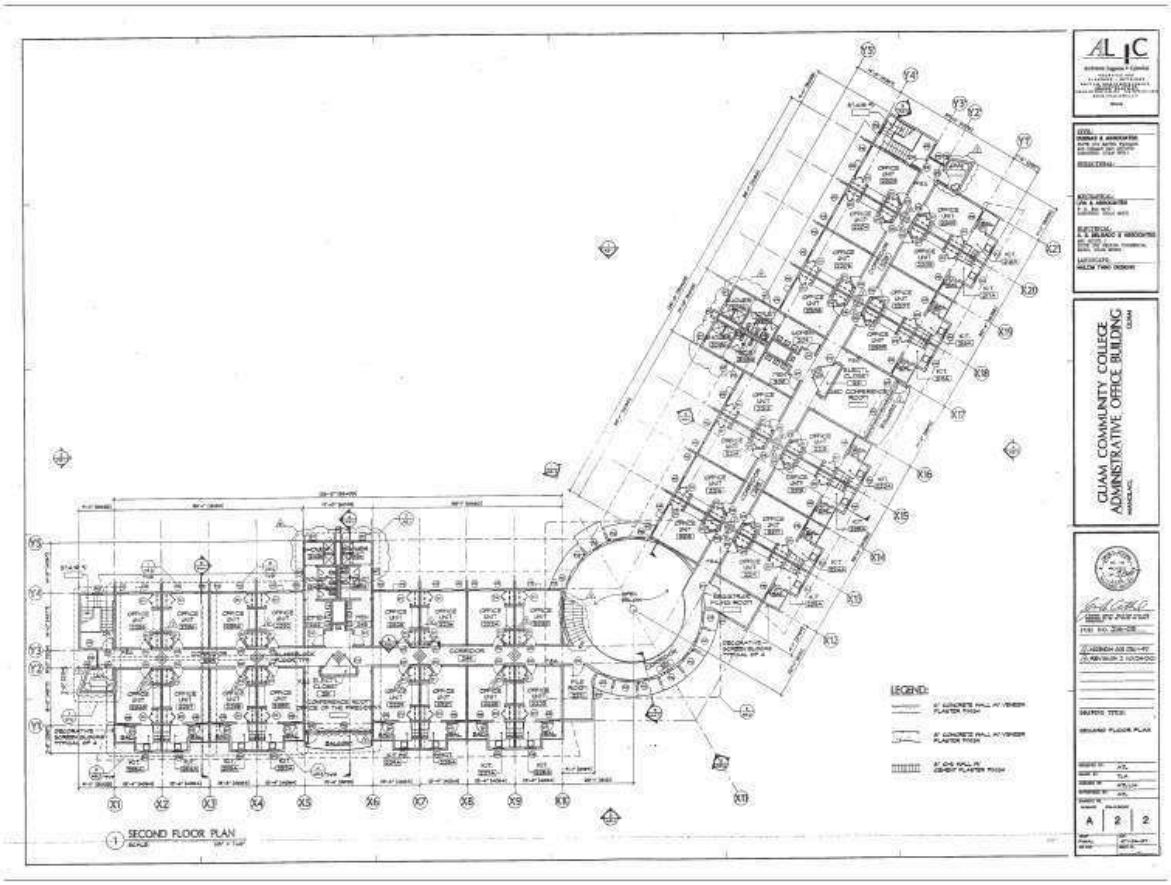


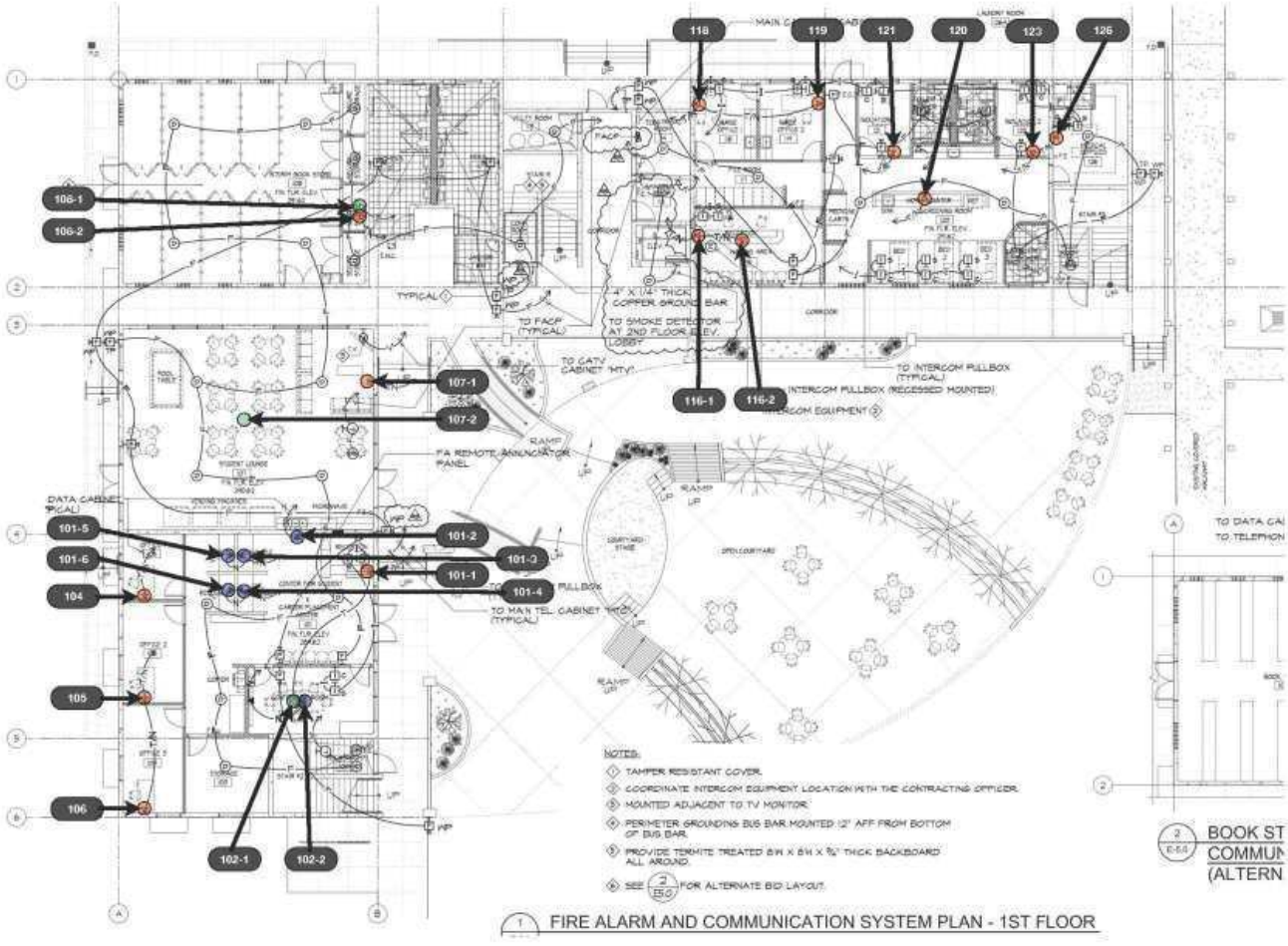
1 E-60 FIRST FLOOR ALARM AND COMMUNICATION PLAN
SCALE: 1/8"=1'-0"

ALLIED HEALTH CENTER

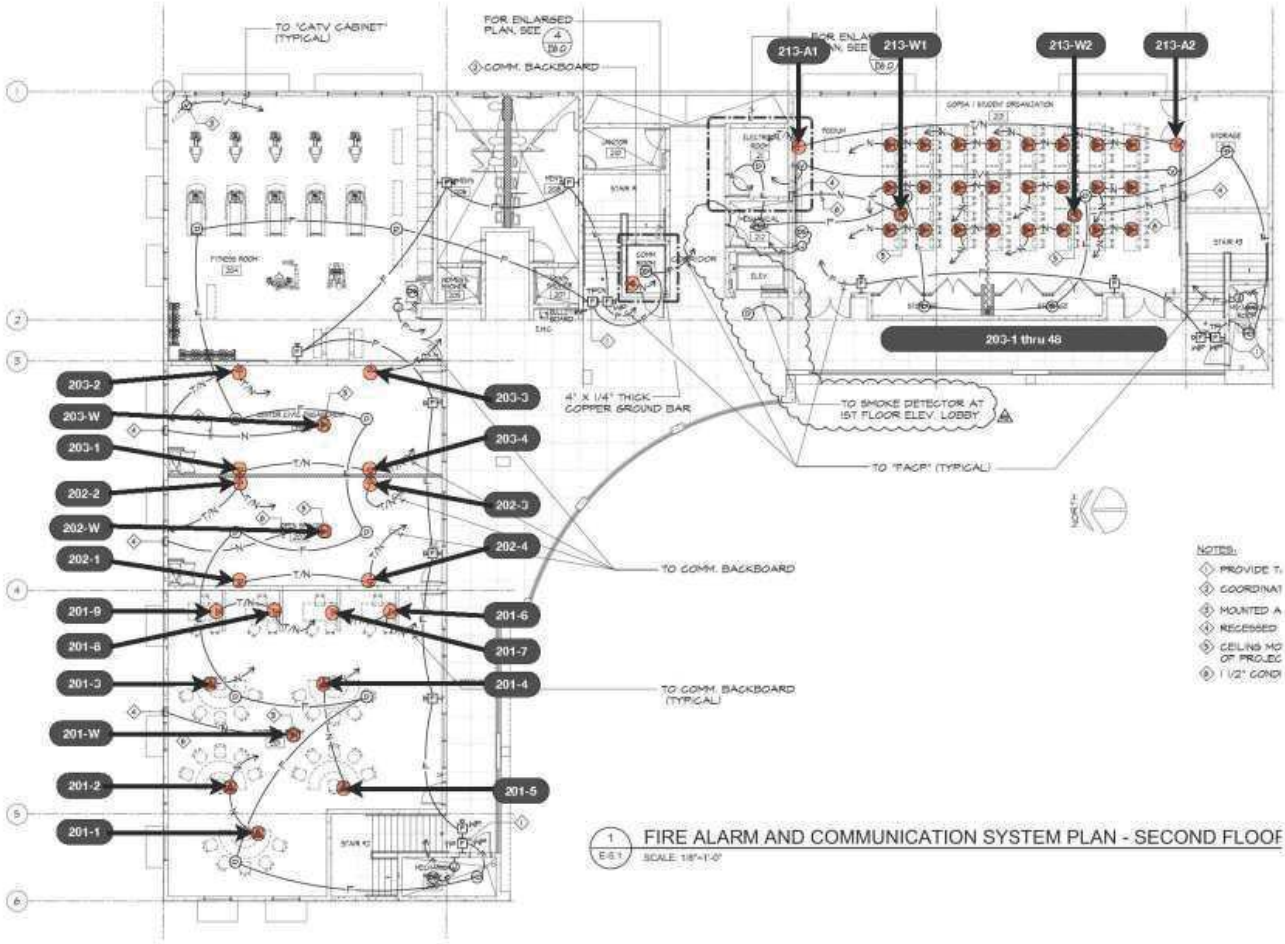



GUAM COMMUNITY COLLEGE
ADMINISTRATIVE OFFICE BUILDING
GROUND FLOOR PLAN
LEGEND:
A 2 1


GUAM COMMUNITY COLLEGE
ADMINISTRATIVE OFFICE BUILDING
SECOND FLOOR PLAN
LEGEND:



