Final Report

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I. Background Information

The Republic of Nauru is an island nation located in the Pacific Ocean. It is the smallest independent republic in the world with a population of roughly ten thousand people and an area of only twenty-one square kilometers. The government has a total of 1,149 employees that serve in a wide range of capacities such as utilities, health care, education, sports, and foreign affairs.

During the consultants' project, they were based out of the Information and Communications Technology (ICT) Department. The ICT Department was created in December of 2006 under the recommendation of the *e-Government Strategic Plan* created by the United Nations Educational, Scientific and Cultural Organization's Communications and Information sector. The goal of this department was to create a centralized process for managing technology and its mission is to be responsible for "*Anything to do with ICT in Government.*"

Although the project was based out of ICT the scope of the project was government wide. The consultants were expected to interview employees from a range of departments and create recommendations based on these observations. Their work was expected to form the basis of future projects. They submitted specific recommendations to eight departments, created three government wide policies, and developed a system for managing fuel for all government vehicles.

The consultants spent ten weeks in Nauru working with their community partner, Marcus Tanner, the Director of ICT

II. Consulting Tasks

Given the scope of the project and the size of the Nauruan government, it was necessary for the student consultants to observe and interview many departments and their employees in order to gain an understanding of the technological environment and information management policies of Nauru's government. Throughout the observations the student consultants took specific notes how employees use technology for work, how they communicate with their co-workers and with other departments, what difficulties or frustrations they have had with the current systems used within the government, and how they record, save, and back-up their information for both electronic and paper documents.

Nauru transitioned to a new fuel distribution plan for all government vehicles where departments would be assigned a budget for fuel. Previously fuel allocations were centrally determined and the government wanted a process that required each department to plan their own fuel use. The consultants developed a new system, which was needed to track and report on fuel usage.

While interviewing the Salaries Officer, the student consultants observed that government departments did not have a standardized timesheet form. Seeing the opportunity to accomplish another "low-hanging fruit", the student consultants decided to take the responsibility of creating a standardized timesheet form.

III. Outcomes Analysis and Recommendations

Outcomes

The student consultants' observation period served as the basis for other projects completed throughout their time in Nauru. Observing departments and the employees led to the following reports and proposals:

- Information Management Policy
- Nauru ID Number (NIN)
- Documenting Work Process
- Department Final Recommendations

Throughout the observations, the consultants provided government employees with methods to more efficiently use their computers. The risks do not lie within the observations but in the reports that were created based on observations. Using their observations as evidence for the reports, the student consultants are optimistic that their recommendations will be implemented.

The student consultants developed an Excel macro-based spreadsheet which automatically generates printable timesheets based on user entered data. The sustainability of the system is dependent on the decision of the Chief Secretary to use the system in all government departments and to enforce a standard timesheet.

Recommendations

The student consultants envision the ICT Department serving as the major proponent of the Information Management Policy. The consultants believe that ICT is not only in the ideal position to ensure that the policy is implemented but also has the ability to further update and develop the policy.

The ICT Department should begin focusing on software and long-term development. The focus has previously been on hardware, and currently frequent maintenance needs prevent time to be spent on long-term planning. Nauru is currently dependent on foreigners for development and maintenance of new databases and other systems. ICT should look to hiring individuals with development experience to better serve the government's software needs.

ICT spends much of its time on maintenance tasks. Tracking those activities will show what areas ICT spends most of its time, what skills are most needed, and the amount of work expected from the department. This will allow for better planning and justification for acquiring additional resources.

Technology Consulting in the Global Community
Final Consulting Report

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I. About the Organization

Organization

Republic of Nauru

The Republic of Nauru is an island nation located in the Pacific Ocean. It is the smallest independent republic in the world with a population of roughly ten thousand people and an area of only twenty-one square kilometers. The island has a history of extreme wealth due to large reserves of phosphate that have been mined for over one hundred years. At its peak the citizens of Nauru enjoyed the second highest per capita GDP in the world. [3]

Unfortunately, there has been a steep decline in recent years due to the depletion of the island's phosphate reserves and mismanagement of the government's trust. The primary stage of mining is complete and according to the people responsible for land rehabilitation the secondary mining is currently operating at a loss. As a result the wealth of the nation has been greatly reduced and it is heavily dependent on foreign aid. Due to a decrease in funding, education is in decline, there are fewer foreign teachers, attendance is dropping and the students' literacy rates and English skills have decreased.[2] The Nauru government is trying to make improvements with the help of foreign assistance.[2]

Nauru is lead by an 18 member unicameral parliament that is elected every three years. The parliament selects one of their members to be president and the president chooses his cabinet.

The public sector dominates the economy of the island with the government employing 95% [1] of the work force with a total of 1,149 people on the payroll. Additionally many services on the island are provided by State Owned Enterprises. These services include the Menen hotel and RONTel, a phone and Internet provider. The government helps to provide much of the citizens needs. Government activities include providing healthcare, public education and scholarships, electricity, and managing the land owners' trust fund. During the peak of phosphate mining the government went even further such as providing houses to citizens.

Information and Communications Technology (ICT) Department

The ICT Department was created in December of 2006 under the recommendation of the *e-Government Strategic Plan* created by United Nations Educational, Scientific and Cultural Organization (UNESCO) Communications and Information (CI) sector. The goal of this department was to create a centralized process for managing technology and its mission is to be responsible for *"Anything to do with ICT in Government."* ICT is part of the ministry of telecommunications and its minister is also the Minister of Transport.

Before the creation of the ICT each department bought its own technology. This resulted in uninformed purchases and a wide variety of hardware and software. Marcus has stated that

costs have decreased and maintenance is easier now that ICT reviews and approves all purchases and has created a standard work environment.

The current Director of ICT is Marcus Tanner. Marcus is one of the five employees working in the ICT Department. Marcus will be leaving Nauru in December and his replacement is expected to arrive sometime in August.

Internet

Currently Internet and phone use among Nauru citizens is low. As of March 2008 only 2% of the population had telephones [4]. Due to Nauru's remote location citizens have limited options for Internet connection. Republic of Nauru Telecommunications (RONTel) is a state owned enterprise that is the current Internet and phone provider for the island. There are problems with service due to the deteriorating cable lines. RONTel is currently being phased out and will be replaced by Digicel, a private international company that will provide Internet access and mobile phone service.

In 2007 there was an attempt to provide WiFi access across the whole island. Oceanic Broadband Solutions was contracted to provide this service and they would charge $1 AUD/ hour to use the Internet. Access points, which charged batteries through solar and wind power, were installed throughout the island, and initially there appeared to be high demand. Unfortunately there were many problems with the access points and they quickly lost service. Currently only three of the over thirty access points are accessible. The failure of the project was mainly the result of poor planning that did not take into account Nauru's climate and cultural factors. First, they grossly overestimated the range of the access points and their network capabilities. The trees on the island have been blamed for absorbing the signal. Additionally many batteries were lost both to heat and theft. The access points were designed to be powered by wind and solar power but the physical infrastructure was not designed to cope with Nauruan climate and it quickly deteriorated. To make matters worse, Oceanic was a very small company and, as a result, Marcus has had great difficulty getting technical support. Service is still available at the few working points on the island by buying prepay cards from RONTel. This should soon be replaced by Digicel.

Problems

Distrust of Technology

Marcus has stated, and our interviews have confirmed, that many Nauruans have expressed a distrust of technology and electronically saved documents. This is understandable given their recent history and the current state of technology on the island. Electricity on the island is unreliable. Except for a few government buildings electricity runs on a four hour cycle with only half the island receiving power at a time. Power surges have significantly decreased but in past years many computers were lost. Data has been lost frequently due to crashes of individual workstation and servers. This has resulted in a common attitude that a paper copy is something real and electronically stored documents are likely to be lost. Further increasing difficulties, departments originally did not have a positive relationship with the ICT department because they instituted new policies and needed to approve new purchases. As ICT has been able to prove the effectiveness of their policies and provide useful services to the other departments the relationship has improved.

Lack of Technical skills

We observed that government workers tend to have the basic skills necessary to use Microsoft Office, but few use applications beyond that. It is difficult for some employees to complete work beyond their routine tasks. The consultants showed several employees how to create new folders and move more than one document at a time. A few people obtain a higher level of competency and the other employees are dependent on their assistance. For example in the Finance Department only two people know how to create and edit the formulas that are used for the Actuals system. These people are frequently asked to fix bugs that are created when the Actuals are edited. Marcus stated that many people obtain a basic level of competence to do their job but do not attempt to learn more advanced features of the software they use. Technical innovation is rare and Marcus has had to train people how to use their current software to eliminate burdensome tasks. Generally employees will find one way to do their work and will not seek a more efficient solution. For example, Marcus taught the Finance staff how to use Microsoft Office's mail merge function to merge paycheck data between Word files, instead of checks by hand (later referred to as the "Finance mail merge example). They are trying to train more staff to use computers and it has been recommended that a certification process be developed for computing skills.

