United States Agency for International Development

Quality Assurance Assessment

USAID Leland Initiative in Eritrea

Asmara, Eritrea
12-30 October 2000

USAID Information Resources Management
SETA Corporation

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1.0 EXECUTIVE SUMMARY

United States Agency for International Development (USAID)/Eritrea Mission tasked[1] the Information Resources Management (IRM)/Program Technology Transfer (PTT) Quality Assurance (QA) team with the conduct of:

a) an assessment – in layman's terms – of the original Leland Initiative Internet Gateway architecture for Asmara; and
b) the options available for its improvement.

The IRM QA team was tasked to provide the USAID/Eritrea Mission with the technical and management analysis and recommendations necessary to insure that, once formally inaugurated and placed in operation, the Internet Gateway – whether as originally configured or as justifiably modified – would adequately serve the current demand for internet access, maintenance and support services.

An IRM/PTT Quality Assurance team led by Freddy Blunt (USAID), and composed of Robert Jefferson, Daniel Maly, and Siika Zhivkova (SETA Corporation), conducted the QA Assessment from 12 October to 30 October 2000. The team was accompanied by representatives from both subcontractor's, Ron Hettich and Randy Holman of Lyman Brothers, and Karl Stanzick of the Morocco Trade and Development Services (MTDS). The assessment consisted of site visits, reviews of all the reports and contracts[2], and meetings and interviews[3] with representatives of the USAID/Leland Initiative (Lane Smith and Jonathan Metzger in Washington, DC), the USAID/Eritrea Mission (William Garvelink and Carol Horning in Washington, DC and Eritrea), the Government of the State of Eritrea (GSE), and Telecommunications Services of Eritrea (TSE). The team also met with the prime contractor, Science Applications International Corporation (SAIC) who was represented by Edward Miller.

The IRM QA team's assessment revealed that although the current technical network design of the Internet Gateway is restrictive in performance, scalability, and flexibility, it is able to serve the current subscriber demand for the next six months, upon completion of outstanding deliverables, i.e., the proper installation of equipment and delivery of training. The IRM QA team recommends an upgrade of the system's capabilities to meet the projected demand, after a thorough technical and business assessment and network redesign are performed.

The management analysis of the IRM QA team's assessment revealed a need to improve communication and coordination between and among the prime contractor, subcontractors, USAID/Leland, USAID/Eritrea, and Eritrean counterparts. Communication and coordination improvements will resolve many of the issues identified during this assessment.

The prime contractor needs to validate its acceptance criteria and procedures with this project. To achieve this they can:

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[1] Appendix A – Scope of Work
[2] Appendix B - Bibliography
[3] Appendix C – List of Interviewees

- Enforce strict timetables and schedules;
- Enforce a systematic reporting mechanism for subcontractors;
- Establish a benchmark for reports submitted;
- Institute clauses for tardy or missed deliverables; and
- Coordinate procurements and shipments.

As subcontractors, Lyman Brothers and MTDS, need to describe products and services delivered to the project. They can:

- Produce or deliver required documentation and training, e.g., site surveys, reports, etc.;
- Resolve system critical problems, e.g., bandwidth, SpeedLAN firmware version, etc.;
- Install equipment, e.g., cabling, racks, etc.;
- Communicate deliverables to the client, e.g., specific training, IP sub-netting and routing, interactive web sites, 24x7 helpdesk, etc.

This final report evaluates the feasibility of the current technical design for sustainability, scalability, and capacity to support the Mission objectives and the Leland Initiative. It also details the roles and responsibilities of SAIC, Lyman Brothers, and MTDS, along with the IRM QA team's findings and recommendations.

2.0 BACKGROUND

2.1. Leland Initiative

The Leland Initiative is a five-year $15 million U.S. Government effort to extend full Internet connectivity to twenty or more African countries in order to promote sustainable development. The Leland Initiative seeks to bring the benefits of the global information revolution to the people of Africa, through connection to the Internet and other Global Information Infrastructure (GII) technologies. Even as African countries move toward more open economies and societies, there remain formidable constraints on sustainable development in such areas as the environment, disease prevention, literacy, and private sector development. Africa needs access to the powerful information and communication tools of the Internet in order to obtain the resources and efficiency essential for sustainable development.