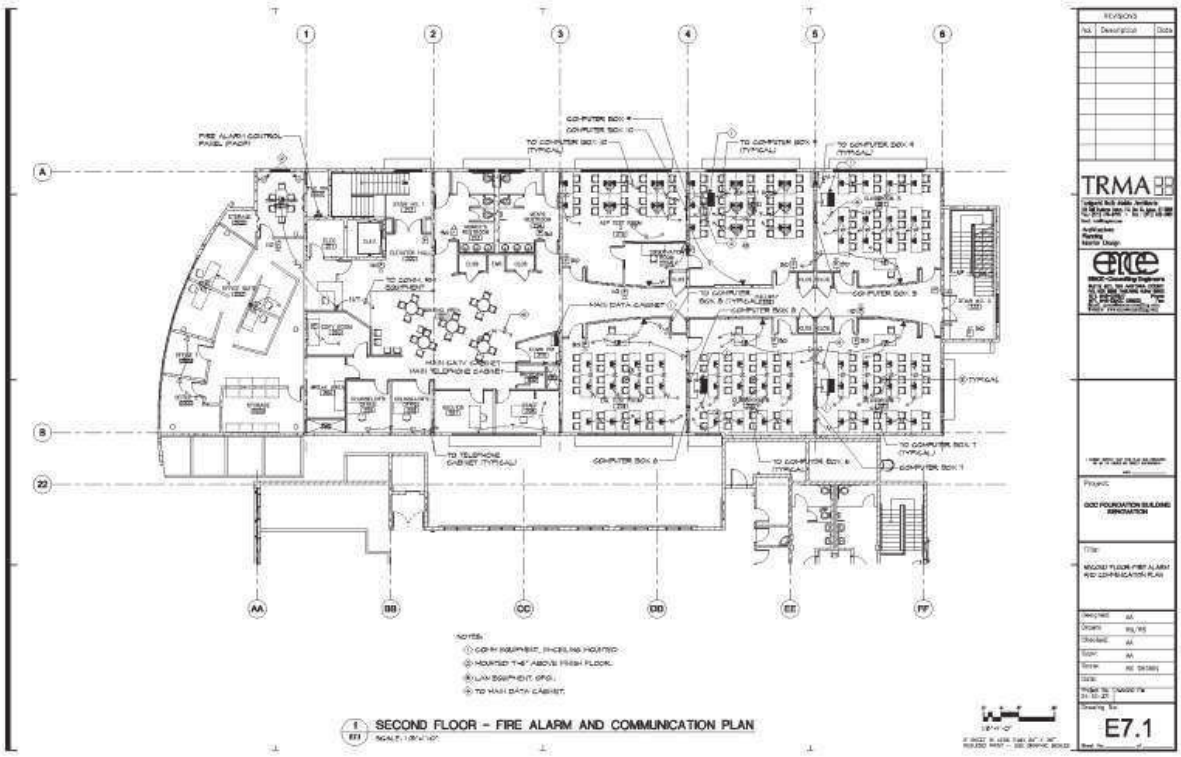
1 FIRE ALARM AND COMMUNICATION SYSTEM PLAN - 1ST FLOOR



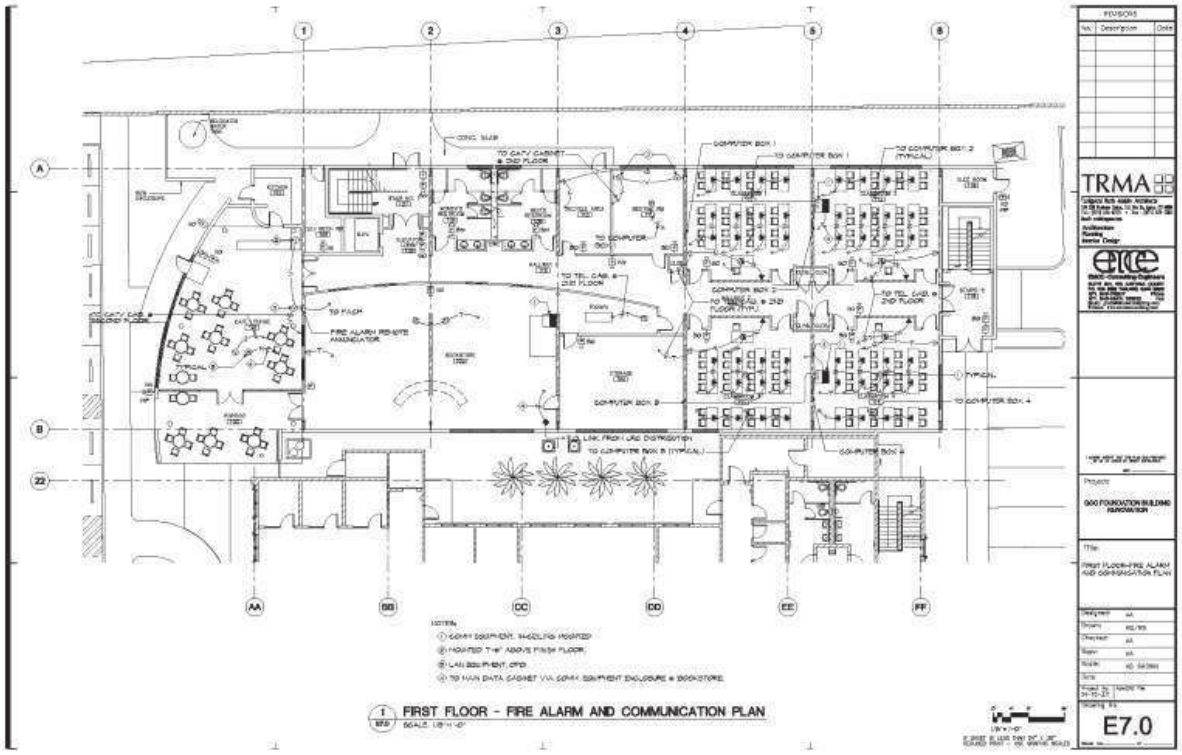
1 E-5.1 FIRE ALARM AND COMMUNICATION SYSTEM PLAN - SECOND FLOOR

SCALE: 1/8"=1'-0"

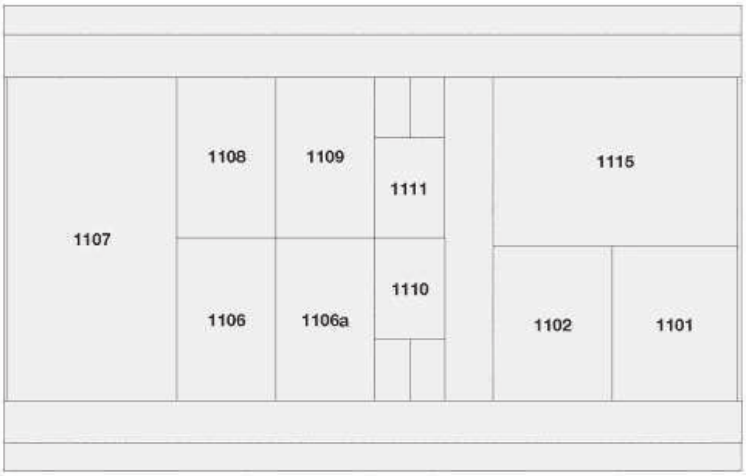
Foundation Building



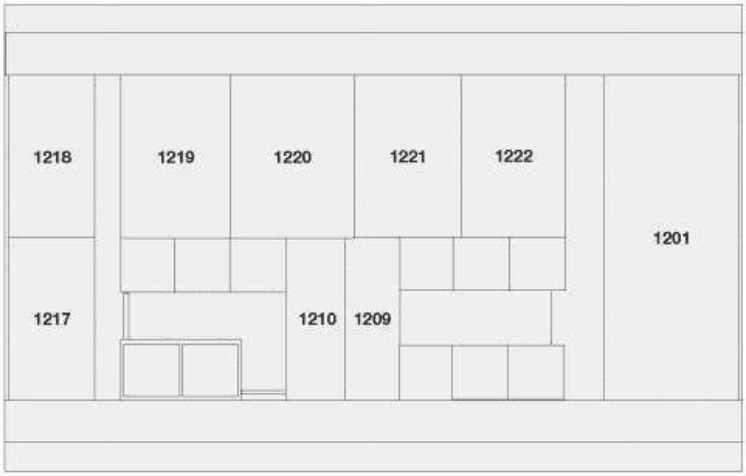
Foundation Building



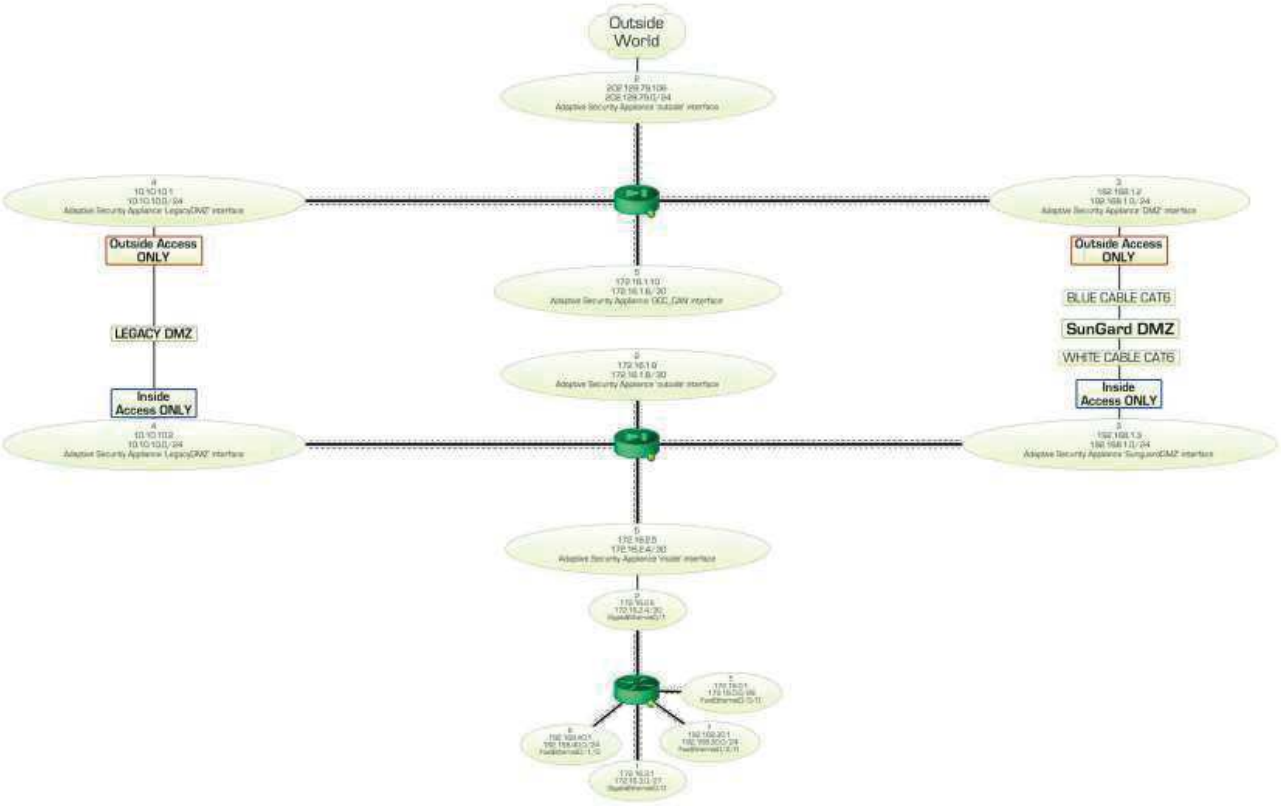
Tech Center Floor 1



Tech Center Floor 2



FIREWALL NETWORKS



APPENDIX H - FOUNDATION BUILDING NETWORK EQUIPMENT

Foundation Building Network Equipment

Item No.	Item Description	Or Equal Spec (OES)	Part No./Location ID	Quan.	Cost Ea.	Extended
1	**Main Telecommunications Room, Rack 4-Post 45U** **Chatsworth Adjustable Rail QuadraRack (ARQR)** • Adjustable Rail QuadraRack (ARQR) has threaded mounting holes that speed installation of patch panels, fiber enclosures, and network switches • The Adjustable Rail ServerRack (ARSR) has square-punched mounting rails that let you change mounting hardware (cage nuts) to match specific computer server and data storage equipment mounting requirements • Each RMU is marked and numbered • The front pair of mounting rails may be mounted to allow RMU numbering to start at the top or bottom of the rack • The rear mounting rail adjusts in depth • UL Listed 60950 • Each rack will support up to 2200 lb (1000.0 kg) of equipment Adjustable ServerRack, Square Mounting Holes, 575mm - 725mm Deep, 45 RMU, 7' High, Black	OES	15213.703	1	$912.48	$912.48
	Evolution Vertical Cable Manager, Single Sided, 6 in. Wide X 7 ft. High, Black	OES	35611.703	1	$697.00	$697.00
	Rack Cabling Managers, 19"W x 3.47"H, Black	OES	11763.719	2	$77.84	$155.68
	Self-Grip End Grommet and Buckle Series, 0.75"W x 6'L, Black, Pkg of 25	OES	05008.201	2	$77.30	$154.60
	Horizontal Cable Guides (Rack Mounted), 9.6"W x 3.96"D, Black	OES	11154.001	1	$9.365	$9.365
	Lockable Storage Drawer, 19"W x 7"H x 20.5"D, Black, Non-Vented	OES	13084.719	1	$405.52	$405.52
	MegaFrame Sliding Shelf, 19"W x 24"D, Black, Single Sided, Vented	OES	12349.719	1	$394.61	$394.61
	Shelf, Vented, 1 RMU, Vented, 575mm - 725mm Deep, Black	OES	15885-732	1	$154.43	$154.43
	Rack Mount Ground Bar, 19"W, Copper	OES	10610-019	1	$62.42	$62.42
	Multi-Mount Hardware Kit, Black, Size: 12-24, Quantity per Package: 25, UL Listed	OES	12638-001	4	$37.04	$148.16
	Concrete Floor Installation Kit	OES	40604-009	1	$10.74	$10.74
	Rear Segregation Kit, Evolution Cable Manager, Black	OES	35475-701	1	$122.40	$122.40
	Cable Lashing Bar Kit, Cable Manager, Evolution Cable Manager, Black	OES	35473-001	1	$61.20	$61.20
2	**Panduit Zone Cabling Active In-Ceiling Enclosure**		PZIOEA	7	$1,420	$9,940
	Support: Classroom 112 & 113, Location: Classroom 113	NON-OES	PND-ENC113	1		
	Support: Classroom 114 & 115, Location: Classroom 115	NON-OES	PND-ENC115	1		
	Support: First Floor Uplink, Location: Book Store RM103	NON-OES	PND-ENC103	1		
	Support: Classroom 215 & 216, Location: Classroom 216	NON-OES	PND-ENC216	1		
	Support: Classroom 217, Location: Classroom 217	NON-OES	PND-ENC217	1		
	Support: Classroom 219 & 220, Location: Classroom 220	NON-OES	PND-ENC220	1		
	Support: Classroom 221, Location: Classroom 221	NON-OES	PND-ENC221	1		
3	**Panduit CAT6 24-Port Patch Panel**		DPKP24688TG	10	$190	$1,900
	Support: First Floor Network	OES		2		
	Support: Second Floor Network	OES		4		
	Support: First Floor Comm, Location: Book Store	OES		2		
	Support: Second Floor Comm, Location: Main Closet	OES		2		
4	**Panduit CAT6 48-Port Patch Panel**		DPKP48688TG	12	$430	$5,160
	Support: First Floor Network	OES		2		
	Support: Second Floor Network	OES		4		
	Support: First Floor Comm, Location: Book Store	OES		4		
	Support: Second Floor Comm, Location: Main Closet	OES		2		
5	**Cisco Catalyst [WS-C2960-48TC-L] 48 Port Switch** (45 W) H 1.73" x W 17.5" x D 13" • Dual-purpose uplinks for Gigabit Ethernet uplink flexibility, allowing use of either a copper or fiber uplink each dual-purpose uplink port has one 10/100/1000 Ethernet port and one SFP-based Gigabit Ethernet port, with one port active at a time • 24 or 48 ports of Fast Ethernet desktop connectivity • PoE configurations with up to 15.4W per port • A wide range of software features to provide ease of operation, highly secure business operations, sustainability, and a borderless networking experience	NON-OES	WS-C2960-48TC-L	6	$2,571	$15,426
6	**Cisco SMARTnet Service** • Around-the-clock, global access to the Cisco TAC • Unrestricted access to the extensive Cisco.com knowledge base and tools • Next-business-day, 8x5x4, 24x7x4, or 24x7x2 advance hardware replacement and onsite parts replacement and installation available • Ongoing operating system software updates within the licensed feature set	NON-OES		6	$150	$900
7	**Cisco Catalyst [WS-C2960-48PST-L] 48 Port Switch POE** • 48 Ethernet 10/100 PoE ports and 2 10/100/1000 uplinks and 2 SFP uplinks • 1 RU fixed configuration • LAN Base image • H 1.73 x W 17.5 x D 9.3 inches	NON-OES	WS-C2960-48PST-L	3	$2,900	$8,700
8	**Cisco SMARTnet Service** • Around-the-clock, global access to the Cisco TAC • Unrestricted access to the extensive Cisco.com knowledge base and tools • Next-business-day, 8x5x4, 24x7x4, or 24x7x2 advance hardware replacement and onsite parts replacement and installation available • Ongoing operating system software updates within the licensed feature set	NON-OES		3	$150	$450
9	**Cisco Catalyst 8 Port Gigabit [WS-C2960G-8TC-L] Distribution Switch** • 7 Ethernet 10/100/1000 ports and 1 dual-purpose uplink (dual-purpose uplink port has 1 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active) • Compact size with no fan, magnet included • LAN Base image	NON-OES	WS-C2960G-8TC-L	1	$700	$700
10	**Rack Mount** for Cisco Catalyst 2960-8TC and Cisco Catalyst 2960G-8TC compact switches	NON-OES	RCKMNT-19-CMPCT=	1	$40	$40