There is also limited technical training in the local schools. ICT is not a part of the Education Department's curriculum, few teachers use computers as part of their work, and only two schools has access to the Internet. Computer skills are taught when they are related to specific subjects in the school's curriculum. The One Laptop Per Child (OLPC) project has recently been introduced so there is hope that this will increase the technical abilities of children. However, currently, and in the near future Nauru is dependent on foreign workers for technical skills. They were unable to find an ICT director locally and three out of five people in the ICT department are foreigners.

Lost Documents

Many work processes require several levels of approval as paperwork is passed between several departments. Often an individual document will pass through many hands and as a result the document may be lost or delayed at each step. It is difficult to discover where a document is in the system or whether it is being processed or was already lost. When documents are lost they must be resubmitted causing delays and lost productivity. Efforts should be made to make tasks more efficient and transparent, especially any tasks that require multiple people across several departments.

Physical Barriers

Nauru is physically remote from the rest of the world and has poor infrastructure. There are only two flights to the island a week and as a result it is difficult for people and supplies to get into or leave the country. Communication out of the island is limited, there are only a few international phone lines and bandwidth is limited and expensive. The copper cable lines connecting parts of the island are deteriorating and require frequent maintenance. The climate itself provides a barrier to building new infrastructure as was evidenced by the failed WiFi network.

Transitions

There are several major transitions set to occur in the next several months, and if they are not handled properly there is the potential for major problems. Government employees are hired on one-year contracts and many people in the public service only work for a few years. In the past this has created problems with lost documents and failure to understand the former employees

work process. Two of the five people in the ICT department (Marcus and Eroni) will be leaving in less than six months. The remaining staff does not have the skills necessary to continue to the ICT Director role, and there are no Nauruans with these skills available.

There are two other important transitions. RONtel is being phased out and its services will be replaced by Digicel. Digicel plans to abandon the current copper network because it is seen as too cumbersome to be sustainable in the longterm. If the new solution is not adequate there could be a loss in service.

Mind Your Own Business (MYOB) is a software package that is being released in several phases throughout government. As part of this project employees are currently entering past leave records. Nauru has had issues with software packages in the past and there could again be issues with this software.

Managing information is not valued

Many people complain that there is a problem with other departments or employees "not understanding" the importance of their work. This was a complaint made by the statistics department and staff in charge of record keeping. Often it is the attitude that record keeping is not real work. Interactions suffer and some jobs are more difficult because people do not see the value in storing and analyzing information.

Failure to meet international standards for record keeping

Nauru fails to meet some international expectations for information collecting and record keeping. For example, it fails to meet the requirements for good record keeping on Pacific Regional Branch International Council of Archives' (PARBICA) checklist. There is also health and income data that are requested by international organizations but are not currently available.

Management issues

Following the decline of phosphate mining and the loss of numerous international assets, Nauru has become dependent on foreign aid. As a result it is difficult for the government to plan spending far in advance. Technology developments often occur based on what countries are willing to donate rather than an established plan on the part of the country.

Another management issue is that due to a lack of skills available locally, many important government positions are filled by foreigners. As a result these positions rotate regularly with many employees only staying for one or two years. This can create loss of government knowledge and loss time spent to train new employees. Any long-term project in Nauru must keep this situation in mind because many of the people involved may change before it is completed. For example the consultants have worked with two Secretaries of Finance and Police Commissioners during their ten week project.

Licensing Issues

Prior to the existence of ICT there was no license management. As a result it is difficult to know whether software was legally purchased or what version was used. Due to the low budget and inability to predict the funds that will be available from year to year there are several licensing problems still faced by the government. Software is often prohibitively expensive for Nauru's use, and when possible a special deal is arranged with suppliers. For example an arrangement was made with Kaspersky for the government to receive antivirus software at a greatly discounted price. When such arrangements are made, ICT usually purchases many more licenses than are initially needed so that it will be able to continually install the software on new

machines. Microsoft has been reluctant to grant a discount to Pacific governments and their volume licenses were too expensive. The main challenge is choosing between software that is tied to a single machine and licensing that can be transferred to new computers but does not allow updates. The government is reluctant to choose plans which will be more expensive in the short term but will have less long-term costs.

Opportunities

Hardware and Foreign Aid

The government currently receives a large amount of hardware and foreign aid. It is common to receive donations of computers, software, and servers from governments and private organizations. These resources can be used to make important improvements.

Available Infrastructure

There is already communication infrastructure in place that is not currently in operation. The biggest example is the mobile phone towers. Mobile phones used to be available on the island and the towers are still in place. Digicel plans to use these towers to resume service. Infrastructure is also available to increase the Internet access to the island. If funds were available to afford a faster connection no new installations would be needed.

Need For Change is Acknowledged

Most government officials recognize that significant improvements can be made to the country's ICT and information management. Marcus the director of ICT embraces the need for change and other directors have been very cooperative and were willing to make themselves and their staff available to answer questions.

Facilities

The ICT department is located in the Civic Centre complex of the Aiwo district. It has four large rooms, including a new training room for government workers that has fifteen available computers. It is in one of the few buildings on the island that has access to twenty-four hour power. Air conditioning is used, which is especially important given Nauru's extreme heat. There is more than enough space for the five current employees so there is room for expansion if additional employees are hired.

There are several government department buildings spread around the country. The main building in the Yaren district includes the President's office, Parliament, and the majority of the government departments. This complex also has access to electricity twenty-four hours a day. There are other government offices such as land transport, fisheries, and the state house. Many of these buildings are on a four hour power supply cycle where half of the island receives power at a time. Some of these locations also do not have Internet access and are not connected to the government server. This includes most of the schools. Nauru has plans to begin charging for electricity use at which point these buildings will begin to receive twenty-four hour power.

Programs

The ICT Department offers a number of technology services to the other government departments. One of their most frequent responsibilities is technical support. Employees request their help to resolve hardware and software issues. They are also responsible for making new computer purchases, and installing and setting up new computers. ICT manages the Internet and telephone access for the government. Occasionally ICT has played a process improvement role such as the Finance mail merge example. Originally other departments did

not trust ICT to make important decisions and would even hire private contractors, but they have gained trust as ICT has shown a record of reliable service and the ability to consider the needs of individual departments.

Staff

There are currently five full time employees of the ICT department.

Marcus Tanner is the ICT director. Marcus was originally from Australia and this is his third and final year working for Nauru's ICT. He originally came to Nauru as a volunteer for the Department of Education and was expected to teach ICT classes. It was decided that his abilities would be better used in the ICT Department. Marcus never intended to go into ICT and had no formal training. As a highly motivated individual he has managed to acquire the skills and knowledge that he has needed while he was working. Marcus spends much of his time traveling around the island solving problems. His time is in very high demand and as a result he almost always works nights and weekends.

John Fong is the telephone technician for ICT. He is in charge of managing the phone lines on the island and looks after the PABX system. He is the primary liaison between ICT and RONtel and is also the person that installs telephones and data cables. John was originally from Fiji and previously worked for RONtel before transferring to ICT.

Deakin Temaki is a Nauruan ICT Officer. He provides network support and updates and installs software. He is also the specialist for photocopiers and printing. Deakin received four months of ICT training in Japan in network engineering. He has been working for ICT since March 2007.

Eroni Tuiloma is the second ICT Officer. Eroni was originally from Fiji and started working in ICT in February. He received his training in India. Eroni has been working closely with Nauru's OLPC initiative. Eroni plans to leave the country in July.

Daicos Jeremiah is an administrative officer. He is the youngest member of the ICT team at 18 years old. He was born in Nauru but he spent nine years in Australia for school. As one of the two Nauruans he represents the future of ICT in the country. He is very motivated to work in this field and he intends to stay in the country. He has not received much technical training and is expected to learn on the job. He began working for ICT in January.

ICT has also been trying to recruit additional employees and is looking to transfer staff from RONtel and fisheries.