The project seeks to be flexible, ready to address the obstacles and opportunities within any given country, including providing support for policy reform, facilitating low-cost, high-speed access to the Internet, and introducing proven mechanisms to build networks of active users. Its Strategic Objectives are to:

Create an Enabling Policy Environment (Objective 1): The project will promote policy reform to reduce barriers to open connectivity. The expected results:

1) Affordable prices, based upon costs plus profit, conducive to broad expansion of the user base;
2) Delivery of Internet services by private sector providers;
3) Free and open access to information available through the Internet, in conformance with host country laws.

Create a Sustainable Supply of Internet Services (Objective 2): The project will identify appropriate hardware, assist with full Internet connectivity, and assist private sector ISPs to develop their industry. The expected results:

1) Indigenous ISPs, trained in marketing and business plan development, offering full Internet access and better communication between counterparts in Africa and the world;
2) Country-wide access, with special attention to extension (rural) issues;
3) Internet Society Chapters serving as advocacy and support organizations.

Enhance Internet Use for Sustainable Development (Objective 3): The project will increase the ability of African societies to use the communication and information tools of the Internet. The expected results:

1) Local and international partnerships sharing information related to sustainable development in manufacturing, business, the environment, health, democracy, education, and other sectors;
2) Indigenous partnerships to create and maintain new information resources based in the African experience which feed the GII;

3) Increased African capacity to use information in decision-making and in managing scarce resources;
4) Broadened user base for information systems and telematics services; and
5) Indigenous training capacity for users and ISPs.

The blend of activities addressing these Strategic Objectives will vary from country to country, depending on the level of e-mail and/or Internet connectivity. The development portfolio of the USAID Mission in each country will be very important, especially in implementing a strategy for growing the user base in priority sectors. For more information, please see Leland's Internet End User Applications page on this process with a highlighted section on USAID's telematic pioneering programs and sector case studies.

2.2. Leland Initiative in Eritrea

USAID/Eritrea and the Government of the State of Eritrea (GSE) signed a Memorandum of Understanding (MOU) for the Leland Initiative on 6 August 1999. The MOU formed the basis of establishing an Internet gateway in Asmara, Eritrea, patterned after similar installations and approaches elsewhere in Africa.

Shortly after the MOU was signed, Leland representatives worked with the GSE to produce a Plan of Action in order to implement the MOU. This Plan outlined the major actions necessary for successful implementation, namely: procurement, delivery, installation, staff hiring, training, and system testing. The Plan incorporated a timeline that identified the projected gateway launch as the end of 1999.

The Mission later agreed to allocate the funding needed to supplement the national gateway with a wider, national network. The expanded network proposal resulted in a secondary cities agreement with installation of similar systems envisioned in Keren, Massawa, Dekemhare, and Mendefera. Telecommunications Services of Eritrea (TSE), of the Ministry of Transport and Communications, agreed to complement the secondary cities expansion with satellite dishes in Assab and Barentu, and free digital microwave connection in the other four cities.

The current Internet architecture in Eritrea is based upon a combination of satellite dishes and microwave links. The four secondary cities are expected to allow Internet users access to the Internet via dedicated links in the country's long-distance network through the satellite dish in Asmara. The Leland Initiative is expected to encourage and establish private sector ISPs that would connect to these access points in all seven cities. The connections would be established through wireless links that will eliminate the need to install dedicated copper wire leased lines. The primary audience, i.e. the Internet users, would then access the private ISPs by dialing in to their facilities through standard telephone lines. Major institutional users such as businesses, Non-Governmental Organizations (NGOs), universities, or others may want to set up their own leased line to the ISPs or directly to the satellite dish in order to get higher speed access than is available through a dial-up modem.

In mid-1999 when the system architecture for the national gateway in Asmara was designed, the demand for Internet access in Eritrea was estimated to be similar to that of other African countries where the Leland Initiative had been implemented. That estimate of demand was based on assessments conducted during the three years immediately prior to the signing of the MOU. It

was expected that there would be 1,750 dial-in users and potentially one or more leased lines to major firms and installations after the gateway was in operation for approximately one year.

Since that time, however, the expectations for demand have changed dramatically. The GSE has decided to explore ways to use the Internet circuit to transmit heavier traffic from Eritrea (such as streaming video). Additionally, following the May 2000 armed conflict with Ethiopia, a large international peacekeeping contingent has been scheduled to be in place by November 2000. Furthermore, donor agencies have already begun to expand their activities and will thus be a factor for increased demand. While there is not enough data available for a definitive estimate, it is clear that demand in Asmara will grow more quickly than was anticipated a year ago.