11	**Cisco SMARTnet Service** •Around-the-clock, global access to the Cisco TAC •Unrestricted access to the extensive Cisco.com knowledge base and tools •Next business day, 8x5x4, 24x7x4, or 24x7x2 advance hardware replacement and onsite parts replacement and installation available •Ongoing operating system software updates within the licensed feature set	NON-OES		1	$150	$150
12	**Nest Patch Cable Management Kit** with QTY (48) 2 FT CAT6 Certified Patch Cables	NON-OES	GNP2K648	3	$150	$450
13	**APC Smart-UPS 2200VA USB & Serial RM 2U 120V (SUA2200RM2U)** APC Smart-UPS, 1980 Watts / 2200 VA Input 120V / Output 120V, Interface Port DB-9 RS-232, SmartSlot, USB, Rack Height 2 U Includes: CD with software, Rack Mounting support rails, Smart-UPS signaling RS-232 cable, USB cable, User Manual	NON-OES		2	$600	$1,800
14	**Rack PDU, Basic, 1U, 15A, 120V, (10)5-15 (AP9562)** APC Basic Rack PDU, Input: 100V, 120V, Input Connections: NEMA 5-15P , Cord Length: 12 feet (3.66 meters), Outputs: 120V, Output Connections: NEMA 5-15R Includes: Installation guide, Rack Mounting brackets	NON-OES		2	$100	$200
15	**802.11a/g/n Controller-based Access Point; Int Ant; FCC Configuration (AIR-AP1142N-A-K9)** Cisco® Aironet® 1140 Series Access Point is a business-ready indoor access point designed for simple deployment and energy efficiency. The 1140 Series is a dual-band, 802.11n access point with integrated antennas. It can be ordered in a controller-based* (lightweight) or Standalone (autonomous) version. It may also be ordered with a single-band 802.11g/n (2.4-GHz) radio for use in regulatory domains that do not allow 802.11a (5-GHz) operation.	NON-OES		9	$800	$7,200
16	**Cat 6, Patch Cables, Blue, 3 feet length (Zone Cabling Enclosure)**	OES		300	$2	$600
17	**Cat 6, Patch Cables, Blue, 5 feet length (Work Space Cabling)**	OES		350	$2	$700
18	**Cat 6, Patch Cables, Blue, 10 feet length (Work Space Cabling)**	OES		100	$3	$300
19	**Keystone Network Modules** RJ-45 (Blue)	OES		400	$5.38	$2,152
20	**FacePlates** Single-Gang, 2 port, "2 module capacity (White)	OES		200	$1.25	$250
						$58,899

1.1.2. Matrix of Project & Activities Completions & Plans Related to Components of the 2012 ITSP/EA Documents. (This documents is an Annual Addendum with undated items prior to 2014). Jan 2017-to-Jun 2017 Updates are as highlighted. Upcoming: Jul 2017-to-Dec 2017 Updates are as highlighted.

REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
ITSP page 32 Transition Plans EA page 34 Records Management	• Jan-Jun 2014 Update: Completed procurement of laptop, scanner, and roving cart for the new dedicated Banner Document Management System (BDMS) scanning hardware setup and conducted user training for Human Resources Office • Jan-Jun 2014 Update: Completed the update of MIS' Technology Inventory file that is now stored on a secure Google Drive for a more easy access and better update management • Jan-Jun 2016 Update: Admissions and Registration Office reported plans for getting 3 price quotes for BDMS implementation • Jan-Jun 2016 Update: Ongoing updates of network equipment inventory • Jul-Dec 2016 Update: Admissions and Registration Office procuring BDMS equipment (scanner, laptop, cart) • Jul-Dec 2016 Update: Completed MIS Technology Inventory annual update • Jan-Jun 2017 Update: BDMS System installed for Admissions and Registration Office • Jan-Jun 2017 Update: Assessed and transitioned GCC High School satellite programs' Internet connections to GDOE's E-Rate Internet services • Jan-Jun 2017 Update: CTC approval of recommended policy for Online digital resources CTC initiative for classroom applications , ebooks, and materials	• Added Jan-Jun 2016: Provided BDMS Project specification information for Materials Management • Added Jan-Jun 2017: ERP transitioning from on-site to Cloud • Added Jan-Jun 2017: Online digital resources CTC initiative for classroom applications , ebooks, and materials
EA page 70 Performance Management	• Jul-Dec 2015 Update: Received FY2015-FY2017 MIS Assessment Plan approval confirmation by assessment committee	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2016 Update: Growth Budget submission partially approved with expected goals, indicators, and outcomes for improvements • Jul-Dec 2016 Update: Completed MIS' Unit Assessment Report for FA15-SP17 Assessment Cycle • Jan-Jun 2017 Update: MIS budget updated on for FY17 & FY18 with ERP Cloud base Infrastructure as a Service (CBIAAS) / Submitted FY18 Fund 01 MIS Budget Request with Goals, Indicators, and Outcomes • Jan-Jun 2017 Update: ROI Analysis submitted for ERP CBIAAS • Jan-Jun 2017 Update: Completed MIS Assessment for Implementation Status Report for FA15-SP17 Assessment Cycle	
EA page 65 Technology IT Architecture (TA) PC Configuration EA page 72 IT Management IT Architecture (MA) MA003 Tools	• Updated CTC-recommended and approved PC / Mac standards • Conducted annual PC bids with standard specifications • Create and apply master images to labs and office systems • Procured Mac server, Mac computers, and software for Mac Systems' imaging as well as similar system tools for PC management • Upgraded Classroom Lab D-9, C-4, TC1220, Allied Health 3114, and Mobile Lab C-1 • Deployed and installed 75 new Construction Trades computers at GWHS, SSHS, SHS, OHS, and JFK • Added Macintosh desktop systems to Student Center Open Lab • Jan-Jun 2014 Update: TC1109 with 13 new Macs as part of VisCom lab upgrade via grant funding	• ITSP Page 30 - Transition Plan #4 - Imaging & EA page 45 Alternatives to imaging via Virtual Desktop Infrastructure Implementing Desktop Security with Fortress Grand • Added Jul-Dec 2015: Virtual Desktop Infrastructure lab upgrades under consideration by the College Technology Committee • Added Jan-Jun 2017 - TC1108 & TC1222 Mac Labs systems procured and received pending installation in Summer 2017 • Added Jan-Jun 2017: TC121 and LRC4111 PC Labs systems procured and received pending installation in Summer 2017 • Added Jan-Jun 2017: Installation of new iMacs going to GWHS and THS VISCOM Labs

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2014 Update: Completed 6-month technology standards review and recommended to continue or until course textbooks require changes • Jan-Jun 2014 Update: Completed assessment of Macintosh Labs for Maverick Operating System and applications upgrade plans • Jan-Jun 2014 Update: Completed labs A7, A26, and D8 PC computer hardware and software upgrades with Windows 7 Operating System (OS) and MS Office 2010 in addition to re-imaging all MIS-managed PC labs with same versions for Spring 2014 semester • Jan-Jun 2014 Update: Conducted campus-wide computer systems assessment and compiled, submitted, and communicated to the college's administrators computer systems recommended for upgrade to Windows 7, and/or replacements of outdated/obsolete XP systems • Jan-Jun 2014 Update: Completed campus-wide sweep and removal of Windows Genuine Authentication (WGA) error notifications for all available and accessible campus systems • Jan-Jun 2014 Update: Completed MicroMD's Electronic Medical Records (EMR) Software and Hardware server system installation for Allied Health program including setup for Client Workstation Application connectivity to the server	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jul-Dec 2014 Update: Completed majority of PC lab systems upgrades from XP to Windows 7, and MS Office 2007 to 2010 • Jul-Dec 2014 Update: Procured and received laptops for the upcoming upgrade of Lab Room C23 in addition to desktop spares for labs • Jul-Dec 2014 Update: Added scanning stations to Student Open Lab • Jan-Jun 2015 Update: Completed Allied Health Center EMR Lab and Network Installation with 18 computer systems • Jan-Jun 2015 Update: Completed another XP campus sweep assessment and compiled a report to show who is still running XP and if system is upgradeable or obsolete • Jan-Jun 2015 Update: Completed AutoCAD DSL Internet line transfer and lab network at new Building E location • Jan-Jun 2015 Update: Completed the update write-up, adoption, and approval by the College Technology Committee of the new Apple MAC standards specifications which is also available as published on GCC's website • Jan-Jun 2015 Update: Imaged and deployed 22 new laptops to CACGP and 11 new laptops to Allied Health • Jan-Jun 2015 Update: Installed web locker on 5 testing exams systems for CIC (Crane Institute Certification) • Jan-Jun 2015 Update: Received, secured, and completed hardware installations of newest PC computer lab - Room C25, and upgrade of the ESL computer lab - Room	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	6219, along with completion of Lab C-25's network cabling • Jan-Jun 2015 Update: Banner Mass Data Update Utility as a batch system tool for Banner database updates • Jan-Jun 2015 Update: Additional capabilities added to our Solarwinds licensing to include IP Address Manager IP4000 and User Device Tracker UT25000 up to 25000 ports. • Jan-Jun 2015 Update: New PC standards and current bid award now include Windows Surface Pro 3 with Windows 8 and Samsung Android for introductory use and assessment and research of technology impact • Jul-Dec 2015 Update: Received, completed imaging, and deployed thirteen new computers for the GWHS Electronic • Jul-Dec 2015 Update: Installed and setup 8 workstations at Okkodo High School Pro Start program • Jul-Dec 2015 Update: Inspected and prepared 10 laptops for connectivity for Work keys assessment at Simon Sanchez High School Room 320 • Jul-Dec 2015 Update: Coordinated and completed with Bookstore and Computer Tech on creating Bookstore Register CPU and disk image • Jan-Jun 2016 Update: Bid with new PC Standards Specifications (Microsoft Windows 10 / MS Office 2016) completed, awarded, and published online on MyGCC and www.guamcc.edu website	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2016 Update: Completed upgrade of Student Center Open lab Macintosh systems' applications • Jan-Jun 2016 Update: Procured 105 computers for the upcoming upgrades of labs D2, D3, D10, and A27 • Jan-Jun 2016 Update: Completed Lab Upgrades for Rooms TC1221, D2, D3, D10, and A27 • Jan-Jun 2016 Update: Installed Cisco Packet Tracer Version 6.2 at LRC (library) and Student Center Open Lab for CISCO's students use • Jan-Jun 2016 Update: Computer Technology Committee demonstration of Virtual Desktop Infrastructure by DMR • Jan-Jun 2016 Update: Completed the publication of the new PC Bid information, as awarded, and latest standards specifications on WWW.GUAMCC.EDU and MYGCC.GUAMCC.EDU Work Life tab • Jul-Dec 2016 Update: Created Windows 10 Operating System image for both Dell and Lenovo computers • Jul-Dec 2016 Update: Delivered, deployed, and installed 12 computers to Science classes at Allied Health Center, 29 computers to GWHS, 12 computers to LRC/Library, and 3 computers to SHS • Jul-Dec 2016 Update: Installed Electronic academic department's special software in lab room TC1220 • Jul-Dec 2016 Update: Upgraded and activated Windows 10 and MS Office 2016 for labs at LRC/Library, A7, A26, C25, TC1220, TC1221, C4, 3114, B bldg., 6219,	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	and STC Open Lab and, Updated MAC OS at STC lab to El Capitan Room 5213 • Jul-Dec 2016 Update: Veterans Lounge mini-lab installation at Foundation Room 6111 completed with printer and network connectivity • Jul-Dec 2016 Update: Captured, created, and tested image for new Lenovo M800 desktop computer for lab and staff use, and customized one lab image for Room D3 accounting class • Jul-Dec 2016 Update: Deployed 3 systems to Financial Aid Office, 1 to Materials Management Office, and 4 to Continuing Education (CE) and Accounting offices, and also imaged 7 new PC systems for CE • Jul-Dec 2016 Update: Completed XEROX vending printer, copier, scanner equipment installation at Student Center Open Lab • Jul-Dec 2016 Update: Completed Windows 10 upgrade for Project Aim lab and setup of two additional workstations • Jan-Jun 2017 Update: Windows 10 OS applied to all lab units • Jan-Jun 2017 Update: Reimaged and prepared older TC1220 PC desktops and laptops computers and redistributed to GCC high school programs • Jan-Jun 2017 Update: Deployed 6 laptops to Simon Sanchez High School GCC satellite program • Jan-Jun 2017 Update: Completed preparations of master images and imaged new iMacs going to GWHS and THS VISCOM Labs • Jan-Jun 2017 Update: Cloud-based Single-Sign-On (SSO) for WiFi and wired network	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	authentication, and Domain Name System (DNS) transition completed and activated • Jan-Jun 2017 Update: Completed evaluation and publication of bid award and new minimum standards for PCs, MACs, and Software • Jan-Jun 2017 Update: Installed TI-83 calculator program in Room A27 Lab • Jan-Jun 2017 Update: Completed hardware upgrade of Room D7 Computer Science Lab and delivered 21 Windows Surface Pro 3 systems procured via the Telecommunications Grant funds • Jan-Jun 2017 Update: Completed another set of older PC equipment redistribution from upgraded campus labs to GCC High School Satellite Programs (Southern, GW, JFK, and Tiyan High Schools) • Jan-Jun 2017 Update: Completed procurement and received 50 PC computers for the upgrades of the Library's Room 4111 Lab & Cisco Academy's Room TC1218 Lab, and 46 iMac computers for the upgrades of Technology Center's Room TC1108 Lab & Room TC1222 Lab • Jan-Jun 2017 Update: Transferred Room A7 Lab computers and peripherals to new Room D6 Lab and installation of new network	
EA page 72 MA007 Licensing EA page 85 Virtualization of all Legacy Servers, Upgrades to BANNER 9/XE and LUMINIS 5	• Upgraded licenses for MS Office from 2003/2007 to 2010/2011 for both PCs and Macs • Upgraded Labs Microsoft Windows Operating System from Windows XP to Windows 7	• Added Jan-Jun 2015: ERP servers to be phased out with ERP movement to Cloud. • Added Jan-Jun 2017: ERP Cloud Hosting (CBIAAS) bid, award, and implementation • Added Jan-Jun 2017: ERP Remote Technical Professional Support Services bid, award, and take effect