There are a total of 1,149 people on the government payroll. There is a range of ICT skills but generally it is low. Some employees have taken classes at the University of the South Pacific (USP) on the island, but most learn through trial and error. A few older workers have refused to learn technology. One employee the student consultants spoke with in Land Transport stated that it was not worth figuring out how to use a computer because he would be retiring in a year anyway.

The government is organized into ten departments with a minister in charge of each department. Each minister is in charge of a collection of departments, known as the minister's "portfolio". Departments also have Secretaries and department heads depending on their size. The larger departments, such as Health, also have multiple sections lead by directors. Individual staff report to one of these directors or department heads.

Technical Environment

Hardware

There is a wide variety of hardware owned by the Nauru government due to the purchases made before the creation of ICT and the frequent donations made by foreign countries. The government has a total of six hundred twenty five computers. Two hundred of these are the XO laptops that are a part of OLPC project leaving four hundred twenty five laptops for the public service. The majority of these PCs have been donated with Lenovo, coming from China, and Acer, from Taiwan.

Servers

The hospital has three servers the main controller, and exchange server for email, and a pharmaceutical management system currently running on a workstation. They have purchased a new server to run the management system.

ICT has a server for file sharing and storage. Fisheries just received a server for file and application sharing; it will eventually be used for domain sharing. Education has a server for file sharing. In a server room in Yaren there is Content Keeper, a content filtering device. There is also a donated server that is being used to host mapping for the Land and Survey Department and a domain server that is used for file sharing. Additionally there is a Birth, Death and Marriage server, and a server for the MYOB small business software. Finally there are five servers for the big schools. Each of the remote sites has a router that acts as a connection to Yaren.

Internet Connection

The entire government is limited to 256 mbps that they get from a satellite connection. This signal is transferred around the island using both cable and wireless transmissions. This Internet connection has been vastly oversubscribed and is operating on deteriorating cable lines owned by RONtel.

Electricity

The island is powered using diesel generators. When the consultants arrived on the island, to conserve power the island was on a four hour cycle where only half the island is powered at a time. Several government buildings and the Menen, the government owned hotel, were exempt from this cycle and received twenty-four hour power. Additionally the electricity used to be unstable causing many blowouts and lost power supplies. The electricity has improved. There are now meters on the houses which will allow the government to charge citizens for their power consumption and will provide twenty-four hour power to those who can afford it. This transition occurred as the consultants left the island and at this time citizens had not paid for power and electricity was still not provided all twenty-four hours.

Operating Systems

Most of the government is running Windows XP Professional which they update through a perpetual license. There are also several machines that use Linux, the Yaren primary school sever uses Fedora and the mail and map servers also use Linux.

Software

The government uses a number of software packages to complete the wide variety of tasks required by a national government. By far the most common program used for information management is Microsoft Excel. Excel is used by most departments and they have used this to develop complex tools such as the Actuals system to manage the government's finances. Other

parts of Microsoft Office Professional especially Microsoft word are also used by government. Other software that is used includes:

- Mail Watch – an email and website monitoring system
- Content Keeper – this service prevents employees from using the Internet for entertainment purposes during the normal work week.
- Kapersky Professional – antivirus software
- mSupply – information management software for the RON Hospital pharmacy department
- Promadis - database software for managing the registry of births, deaths, and marriages
- Mind Your Own Business (MYOB) – small business software that is being implemented in stages starting with payroll.
- Microsoft SteadyState – network computer management software that stops users from accessing the C: drive

There is no process for making regular updates to software or Operating Systems. As a result the government software faces security threats and will continue to experience bugs that have been fixed.

Printers, photocopiers, scanners

Before the creation of the ICT department printers were purchased for individual machines. Marcus has been promoting the use of network printers, to cut costs. Many departments have multipurpose machines that print, photocopy, and scan. At the moment scanning is used infrequently. Many of the printers are Cannon but there is a variety due to donations and pre-ICT purchases.

Technical Management

The ICT Department is responsible for maintaining the government's technology infrastructure. ICT covers the initial installation of software and creates a standard computing environment. They are later contacted to troubleshoot software problems and, repair computers and other hardware. They are also responsible for adding and fixing departments' Internet connections. Currently there is no paperwork or formal process for reporting technical issues. When people have a problem they want ICT to address they simply contact Marcus by phone, email, or in person. Frequently when Marcus is visiting a location he is asked to fix a number of other problems. The student consultants have become a part of the reporting process as people frequently ask them to pass along messages when they visit locations on interviews. There is currently no formal system for recording or tracking reported problems that and most issues are addressed shortly after they are reported.

File Backup

The Nauru government has had a history of losing important documents due to a failure to properly backing up their electronic files. Both servers and individual computers have crashed losing vital information. As a result of these problems improvements have been made in backing up files but there are still significant risks. Many government employees save files both locally and on the server. Employees that store their work files locally often create a back up on a USB flash drive. There are a few people who only store their files locally or on a USB drive, but Marcus is trying to discourage this practice. Whenever possible Marcus is encouraging people to save all their files onto the server, the schools do not even have the ability to save locally. Unfortunately, the information on the servers themselves may be lost. Some servers are

not being backed up regularly and the Yaren Primary School's servers are only mirrored. Those servers that are being backed up do not keep a copy of their data in a separate location. If something happened to the server room such as a flood or a major theft much of the governments electronic data would be completely lost. The slow network connection has prevented the government from backing up documents at a remote location.

Security Threats

There are several important security risks. To limit the number of people using the limited bandwidth, Internet access is limited to people who need it for their jobs. As a result in some cases passwords have been shared to give access to other employees, friends, and family. Sharing password also gives access to government files to people who should not have it. Another security threat is people saving important government documents to flash drives. These flash drives are not password protected and as a result if they are lost or stolen, unauthorized people may get access to sensitive information. Spam presents an additional problem. Their email client only allows 3% of spam to get through but there is a lack of understanding of spam and so that small percentage presents a problem. Employees have responded to spam in the past, they have even supplied user-names and passwords to individuals claiming to be from ICT. One final problem is that the servers do not store a history of documents. As a result users have the ability to delete and corrupt documents found on the server and a backup may not be available.

Improvements

Current technology management practices allow for important improvements. An improved and documented process for backing up data would help to ensure that important government documents are not lost. In addition to learning the importance of backing up documents, government employees need to develop a better understanding of spam and viruses. They should also be trained to use available servers and ICT should help address the concerns that are preventing its use. Newly arriving hardware will hopefully allow for more consistent backing up of data. Currently there are no plans or process in place for updating software. Connecting workstations to a server could allow for remote updates

Technology Planning

As the Director of ICT, Marcus is in charge of technology planning. There is no official government-wide technology plan. Most ICT improvements occur based on immediate needs and donors who are willing to provide hardware or funding for a specific purpose. This foreign assistance provides technology and funds that can provide new opportunities with little advanced notice.

There were three past documents that provided an outline for technology planning. First there was the "Nauru e-government strategic plan" produced in May 2006. Next there was the "e-government strategy report" which followed up on this strategic plan. There was also the "e-Readiness Assessment" from March 2008. Marcus also created a report "The Republic of Nauru Project to Strengthen Information and Communication's Technologies in the Nauru Public Service". The three outside reports acted as assessments and recommendations and Marcus's report is the closest Nauru has to an official technology plan. These reports have produced several changes, most notably the creation of the ICT department. Other suggestions were tested but proved to be unsuitable for Nauru, this includes using Sharepoint, making extensive use of open-source software, and the WiFi network. Other parts of the plan are

awaiting implementation such as providing Internet access in all schools and banning pirated software.

Each department is responsible for creating their own plans of how to use technology to meet their goals. They use their own budget for technology purchases but they must go to Marcus for approval. Marcus has helped advised departments to better utilize ICT, as seen in the Finance mail merge example. This reduced the time it took for Finance to write the 1,149 checks per fortnight. Marcus also advised the Education Department to abandon the use of PINEAPPLE, a database system for the education department that had numerous issues and failed to be appropriately customized for Nauru's needs. Consultants are frequently hired from off island or are sent by international organizations to provide recommendations for using technology.

As ICT director Marcus has a vision for ICT development that has not been recorded. Due to frequent interruptions by other departments to maintain their current systems, it is difficult for him to find time to begin work on new projects, but he has discussed several strategic improvements. The government website is underutilized compared to other Pacific Nations and once a new server is available to host the site it could be greatly expanded. Nauru could push for more paperless government and allow people to complete and submit forms electronically. More technology training could also provide substantial improvements. The ICT department recently acquired a training room and workshops have begun to be offered.