2.3. IRM QA Intervention

On 6 October 2000, the USAID/IRM was requested to conduct a Quality Assurance Assessment on the Leland Initiative gateway in Eritrea. The scope of work entailed providing USAID/Eritrea with a technical and management analysis and recommendations necessary to ensure that, once formally inaugurated and placed into operation, the Gateway – whether as originally configured or as justifiably modified – would adequately serve the current demand for Internet access, maintenance and support services.

The IRM QA team was requested to review the original configuration, along with recent improvements made by Lyman Brothers, and determine whether it was sufficient to serve the current demand for Internet access. In the event it was determined that the Gateway performed inadequately, the IRM QA team was to provide the advice and recommendations needed to remedy the problem. The set of recommendations was to include, at a minimum, the equipment and software needed, acquisition costs, delivery schedules, installation and testing timelines, staff and budgetary implications of operation (whether USAID or GSE), continuing training, support needs, critical assumptions, and measures needed to ensure long-term sustainability.

It bears noting that the perception held at the time by the USAID Mission, TSE, as well as the community of potential users of the Internet whether ISPs, institutions or donors, was that the original architecture would not be able to meet demand very long once put into operation. It was the USAID Mission's position that opening the Gateway under these circumstances would not further the foreign policy objectives of the United States Government (USG) and therefore would be unacceptable. If during the course of its assessment the IRM QA team determined that an "enhanced system" was warranted, i.e., one linked to a satellite providing dedicated bandwidth, the QA team would clearly lay out the pros and cons of such an alternative. The objective was to establish an Internet access/user environment for a duration sufficient (12 - 18 months at present demand levels) so that the GSE could plan and provide the budget, staffing, training, and equipment upgrades needed for complete ownership and sustainability.

Part of the methodology employed by the IRM QA team in facilitating this assessment was as follows:

- **Interviews** with Contractors, Subcontractors, USAID/Eritrea Mission, Ministry of Transport and Communications, Department of Telecommunication, Local ISPs, etc.

- **Site Visits** of Primary and Secondary Cities, Government Facilities, and Local ISPs

- **Review** Contracts, Subcontracts, Reports, Emails, and Presentations

The QA Assessment began in Washington, DC by interviewing representatives from the USAID/Eritrea Mission, specifically William Garvelink (Mission Director) and Carol Horning (Supervisor General Development Officer). Each reiterated the concerns and expectations outlined in the scope of work, and emphasized the change in demand for Internet access as a result of the arrival of UN Peacekeepers.

The IRM QA team worked closely with Edward Miller of SAIC and collected relevant information and materials associated with the Leland Initiative in Eritrea. The subsequent discussion centered on the technical design and contractual roles and responsibilities for each of the subcontractors. This provided an understanding of who was liable for each of the technical components and gave insight to the reasons why delays incurred during the implementation of this project.

The USAID / Leland Initiative Coordinators were contacted and interviewed as well. The IRM QA team met with Lane Smith (lead Leland Initiative Coordinator) and Jonathan Metzger (former Leland Coordinator for Eritrea) prior to departure for TDY. These interviews were used to gain perspective on their understanding of the events leading up to the request for intervention from the IRM QA team. The findings revealed that delays in the project stemmed from miscommunications and a lack of initiative from contractors. Mr. Metzger was helpful in providing volumes of documentation, including his "Leland and Eritrea Summary of Findings and Recommendations" for August 1999 and January 2000.

The IRM QA team met with Bill Raney and Ron Hettich of Lyman Brothers, in London, England. Mr. Raney explained how Lyman Brothers purchases and distributes bandwidth to their customers. Ron Hettich, Director of Satellite Engineering, reviewed the technology being employed, i.e., TDMA, and discussed the recent TDY of their engineer, Andre Finlinson. The discussion revealed there were ongoing technical glitches with the system.

The IRM QA team, along with Ron Hettich, traveled to Casablanca, Morocco to meet with Karl Stanzick of MTDS. The discussion touched upon MTDS's experience with the Leland Initiative across the continent of Africa, as well as the problems MTDS had had with implementation in Eritrea. The meeting provided a forum for the two subcontractors to meet, discuss, and explain each of their roles and responsibilities. The discussion revealed the subcontractors were at times unclear about who was responsible for certain technical components.