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Continued renewal of licensing and software support of GCC's Enterprise Resource Planning (ERP) system (BANNER, LUMINIS, ODS, COGNOS, EDW, Evisions, TouchNet, etc.) • Jan-Jun 2014 Update: Completed creating, testing, and capturing base and master images for various models of current and new computer systems especially those from the latest computer bid and those being upgraded to Windows 7 • Jul-Dec 2014 Update: Completed creating, testing, and capturing additional Windows 7 Operating System base and master images for various desktops and laptops computer system models • Jan-Jun 2015 Update: Completed downloading from Autodesk Education Master Suite 2015 for AutoCAD 2015 upgrade installation (64 & 32-bit versions) and with NavisWorks, Civil 3D, and Revit on for the upgraded computers of the AutoCAD lab • Jan-Jun 2015 Update: Loaded and updated Office 2013 on Lenovo ThinkCentere M73 series type system with Master image captured • Jan-Jun 2015 Update: MS Office 2013 as a CTC standard • Jul-Dec 2015 Update: Completed renewal licenses and maintenance for Evisions' FormFusion/IntelliChek, SolarWinds network monitor, TouchNet Payment Gateway, Symantec EndPoint Anti-Virus, and Backup Exec applications and services	• Added Jan-Jun 2017: Fully tested TEST environment and ESTA Production installation of Ellucian's Banner 9/XE Modules • Added Jan-Jun 2017: Standardization to MS Office 2016 • Added Jan-Jun 2017: Standardization to Windows 10

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2016 Update: Microsoft Windows 10 and MS Office 2016 approved by CTC as new standards • Jan-Jun 2016 Update: BANNER 9 Events Management and Requisition Module Test installation completed, pending technical and end user training • Jan-Jun 2016 Update: Created base image of Windows 10 for lab computers • Jul-Dec 2016 Update: 1st Draft of ERP Cloud Hosting specifications for bid submitted • Jul-Dec 2016 Update: Renewed Maintenance of Evision's FormFusion/InteleCheck software and Payment Gateway Service Contract with TouchNet • Jan-Jun 2017 Update: 2nd and 3rd Drafts of ERP Cloud Hosting (CBIAAS) bid specifications completed • Jan-Jun 2017 Update: 2nd and 3rd Drafts ERP Remote Technical Professional Support Services bid specifications completed • Jan-Jun 2017 Update: Completed and submitted finalized bids specifications for Institutional Enterprise Resource Planning (ERP) system's remote technical professional services and support (4th draft/final), and a separate one for the ERP system's migration to a Cloud Base Infrastructure As A Service (CBIAAS) (4th draft/final) platform, with both pending bid packaging and announcement • Jan-Jun 2017 Update: Completed TEST installation of Ellucian's Banner 9/XE Modules with ongoing functional user testing	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2017 Update: Ongoing Banner 8 ESTA production environment upgrades and updates pre-requisites requirements for Banner 9/XE ESTA upgrades	
EA page 64 TS009 Availability	• Continued critical maintenance and support of GCC's Enterprise Resource Planning (ERP) system through outsourcing of necessary remote Professional and Technical Services with TechProven • Continued to address the needs of our labs, networks, Internet bandwidth, and facilities • Jan-Jun 2014 Update: MIS D-Wing Storage Room renovation completed • Jan-Jun 2014 Update: Completed installation and setup of MIS shelves, work room and storeroom reconfiguration, and shelving and transfer of equipment inventory and spares • Jan-Jun 2014 Update: Completed the campus-wide implementation with XEROX for the new photocopying, printing, and scanning machines and updated the www.guamcc.edu/11erox web page to reflect the current setup • Jan-Jun 2014 Update: Conducted and completed campus-wide network re-configuration for access and connectivity to newly implemented and deployed XEROX equipment • Renewed subscriptions for licenses, support, and continued use of BANNER, LUMINIS and all other ERP-related systems • Continued services with TouchNet for our student online credit card payment system	• Updated Jul-Dec 2014: Building E (200/100) Electronic Building Key Access and ID system holistic integration / consolidation • Added Jan-Jun 2015: Mobile ERP Apps to be phased into system. • Added Jul-Dec 2015: Computer in every classroom project under consideration by College Technology Committee • Added Jul-Dec 2016: Campus IP Mapping - IPV6 Oriented • Added Jul-Dec 2016: Firewall Migration Plan (Departure from split horizon to simple DMZ configuration) • Added Jan-Jun 2017: Legacy Systems Migration Planning to move to the Cloud • Added Jan-Jun 2017: ERP Cloud Hosting (CBIAAS)

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	Continued contractual services to renew software subscription services for Oracle Relational Database System via Ellucian • Upgraded Moodle Learning Management System from 1.9 to 2.2 • Jul-Dec 2014 Update: Completed major network configuration changes such as repositioning of Net Monitoring Systems to new router, various LAN Network Address Translations (NATs) and more updates to Domain Name System (DNS) • Jul-Dec 2014 Update: Completed reinstallation of new Bldg. 200/E networking and data lines, WiFi, and VoIP • Jul-Dec 2014 Update: Completed procurement and replacement of UPS batteries for network devices in various building communication rooms • Jul-Dec 2014 Update: Disaster Recovery project for BANNER INB approved and implementation phase is ongoing • Jan-Jun 2015 Update: Setup workstations and configured secured Xerox printing at E building • Jan-Jun 2015 Update: Updated DNS Server Management Software from 1.73.0 to 1.74.0 • Jan-Jun 2015 Update: Now in place the procedure and allowance of direct GCC Gmail access in case of total system shutdown • Jan-Jun 2015 Update: Continued critical maintenance and support of GCC's Enterprise Resource Planning (ERP) system through outsourcing of necessary remote	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	Professional and Technical Services with TechProven • Jan-Jun 2015 Update: Basic Disaster Recovery for BANNER INB implemented • Jul-Dec 2015 Update: Updated Domain Name System Servers Management to 1.760 • Jul-Dec 2015 Update: TracDat Assessment system now available on GCC WIFI • Jul-Dec 2015 Update: Setup Cosmetology program at E.M. Chen Bldg. in Barrigada to receive Internet services via GTA MiFi • Jul-Dec 2015 Update: Setup DHCP Reservation service mapping to various critical systems throughout campus network • Jul-Dec 2015 Update: Upgraded Management Information Systems' D1 Network Configuration, Switch and Network Cabling by replacing 3Com switch with new Cisco Switch • Jul-Dec 2015 Update: Repaired Admin. Bldg. switch • Jul-Dec 2015 Update: Replaced 3COM with spare 3COM switch to resolved no internet connection in Room 502 • Jul-Dec 2015 Update: MyGCC TEST upgraded to LUMINIS 5.2.X version with MyGCC Production environment scheduled next • Jul-Dec 2015 Update: Completed 2 (two) Enterprise Resource Planning (ERP) Disaster Recovery (DR) quarterly training and testing (1st 6/2015, 2nd 10/2015)	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jul-Dec 2015 Update: Consolidate D-Wing building's network uplinks to WiFi Distribution Switch • Jul-Dec 2015 Update: WWW.GUAMCC.EDU now accessible regardless of campus system shut down due to implementation of external backup Domain Name System (DNS) with GoDaddy • Jan-Jun 2016 Update: MyGCC upgraded to LUMINIS 5.2.X version • Jan-Jun 2016: MyGCC portal website Cloud-based Disaster Recovery (DR) completed • Jan-Jun 2016 Update: Successfully repositioned GCC WiFi Access Point into new Virtual Lan (vLAN) infrastructure • Jan-Jun 2016 Update: Successfully negotiated reduced cost with combined Ellucian BANNER-Oracle Contract 2016-2023 • Jan-Jun 2016 Update: Resolved proxy issue with MyCAA website for invoice processing using hoxx.com's free VPN account • Jan-Jun 2016 Update: Relocated WESCOM Router to C6 Telecom Room and cleaned up Fiber Optics connections at SRVCOM (Server Room) • Jan-Jun 2016 Update: Installed Master MDNS TEST base OS, formerly NSR1 • Jan-Jun 2016 Update: Conducted 2016 Quarterly BANNER and MyGCC portal Disaster Recovery Training/Testing • Jan-Jun 2016 Update: Completed XEROX Black/White and Color Quota setup for administrative users • Jan-Jun 2016 Update: Completed IP assignment and firewall clearances for the upgrade of First Hawaiian Bank's (FHB)	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	Credit Card swipe machines to work over GCC's Internet link • Jul-Dec 2016 Update: Campus Internet Bandwidth upgraded increase by 50% from total of 110Mbps to 165Mbps to respond to high demand • Jul-Dec 2016 Update: Virtual Machine (VM), Virtual Private Network (VPN), and related activities - Completed fire alarm vLan configuration, Various vLan Additions & Changes, Ongoing ASA (Firewall) Device installation (Licensing, Network Management Access, Replicate Routes & DMZ Access Rules completed), and Domain Name System / InterMapper Updates • Jul-Dec 2016 Update: Cleaned up all MIS network communications closets throughout campus in preparation of fire inspection • Jan-Jun 2017 Update: Increased licensed subscription from 2 to 25 for Virtual Private Network (VPN) and installation and configuration completed	
EA page 32 GUAM COMMUNITY COLLEGE EA OBJECTIVES AND STRATEGIES General Overview	• GCC procured generators, routers, switches, firewalls, UPS, and related licenses of software and systems tools, and virtualized our ERP servers on a blade platform to provide • Continuing efforts to design and implement a true Help Desk, a Redundant Network and Systems or a COOP (Continuity Of Operations) site for Disaster Recovery • Continued upgrades to GCC's ERP system • Jan-Jun 2014 Update: Completed Banner & Related Systems Upgrades: Enterprise Data Warehouse (EDW) system upgraded to 8.4.2 for ESPIA's Operational Data Store	• True Help Desk Systems Implementation • Added Jan-Jun 2014: Completed ISP Site Survey & Request for Quotes (RFQ) for GCC's Title V funded High School programs' Internet services with plans to upgrade as soon as funding becomes available • Update Jul-Dec 2014: GCC's Title V nearing completion for the procurement of GCC's High School programs' Internet services upgrade • Added Jul-Dec 2016:Ongoing GCC Website redesign with Website committee / Major updates to be done internally / attempting sole source

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	(ODS) environment, Financial Aid upgraded to 8.19, Human Resources upgraded to 8.10.1, and COGNOS upgraded to version 10 • Jan-Jun 2014 Update: Completed Enterprise Resource Planning Systems Upgrades in BANNER, LUMINIS, and related systems to include: Internet Native BANNER (INB) for Financial Aid 8.20, General 8.6, Student 8.6.3, and Accounts Receivable 8.4.5; as well as, Self-Service BANNER (SSB) for Financial Aid 8.20, Web Tailor 8.6, Web General 8.6, and Student Self Service 8.6; • Implemented Campus Wireless for Internet access • Upgraded our Internet bandwidth total capacity to 110Mbps and put in place a 3-prong redundant connection to the cloud • Renewed InterMapper software licensing and support subscription services with Help/Systems (formerly Dartware) • Installed CCTV Digital Camera Surveillance Systems for new and existing computer labs at the Foundation and Allied Health buildings, as well as the Student Bookstore • Jan-Jun 2014 Update: Completed Technical Assistance for CACGP new Surveillance System, which is now up and running • Installed new BookLog BookStore POS (Point-of-Sale) System • Renewed software licensing and support subscription services for SolarWinds, Symantec EndPoint Enterprise Antivirus System, VeriSign	• Added Jan-Jun 2017: BANNER 9/XE Rollover by October 2017, and Full Launch/Switch by December 2017