Internal and External Communication

Communications within the Nauruan government are continually evolving, becoming more efficient and reliable with the help of technology. In the past, the main method of communication between departments was to travel to various offices to speak or deliver forms in-person. Due to limited landline connectivity, personal interaction remained prevalent, making communication both time consuming, especially for departments not located in the government's Yaren offices, and unreliable, as forms would frequently be lost during delivery or departments would submit forms past their deadlines.

One of the first initiatives of the ICT Department was to create email accounts for government employees. Beginning in 2006, ministers and select employees were given email addresses, and in 2007, many employees requested their own email addresses by completing an email request form at the ICT department. Employees can now simply visit the office and submit their names, after which Marcus will create their email address. Currently, nearly all public servants have personal email accounts using their first and last names and the "@naurugov.nr" domain. Ministers, directors, secretaries, and some offices also have additional email addresses with their title serving as the username. Email now serves as the primary and most stable means of communication. Several interviewees commented on the efficiency of email communication over asking questions in-person, writing memos, and personally delivering documents. Phone calls are still made and many hand-written documents are personally delivered in order to enter the data into spreadsheets.

Within departments, electronic files are frequently transferred through USB flash drives. While transferring files electronically allows employees to easily update data, the USB flash drives present a security risk as data is frequently lost or the drives contain viruses. As mentioned in the *Technical Environment* section, the ICT staff installed various servers in order to aid file sharing between departments and lessen the risks of transferring viruses. However, use of the server is limited in many departments as employees frequently save files on their local workstations or continue to use USB drives. While departments such as Finance and ICT made

conscious efforts to save documents on the server, reasons for employees not utilizing server space range from slow connection to files being too large (as in the case of the Actuals budget data) to the lack of understanding of the purpose of a server. Along with connection to the server, all offices which have a computer are also connected to the internet, although some employees' workstations can only receive email and cannot access the internet through the use of a government filter put in place due to work productivity issues. English is used as the formal language within the government, although employees will often speak with one another in Nauruan both over the phone and in-person.

In terms of external communication, the government primarily uses email to communicate off-island. There is no official external contact list in any of the government departments, although some individuals utilize Microsoft Outlook to manage their contacts. Last year, a Taiwanese technical consultant created The Republic of Nauru website (http://naurugov.nr/) which is stored within a workstation in the ICT department. The website contains information on the Fisheries, Media, Finance, and other various departments; however, ICT was given the responsibility to maintain and update the website. The consultant finished building the foundations of the site, but the site has yet to be updated since her departure, and is now primarily used as the portal for government's webmail. If the website can be utilized to its full potential, it provides a great opportunity for the government to better communicate between departments and provide greater transparency for Nauruan citizens and foreign stakeholders.

Nauru's limited infrastructure serves as the greatest barrier to improving communication within the government. Due to the low bandwidth allocated to the entire island, use of internet applications such as YouTube and Skype are nearly impossible. Intranet is also limited as not all departments have dedicated server space, while those that are connected, may have slow connections or employees that do not fully utilize the server. Since some computers are not connected to the server or to the internet, employees must distribute USB drives to transfer data or print documents, or, in the case of the Land Transport Department, employees must go to other locations in order to access online information which could be beneficial to their work. These constraints also have led to the continued use of transferring hard copies between employees. This slows communication and effects timeliness as documents are personally delivered between departments, and creates points where information is frequently lost, as in the case of frequent misplacement of Payment Vouchers within the Finance Department. Finally, although email has allowed for more efficient communication, there is no government policy in place for storing or deleting emails.

Utilizing Nauru's current technological environment can lead to vast improvements in the efficiency and reliability of communication for the Nauruan government. Emailing forms and allowing access by all departments to the Yaren servers will allow for easier access to information, cut down on travel time between departments, and reduce loss of information within offices. Also, departments could utilize scanning with their multi-function printers in order to lessen the need to personally deliver documents to other departments. The use of sharing electronic documents is contingent on employees utilizing the technological environment, meaning employees need to understand the importance and functionality of these functions and the Nauruan government must create regulations in order to secure their data. The government can leverage the strong personal relationships between its employees, utilizing the employees who have realized the potential of using electronic communication, in order to continue further development into more departments and processes.

Information Management

The Republic of Nauru, as a government organization, must create and track a vast amount of information ranging from citizens' personal data to financial information. Each department has numerous responsibilities in tracking the information. The following is a list of critical information at the various departments which the student consultants have observed thus far:

- Finance: payment vouchers, budget, donations, debt management, payroll
- Health: patient records, x-rays and ultrasound images, pharmaceuticals, lab results, dental reports, birth and death certificates, WHO and other international data requirements
- Education: asset management, supply ordering, student and teacher personal information, school data, student and teacher performance, scholarships, attendance records, UNESCO and other international organizations requirements
- Chief Secretary: payroll, warehouse asset management and ordering, vacancies, variances, leave forms, fuel rations, discipline, personnel files
- Statistics: census data, international organizations requirements, social and economic data
- Land transport: asset management, vehicle history, ordering parts and vehicles, bus routes
- Land records: land cards which record ownership
- ICT: technical asset management, software, drivers, website data, order reports for other departments, email accounts, IP Addresses

Along with each their own information, each department is responsible track their employees' time sheets, variations, and leave forms as well reconciling their budget information with the Finance Department.

The Nauruan government manages its information through a mix of electronic and paper documents. Paper documents are printed from an electronic copy, the information is handwritten, and the document is returned to the original department in order to enter the data electronically. An example of this process is the Education Department's attendance records, which are distributed to the schools throughout Nauruan schools where teachers record their class attendance through handwriting and then return the report to the Education Department at the end of the month, which is then entered into an Excel spreadsheet. The departments primarily utilize Microsoft Excel to record their information. This limited employee skill level with Excel results in information that must be entered multiple times whether through copying and pasting data in multiple Excel files or copying information through handwriting in registry books.

Numerous attempts to automate information in government departments have had varying success. Databases have been primarily commercial software or were developed by foreign consultants. While the databases in the RON Hospital have been successfully implemented (PROMADIS for births and deaths and mSupply for pharmaceutical), other databases failed and are no longer in use due to unintuitive user interfaces or fields that were too complicated or which was not adapted for Nauru, this includes ICT's asset manager and the PINEAPPLE database to track education statistics. In place of these failed databases, Marcus has suggested that departments use Excel spreadsheets in order for consultants to later create databases customized for information needed in Nauru. This has led to employees managing numerous Excel files with many sheets and linked data.

Marcus identified information management as one of the major areas in need of improvement. The Nauruan government has made large strides in their technological infrastructure in the two

years that the ICT department has been operational; however, work practices have not yet adapted to take full advantage of these advancements. Problems exist in many areas of the government's information management. There is no formal practice to ensure that data is entered into spreadsheets correctly, this is especially problematic as budget data in the Finance Department's Actuals system is frequently entered incorrectly. Numerous forms required by all government departments are not standardized, leading to repeated data entry, as seen with the identical data found in the Nauru Public Service (NPS) 6 form, payroll spreadsheets, and the civil list. The same information is manually entered into three separate spreadsheets. The data should instead be entered once and then electronically accessed for the various needs eliminating duplicate work. There is a lack of documentation of standard practices to store electronic information, leading employees to save solely to their local workstations, underutilize their department's server space, or employing their own file naming conventions, making it difficult for other employees to locate files saved to the server. Finally, Nauru has yet to formalize its practices on security and record keeping. Presently, there are no regulations on how hard or soft copy doe cuments should be stored or how long they should be retained. Paper files are often left openly throughout the office with few or no security measures put in place to secure these documents. Also the "unwritten" rule within the government is to keep the files for 10 years; however, in most cases the consultants found that most departments kept their documents forever.

Fortunately, many government employees recognize problems in their information management and are willing to change their practices or have already made steps to improve their management of information. A key movement within the government is being headed by the Secretary of Home Affairs, Charmaine Scotty, to implement the PARBICA *Recordkeeping for Good Governance Toolkit*. This international standard, which is in the process of being adapted throughout the Pacific island region, will prove to be integral in regulating the management and accessibility of both paper and electronic files. It is integral for the government of Nauru to put in place and practice regulations on information management in order to secure its documents and limit its legal liability in the case of public trials. Marcus and the ICT department have encouraged departments to save to the server, leading to employees in departments such as Finance and Education to share their files to the network. Though work still needs to be done with securing documents and setting accessibility rights to those saved on the server, storing files in a department's server space will allow for more accurate and up to date data entry, leading to better inter-departmental communication and decision making. For both record keeping and saving on a server, it is vital that employees understand the importance of both practices so that they fully and consistently implement both practices.