For the duration of the TDY in Asmara, Eritrea, the IRM QA team followed a strict agenda[4]. This agenda consisted of frequent counterpart meetings with the Ministry of Transport and Communication, Telecommunication Services of Eritrea (TSE), local ISPs, and the Donor Community. Site visits were conducted throughout the country, accompanied by representatives from GSE and TSE. Each of the TSE facilities was inspected thoroughly. All hardware and software were tested, as well as photographs taken. Each of the ISPs were interviewed and their

[4] Appendix D – Agenda for IRM QA Team

facilities inspected. The counterpart discussions covered bandwidth and performance testing, Eritrean regulations and policies, and training issues.

The conclusion of the TDY consisted of a series of Exit-debriefing presentations (in PowerPoint) for the U.S. Ambassador, the Donor community, the ISPs, the GSE and TSE, as well as USAID Mission[5]. The presentations shared relevant findings and recommendations, specifically addressing those requirements needed for an operational Internet Gateway. The IRM QA team provided the USAID/Eritrea Mission with the list of 'outstanding' technical deliverables. The USAID/Eritrea mission in turn met with the subcontractors, informed them of the intended date of inauguration (November 15, 2000), and held them responsible for fulfilling their obligations. (See Appendices I and J for USAID checklists of completion for Lyman Brothers and MTDS, respectively.)

[5] Appendix E – Exit Presentation

3.0 QUALITY ASSURANCE

The general goals and purpose for conducting a Quality Assurance assessment are to: provide vision or clarity for improvement; share proven "how to" solutions; actively bring counterparts together; respond to counterpart needs and requests; and support counterparts to ensure their solution implementations are successful.

The IRM QA team's approach to the QA assessment of the Leland Initiative in Eritrea focused on the two main aspects of the effort: Project Management and Technical Design Requirements. Each component was analyzed using specific criteria. Quality assurance of the project management of this activity called upon addressing the following categories: roles and responsibilities, milestones and schedules, performance satisfaction, and expectations. Quality assurance as it pertained to the technical aspects of this activity required a review of the network design and the specifications for its operational status, as well as thorough inspection and verification of all existing pieces of equipment.

Project Management activities were assessed through collection of the available relevant documents associated with the project, including all contracts, subcontracts, status and trip reports, and presentations. A thorough review of all of the materials that were received was conducted. The counterparts, e.g., GSE, USAID/Leland, TSE, ISPs, prime contractor, subcontractors, etc., were then contacted and a series of interviews were scheduled. The interviews were conducted to meet the various counterparts and receive subjective responses on project developments and activities.

The Technical Design and Requirements component of this assessment was facilitated in two ways. The first assessment strategy was via quantifiable interviews with the technical counterparts. The discussions focused on the following categories:

- Measurability: quantifying the 512/256kb bandwidth, verifying a 24-hour/7-day helpdesk
- Minimal Acceptance: speed and performance for each link
- Standards: establish and document standards for each connection
- Operational Acceptance: user acceptance testing and acceptance criteria
- Quality: instruction, training, materials, etc., from the customer's perspective

The second strategy was through on-site inspections of each of the facilities. The categories identified and addressed under this approach were as follows:

- Identification of test processes and procedures, technical results inquiry, results analysis
- Identification of a standard system performance measuring procedure
- Clarification of technical roles and responsibilities
- Identification of quality standards
- Management of network resources (IP addresses and DNS)

4.0 PROJECT MANAGEMENT ACTIVITIES

4.1. Roles and Responsibilities

4.1.1 SAIC

SAIC was selected by USAID as the prime contractor and vehicle to implement the Leland Initiative. SAIC subsequently subcontracted Lyman Brothers and MTDS to actually perform the work involved in the implementation. The broad categories of responsibilities entrusted to SAIC under the Leland Initiative are:

- Conduct Country Assessment
- Develop a Country Action Plan
- Implement Technical Solutions
- Conduct Training and Workshops
- Provide Planning Support
- Provide Technical Support
- Provide End-User Assistance

These categories are further detailed in the tasks and activities assigned to each subcontractor by SAIC. As the prime contractor, SAIC has the responsibility for managing, tasking, and coordinating its subcontractors in the implementation and execution of project activities. SAIC is ultimately accountable for timely delivery of each task.

During the course of the assessment, the IRM QA team encountered instances of miscommunication between SAIC and its subcontractors, as well as among the subcontractors. The roles and responsibilities of the prime contractor, subcontractors, and Leland representatives at times overlapped. During one instance a Lufthansa freight carrying project equipment was delayed in Frankfurt for nearly one month due to confusion. In another instance, when the contractors were asked who was responsible for installing specific pieces of equipment, the contractors deferred to one another.