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Outsourced to WSI GCC's public website and moved web server to the Internet Cloud • Migrated our eMail system to the Internet Cloud by using Google's GMAIL email platform which also comes with many other related Google Apps services such as Google Docs, Google Drive, Calendar, and Sites, etc. • Implemented, as part of the computer standards specifications, security cable-lock system to be installed for all new PC and Mac systems to improve physical security and to deter theft • Registered iMacs from Student Center lab and SSHS Marketing Lab computers to the iCloud for hardware equipment tracking in case of theft • Jul-Dec 2014 Update: BANNER Financial Aid upgraded to 8.21.0.1, Student to 8.6.6, and MyGCC portal security certificate with GoDaddy • Jul-Dec 2014 Update: Procured and Received renewal and upgrade codes for Solarwinds Network Monitoring Software • Jul-Dec 2014 Update: Procured and upgraded surveillance systems from analog to digital equipment for buildings A, B, C, and D • Jan-Jun 2015 Update: Completed Banner upgrade of Financial Aid to 8.22.1, Human Resources to 8.11.3, Finance to 8.10, General to 8.7.4, General Web to 8.7.1, Student to 8.7.3, Student Web to 8.7, Faculty and Advisors Self-Service to 8.7.1,	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	Financial Aid Self Service to 8.22, COGNOS 10 package to work with EDW 8.4.3 • Jan-Jun 2015 Update: Cognos SSO now in production and working with EDW 8.4.3 • Jan-Jun 2015 Update: BANNER INB DR testing successful in both wired and WiFi environments • Jan-Jun 2015 Update: Completed installation and testing of Banner Mass Data Update Utility in ESTA with Techproven • Jan-Jun 2015 Update: Renewed InterMapper network monitoring and reporting system • Jan-Jun 2015 Upate: Renewed Symantec EndPoint Enterprise and ESET NOD32 EndPoint Server Antivirus System • Jan-Jun 2015 Update: Title V funds used to replace JFK networking equipment damaged by lightning strikes • Jul-Dec 2015 Update: Upgraded Intermapper Server from 5.8 to 5.9 • Jul-Dec 2015 Update: RIPE ATLAS probe installation completed - Installed, Registered & Operational, as allowed by the College Technology Committee and as approved by the President • Jul-Dec 2015 Update: Received the NOD32 25 licenses for renewal and activated the accounts in various servers • Jul-Dec 2015 Update: Installed and included new packages in COGNOS for users • Jul-Dec 2015 Update: Completed Web Tailor modifications and SOP to remove the Self-Service menu options using both	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	Students and Faculty and Advisors menus in MyGCC and MYGCCTEST • Jul-Dec 2015 Update: Completed upgrade and created new 64bit Packages for Symantec Endpoint 12.1.6. • Jul-Dec 2015 Update: BANNER upgrades completed for Financial Aid & Financial Aid Self-Service 8.23.0.5 (Regulatory Patch), Finance Self-Service 8.7, Employee Self-Service 8.11.2, AR 8.5, Position Control 8.11.1, and HR 8.11.5 • Jan-Jun 2016 Update: Completed 2nd quarterly Disaster Recovery (DR) training for BANNER INB and initially tested MYGCC's DR • Jan-Jun 2016 Update: Completed Banner Production ESTA upgrade of Financial Aid module to 8.25 and Student module to 8.9.1 • Jan-Jun 2016 Update: Completed BANNER HR 8.12.2 and 2016 Tax Table upgrades in ESTA production environment • Jan-Jun 2016 Update: Completed InterMapper Server & RA download and upgrade from version 5.9.1. to 6.0 • Jul-Dec 2016 Update: Completed quarterly Disaster Recovery (DR) Training / Testing on 10/14/16 • Jul-Dec 2016 Update: Refreshed Bookstore's Booklog Point-Of-Sale system with the removal of old backup files, created image backups, and exported reports to Excel • Jul-Dec 2016 Update:Symantec EndPoint Antivirus System Upgrade License received and maintenance renewed, and upgraded	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	Symantec Endpoint Management Console to version 12.1.6 • Jul-Dec 2016 Update: Quarterly Disaster Recovery (DR) Training / Testing on 12/23/16 completed • Jul-Dec 2016 Update: Banner HR & Position Control upgraded to 8.13 • Jul-Dec 2016 Update: Financial Aid Office with Banner Financial Aid 8.28 completed • Jan-Jun 2017 Update: Completed Banner TEST & ESTA upgrades for Financial Aid 8.29, Advancement 8.8, General 8.9, Student 8.10.4, and Accounts Receivable to 8.5.2 • Jan-Jun 2017 Update: Completed needed Banner updates for W2 and loaded 2017 Tax Table in ESTA • Jan-Jun 2017 Update: MIS updated systems for the launching of the new GCC Logo for E-Mail and MyGCC login, with outsourced vendor, WSI, updating the public website • Jan-Jun 2017 Update: Completed ESM (Ellucian's Solutions Manager) installation for BANNER TEST and ESTA environments	
EA page 41 Application Architecture and Standards Justification	• Jul-Dec 2015 Update: Added HTTP and HTTPS Single Sign-On secured access to Production Internet Native Banner (BANNER INB ESTA SSO) for off-campus access of GCC's Enterprise Resource Planning system • Jul-Dec 2015 Update: Single-sign-on (SSO) implementation to DE portal completed • Jul-Dec 2016 Update: Cloud SSO implementation for wired network completed	• Added Jan-Jun 2017: Online touch-free transcript system • Added Jan-Jun 2017: MS Office 365 alternative to standalone desktop MS Office Professional • Added Jan-Jun 2017: Alternatives to LUMINIS MyGCC portal – CANVAS, CampusCruiser, and Campus Management • Added Jan-Jun 2017: Exploring Alternatives to Ellucian's Banner with Campus Management, Jenzabar, and BlackBoard

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2017 Update: Cloud-based Single-Sign-On (SSO) for wireless (WiFi) network authentication completed and activated	
EA page 62 Application IT Architecture (AA) AA002 Access Portals	• Continued service subscription for SirsiDynix Symphony SaaS (Software as a Service) for the library • Jan-Jun 2014 Update: Upgraded Financial Aid EDE Software and database to 2014-2015 version • Jan-Jun 2014 Update: Upgraded the LRC's Circulation PC's from windows XP to Windows7 with Library's SirsiDynix Application • Jan-Jun 2014: Updated Banner Links in current MYGCC portal to reflect changes as a result of COGNOS 10 upgrade • Jul-Dec 2014 Update: Completed the Financial Aid upgrade of EDConnect to 8.3 network install and EDExpress 2014-2015 software • Jul-Dec 2014 Update: Installed ArcGIS upgrade program with Department of Land Management in Room 107 • Jan-Jun 2015 Update: Completed EDExpress 2015 – 2016 installation for Financial Aid Office • Jan-Jun 2015 Update: Continued service subscription for SirsiDynix Symphony SaaS (Software as a Service) library system • Jan-Jun 2015 Update: Cloud based Disaster Recovery solution for GCC's BANNER INB environment in place • Jul-Dec 2015 Update: LRC - Install the Dynix WorkFlows 3.4.1.4 software on the iMac computer at the Circulation Desk	• Added Jan-Jun 2015: Legacy Systems planning to move into Cloud • Added Jan-Jun 2017: SaaS planning alternatives for Legacy-related systems in the Cloud

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2016 Update: Resolved website blocking issues with internal and external Internet routing changes within routers • Jan-Jun 2016 Update: EDExpress 2016 - 2017 version 2 for Financial Aid Office completed • Jan-Jun 2016 Update: Completed upgrade of EDExpress 15-16 to version 3 and installation of EDExpress 16-17 for Financial Aid Office • Jul-Dec 2016 Update: Updated SirsiDynix software for Learning Resource Center / Library • Jul-Dec 2016 Update: Completed upgrade installation of EDExpress 2017–2018 version 1.0 software on Financial Aid systems • Jul-Dec 2016 Update: Oracle Critical Update Doc Id 2171485.1/ Patch Set Update and Critical Patch Update Availability Document • Jan-Jun 2017 Update: ARC GIS software upgraded for training • Jan-Jun 2017 Update: Completed upgrade installation of EDExpress 2017-2018 version 2 for Financial Aid Office's Pell Grant processing system	
EA page 64 Technology IT Standards (TS) TS006 Hardware Standards	• Continued to upgrade labs and servers that are 3 years old or older • Jan-Jun 2014 Update: Procurement of Photocopying Equipment Lease and Services Bid to include equipment installation and client workstation setup with XEROX • Jan-Jun 2014 Update: Completed computer assessment and redistribution & re-use of systems as a result of upgrades to labs A7, A26, and D8	• Continued updates to both Mac and PC standards specifications • Added Jan-Jun 2015: Implementation of CTC's Technology Acquisition form

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jul-Dec 2014 Update: Completed PearsonVue Server and Workstation testing systems upgrades in TC1106B to comply with new standards • Jul-Dec 2014 Update: Completed PSI/Atlas software updates with new computers at Testing Center • Jan-Jun 2015 Update: Completed new updates for Pearson VUE server and workstations • Jan-Jun 2015 Update: Completed Pearson VUE Testing Center's camera diagnostics and repair with Micropac • Jan-Jun 2015 Update: Completed setting-up PSI ATLAS on 3 test stations and 1 proctor station and updated Java on all 4 systems at the PearsonVue Testing Center • Jan-Jun 2015 Update: Successfully installed PSI ATLAS' webcam to take test candidate's photo before being admitted to take ATLAS exam • Jul-Dec 2015 Update: Completed 2nd Pearson VUE site at Foundation Bldg. Room 6216 - configured Admin station / server, downloaded and installed all necessary files, created service accounts, prepared base image for all workstations, imaged 24 workstations and admin station, confirmed connection with PearsonVUE hub • Jul-Dec 2015 Update: Second PearsonVue and CASAS stations printer installation at Foundation Bldg. room 6216 completed • Jul-Dec 2015 Update: Installed Delivery manager Application for testing at Technology Ctr. Testing lab	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jul-Dec 2015 Update: Installed and ran test delivery applications and uploaded results to Pearson VUE hub, plus installed signature pad and camera for test candidate admission • Jan-Jun 2016 Update: Updated HiSET software version • Jan-Jun 2016 Update: Installed update to Pearson Vue Software at 2nd GED testing center in room 6216 • Jul-Dec 2016 Update: Completed installation for lockdown browser at Technology building's Pearson Vue test center, Room 1106A • Jul-Dec 2016 Update: Completed preparation of systems for upgrade of testing software and re-configured the Java version to run the HiSet Test Program • Jul-Dec 2016 Update: XEROX vending printer installed at Student Center Open Lab • Jan-Jun 2017 Update: Installed Microsoft Silver Light software for Hi-Set updates at Pearson Vue testing system center in Room 6216 Lab • Jan-Jun 2017 Update: Standards specifications for both Mac and PC upgraded with 16Gb RAM and 1Tb HDD pending new bid • Jan-Jun 2017 Update: Completed evaluation and website and portal publication of 2017 Personal Computer (PC) bid awards, and minimum standards for PC, Macintosh, Windows Surface Pro, and Android tablets for technology procurement	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
EA page 64 Technology IT Standards (TS) TS003 Network	• Completed the WESCOM bid for the expansion of the network to improve efficiency and achieve greater redundancy • Completed the campus Wireless WiFi network project • Added VoIP (Voice Over Internet Protocol) telephone services technology to the network of newer buildings • Jan-Jun 2014 Update: Updated network monitoring software InterMapper / InterMapper Remote Assistant (RA) to version 5.7.1 and Orion Network Server to 10.7 • Jul-Dec 2014 Update: Upgraded Network Routers and Switches to replace old/obsolete and problematic network equipment • Jan-Jun 2015 Update: Completed WiFi/Wireless upgrade and WiFi authentication expansion to Student Center and LRC with the Ruckus Access Point • Jan-Jun 2015 Update: Completed Foundation Bldg. WiFi Access Point upgrade resulting in resolving GCC Wireless challenge with the removal of 5 Cisco wireless access points and replaced with 4 new Ruckus Aps • Jan-Jun 2015 Update: Replaced Building B WIFI Access Point with newer equipment • Jul-Dec 2015 Update: Installed network lines in D5 server room to be used for CCTV connection to new subnet • Jul-Dec 2015 Update: Installed new network Cisco switches in rooms D2, D3, D9, D10	• Promote Thin Client via web-browser based applications • Added Jan-Jun 2015: More WiFi/Wireless expansion planned for Building 2000 (Admin. Bldg.) • Added Jul-Dec 2016: Installation of networking equipment to create a wired network in classroom E105 and E107 at GWHS (electronics classroom) • Added Jan-Jun 2017: Review for upcoming bid, Campus VOIP (Voice Over Internet Protocol) Implementation and limited POTS (Plain Old Telephone System) • Added Jan-Jun 2017: Network Equipment upgrade installation, pending delivery by or before 30 calendar days or by 7/3/2017 • Added Jan-Jun 2017: In-Classroom WiFi Infrastructure Expansion : 1st - TC1222, 2nd - TC1101, 3rd - TC1109, 4th - D10, 5th - C23 (done), 6th - E203, 7th - E204 , Entire Tech Bldg, 1000 (WiFi in place already, increased signal strength needed), Entire D Building Classrooms (WiFi in place for D-Wing area, need to identify and prioritize which specific rooms), Entire C Building Classrooms (WiFi in place for C-Wing area, need to identify and prioritize which specific rooms)

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jul-Dec 2015 Update: Completed Administration Building 2000 (SSA) WiFi (Wireless Internet) expansion project • Jan-Jun 2016 Update: CIPA Compliance at the GCC-DOE satellite sits in place • Jan-Jun 2016 Update: Installed Server 2008 on Orion server • Jan-Jun 2016 Update: Completed network switches upgrades for rooms D5, D8, C1, C4, C25, and SOCOM Switch to Brocade • Jul-Dec 2016 Update: Upgraded primary Internet 90Mbps Bandwidth link's router to remove Internet traffic errors • Jul-Dec 2016 Update: Completed onsite assessment for equipment and supplies needed to create a wired network in classroom E105 and E107 at GWHS (electronics classroom) • Jul-Dec 2016 Update: Received and preparing image of 42 new systems from Sanford Technology Group for Electronics and Accounting academic programs • Jul-Dec 2016 Update: Captured, created, and tested image for new Lenovo M800 desktop computer for lab and staff use, and customized one lab image for Room D3 accounting class • Jan-Jun 2017 Update: Merged SOCOM's network into WESCOM Network • Jan-Jun 2017 Update: Completed buildings 500 and 600 network migration to Technology Center building • Jan-Jun 2017 Update: Completed WiFi installation and deployed new laptops in Room C23 mobile lab • Jan-Jun 2017 Update: Completed and submitted Network equipment bid	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	specifications and completed bid process with Materials Management Office (MMO) • Jan-Jun 2017 Updated: Completed Network Upgrades, Updates, and Migrations: Firmware upgrade on Cisco switches; Network Switches Configuration for Network Time Protocol (NTP), Logging, & DHCP Protection at C-Wing, D-Wing, Building E, Allied Health Center, Learning Resource Center, Student Center, and Foundation Building; Network Migrations & Additions - Room TC1108 Lab network migration to ECOM Student network, , A-Wing Building (wireless and wired) network migrated to WESCOM network, Allied Health Center added to WESCOM network, Rooms 3114, 3220, 3221, and 3222 moved to new network; Wireless (WIFI) Network - Building E reprogrammed access points, removed, reinstalled, and reconfigured Wi-Fi access points in E building	
EA page 66 Technology IT Architecture (TA) TA013 Virtualization EA page 85 Virtualization of all Legacy Servers, Upgrades to BANNER 9 and LUMINIS 5 ITSP Page 12 Desired Future State of Information Technology Resources In GCC	• Jan-Jun 2014 Update: Completed processing maintenance renewal of VMWare Software Licensing and Extended Hardware Warranty for GCC's Enterprise Resource Planning (ERP) servers, and for GTSoftware NetCOBOL BANNER programs compiler • Jul-Dec 2014 Update: Upgrade for MyGCC portal to LUMINIS 5 completed • Jan-Jun 2015 Update: Retired (shutdown) old Prodlum / MyGCC server to reclaim Virtual Machine resources for upgrades • Jan-Jun 2016 Update: BANNER 9/XE TEST installation for Procurement and Event Management completed	• Added Jan-Jun 2014: Progressive upgrade of BANNER modules to latest versions up to 9.x and fully towards BANNER 9/XE • Added Jan-Jun 2015: Simultaneously planning for BANNER 9/XE upgrades completion and Mobile and Cloud transition • Added Jan-Jun 2017: Virtual Desktop Infrastructure (VDI) Systems Pilot Planning • Added Jan-Jun 2017: Alternatives to LUMINIS MyGCC portal – CANVAS, CampusCruiser, and Campus Management • Added Jan-Jun 2017: Exploring future alternatives to Ellucian's Banner with Campus Management, Jenzabar, and BlackBoard