Another, more long term, opportunity would be to implement a national ID number for all Nauruan citizens. The student consultants found that offices such as the Education Department and RON Hospital often ran into issues in tracking individuals in order to access or update their personal information. This was due to the fact that Nauruans are frequently inconsistent with the name used to record information. Though implementing a national ID system would take significant work and collaboration between departments, the results would be more accurate and easier to locate information across departments such as Health, Education, and Finance.

Business Systems

The business systems in the Nauruan government represent processes which are initiated or tracked by individual departments and then are finalized in one of two departments, Finance or Chief Secretary.

Annual Budget

The Finance Department handles two main functions. First, the department tracks other department's budget throughout the year. Departments apply for budget allocation at the end of each fiscal year. Steps have been taken in order to standardize the budget allocation process. The system begins in February with the department head submitting a "New Policy Proposal" (NPP) to the Finance Department. The NPP is a template sent to each department where they submit any new budget items and explain why the departments needs the added allocation. The Finance Department Budget Advisor comments on the feasibility of each newly proposed item on an Excel sheet, which he submits to Cabinet. After meeting, the Cabinet sends a preliminary outcome report on the new budget proposals, either accepting or rejecting the item. Many accepted items will be contingent on donor funding. The departments then include their new items with their baseline budget template, which they submit to Finance as the department's "Final Submissions". The Budget Advisor again reviews each item and comments on its feasibility. He then types concluding notes on the spreadsheet template which includes why expenditures are changing along with comments on departmental performance.

A department's performance is determined by the department's "Achievement Report", which is a template given by the Finance Department where departments report their core activities and summarize the outcomes and improvements that the department has made during the year. A department's performance is judged by the Budget Advisor and plays a large role in whether or not a department's budget will grow or diminish in the following fiscal year.

The Final Submission must be approved once again by the Cabinet before the department's budget is officially entered into the Finance Department's Actual system.

The Actuals: Budget tracking & Payment Vouchers

The Actuals is an Excel spreadsheet which contains a database of all government departments and their budget, which is updated through the use of the second function of the Finance Department, Payment Vouchers or PV's. PV's are used for departments to request fund allocation from their budgets. Departments complete a standardized PV form based on invoices and quotes, which they must submit with the PV. The department sends an employee to the Finance where the PV is submitted to the receptionist. The receptionist records the PV into a registry book and then gives the form to one of two accountants. The accountant then checks the department's file on the Actuals to see if the PV purchase is within budget. If the purchase is feasible and can be made within budget, the accountant signs the PV form, or, if the purchase is over $150 AUD, the PV is given to the Secretary of Finance, who also must approve and sign the form based on the feasibility of the purchase. The form is then given to the receptionist who writes a check for the given amount. The requesting department then sends an employee to pick up the check and sign the registry book to confirm that the check is received. The department receives a copy of the PV while another copy of the form is kept by Finance. The receptionist gives the PV to an appropriate data entry staff who enters the purchase into a local copy of the department's Actuals budget. The data entry employee then copies their Actuals file to a USB flash drive, which is given to the accountant, who copies the data into the finalized version of the Actuals. The PV is then filed in the Finance Department's record room.

The PV process is made up of multiple steps and is easily delayed as departments send in urgent requests which affect all other payment requests. However, the PV process needs a system of checks and balances in order to curtail fraudulent spending of government funds. The more pressing issue for the PV process is the frequent cases of loss or erroneous budget information. Accountants are supposed to check data entry of PV's; however, due to time constraints,

checking data is rare, which leads to inaccurate budget data. This issue is complicated as other departments often complain about the cumbersome task of reconciling their budgets with the Finance Department.

Leave Forms

The Chief Secretary Department is made up of multiple offices which handle specific functions for other government departments and staff. Among its other duties the Human Resources Department (HR) handles staff leave and initiates the salary payments. In order to request for leave, government employees must complete a "Leave Application", or the NPS 3 form. The Leave Application is a standard document, where employees must identify the reason and duration of their absence. Once the leave form is approved by the employee's department head, he or she then submits the form to HR. The form is received by one of two Leave Clerks, who are designated by department. The Leave Clerks' desks each have a tray containing government employee's leave card, a paper card which tracks the employee's remaining days of each type of leave, which include recreation, sick, special, furlough, leave without pay, study, official, toil, or maternity. The Leave Clerk then advises if the leave is approved, sends this advice to the Chief Secretary who must sign the leave form. The Leave Clerk then completes an "Advise Form" which states whether the leave was approved and the employee's updated amount of leave credits.

Variations & Payroll

HR also initiates the variation process. The HR Secretary receives "Variation Payroll" forms from each department. These forms record each department's employees' absent hours along with leave hours. The Secretary then creates a "Variation Summary" spreadsheet, also known as the NPS 6, which summarizes each department's variation. The NPS 6 is given to the Salaries Office, which enters variations into the government payroll Excel spreadsheet. The Salaries Office also enters leave hours with advice from HR's Leave Clerks. Once the absentee and leave hours are entered, the Salaries Director checks the spreadsheet against the NPS 6 to ensure the data was entered correctly. The Salaries Director then emails each department their respective payrolls. The Head of Department (HOD) then must approve of the payroll before submitting a PV to the Finance Department. Salaries then emails an electronic copy of the payrolls to Finance, which prepares and distributes payment voucher to each government employee.

The payroll process currently suffers from repeated data entry, especially in transferring handwritten data to electronic files. For example variation data must first be calculated by each department based on their timesheets where employees sign their time in and out of the office. Departments then enter the data electronically, which is given to the HR secretary who copies data into a summary form, which is then copied in the payroll spreadsheet and Civil List spreadsheet. The Chief Secretary Department also has no formal process in tracking employee overtime hours. In the current system, individual department heads track any employee working hours over the normal 35 hour work day and add these hours to "banked hours". These banked hours are then used in place when employees are absent without pay. This system adds another responsibility to the Heads of Departments to track the banked hours and provides a security risk as HR is not regulating these overtime hours.

Government Warehouse

The Chief Secretary Department is in charge of the government warehouse. The government warehouse began operations in 2008 and was put in place to cut spending on common

government supplies and reduce fraudulent purchases. In order to make any supply purchase, a department must first check to see if the supply they are ordering is in stock in the warehouse. In the past, departments hand delivered a "Purchase Requisition" form to the warehouse Procurement and Supply Manger; however, most departments now email the manager with the supplies that they need. The manager then checks the warehouse to see if the supply is in stock, if it is not he must then receive a quote for the supplies either locally, through Nauruan stores, or through foreign suppliers. The manger then completes a Purchase Requisition form, if the request was sent by email, and submits the form to Finance. If the supply is in stock, the Finance Department sends the manger a Journal Voucher (JV), or if the supply is not in stock then the manger receives a check to pay suppliers. The manger then oversees the successful delivery of the supplies to the departments, as Head of Departments must sign to confirm that they received the supplies.

Fuel Rations

The Chief Secretary Department also tracks fuel rations for the Nauruan government vehicle fleet. The Fuel Officer records each government vehicle and its respective fuel allocation per week through an Excel spreadsheet. The Chief Secretary then delivers a hardcopy spreadsheet to the petrol "Bowser" (gas station), a private station called "Aiwo Town Ace", or the diesel site, state-owned station. Throughout the week, government employees that refuel their vehicles must sign their signature on the fuel allocation spreadsheet to confirm they have received their rations. The stations then send the spreadsheets along with weekly summaries back to the Chief Secretary Department which sends a check to the private station or refuels the state-owned station based on the number of liters used at the site throughout the week.

Opportunities

Many opportunities exist to improve the business systems in Nauru to make systems more efficient and accurate. The government of Nauru must continue its progress towards automating government forms. More government documents are becoming standardized and sent electronically, which allows the government's business systems to increase efficiency and reduce delivery time and the number of document lost in the hand delivery process. Once more forms are automated, it is crucial that departments share their information on the government's server. Saving documents to the server will increase efficiency in the business systems, as departments can share and copy information, which decreases the amount of time spent reentering data into separate files. Utilizing the server will also allow individual departments to track their administrative duties more accurately. For example sharing each departments' budgets, the government warehouse inventory, or an employee's leave record will reduce the time spent checking and correcting information.