A review of the contracting methods used by the prime contractor to implement this activity showed that subcontractors were not firmly bound to deadlines or timeframes by penalties for delays incurred. For example, the delivery date for the Gateway, as agreed to in the Memorandum of Understanding, stipulated a November 1999 date. This date was pushed back to January and March 2000, after which, hostilities developed between Eritrea and Ethiopia. This external dependency caused further delays until Lyman Brothers resumed activities in August 2000.

The management methods employed to execute this project resulted in production delays, many of which could have been circumvented with active managerial intervention to encourage completion of deliverables in a timely fashion. No representative of the prime contractor visited Eritrea to conduct onsite visits and inspections.

4.1.2 LYMAN BROTHERS ROLES AND RESPONSIBILITIES

Lyman Brothers is one of the subcontractors selected by SAIC to implement the Leland Initiative. Based on the Statement of Work for Lyman Brothers, Leland Initiative: Africa GII Gateway, Task Delivery Order #5 (4400016916) for Eritrea, Lyman Brothers is responsible for the following tasks.

TASK 1

Conduct telephone and field site surveys to determine appropriate equipment design and configuration, cable lengths, digital microwave interfaces, etc. On-the-ground survey should be done by a qualified satellite technician as measured by their extensive installation of VSATs and should last three to five days. Preference should be given to a satellite engineer in the field to reduce costs if possible.

Findings 1

Prior to the IRM QA team's departure for Eritrea, Ed Miller, SAIC Program Manager, was asked to provide a copy of the field site survey report. The team has never received this documentation. During a meeting at the USAID Techhub in Rosslyn, Virginia, Ed Miller placed a conference call with Randy Holman of Lyman Brothers and requested that the site survey report be sent via FEDEX directly to Daniel Maly of USAID/IRM. The package arrived 10 October 2000, but did not contain the requested site survey report. It did not include any site survey related material.

During the IRM QA team's TDY to Eritrea, the site survey report was requested once again from SAIC. After Randy Holman of Lyman Brothers agreed to join the IRM QA team in Eritrea, he was asked to bring the site survey report. The documents were unavailable for IRM review during the TDY.

Recommendations 1

The IRM QA team recommends that a site survey report or relevant information be added to the list of outstanding deliverables.

TASK 2

Create a technical schematic based on the proposed equipment design. Schematic should be delivered in PDF format and should be done by a qualified engineer, preferably one who has designed and constructed Leland gateways and provided the supporting documentation. The equipment requirements should include preposition spares that will allow the expected down time from component failure not to exceed four hours.

Findings 2

The network design currently in place has been slightly modified from with the original technical schematic. Specifically, Lyman Brothers have added the use of UDP and Cache servers.

The servers were introduced in order to address and combat the poor performance of the bandwidth.

Secondly, pre-positioned spare equipment or "hot" spares (as they are customarily referred) were not located at the Teleport, as the network design stipulates. The significance of having "hot" spares available is system critical for preserving business and network continuity in the event of equipment or system failure. When the hot spares were inspected, they were wrapped and packaged in their original boxes at the Network Operations Center (NOC). "Hot" spares should always be mounted on the original rack or on a duplicate rack located at the same site. Additionally, the IRM QA team discovered that there were no "hot" spare UPSs at any of the primary or secondary cities. During the site visit to Massawa, a damaged UPS was discovered that had been inoperative for over six months.

Lastly, the IRM QA team also found that of the seven laptops procured for the primary and secondary cities, four laptops earmarked for the secondary cities were being "safeguarded" at the Asmara NOC. TSE made the determination to secure the laptops based on their lack of human resources at the secondary cities as a result of the Eritrean-Ethiopian conflict. The short-term impact of this decision is limited. The long-term impact will hamper the TSE technician's ability to conduct remote troubleshooting and diagnostics.

Recommendations 2

The IRM QA team determined that Lyman Brothers recently introduced the concepts of UDP and Cache servers in the May 2000 Lyman Brothers Technical Bulletin. There was no documentation from either SAIC or USAID/Leland authorizing implementation of this technology. The initial use of UDP and Cache servers prior to the inauguration of the Gateway makes it difficult to gauge the "pure" performance of the bandwidth. The IRM QA team noted that TSE took issue with the implementation of this technology and argued that the validity of any system test results would be misleading with the introduction of this technology. In addition, the ISPs were concerned with the same issue and suggested that this technology be introduced at the local ISP level. To do so would force each ISP to introduce their own UDP and Cache servers, force them to configure and optimize their own equipment, thus creating a greater delineation in the performance of service each ISP can provide.