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jul-Dec 2016 Update: Successfully completed the migration and launching of Cloud-hosted MyGCC portal	
ITSP Page 31 Transition Plan 7 – IT SKILLS TRAINING EA IT Training within all standards ITSP; EA Sections TT09-TT012	• Ongoing knowledge transfer • OJT/JIT Training taking place • Staff/Administrator Development Funds available • Jan-Jun 2014 Update: Completed LUMINIS 5 user training and currently conducting Working Sessions in preparation for GoLive and upgrade of MyGCC portal from version LUMINIS 4 to LUMINIS 5 (User training was also digitally recorded and published for online access and review) • Jan-Jun 2014 Update: Submitted updated MIS personnel individual training plans • Jan-Jun 2014: Conducted Time Clock application training for 2 Cosmetology faculty members; • Jul-Dec 2014 Update: Created the SOP for creation of Group Site and Uploading files to Group Site, Site Management, etc. • Jul-Dec 2014 Update: MIS Personnel attended Customer Service Workshop, Community Cyber Security Workshop at Civil Defense, Fiber Optics Installation, and Introduction to Linux training • Jul-Dec 2014 Update: Provided training/presentation of LUMINIS 5, specifically on Navigation and Site Management training for DCs/Faculty, staff , and administrators • Jul-Dec 2014 Update: Updated MyGCC Help/Tutorial Portlet with SOP on creating email account in Iphone and Android devices and included MIS' FAQ with Gmail	• Actual full implementation of submitted training plans especially for critical areas as follows: Oracle from Oracle University Unix/Linux Oracle University Cognos Banner Technical classes from Ellucian Banner Functionalities classes from Ellucian Java classes from Ellucian Groovy and Grails for Banner XE from Ellucian Luminis & Liferay Ellucian Technical Training Week • Actual full implementation of training plans for general to specific user support such as: Microsoft MCSA/MCSE/MCP/etc. CompTIA Network+ Apple ACMT and OSX Certification Adobe Connect- collaboration and learning solutions • Related Distance Education Targeted Training Moodle/Blackboard/WebCT/e-Campus/etc.. HTML/XML/Web Design & Development Online Course Design & Development • Added Jan-Jun 2015: Related Distance Education and Web Training for new Systems Programmer and Computer Systems Analyst II with focus on Moodle, LUMINIS 5, Cloud, HTML/XML/Web Design & Development, Online Course Design & Development • Added Jan-Jun 2016: Ongoing Remote Learner Learning Space's Moodle Administrator and Course Developer Training • Added Jan-Jun 2016: Ellucian Live 2017 Staff/Administrator Professional

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	tips, important Log-in/Log-out information, Pop-outs for email access, and on removing cache, etc. • Jul-Dec 2014 Update: Completed the creation of Individualized Training Plans for each MIS personnel with ongoing updates • Jan-Jun 2015 Update: Completed review of TechProven's SOP knowledge transfer for form recompilation of Banner Forms • Jan-Jun 2015 Update: Banner Database Independent & On-demand Cloning Training and testing completed • Jan-Jun 2015 Update: MIS Computer Technician II, Benedict De Leon completed Security + Training at GuamCTS • Jan-Jun 2015 Update: MIS Systems Programmers, Kenneth Bautista and Catherine Solidum, completed overview training of Grid Control knowledge transfer with outsourced technical consultants TechProven • Jan-Jun 2015 Update: MIS Systems Administrator, Francisco Camacho attends Ellucian Live 2015 in New Orleans, Louisiana • Jan-Jun 2015 Update: MIS Systems Programmers, Ken Bautista and Cathy Solidum completed MDUU training provided by TechProven • Jan-Jun 2015 Update: Richard Reyes, Teleprocessing Network Coordinator completed CS204-01 C Programming and EE103-01 Electricity I - DC Circuits • Jul-Dec 2015 Update: Staff/Administrator Professional Development approved CS104	Development pending approval for Catherine Solidum • Added Jan-Jun 2017: Ellucian Solution Manager (ESM) Training / Knowledge Transfer • Added Jan-Jun 2017: Continuing OJT for new Computer Systems Analyst II

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	Visual Basic Programming course for Richard Reyes • Jul-Dec 2015 Update: PacNOG (Pacific Network Operators Group) with APNIC, NSRC attendance and training for MIS' TNCs and System Administrator • Jul-Dec 2015 Update: Ongoing Remote Learner Learning Space's Moodle Administrator and Course Developer Training • Jul-Dec 2015 Update: Introduction and ongoing on-the-job-training (OJT) for new Computer Systems Analyst II (MyGCC, E-Maint, Website Group, BANNER Core Group, TechProven Teleconferencing, MIS SOP's and mandates, etc.) • Jan-Jun 2016 Update: MIS Systems Administrator, Francisco Camacho attends Ellucian Live 2016 in Denver, Colorado • Jan-Jun 2016 Update: Benedict De Leon currently taking classes at SNHU.EDU for Cyber Security • Jan-Jun 2016 Update: Provided updated training / instructions to GCC Cosmetology on use of time clock system • Jan-Jun 2016 Update: MIS Training: Ellucian Live 2016 Conference, Interest Based Bargaining Training, and Transformational Leadership Academy for Francisco Camacho / GCC's IT Essentials I and Network Communications for Richard Reyes / Oracle PL/SQL for Kenneth Bautista approved / Victor De Roca's Staff/Administrator Development application approved and has successfully completed Data and Voice Cabling course provided by GCC and also passed the ETA	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	(Electronics Technician Association International) FOIC certification exam • Jan-Jun 2016 Update: Gerry Dacanay and Francisco Camacho attended Cyber Threats workshop by SecureWorks • Jul-Dec 2016 Update: Conducted Finance and Administration Division Training and Customer Service for MIS Section • Jul-Dec 2016 Update: Employee Trainings Completed: Benny De Leon completed iMac Operating System X training in P.I., Victor De Roca completed training in the P.I. for Microsoft Course 20697-1B Installing and Configuring Windows 10, NSRC Sponsored Campus Network Design Training completed by Richard Reyes and Christopher Camacho at the University of Guam, and Morris Eblacas completed staff development training for Windows 10 Installation and Configuration in the P.I. • Jul-Dec 2016 Update: Francisco Camacho, Benedict De Leon, Gerard Dacanay, and Victor De Roca completed ACCJC Accreditation Basics course • Jul-Dec 2016 Update: EDUCAUSE 2016 conference attended by MIS Systems Administrator, Francisco Camacho, who was also a 2016 MagPro Supervisor of Year winner for Programming and Analysis, and Top Ten Finalist for Merit Cup Leader Excellence Award • Jan-Jun 2017 Update: ESGR Patriot Employer awarded to Francisco Camacho as nominated by Morris Eblacas • Jan-Jun 2017 Update: Team MIS attendance to Phase I and II of Human Resources' Customer Service training	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2017 Update: Systems Administrator, Francisco Camacho, attendance to the Guam Longitudinal Data System (GLDS) Joint Research Workshop at UOG for the Guam One Stop Data Village (GOSDV) project • Jan-Jun 2017 Update: Completed multimedia projector calibration demonstration / training for MIS staff • Jan-Jun 2017 Update: Completed Student Center Open Lab XEROX vending printer MIS technician training • Jan-Jun 2017 Update: Cross-training of Systems Programmer with new SOPs and updates for Payroll Automated Clearing House (ACH), Child Support ACH, and Accounts Payable (AP) Vendor payment ACH, DB/DC Retirement, Death & Disability (ACH) upload process to Bank Of Guam (BOG) • Jan-Jun 2017 Update: Completed these subjects for On-the-Job-Training (OJT) for new Computer Systems Analyst II: Google Site Training, updating MIS information web page, website CMS/webpage update, MyGCC site access and upload, FAQ and SOP reviews, logins/passwords, and email assisting and troubleshooting	
EA page 67 Technology IT Training (TT) TT004 Survivability	• Continued renewal of the Symantec Backup EXEC for the backup and restore system • Jan-Jun 2014 Update: Completed installation and setup of Symantec Backup Exec Linux Remote Agent program on Moodle Server • MIS Succession Plans written and submitted	• Continued staffing resources for MIS • In-house DBA • In-house DE Expertise • Added Jan-Jun 2017: In-house Moodle Expertise • Added Jan-Jun 2017: In-house Drupal Open Source Content Management System (CMS) Expertise

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2014 Update: Completed the hiring of a new Computer Systems Analyst I and Teleprocessing Network Coordinator and now undergoing OJT • Jan-Jun 2015 Update: Renewed subscription for Symantec Backup Exec • Jul-Dec 2015 Update: Victor De Roca promoted from Computer Technician I to Computer Technician II • Jul-Dec 2015 Update: Recovered and restarted BANNER and MYGCC systems after power outage and generator failure • Jul-Dec 2015 Update: Recovered GCC Operations server due to bad memory and battery for PERC controller • Jul-Dec 2015 Update: Computer Systems Analyst II vacancy filled • Jan-Jun 2016 Update: Hired and filled vacant positions of Computer Technician II with Morris Eblacas and Systems Programmer Catherine Solidum • Jul-Dec 2016 Update: Computer Systems Analyst II interviews and selection completed pending start date of December 19, 2016 • Jan-Jun 2017 Update: Completed recruitment and hiring of MIS Computer Systems Analysts II, now filled by Andrew Marquez with ongoing On-the-Job-Training	
EA page 67 Technology IT Training TT011 Application Support	• Completed remote / virtual training for MIS System Programmer, Kenneth Bautista, on ORACLE 11g Admin II • Completed training for MIS Systems Programmer, Kenneth Bautista, and new Computer Technician, Victor De Roca on the new BookLog BookStore POS (Point-of-Sale) System	• Execution of MIS Training Plans • Submission and Execution of Faculty Technology Training Plans • Submission and Execution of non-MIS staff/administrator Technology Training Plans • Added Jan-Jun 2015: Identify and focus on Mobile Application training

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Systems Administrator completed Basic e-Maint (Work Order System) Training • Systems Programmer completed installation and training of the Lance Carpenter's Time System (Handpunch 1000 / Pendulum Time Clock System) for GCC's Cosmetology Program • Jan-Jun 2014 Update: MIS analyst and technicians attended training for MicroMd PM Electronic Medical Records (EMR) application for Allied Health program • Jan-Jun 2014 Update: MIS Personnel received basic technical training on setup and implementation of new XEROX multifunction devices • Jan-Jun 2014 Update: Published and continue to update MIS FAQs on MyGCC Home tab, Help/Tutorial channel • Jan-Jun 2015 Update: Completed Pendulum System/Time Clock setup of users and configuration and refresher training • Jan-Jun 2015 Update: Chris Camacho and Richard Reyes Completed Direct Digital Control (DDC) Training (Basics) for HVAC; • Jan-Jun 2016 Update: Published on MyGCC the new Student Help FAQs (Frequently Asked Questions) • Jan-Jun 2016 Update: Conducted two Google Forms / Google Apps training to GCC employees • Jan-Jun 2017 Update: Completed LUMINIS 5 Video sessions training by newly hired Computer Systems Analyst II • Jan-Jun 2017 Update: Upgraded and re-imaged workstations at the Technology	• Added Jan-Jun 2017: Updated Moodle Training • Added Jan-Jun 2017: Drupal Open Source Content Management System (CMS) Training • Added Jan-Jun 2017: Banner 9/XE, Mobile Applications, and Ellucian Solution Manager (ESM) Training

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	Center's Training/Discovery Room TC1110 Lab	
Help Desk ITSP; EA sections TT010,MS04,MS05	• E-Maint Work Order system continues to be the defacto Help Desk that dispatches e-mailed work order service requests • Jan-Jun 2015 Update: MIS Availability for DE Help and Support for ongoing Pilot DE Project • Jul-Dec 2015 Update: Technical assistance to FAO on file "FTP/ASCII" conversion, ownership and permission flags settings for the NSLDS FISAP reporting process • Jul-Dec 2015 Update: Attended E-Maint Work Order Dispatch Training and now dispatching MIS work order requests • Jan-Dec 2016 Update: E-Maint Work Order Training to all MIS Staff to close completed or cancelled work orders	• Learn how to use and implement help desk software • Establish help desk support phone number • Integrate chat help desk on end user systems • Provide Email support • Conduct awareness campaign of help desk support and how to use and access help desk support (SOP) • Implement Help Desk Support software Solar Winds WEB HELP DESK ZOHO Support SysAid IT help desk software Fresh Desk Online • Added Jul-Dec 2016: Separation of E-maint's database between MIS and P&D work orders
EA page 67 Technology IT Training TT009 PC Troubleshooting	• MIS Computer Technician, Benny De Leon, completed Mac OS X 10.8 Training • Completed training for Windows 7 Operating System by MIS Computer Technician, Jeff Fabro • MIS Computer Technician, Benny De Leon, attended Windows 7 Tips training • Macintosh system support training in the Philippines completed by MIS Staff Benny De Leon • Jan-Jun 2015 Update: Benedict De Leon completed Security + Training • Jul-Dec 2016 Update: Benedict De Leon, Victor De Roca and Morris Eblacas completed training in PC and/or Mac Operating Systems	• Added Jan-Jun 2015: Additional training to MIS staff on Security, Fiber/Cat5, and Microsoft Operating System

1.1.2. Matrix of Project & Activities Completions & Plans Related to Components of the 2012 ITSP/EA Documents. (This documents is an Annual Addendum with undated items prior to 2014). Jan 2017-to-Jun 2017 Updates are as highlighted. Upcoming: Jul 2017-to-Dec 2017 Updates are as highlighted.

REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
EA page 73 Management IT Training MT005 Risk Management	• Computer Technician completed Camera Surveillance training for the Foundation, Allied Health Building, and BookStore DVR Systems from Micropac • Jan-Jun 2015 Update: All MIS-managed surveillance system upgraded to Digital and network-accessible systems • Jul-Dec 2015 Update: New surveillance system and cameras installed at Foundation Building Room 6216 for 2nd and new Pearson VUE Testing Center	• Added Jan-Jun 2017: Updated Information Technology Business Manager Certification Training • Added Jan-Jun 2017: Project Management Training
EA page 95 The gap – Gap & Impact Analysis DATA – 3. "2) store the electronic image of a document but not the physical document"	• Jan-Jun 2014 Update: Completed 2013 W2 system setup, processing, and W2 printing plus creation of electronic data file • Jan-Jun 2015 Update: Maintain or update script to reflect 2014 W2 setup • Jan-Jun 2016 Update: Clearing House Data now set up to automatically e-mail AIER administrator when process is executed • Jan-Jun 2016 Update: Maintain or update script to reflect 2015 W2 setup • Jan-Jun 2017 Update: Maintain or update script to reflect 2016 W2 setup • Jan-Jun 2017 Update: Completed creation, adjustments, and electronic filing of 2016 W2 and loaded 2017 Tax Table in ESTA • Jan-Jun 2017 Update: BDMS initial installation for Student Transcripts	• Added Jan-Jun 2015: BDMS expansion plans for Student Transcripts and Materials Management Office records/files • Added Jan-Jun 2017: BDMS full installation and implementation for Student Transcripts and Materials Management Office records/files as part of online requisition process.
ITSP Strategic Goal 1: GCC will develop and implement a target Enterprise Architecture	• Virtualized the ERP system • Upgraded Internet bandwidth to 110Mbps • Continued Work Orders completion rate at 90% weekly • Jan-Jun 2014 Update: Completed setup, installation and testing of VSphere Web client and VCenter Console access for the upgraded VM	• Establish WIFI policies • Implement Network and Systems Load-balancing and/or filtering software • Added Jul-Dec 2016: Upcoming Cloud Based Infrastructure As A Service (CBIAAS) as a New target Enterprise Architecture • Added Jan-Jun 2017: Implement Cloud Based Infrastructure As A Service (CBIAAS)

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2014 Update: Successfully worked with Data Management Resources on GCC's ERP Virtual Machine (VM) Environment upgrade to 5.5 including the client workstations' upgrade to Vsphere 5.5 • Jul-Dec 2016 Update: Completed VM Licensing and DELL VMWare Server Hardware Extended Warranty for Enterprise Resource Planning System • Jan-Jun 2017 Update: Completed and finalized Enterprise Resource Planning (ERP) system's Cloud Based Infrastructure as a Service (CBIAAS) bid specifications pending announcement and bid process	environment as a New target Enterprise Architecture
ITSP Strategic Goal 2: GCC will develop policies, procedures, and processes to analyze and acquire the components (hardware, software, applications) of the Enterprise Architecture	• CTC-approved and recommended IT policies published on MyGCC portal Governance tab • CTC-approved and recommended computer standards published • Network infrastructure upgraded to maintain efficiency, stability, and reliability • Jan-Jun 2014 Update: Completed initial bid process for CISCO Routers / Switches to upgrade network infrastructure (to undergo re-bid due to scam incident) • Jul-Dec 2014 Update: Conducted site survey with Pacific Data Systems crew for Building "C" fiber micro-trenching to bring in link as per GCC-FB-13-019 bid • Jul-Dec 2014 Update: Procured and upgraded Network Routers and Switches as per GCC-FB-14-010 bid • Jan-Jun 2015 Update: Relocated rack mount UPS from building 2000 to building 1000, 1st floor COM room, Relocated 1 tower UPS from building 1000 to 1st floor	• Complete appropriate technology training relative to current and future EA for faculty, staff, and administrators • Establish departmental individual training plans based on institutional needs and priorities for all divisions • Establish sufficient personnel to support EA • Annual signing of technology user-agreement • Added Jan-Jun 2015: Submitted CIP suggestion for Underground/Buried Backbone Fiber Optic Cable • Added Jul-Dec 2015: Request for Tech Fees Form recommendation forwarded to VP of FAD for CGC consideration and approval for adoption by GCC • Added Jan-Jun 2017: Move forward CTC's recommended Digital Resources Policy • Added Jan-Jun 2017: Preside and have oversight of new Technology Working Group (TWG) to develop policies, procedures, and processes for IT

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	COM Rm in Building E, Relocated rack mount UPS from 1st floor COM Rm in Building E to 2nd floor COM Rm in Building E, and UPS from 1st floor now mounted on 4 post rack on 2nd floor in building E • Jan-Jun 2016 Update: Positioned buildings 300-600, 1000, 2000 Fiber Switch at ECOM Telecom Room and verified Fiber Optic pairs • Jan-Jun 2016 Update: Completed fiber optic cable termination project from Building 500 to 4000 • Jul-Dec 2016 Update: Movement of Wi-Fi Access Points from old network to new network in building 500 / WiFi 500 & 600 migrated to ECOM • Jul-Dec 2016 Update: FY17 Technology Fee budget detail, PC & Mac bid specifications, and MIS upgrades plans submitted to and approved by College Technology Committee • Jul-Dec 2016 Update: CTC approved recommended new policy on digital resources and assets related to e-Books, Open Source, web-based tools, etc. • Jan-Jun 2017 Update: Completed bid specifications, evaluations, award, and procurement of new PC and Mac systems • Jan-Jun 2017 Update: Upgraded 3COM distribution switch at building 1000 with Cisco switch	
ITSP Strategic Goal 3: GCC will acquire the funding needed to implement the Enterprise Architecture	• Enterprise Architecture in its current form is in place, but with much improvements still ahead • 24/7 Access to ERP available • Professional Technical Outsourced Support available	• Remove dependency of legislative appropriations • Implement Disaster Recovery (DR / DRaaS – Disaster Recovery as a Service) / COOP (Continuity of Operations Plan) system

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Contractual Services for licensing and help desk support available • Jan-Jun 2014 Update: Continued support being given by GCC management for the funding of Ellucian's BANNER and related systems software maintenance renewal • Jan-Jun 2014 Update: Continued support being given by GCC management for the funding of Oracle systems software maintenance renewal • Jan-Jun 2014 Update: Continued support being given by GCC management for the funding of Professional Technical Outsourced support for TechProven • Jan-Jun 2015 Update: Completed the renewal license and maintenance of our ERP NetCOBOL compiler from GTSoftware • Jan-Jun 2015 Update: Continued contractual services to renew software subscription services for Oracle Relational Database System and ERP Banner Systems with Ellucian, Evisions, and TouchNet • Jan-Jun 2016: Successfully reduced cost for Oracle licenses' expenses • Jan-Jun 2016 Update: Oracle Database Upgrade to 9.0.3 in ESTA completed • Jan-Jun 2016 Update: Completed Upgrades of BANNER ESTA & TEST: Student 8.9.2 – 8.9.4, CR-000139295 Student Patch, General 8.8.3, FA 8.26.1 and pcr-000139267_res8260001, and clone from ESTA to TEST as of 5/14/16 • Jul-Dec 2016 Update: Completed ERP Upgrades of BANNER ESTA & TEST: Financial Aid to 8.26.1 and 8.27, Student to 8.10.1, and Accounts Receivable to 8.5.1	• Implement Full Redundancy of Systems and Network • Implement IaaS - Infrastructure as a Service • Implement DaaS – Desktop as a Service • Added Jan-Jun 2014: Continuing to work with GCC's Grant Office personnel for applications of grants for any of the above initiatives as the opportunity presents itself or as related grants are found • Added Jan-Jun 2017: Confirm approved FY18 Budget for Enterprise Resource Planning (ERP) system's Remote Professional Technical Services and Cloud Infrastructure As A Service (IAAS) bid

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jul-Dec 2016 Update: Enterprise Resource Planning (ERP) system's Remote Professional Technical Services and Cloud Infrastructure As A Service (IAAS) bid specification completed and submitted • Jul-Dec 2016 Update: FY17 Technology Fee budget detail plan approved by College Technology Committee • Jul-Dec 2016 Update: Completed ROI analysis for Cloud Base Infrastructure As A Service environment • Jul-Dec 2016 Update: ERP (Enterprise Resource Planning) System Remote Professional Technical Services and Cloud base IAAS (Infrastructure As A Service) specifications, and PC & Mac specifications submitted to Materials Management Office for two separate bid packages preparations • Jul-Dec 2016 Update: FY17 Budget approved for Enterprise Resource Planning (ERP) system's Remote Professional Technical Services and Cloud Infrastructure As A Service (IAAS) bids • Jan-Jun 2017 Update: Completed 2017 renewal of GTSoftware's NETCOBOL BANNER codes compiler • Jan-Jun 2017: Completed and submitted FY18 Budget for Enterprise Resource Planning (ERP) system's Remote Professional Technical Services and Cloud Infrastructure As A Service (IAAS) bid	
ITSP Strategic Goal 4: GCC will expand the use of technology in education by the College faculty	• Distance Education policy in place • Distance Education assessment started • Course Studio available via MyGCC LUMINIS portal • Moodle Course Management System available	• To incorporate Technology training language into BOT/GFT Agreement • For Faculty to incorporate technology training into their IFPs (Individual Faculty Plans) • Fully implemented Distance Education

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jul-Dec 2014 Update: DE Pilot Planning in Progress • Jan-Jun 2015 Update: $10,000 of the Technology fund was used to pay for the pilot hosting of the new DE Moodle remote site with Remote-Learner • Jan-Jun 2015 Update: $80,000 of the Technology fund was used to pay for the campus-wide installation of multimedia projectors in selected classrooms • Jan-Jun 2016 Update: Completed pilot and now maintaining implementation of DE Programs with Moodle and with Cloud hosting	• Added Jan-Jun 2017: Continue to facilitate and assist in Google Applications, MyGCC, and Banner training to employees and students • Added Jan-Jun 2017: Finalization of bid specifications and bid process for FY2018 DE hosting and Moodle support services
ITSP Strategic Goal 5: GCC will enhance the governance process to provide timely and efficient integration of users' needs into decisions on investments in technology	• Faculty representation and membership requirement in College Technology Committee • Faculty representation and membership in committees that influence decisions on GCC financial resources • Jan-Jun 2015 Update: Campus-wide Multimedia Projector Upgrades bid evaluation and award completed and units partially installed • Jul-Dec 2015 Update: Assistive technology SOLO 6 software suite licenses now installed at Office of Accommodative Services and Library • Jul-Dec 2016 Update: Multimedia projector bid completed pending delivery and installation of hardware • Jul-Dec 2016 Update: Increased budget allocation for multimedia upgrades • Jan-Jun 2017: Additional multimedia projector procurement using Tech Fee completed and delivered with installations	• Formal Information Technology Governance Structure • Development of Faculty Technology Needs Assessment, Planning, and Implementation • Added Jan-Jun 2015: CTC to review and implement Technology Acquisition form • Added Jul-Dec 2015: Request for Tech Fees Form recommendation approved by College Technology Committee pending College Governing Council approval for adoption by GCC • Added Jan-Jun 2017: Preside and have oversight of new Technology Working Group (TWG) and recommend members that will enhance governance of IT needs and investments for all users

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
ITSP Strategic Goal 6: GCC will build partnerships with external business and government organizations to expand business, educational, and funding opportunities Pg. 27 – "Greater Number of Testing Options"	• Foundation continues to be a critical resource • Apprenticeship continues • Guam Trades Academy collaboration • Noticeable improvements and expansion of course / program articulations • Continuance of CISCO Academy • Jan-Jun 2014: Completed the assessment and installation for over 50 redistributed systems replaced by upgrades including the 30 units installed at Pacific Islands University for the GCC-PIU program partnership • Jan-Jun 2014 Update: CASAS eTesting system converted to online environment with previous database transferred • Jan-Jun 2014 Update: Registered workstations for Casas eTests in testing room at Foundation bldg. 6000. • Jul-Dec 2014 Update: Completed implementation of the GCC-GCEC MOU/MOA Document Imaging/Archiving project which will continue for a 3-year term • Jan-Jun 2015 Update: Continuing with GCC-GCEC MOU/MOA • Jul-Dec 2015 Update: Worked with Web Developer vendor, GuamWebZ, to update www.guamkids.org website and document resources for CEWD • Jul-Dec 2015 Update: Reviewed and approved ERS (Environmental Rating Scales) Data System for CEWD in conjunction with DPHSS work with various Guam Child Care Services	• Increase number of partnerships and formalize and/or update existing ones with MOAs, MOUs, Contracts, etc. • Assess partnerships to provide evidence of win-win outcomes as a result of formal relationships between GCC and organizations • Added Jan-Jun 2015: Possible plan to assist another GovGuam department with a Financial Management System • Added Jul-Dec 2016: Planning & Development / Dept. of Labor (DOL) database linking project between DOL's GSI's VOS and GCC's TOPSPro systems • Added Jan-Jun 2017: Use MIS Incentive Funds to join and become an active member of AFCEA (Armed Forces Communications & Electronics Association) Marianas Chapter

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jul-Dec 2016 Update: MOA-MOU for Guam Commission for Educator Certification (GCEC) Verified and Renewed • Jul-Dec 2016 Update: Accuplacer now in Banner and replaces COMPASS as a placement testing system and can be used by counselors in "View Test Scores" in Self Service Banner for MyGCC • Jul-Dec 2016 Update: Completed 100% systems upgrades, swap-outs and / or replacements of XP systems, as approved, with Windows 7 OS • Jan-Jun 2017 Update: Guam Longitudinal Data System (GLDS) Joint Research With UOG for the Guam One Stop Data Village (GOSDV) project	
Data IT Standards DS010 Safety Data IT Architecture DA007 Safety EA Page 57 & 59	• Installed and continue to use the CISCO ASA firewall technology with built-in Intrusion Prevention Solutions (IPS) / Intrusion Detection Solutions (IDS) • Employee, Student, and Institutional data already entered into the BANNER database system are electronically backed up daily • Tape backups of the system which includes employee data are moved and stored off-campus at a bank's vault at least every two weeks • Jan-Jun 2014 Update: Procurement and installation of Dedicated Scanner to scan historical and current hardcopy documents for electronic storage and retrieval as well as archiving and backup • Jan-Jun 2015 Update: Jan-Jun 2015: Basic DR remote site project for BANNER INB completed	• Standardized use of External Drives, Flash Drives, and On line back up (Google Drive, Drop box, Xdrive) • Added Jan-Jun 2015: New ERP UPS to replace aging UPS • Added Jan-Jun 2017: Ensure Service Level Agreements are in compliance with vendor(s) for ERP Cloud and outsourced remote professional and technical support services