It is important to note that saving documents to a server leads to other possible problems. Storing documents on a server means that access rights must be in place in order to secure files and ensure that the data cannot be tampered. As individuals save documents to a server, individual file naming and saving methods can quickly create numerous directories and documents, making search tedious, and determining the correct version of a document difficult. To avoid this, all government departments must establish uniform document naming, storing, and updating practices. In order to keep information organized and secure on a server, the student consultants will highlight these issues in the Information Policy Management report.

It is important to note that a transition for the government's business systems is currently underway. The Chief Secretary Department is heading a shift of its payroll functions from Excel to the Mind Your Own Business (MYOB) software. Beginning in the next fiscal year, the

MYOB software will track each government employee's leave credits and pay. In the past months, employees in the HR department have been entering leave records and government employee information into the MYOB database. All employees in HR as well as many employees within the Chief Secretary Department have received training on how to use MYOB's employee information system. Beginning in June, the administrative staff in other departments has been receiving training on standardizing their employees' weekly time sheets in order for the data to be easily converted into MYOB. The MYOB software exhibits Nauru's desire to automate its business systems. The software also presents opportunities to further its impact beyond payroll. For example, the government warehouse plans to use the software to track its inventory and Finance intends to record data in the software to better comply with internationally accepted accounting practices.

II. Scope of Work

Task 1. Comprehensive evaluation and observation of Nauru's information management practices

In the first weeks of the project, the student consultants met and observed the work done by numerous employees and departments in the government of Nauru. Given the scope of the project and the size of the Nauruan government, it was necessary for the student consultants to observe and interview many departments and their employees in order to gain an understanding of the technological environment and information management policies of Nauru's government. Over this time the student consultants observed the many problems and opportunities addressed throughout this report such as departments not utilizing information resources, the lack of government-wide standardized practices, the difficulty for departments to communicate internally and externally, and the inefficiencies and frequent errors made throughout various government processes.

Task 2. Fuel Rationing System

Along with the student consultants' observations and creating a government-wide information management policy, the project will also seek to complete the "low hanging fruit", or easily achievable goals, in the various government departments. In the second week of the project the student consultants met with the Director of Administration, Sasi Kumar, who described the need to update the fuel ration system used to refuel the government's fleet of vehicles. The student consultants saw this project as an opportunity to improve a system which affected all government departments. Every department would be exposed to the technical advantages of this system through the allocation forms they submitted and the collection reports they received. Creating a system which increased the accountability of departments tracking their fuel usage would also highlight the need of accurate record keeping. Finally, developing the system in conjunction with the Chief Secretary staff would also increase employee technical capacity.

The current system to distribute fuel rations is detailed in the Business Systems section of this report. Sasi expressed the need to further automate the process of collecting and reporting fuel rations. He specifically wanted a system which could report on government-wide and individual department fuel usage and costs. The fuel rationing system fits into the goals of the project since departments and employees should be tracking their weekly fuel rations and because all departments receive fuel rations for their assigned vehicles. The system will also be important in order for the government to better predict fuel usage and spending as well as keeping a sufficient amount of diesel at the Statehouse station to provide energy throughout the island.

Task 3. Website Design

Marcus's initial expected outcomes of the partnership included "Recommendations for the structure / organization of information on the Government website". As mentioned earlier in the Internal & External Communication section, Nauru's government website was designed in 2008 by a Taiwanese consultant. The website and its content are all stored an ICT department workstation and ICT has been given the responsibility of updating content on the site.

Nauru's government website has yet to been updated since its creation in 2008. Some hyperlinks are broken or are not present and pages contain outlines of information which has yet to be inserted. As such, the site still remains in development; however publishing the site makes

it unsuitable as the main source of contact and information about Nauru and its government, and is primarily only used by government employees to access their webmail. The reasoning for failed management of the website is two-fold. First, there is a limitation on the content that can be stored on the site since it is running on an ICT workstation. Marcus is hesitant to update the site and its content because the workstation is not managed as a server and has limited storage space, therefore the site would be lost if the workstation crashed. Secondly, and most importantly, there was little sustainability done to plan who would manage the website and its contents. When asked, Marcus said that there is no employee in the ICT department with website design or management experience. A larger issue is that departments are not taking responsibility for their own sections on the website. It should be each department's own duty to update the content and links on their pages in order to best communicate within the government and to foreign partners.

Task 4. Standardize Department Timesheets

While interviewing the Salaries Officer, the student consultants observed that government departments did not have a standardized timesheet form. Timesheets varied in areas such as the page orientation, the method in which employees checked in and out, and the manner that staff member were listed. While departments have become accustomed to their own timesheet format, the issue arises in the salaries and payroll process where Salaries staff may need to refer to timesheets in order to verify variations. Without a standard timesheet format, Salaries employees are forced to locate information found in different areas of the timesheets. Some departments also did not require signatures when employees checked in or out, which creates the possibility of fraudulent times. Seeing the opportunity to accomplish another "low-hanging fruit", the student consultants decided to take the responsibility of creating a standardized timesheet form.

III. Outcomes and Recommendations

Task 1. Comprehensive evaluation and observation of Nauru's information management practices

The student consultants' observation period lasted throughout the project. The majority of observations were made in the first three weeks of the project when the consultants interviewed and observed employees in the Health, Chief Secretary, Education, and Finance Departments. As the project progressed, the consultants continued observations where needed. This included observing more sections under a Department, such as the Nauru General Hospital, as well as the Nauru Police Force.

The student consultants wrote notes throughout the observation period, which when typed and compiled, amounted to 86 printed pages. As the pioneer project between the government of Nauru and Technology Consulting in the Global Community, the consultants hope that these notes can be utilized by future projects.

The observation period also served as the basis of various reports, policies, and recommendations throughout the project.

Government-Wide Proposals

Throughout their observation period, the student consultants noted recurring problems and obstacles faced by all government departments and employees. After evaluating these issues, the consultants chose to create three proposals created in order to address government-wide problems in information management. These three proposals are the *Information Management Policy*, the *Nauru Identity Number (NIN) Proposal*, and the *Documenting Work Process* report.

Information Management Policy [Appendix B]

The government of Nauru's technological capabilities are rapidly advancing as more departments and their employees implement hardware which allows them to transition form paper-based to electronic information. However, Nauru currently does not have the policies in place to adapt to this evolution in technology. This raises two main issues. First, there is no uniform document management policy. This means that employees are left to implement their own filing and naming conventions for electronic documents. Individual conventions make searching and locating electronic documents a tedious task. Also without the proper security measures in place, documents can be easily deleted and corrupted. As employees fail to locate or lose files, they also lose their trust in electronic documents and revert to using paper documents. Second, as more departments use computers, Nauru's government will generate more electronic files. Establishing a government-wide Information Management Policy as soon as possible will make adapting documents to the policy less time consuming.

The *Information Management Policy* report recommends policies that can be implemented immediately by all government employees. Head of Departments and supervisors should encourage the policy to be utilized by all staff members. The report defines standard file naming conventions and defines the technical and usability issues solved by the conventions. The report also discusses file security and recommends how the government can further its Information Management once conventions are standardized.

In order to apply the *Information Management Policy*, the consultants chose create a document management table for Cabinet proposals [Appendix C]. This table will help the Cabinet

Secretary to quickly locate both electronic and hard copies of proposals as well as search for proposals in a variety of methods. The consultants created the table in conjunction with the Cabinet Secretary, who was excited when learning to use the hyperlink functionality to easily locate proposals. She is now in the process of adding proposals into the document management table.

Nauru Identity Number Proposal [Appendix D]

Despite its small population it has been challenging to find a unique way to identify each person in Nauru. There are two major issues that need to be resolved. The first is that people often use different names at different times and places. This makes it difficult to consolidate the information about that person, meaning multiple files are created to keep track of the same person. The next issue is that multiple people often have the same name. This can cause confusion where multiple people are recorded as the same person. This can lead to costly mistakes and when health care is involved it is also potentially dangerous.

These problems were first noted with the Education Department. Students frequently change schools and when they change schools they often register under a new name. Students change names without informing the government and can begin to use a different last name when they are informally adopted or even temporarily staying with a relative. The Education Department struggles with these name changes and most often a new file is created when a student registers under a different name. This has occurred so frequently that the Education department currently has almost twice the number of students recorded as are known to actually exist in Nauru. This makes it difficult to track students' progress, and the lack of accurate information prevents the Education Department from using reliable data to improve planning and decision making.

The consultants believe that it is integral for Nauru to begin implementing an identification system. In regards to information management, if no national ID system is implemented soon, it will become much more difficult to implement later. Departments will begin assigning their own numbers, making it difficult to consolidate into a national number. This could be seen as the Education Department attempted to develop their own student identification number.