The IRM QA team suggests the installation of the "hot" spare equipment into an identical rack at the Teleport in order to provide a true back up in the event of hardware failure. Regarding UPSs, the IRM QA team recommends that each primary and secondary site be equipped with a back up UPS. The functional attribute of any UPS is to maintain voltage consistency to the piece of equipment it supports. Typically that piece of equipment is a server or workstation, which is considerably more expensive than a UPS. Thus it serves to reason that investment in back up UPSs is a cost-effective solution to avoid damage to more expensive and system critical equipment.

Finally, the IRM QA team suggests that the four laptops being "safeguarded" be disseminated to their intended locations at the appropriate time. The significance of having these laptops stationed at the appropriate sites helps in the coordination of system integration tests which measures Internet connectivity and performance.

Update 2[6]

The VSAT and SpeedLAN training materials (4 copies each) and equipment specifications (3 copies) have been provided and signed for by the TSE for eventual use at the three VSAT locations (Asmara, Assab, Barentu).

The trainees for each of the courses were specifically selected by the TSE and the decision to restrict the courses to TSE personnel was made by that institution

The VSAT and SpeedLAN courses have been completed to the TSE's satisfaction. 16 TSE technicians (8 for VSAT and 8 SpeedLAN) attended the training.

TASK 3

Coordinate with SAIC, which will procure, test, and ship equipment to the USAID/Eritrea facility based on Lyman Brothers (LB)'s equipment design. Also coordinate with SAIC on evaluations and tests of multiple manufacturers of multi-point wireless modems operating in the 2.4 – 2.485 GHz band. These evaluations will determine if different brands supporting the IEEE 802.11 can "talk" with one another. Due to the time critical nature of identifying all of the gateway equipment and providing information for the ISPs on which kinds of multi-point wireless equipment will work with the gateway equipment, these evaluations should be conducted promptly.

Findings 3

The Teleport NOC, SpeedLAN, multi-port wireless equipment were commissioned prior to the IRM QA team's TDY. According to the MTDS status reports, the unreliable functionality of this equipment has been an ongoing setback since April 2000. Lyman Brothers had been tasked to evaluate and test the SpeedLAN multi-port wireless equipment at each ISP location to avoid any delays once SAIC had procured the SpeedLAN equipment for the Teleport NOC. The IRM QA team was unable to view the evaluation and test results for the equipment during the timeframe of the intervention.

The IRM QA team could not determine whether or not any evaluation or testing had been conducted prior to SAIC's procurement of the SpeedLAN wireless equipment. The IRM QA team did manage to conclude that SAIC procured the SpeedLAN equipment from the same vendor used by the ISPs. During the course of this QA Assessment, the IRM QA team learned that one of the ISPs (EWAN) is actually an official vendor for SpeedLAN wireless equipment in Eritrea and had identified the firmware version incompatibility problem months prior to Lyman Brothers.

Recommendations 3

As part of the IRM QA team's long-term recommendations, SAIC and Lyman Brothers should consider taking advantage of the local SpeedLAN retailer in Eritrea. SAIC should determine whether or not the local retailer would honor the SpeedLAN's warranty. If this proves to be the case, perhaps this retailer could facilitate future evaluations and testing of equipment. This solution would appear to be time saving and cost effective.

[6] This update is the most recent information available as of the publication date of this QA assessment.

Update 3

Connectivity at the router was certified by TSE and Lyman between each of the secondary cities and the NOC on the following dates:

Dekemhare	November 17, 2000
Mendefera	November 17, 2000
Keren	November 18, 2000
Massawa	November 19, 2000

TASK 4

Install the gateway in the TSE facility in Asmara. The facility is being prepared by TSE. Documentation of the facility is available from Jonathan Metzger by request. Install secondary city equipment in Keren, Massawa, Dekemhare, and Mendefera.

Findings 4

The Gateway equipment at the TSE facility and secondary cities equipment were installed; however, this equipment was not properly configured by MTDS.

Recommendations 4

The IRM QA team recommends the Gateway equipment be properly configured by MTDS and the proper documentation be made available to the local TSE technicians.

Update 4

The equipment installations at the Teleport and NOC in Asmara, at the stations in Massawa, Dekemhare, Mendefera and Keren have been completed, including the installation of racks and UPS.

The equipment at the above sites has been inspected and certified in writing as operational by both Lyman and TSE.