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2015 Update: Completed existing UPS condition assessment and inspection • Jan-Jun 2015 Update: Procured 10 Portable External 4TB drives for data and software backup of MIS' managed office computer systems. • Jan-Jun 2015 Update: Procured Drive Vaccine for Education from Horizon Data Sys • Jan-Jun 2016 Update: Continuing to conduct successful DR tests and training • Jan-Jun 2016 Update: Setup of Transformation Leadership Academy Google Drive repository and sharing • Jan-Jun 2016 Update: Resolved down firewall and restored campus network operations with loaner equipment from GPA • Jan-Jun 2016 Update: Installed backup drive for new Dell server • Jul-Dec 2016 Update: CISCO Firewall bid completed and delivered • Jan-Jun 2017 Update: New CISCO Firewall hardware installation completed • Jan-Jun 2017 Update: Completed network stabilization with GTA's 90Mbps and PDS's 30Mbps links, pending the GTA's 60Mbps	
Security Principles EA page 25 Data IT Standards DS008 Security EA page 57 Data IT Architecture DA001 Data Security EA page 58 Data IT Training DT001 Data Security	• Conducted and implemented recommended changes as a result of Penetration Testing by 3rd and 4th parties • Implemented TouchNet Payment Gateway System for PCI/DSS Compliance • Implemented SSL Certificates in critical systems and servers • Implemented password policies and session timeouts	• Deployment of full network redundancy • Move to use of contact-less or swipe-less technology for over-the-counter transactions • Upgrade of institutional ID system with facial image capture and integration into BANNER database • Added Jan-Jun 2015: New ERP UPS to replace aging UPS

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
EA page 60 Technology IT Standards TS002 Security EA page 64 Technology IT Training TT007 E-commerce EA page 67 Enterprise Security EA page 78 Security and Vulnerability Testing, Network Security EA page 82-84 Guiding Principles EA page 11 & ITSP page 8	• Implemented strict procedures for user access using BANNER Access Security form to be reviewed, cleared, and signed by BANNER module leaders • Implementation of BANNER module-level security access (Fine Grain Access) • Active wired and wireless network management and monitoring via InterMapper, SolarWinds, CISCO/3COM Switch and Router Utilities, CISCO ASA Firewall • Implemented 3-prong Internet line connectivity • Jul-Dec 2014 Update: Continuing with resolution of removal of Windows Genuine Authentication (WGA) error notifications for all reported, available and accessible campus systems • Jul-Dec 2014 Update: Installed Apache Directory for Lightweight Data Access Protocol (LDAP) database access and maintenance • Jul-Dec 2014 Update: Installed, transitioned, and provisioned Internet services with GTA's 60Mbps and 30Mbps and PDS' 20Mbps as per GCC-FB-13-019 bid, and updated network configuration and routed all WiFi/Wireless traffic to PDS ISP link • Jul-Dec 2014 Update: Launched LUMINIS 5 MyGCC and Campus-wide Ruckus WiFi/Wireless Authentication • Jul-Dec 2014 Update: Upgraded and expanded compatibility of the WiFi/Wireless system at LRC & Student Center to WiFi Ruckus system	• Added Jan-Jun 2015: Title V technical assistance and requisitioning and PO processing to selected ISP's per school and trying to implement security cabinet enclosures at same venues. • Added Jul-Dec 2015: Discussions with Bank Of Guam ongoing for possible credit card processor status changes related to the TouchNet Payment Gateway, pending confirmation on plans • Added Jan-Jun 2016: Ongoing / On-hold credit card processor discussions with Bank of Guam, pending actual plans and changes • Added Jan-Jun 2017: Survey all unnecessary equipment from Server and Storage Rooms, and purge all old and obsolete supplies, materials, documentation, manuals, books, other • Added Jan-Jun 2017: Address minimum maintenance requirement for main UPS until ERP is fully migrated to Cloud • Added Jan-Jun 2017: Begin plans and specifications for new Internet services bid that is expiring August 2018

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2015 Update: Completed surveillance equipment installation with Micropac for Bldg. E (E207 AutoCAD lab) and Computer Lab Room C25 • Jan-Jun 2015 Update: Completed UPS diagnostics and assessment for UPS upgrades planning and quotes received still under review • Jan-Jun 2015 Update: WiFi policing investigation and reports now allow MIS to identify and block unenrolled student accounts and computers with very unusual or suspicious traffic • Jan-Jun 2015 Update: Setup Simple Network Management Protocol (SNMP) on 21 workstations in lab C25 • Jan-Jun 2015 Update: Renewal and and new implementation of SSL Certificates in critical systems and servers with GoDaddy services • Jul-Dec 2015 Update: Replaced CCTV cameras and repaired connectivity to surveillance system in Room A26 • Jul-Dec 2015 Update: Announcement of Computer Scams and E-Mail Phising ALERTS on MyGCC submitted Network Penetration specifications • Jul-Dec 2015 Update: Request For Quote (RFQ) sent to vendors, pending quotes submission and also sent to Materials Management Office for possible bid announcement • Jul-Dec 2015 Update: Installed and configured new computer systems for AutoCAD program	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jul-Dec 2015 Update: Applied updates to InterMapper network monitoring system and CISCO ASA Firewall • Jan-Jun 2016 Update: Network Vulnerability Assessment ("Penetration Test") completed by Ernst & Young, pending vulnerabilities remediation • Jan-Jun 2016 Update: Adjusted firewall settings to allow BANNER-related server IP addresses to be available over WiFi • Jan-Jun 2016 Update: APNIC Resource WHOIS 2016 updates completed and renewed APNIC subscription services • Jan-Jun 2016 Update: Updated MyGCC My Account tab to include option to change secret question and answer • Jan-Jun 2016 Update: Project Aim AutoCAD software installation completed • Jan-Jun 2016 Update: Gerry Dacanay and Francisco Camacho attended Cyber Threats workshop by SecureWorks • Jan-Jun 2016 Update: DNS/InterMapper/Firewall Updates • Jan-Jun 2016 Update: Completed implementation of CIPA (Child Information Protection Act) compliance to GCC secondary labs Internet connections with OpenDNS security subscription services • Jan-Jun 2016 Update: Completed Network Penetration Test • Jul-Dec 2016 Update: Completed Security Vulnerabilities Remediation as per Penetraiton Testing Recommendations • Added Jan-Jun 2016: Completed CIPA renewal with OpenDNS for compliance • Jul-Dec 2016 Update: CISCO Firewall bid evaluations complete	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jul-Dec 2016 Update: Symantec EndPoint Antivirus System Upgrade License renewed and upgraded to include Symantec Endpoint Management Console to version 12.1.6 • Jul-Dec 2016 Update: Submitted to Standard 2B3 committee computer lab reports as evidence of MIS' student and faculty resources support to SLOs (Student Learning Outcomes) • Jul-Dec 2016 Update: Password expiration of 6-months system setting for MYGCC Test completed, pending MyGCC Production as scheduled for 12/15/2016 • Added Jan-Jun 2017: Completed OpenDNS license subscription renewal, installation, and updated implementation for CIPA (Child Internet Protection Act) compliance • Jan-Jun 2017 Update: Cloud-based Security via Single-Sign-On (SSO) for WiFi and wired network access to ERP • Jan-Jun 2017 Update: Completed system audit with Deloitte for BANNER and technology environment • Jan-Jun 2017 Update: Included new "MYGCC - Change my security question and answer" in portal	
Technology IT Architecture TA011 Smart Devices Technology IT Training TT013 Smart Devices EA Page 66 & 67	• MIS procurement of two iPad 4 128GB devices to provide tools to MIS technicians to begin familiarization of support needs for and of smart devices • Jan-Jun 2015 Update: Procured 2 Samsung Galaxy Note Pro 12 for user support and field use • Jul-Dec 2015 Update: Mac Imaging Server and Windows Surface Pro procured for MIS technical user support	• Issuance to each MIS personnel smart devices (iPads and/or iPhones, Android Tablets) for full familiarization of support needs for and of smart devices • Technical Training for IT Staff and faculty for the support of smart devices (iPads and/or iPhones, Android Tablet, smart phones) for full familiarization of support needs for and of smart devices

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
Distance Education (DE) EA Page 80	• Bid conducted for DE Assessment and Feasibility Study • Jan-Jun 2014 Update: Awarded DE bid pending actual deliverables as per Scope of Work • Tech Friday Trainings conducted during regular semesters • Jul-Dec 2014 Update: Ongoing DE Pilot Planning Meetings • Jan-Jun 2015 Update: Distance Education Moodle Site with Remote Learner up at http://guamcc.remote-learner.net/login/index.php (Pilot Project) • Jan-Jun 2015 Update: Distance Education activities: Completed changes in Moodle Login Screen with Google Chrome link and icon, modified Language packs to reflect new block title, and added Support information block to Courses and Course Template. • Jan-Jun 2015 Update: Distance Education Activities: Tested student activity via e-mail and forum posting with Steve Lam with me acting as a student for his MA110A-31 FA15 class • Jan-Jun 2015 Update: Ongoing Remote Learner Learning Space's Moodle Administrator and Course Developer Training • Jul-Dec 2015 Update: Distance Education: Completed minimum specifications for GCC Moodle Users' Computer Readiness, setup user password policies, verified and configured accounts in MyGCC and GCC Gmail	• Pending full DE training during implementation of DE • Added Jan-Jun 2017: New DE remote hosting and support bid specifications updates

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2016 Update: Provided updates and recommended changes to Distanced Education Strategic Plan • Jan-Jun 2017 Update: Retired obsolete internal Moodle.guamcc.edu Learning Management System (LMS) server	

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REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
Application IT Standards (AS) AS008 Office Automation and Utility Services EA Page 61 TS004 Automation vs. Manual EA page 64	• Jul-Dec 2014 Update: Completed creation of 2014 Quarterly SWICA Electronic Data File and verification of employee record count • Jan-Jun 2015 Update: Completed creation of 2014 W2 Electronic datafile as adjusted • Jan-Jun 2015 Update: Completed 1st independent database clone of ESTA to TEST • Jul-Dec 2015 Update: Latest ESTA Database to TEST clone completed 10/12/2015 • Jul-Dec 2015 Update: Completed clone / migration of MyGCC portal contents to MyGCCTEST • Jul-Dec 2015 Update: Completed 2015 3rd Quarter SWICA file creation and submission of electronic file • Jul-Dec 2015 Update: Completed SNMP (Simple Network Management Protocol) configuration in Student Center, Allied Health Lab room 3223 & 3220, LRC (Learning Resource Center), & FND (Foundation Building) • Jul-Dec 2015 Update: Ongoing installation of Tight Projector application for instructor use in computerized classrooms • Jul-Dec 2015 Update: Completed Bookstore's Booklog POS system upgrade for testing and processing of customer merged records • Jan-Jun 2016 Update: Completed 2015 4th Quarter SWICA file creation and submission of electronic file • Jan-Jun 2016 Update: Completed 2015 W2 along with adjustments and Electronic file creation	• Added Jul-Dec 2014: Materials Management automation of the requisitioning process planned for FY15 • Added Jul-Dec 2015: Ongoing research on Approval Queue for Materials Management Office as planned with Banner 9/XE upgrades

1.1.2. Matrix of Project & Activities Completions & Plans Related to Components of the 2012 ITSP/EA Documents. (This documents is an Annual Addendum with undated items prior to 2014). Jan 2017-to-Jun 2017 Updates are as highlighted. Upcoming: Jul 2017-to-Dec 2017 Updates are as highlighted.

REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	• Jan-Jun 2016 Update: Completed 2016 1st Quarter SWICA along with additional corrections • Jul-Dec 2016 Update: Completed Compact Disc creation for 2016 second quarter SWICA • Jul-Dec 2016 Update: Completed latest database and filesystem clone of Banner ESTA production to TEST, 9/14/16 • Jul-Dec 2016 Update: Completed installation of Soap tool for the Keyboarding software in labs Room D3, D10, and A27 • Jul-Dec 2016 Update: Resolved ongoing testing and review of Accounts Payable ACH issue in TEST / Successful Banner test of vendor payment AP ACH file creation, pending Bank of Guam load and processing test • Jul-Dec 2016 Update: Completed Standard Operating Procedure (SOP) of Define Benefit plan file creation for Retirement Office • Jul-Dec 2016 Update: Database and filesystem clone from Banner ESTA to Banner TEST completed as of 11/24/2016 • Jul-Dec 2016 Update: Booklog - Completed removal of old Bookstore backup files, system imaging of Bookstore registers, exporting reports to Excel from Booklog system, updating payment type title, and created backup image of POS systems • Jul-Dec 2016 Update: Completed creation of 2016 3rd Quarter SWICA electronic file • Jan-Jun 2017 Update: Completed research, troubleshooting and implementation for Bank Of Guam Accounts Payable	

1.1.2. Matrix of Project & Activities Completions & Plans Related to Components of the 2012 ITSP/EA Documents. (This documents is an Annual Addendum with undated items prior to 2014). Jan 2017-to-Jun 2017 Updates are as highlighted. Upcoming: Jul 2017-to-Dec 2017 Updates are as highlighted.

REFERENCE:	COMPLETED RELATED ACTION ITEMS:	PLANNED RELATED ACTION ITEMS:
	Automated Clearing House (ACH) Direct Deposit upload process for payroll deduction vendors • Jan-Jun 2017 Update: Completed creation of new SOPs and updates for Payroll Automated Clearing House (ACH), Child Support ACH, and Accounts Payable (AP) Vendor payment ACH, DB/DC Retirement, Death & Disability (ACH) upload process to Bank Of Guam (BOG) • Jan-Jun 2017 Update: Completed 2016 4th Quarter SWICA and downloaded, installed and modified Evisions 2016 Student 1098 template in FormFusion and 2016 W2 Tax Template in ESTA , and 1098T printing, also completed • Jan-Jun 2017 Update: Completed 2017 1st Quarter SWICA electronic data file creation • Jan-Jun 2017 Update: Completed C23, Student Center, and Library Lab installations of Accounting Software using licenses for General Ledger Klooster & Allen 24th & 20th editions	

The current approach to meeting objectives and strategies in the implementation of the ITSP/EA documents is to accomplish as much as possible with the resources available and as long as progress or improvements are being made, regardless of whether efforts are fragmented or cohesive. The point is to keep improving proactively while having the flexibility to adjust and react to the constraints of resources, especially the budget.