The student consultants first proposed the Nauru Identity Number (NIN) to the Secretary of Home Affairs, who praised the proposal. After collaborating with the Secretary to draft a formal proposal for the NIN, the consultants also distributed the proposal to other Heads of Departments. In all cases, the proposal was met with a positive reception. The NIN is now being developed in conjunction with the Department of Home Affairs and the Chief Secretary Department. The Secretary of Home Affairs hopes to begin implementing the NIN through a trial period with the Human Resources Department.

Documentation of Work Process [Appendix E]

During the consultants' observations they encountered frequent complaints that could have been avoided if employees were required to write a description of the work that they perform.

When government employees go on leave or commence their duties, work processes often come to a halt. Co-workers are forced to spend a significant amount of time learning to perform an employee's tasks and locating where the employee stored information.

The *Documentation of Work Process* report outlines the need for government employees to begin documenting their processes. Besides aiding co-workers when employees go on leave, these documents will also allow senior management to gain new perspectives on their staff's major processes which can help management to make improvement and more efficient methods.

As part of the *Documentation of Work Process* report, the student consultants drafted a template [Appendix F] and provided an example of a Nauru Police Force employee documenting her duties [Appendix G]

Department Final Recommendations

Using their observations, the consultants were able to analyze and evaluate the work processes in individual departments. After meeting with Heads of Departments to report their findings, the consultants chose to document their observations and recommendations, which were compiled to create *Final Recommendation* reports. These reports provide background on the consultants' project, describe the departments and their respective duties, and conclude with recommendations which include how departments could apply the consultants' government-wide recommendations. The consultants planned for these *Final Recommendations* reports to identify attainable improvements while also recommending future projects for department to consider in order to better manage information. In the final week of the project, the student consultants met with seven departments: Home Affairs, Health, Finance, Human Resources, the Nauru Police Force, Chief Secretary, and Education. The consultants reviewed the final recommendations with the Head of Department and gave each Head a paper and electronic copy of the *Final Recommendations, Information Management Policy, NIN,* and *Documenting Work Processes* reports.

Need-based Training

Throughout their time working with government employees, the student consultants provided simple methods for employees to improve their use of computers. For example, many employees were unaware that they could select more than one file at a time. The consultants also held a workshop for the Nauru Police Force, which was attended by seven Inspectors and the Superintendent of Operations. The consultants describe basic computing tasks such as saving files as read-only and attaching documents to emails.

The student consultants hope that the processes they taught will not only help employees utilize their time more efficiently, but also encourage them to experiment with other methods to interact with their computers.

Task 2. Fuel Rationing System

- Developed a Fuel Rationing System that is already in use
- Two user manuals for the system
- Training workshop attended by fourteen departments
- ICT staff trained to maintain the system

The Fuel Rationing System has been successfully developed and is already being used to track the fuel use of thirty-three departments. The system was developed using Microsoft Excel and uses Visual Basic (VBA) macros to automate tasks and generate both departmental and overall reports. For a complete description of the system please consult the user manual in Appendix H.

As a part of this system each department has received a fuel allocation form. This form includes the vehicles and fuel rations that were assigned during the annual budget. Departments use this form to plan and submit their fuel usage for the following week. We offered a training session to explain this form. This workshop was attended by fourteen departments.

We have written two user manuals to provide assistance. The first user manual is for the Chief Secretary office and it explains how to use the system as well as how the system works and how to fix problems that may occur. The second manual has been given to each department to explain how to complete the fuel allocation form [Appendix I].

In order to maintain the system and build local capacity we have taught ICT staff how the system was developed and how changes can be made.

The Chief Secretary Department has already begun using the system it is likely that this work will be sustainable. However, there are a few risks to long-term sustainability. First, one Chief Secretary staff members have received full training in how to input data and generate reports, if she leaves, her replacements may not be able to learn the systems from the user manuals. Second, if the system breaks or changes are needed, staff may not be able to make the necessary changes. Third, the system needs to be updated at the end of each year to include the new budget. We have documented the steps required and trained the staff, but the additional steps that are required will present a yearly risk to sustainability. We have taken precautions to address each of these risks to sustainability.

Task 3. Website Design

As the project progressed, the priority of this designing a website decreased. The consultants believed that due to the significant hardware and personnel challenges there was a major risk to the sustainability of any work completed for this task. Marcus was reluctant to host additional content on the current hardware and the staff currently lacks the time and skills needed to continue this project after the consultants have departed. As a result the consultants decided that their time would be better spent focusing on other tasks.

The consultants analyzed the websites of other Pacific Island Countries and used this information as the basis for more long-term discussions with departments regarding potential uses of the government website.

Task 4. Standardize Department Timesheets

In order to limit confusion in formatting a standard timesheet, the student consultants created an automated system where employees fill an Excel form, which then generates a standardized timesheet which is ready to print. The system uses Excel and Visual Basic macros. The system is currently under consideration of implementing throughout government department by the Chief Secretary Department. The sustainability of the system is dependent on the decision of the Chief Secretary to require a standardized timesheet form.

Recommendation 1. Implementation of the Information Management Policy

The student consultants plan for the ICT Department to be the central proponent of the *Information Management Policy*. As department which standardizes operating environments and provides technical assistance, the ICT Department has the greatest access and ability to implement the policies made in the report.

Although the student consultants met with seven government departments, they hope that the ICT Department distributes the *Information Management Policy* to the remaining departments and their heads. The report could be distributed during the Heads of Departments monthly meeting or workshops could also be held in order to demonstrate the benefits of a government-

wide information management policy. Whenever providing technical assistance, ICT employees could also remind other government employees when they are deviating from the policy.

Some additional recommendations in regards to the *Information Management Policy* which the ICT Department should address include:

Case Study of the RON Hospital Server

In order to illustrate the benefits of operating in a server environment, the ICT Department could perform a case study on the RON Hospital server system. The case study would involve a comparison between networked and non-networked computers. ICT would investigate the amount of technical support needed for each system along with comparing processes such as users sharing and accessing files, recovering deleted files, and providing remote assistance. The case could also utilize evidence from the ICT support jobs spreadsheet by comparing the amount of time needed to support the RON Hospital versus other departments.

The purpose of the case study would be to provide evidence of the benefits of implementing a stable server environment over only having access to a single local workstation. The server environment should allow departments to have greater ability to collaborate and secure their files while decreasing the need for ICT to provide service on these computers. Once departments saw the benefits of moving towards a server environment, they would then collaborate with ICT to move their systems to servers.

Desktop Search

Marcus has already tested various desktop search software. The student consultants recommend that ICT begin installing a desktop search system into the standard build. If the *Information Management Policy* is correctly implemented, desktop search should be used only as a last resort. However, software beyond the default Windows XP Search would allow for more advanced information management policies such as utilizing metadata or document properties. By installing the search software on the standard build, employees will not have to index existing files, easing the software's integration.

ICT could install desktop search such as Windows Search software which is a search function being used in Windows Vista and Windows 7 and can be downloaded for free. Windows Search does not require online access in order to index files as is the case with Google desktop search. Windows Search also integrates with Microsoft document properties in order to easily sort through metadata.

Scrubbing Software

As described in the *Information Management Policy*, it is important for publicly distributed government documents to be "scrubbed" before issued. Departments should have a standard practice of scrubbing documents before emailing or uploading in order to limit the liabilities of metadata. The ICT Department should include a scrubbing software in the standard build of all computers to give employees the option to scrub their documents.

Continuing the Policy

The student consultants hope that the ICT Department will continually update and add new content to the *Information Management Policy*. As the supporting body of the policy, ICT should update the document in order to reflect changes in Nauru's computing environment.

Recommendation 2. Reduce Restrictions on Internet and Computer Use

There are good reasons to restrict user access to software and the Internet. Nauru is especially concerned about limiting unnecessary Internet use due to the government's low bandwidth and lost productivity is also a major problem. Limiting access to software helps conserve resources and avoids security threats. For a country like Nauru these concerns must be weighed against the need for innovation and the development of technical skills. Limiting the software that can be installed creates a barrier that can prevent people from trying new software options and also requires ICT involvement whenever changes are needed. Preventing employees from using content unrelated to work, decreases the incentive to use the computer. Any computer use will steadily build competency and given the extremely low skills that the consultants observed, any activity that will build greater competency is worth considering.