TASK 5

Provide one-year worth of bandwidth service, starting at 512/256kb, if a Hybrid satellite solution is employed. The service should provide a guaranteed performance clause.

Findings 5

During the IRM QA team's interview with Bill Raney of Lyman Brothers, it became apparent that there is no official agreement for 512/256kb bandwidth between SAIC and Lyman Brothers, consequently there is no service level agreement or performance guaranteed clause.

Recommendations 5

The IRM QA team recommends formulation of a signed service contract between SAIC and Lyman Brothers containing a 'performance clause' guaranteeing 512/256kb bandwidth.

TASK 6

Lyman Brothers (LB) shall test all equipment and tools and demonstrate connectivity and the ability to download web pages. LB is responsible for getting a certificate from a US government representative and the PTT that VSAT installation has been completed successfully and that they are satisfied with the work.

Findings 6

The IRM QA team discovered that not all of the equipment had been tested in its production configuration. Although it is technically possible to demonstrate connectivity, both quality and performance remain outstanding issues. During the TDY, Ron Hettich of Lyman Brothers experienced repeated difficulty in demonstrating certain basic web page downloads, most notably Hotmail.

Additionally, the IRM QA team found that there was no formal, standard system integration test available for the counterparts to utilize. Consequently, the IRM QA team formulated, introduced, coordinated, and executed a system integration test.

Recommendations 6

The IRM QA team recommends that the problem of downloading all types of web pages be resolved.

TASK 7

Provide installation training and follow-up support training (as per typical install) for NOC operators.

Findings 7

The TSE NOC representatives reported that support training had not been delivered.

Recommendations 7

The IRM QA team recommends Lyman Brothers deliver the support training. It should be noted that prior to the IRM QA team's TDY departure, Randy Holman of Lyman Brothers agreed to schedule training for mid-November.

4.1.3 MOROCCO TRADE DEVELOPMENT SERVICES (MTDS)

In accordance with MTDS Subcontract Agreement No. 4600002148, Exhibit A, MTDS Statement of Work for The Leland Initiative: Africa Global Information Infrastructure (GII) Gateway, MTDS is responsible for supporting the following activities:

TASK 1

Conduct policy visits to facilitate Memorandum of Understanding (MOU) signing, establishment of PUBLIC TELEPHONE TELEGRAPH pricing structure, ISP selection, PUBLIC TELEPHONE TELEGRAPH/ISP convention adoption and other problem resolution.

Findings 1

According to Jonathan Metzger (former USAID/Leland Coordinator for Eritrea), he participated in the negotiations with the GSE for over three years to bring about the signing of the MOU. MTDS was not mentioned as part of the facilitating team.

According to Jonathan Metzger's Leland and Eritrea Summary of Findings and Recommendations (August 1999), there is no mention of MTDS's participation in deriving a pricing structure or participating in the selection of prospective ISPs. It is worth noting that during a meeting with the IRM QA team, Mekonnen Fesshazion of the Ministry of Transport & Communications specified that Jonathan Metzger had assisted the Ministry with formulating the pricing structure.

Recommendations 1

The IRM QA team recommends MTDS provide guidance to the Ministry of Transport & Communications on pricing structures for Internet access based on their experience in comparable countries.

Update 1

To date, the Ministry of Transport and Communication has instituted a pricing structure that was facilitated by MTDS in cooperation with the local ISPs.

TASK 2

Perform Pricing and Business Plan Facilitation to foster Pricing and Business plan development for PUBLIC TELEPHONE TELEGRAPH/ISP operator.

Findings 2

As mentioned previously, Jonathan Metzger took responsibly for formulating the pricing plan that was introduced to the GSE.

On the issue of performing or facilitating business plans, neither TSE nor the ISPs could acknowledge receipt of this assistance in any form from MTDS.

Recommendations 2

The IRM QA team recommends ensuring that MTDS fulfill its contractual deliverables. In addition, SAIC should conduct a review of activities billed by MTDS.

TASK 3

Perform Communications Assessment to review of existing telecom sector policy framework, institutional setting, existing infrastructure, human resources deployment, promotion, range of services, pricing, and identification of telecom sector modernization projects.

Findings 3

There was no documentation establishing that MTDS had performed a communication assessment review on any of the items specified in the contract, specifically the existing telecom sector policy framework, institutional setting, existing infrastructure, human resources deployment, promotion, range of services, pricing, and identification of telecom sector modernization projects.

Recommendations 3

The IRM QA team recommends a communication assessment review be conducted as specified in the contract.