One specific area where restrictions may be loosened is with regards to the Content Keeper. Currently, Internet Forums are blocked during work hours. During the development of the Fuel Ration System the consultants discovered that this also blocked forums that provide technical advice and troubleshooting. Such forums can be an important resource whenever employees are looking to perform a specific task or develop a new computing related skill. If the option is available it may be in the government's interest to allow access to forum sites for this reason.

It is the consultants' belief that in order to encourage development of technical skills any policies that are designed to restrict employee activities should err on the side of allowing greater access.

Recommendation 3. Transition to focus on Software and Development

In order to develop the initial infrastructure the ICT Department needed to focus on providing and maintaining hardware. The student consultants believe that it has now time to place a greater focus on future planning especially on software maintenance and development.

With its current staff, ICT has to devote most of its time and energy into maintaining the current system. This prevents long-term planning and improvements, and may even be preventing ICT from implementing solutions that will decrease their long-term maintenance requirements.

The Nauru government is entirely dependent on outside consultants and developers to build and maintain new systems. This has created major problems because systems frequently break down after these people have left the island. Due to Nauru's isolation it is difficult, time consuming, and expensive to find people to fix any errors that arise. Errors that can prevent weeks of productivity may be solvable in a few hours by someone with the correct knowledge and skills. During our observation we identified many processes where a small database system would provide a major benefit. Unfortunately, there is currently no one in government who could develop and maintain these systems. This situation is frustrating, costly, and inefficient. There must be skills available locally and the ICT Department is the best location to include such employees.

ICT needs additional people with the following skills

- Database development: Throughout the Nauru government there are areas were a small database system would save time, increase efficiency, improve decision making, and decrease errors.

- Programming: Currently when systems malfunction or need to be changed, the government is dependent on foreign consultants. The work that is required may be minor and someone who has the ability to make these changes would add great value.

- Excel / VBA knowledge: Employees are already comfortable with Excel and developing improvements or new systems will add value without a new interface discouraging employees

- Developer: An employee that has the ability to identify areas of improvement and design software solutions. Many departments will not be able to identify what processes are inefficient and what technology solutions they need.

The ICT Department will have to look abroad to find people that have these skills but in the long-term they should to train Nauruans under the current scholarship solution. This will provide for greater long-term sustainability.

As a part of placing a greater focus on software, ICT should be involved with any new software that is introduced. To maintain good relations with other departments, ICT's role should be one of advisement and assistance, not approval. An ICT staff member should receive training on any new software that is developed and should learn how to fix common bugs that may occur.

We believe that the ICT department is moving in the right direction. The scholarships offered to Nauruan citizens are a good investment in long-term sustainability and the new ICT Director will have greater software experience. However, it is important not to get distracted from the large maintenance requirements placed on the department. This will be a substantial risk when Marcus leaves because it will greatly increase the challenge of providing maintenance.

Recommendation 4. System to track ICT support jobs

The ICT Department spends most of its time providing technical assistance to other departments. Requests for assistance arrive through phone, email, and people arriving in person or stopping ICT personnel when they are working on another job. There is currently no system in place to track the jobs that are performed. Such a system would have a number of advantages.

A record of the past jobs that have been performed can be very valuable to the ICT Department. First it can highlight the issues that cost the ICT Department a large amount of time each week. Finding solutions that will reduce the needs for these tasks should be a high priority of ICT to increase long-term efficiency. It can also track what skills are most needed to improve future hiring and training decisions. The second advantage is that it can be used as evidence to illustrate the workload on ICT. This can be used to justify requests for supplies and personnel.

Initially such a system can be very basic. Requests for assistance tend to be immediately addressed as they arrive so all that is really necessary is a record of work done. When staff return from a job they can enter into a spreadsheet the type of job they performed, time spent, department visited, date, ICT employee's name, status, remarks, and any resources that will be needed to complete the task. This system will require a few extra minutes of work but the data that is collected can have major benefits to the department. We do not believe that this system should be used to measure the performance of employees because this could cause employees to enter invalid data.

If the information gathered is useful, the system could eventually be expanded to be a more comprehensive technical assistance tracking system. Requests could be entered for both short jobs and larger projects, and list of current technical problems could be kept, even of jobs that are currently beyond ICT skills to solve. For example if such a system was currently in operation the errors with the PROMADIS system would be recorded. Analysis of this data can help to make better long-term decisions and to prioritize tasks. Such a system should only be developed if the first stage is successful.

Recommendation 5. Disaster Recovery Plan

There is currently no plan in place to recover from a major disaster. Servers are backed up to the same location as the servers, and if a disaster occurs to a server room, all data will be lost. Plans should be made to recover data in the event of major disasters, especially as servers are increasingly utilized. The government has frequently lost files due to fires in the past and one of the advantages of transitioning to paperless records is that they can easily be copied and stored in multiple locations.

A disaster recovery plan does not require a huge investment or extra effort. If each server is backed up once a week into an external hard drive and then that hard drive is physically moved to another location then there will be a backup when disaster occurs. This solution is not ideal because it requires a person to follow this procedure each week. However it will provide some measure of security until the issues that prevent an automatic remote back up of software are resolved.

About the Consultants

Hans Schweitzer grew up in Montana on a small farm along the Yellowstone River. He is a recent graduate of Carnegie Mellon University with a double major in Information Systems and Creative Writing. He plans to soon begin his career in IS while also seeking a publisher for his first novel, *Birds of a Feather.*

Richard Chen is entering his junior year at Carnegie Mellon University where he majors in Business Administration with a track in Information Technology and is pursuing an additional major in Human-Computer Interaction. Upon graduation, he hopes to work in the Information Technology field or in the videogame industry.

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Appendix A: High Level Goals

The original document of high level goals created by the student consultants before meeting with Marcus is available as a separate document.

Appendix B: *Information Management Policy*

The *Information Management Policy* report created by the student consultants is available as a separate document.

Appendix C: Document Management Table

The student consultants created a document management table to help organize Cabinet proposals. The image below displays the document management table split into two halves for viewing purposes.

The first image is the left side of the table. The Cabinet Secretary enters the "Submission Number" for every proposal, she then enters a head number in the case that a proposal is affecting a department's financial data. "Department" and "Submitted By" represent the origins of the proposal. The "Type" column allows the user to enter a specific type of proposal, which can be filtered. "Amount" and "Affected Party" can be left blank depending on the proposal. "Subject" is an open area where the Cabinet Secretary identifies the proposal with any information still needed. This column can be searched using Excel's Find function in order to search for documents with key information.

Sub No	Head	Department	Submitted By	Type	Amount	Affected Party	Subject
1	71	Foreign Affairs	Robert Sisilo	Inter Subhead Transfer	$6,900		Head 71 - Inter Subhead Transfer
92		Foreign Affairs	Robert Sisilo				PROPOSED AGREEMENT BE
93		Health	Sunia Soakai	Acting Appointment		Madeleine Salton	Acting Appointment of Secretary for Healt

The next image represents the right side of the table. The Cabinet Secretary enters the date that the proposal is received and decided upon. Breaking the date into year, month, and day allows the user to filter and search for the results. The user chooses if the proposal was approved or not. Finally the last four sections indicate the location of the electronic file or physical file. The electronic files are stored with a hyperlink to the location of the files.

Date Received			Date of Decision							
Year Rec	Month Rec	Day Rec	Year Dec	Month Dec	Day Dec	Decision	Agenda	Minutes	Decision	Physical Location
2009	January	14	2009	January	15	Approved		Minutes\2009\20090116-DF-20090116-Minutes.docx		
2009	April	6	2009	May	4	Approved	Agendas\2009	Minutes\2009	Decisions\2009\0	Decisions 2009
2009	April	6	2009	May	4	Approved	Agendas\2009	Minutes\2009	Decisions\2009\0	Decisions 2009

Appendix D: *Nauru Identity Number (NIN) Proposal*

The *Nauru Identity Number (NIN) Proposal* created by the student consultants is available as a separate document.

Appendix E: *Documenting Work Process* report

The *Documenting Work Process* report created by the student consultants is available as a separate document.

Appendix F: Documenting Work Process Template

The template used by employees to document their work processes is available as a separate document.

Appendix G: Nauru Police Force Documentation Example

The Nauru Police Force example used for documenting work processes is available as a separate document.

Appendix H: *Fuel Ration System User Manual*

The *Fuel Ration System User Manual* created by the student consultants for the Chief Secretary Department is available as a separate document.

Appendix I: Guide to using the Department Fuel Allocation Form

The guide to using the Department Fuel Allocation Form which the students created for the Chief Secretary Department is available as a separate document. The department then sent the guide to all 33 government departments.