TASK 4

Conduct site survey to country to support planning or connectivity activities.

Findings 4

MTDS could not produce documentation demonstrating activity that pertains to a site survey to support planning or connectivity activities.

Recommendations 4

The IRM QA team encourages formulation of a site survey to ensure proper support planning and connectivity activities.

TASK 5

Make ISP preparatory visits to inform selected ISPs (up to five) of the installation action plan, answer questions and concerns, examine ISP equipment and locale and provide recommendations or technical requirements.

Findings 5

The ISPs reported there had been very limited contact or communication with MTDS. According to the ISPs, MTDS engineers "appeared one day" to configure the SpeedLAN equipment. All but one ISP reported that on such short notice, no questions or concerns were answered, the ISP's equipment and locale were not examined, and no recommendations or technical requirements were provided. CTS is the sole ISP that received recommendations and technical requirements, and was solicited and sold MTDS products and services.

Recommendation 5

The IRM QA team recommends MTDS complete Task 5.

Update 5

MTDS has completed the activities associated with Task 5.

TASK 6

Site assistance visit to assist PTT staff in establishing PUBLIC TELEPHONE TELEGRAPH/ISP connectivity in a fair and efficient manner, to include IP sub-netting and routing to ISPs.

Findings 6

The IRM QA team confirmed that MTDS provided the routing configuration for the Public Telephone Telegraph/ISP. As for site assistance, including IP sub-netting, the IRM QA team could not confirm the completion of this activity.

Recommendations 6

The IRM QA team recommends confirmation that SAIC closely monitor and review this incomplete deliverable, as well as the solicitation of new business by MTDS. The IRM QA team also strongly recommends clarification and rectification of duplicate payments for services rendered.

Update 6

Permanent license for the Checkpoint firewall provided to TSE on November 22, 2000.

TASK 7

Promotion Support to provide technical support for major demonstrations and trade shows.

Findings 7

The IRM QA team found no evidence of promotion support provided to the ISPs.

Recommendations 7

The IRM QA team recommends that this task be fulfilled.

TASK 8

MTDS shall coordinate and provide training to new Public Telephone Telegraph or Internet Service Providers (ISPs) in support of the USAID Africa GII Gateway. Subject matter shall include but not be limited to UNIX, TCP/IP, basic communications skills, IPS operations, and business practices. Training may be conducted on a country or regional basis for groups of up to 25 students. From two to eight in-country personnel will be trained following installation of gateway and ISP's equipment at each of the locations. Upon completion of training, the in-country personnel will be expected to configure and manage all aspects of an Internet gateway or ISP operation.

Findings 8

MTDS coordinated and provided training for the NOC operations staff and, at the insistence of TSE, was limited to TSE-ISP staff.

Recommendations 8

The IRM QA team recommends that the same training provided to the TSE-ISP be provided to the local ISPs as well.

Update 8

The NOC II training materials (3 copies) and the equipment specifications have been provided and signed for the by the TSE for use at the NOC in Asmara, and for eventual use at the NOCs in Assab and Barentu.

The trainees for the NOC courses were specifically selected by the TSE and the decision to restrict the courses to TSE personnel was made by the institution.

The NOC II training course has been completed to TSE's satisfaction.

TASK 9

MTDS shall support student knowledge and performance measurements by insuring the survey, test, and evaluation exercise are completed by the students and reported. These activities will include but not be limited to the following: a) Student Critique Forms – student critique form with each copy of the student texts provided; b) Pre-Class Survey – a questionnaire will be developed and included with each copy of the student texts provided in item 2 above. This questionnaire is used to determine the students' background and prerequisite experience at the beginning of the class. This will assist the instructor in determining the level at which the class is to be taught and which students may require additional assistance; c) Post Class Knowledge Measurement – This is an examination that will measure the students' knowledge level of the subject material just taught. It will be in the form of an interactive Web Page; and d) Post Class Proficiency Measurement – This is an interactive Web Application measurement that will assist in determining the students' ability to perform the essential functions required to operate and maintain an ISP.

Findings 9

During the QA Assessment, Karl Stanzick of MTDS provided hard copies of the student pre-class surveys and post-class surveys; however, there was no demonstration of a an interactive web site to examine knowledge level and performance ability of the trainees.

Recommendations 9

The IRM QA team recommends the development of the referred to "interactive Web Application" by MTDS.

TASK 10

MTDS shall provide a report following training at each site to summarize the training activity, identify all students and the instructors assessment of each, identify problems encountered and resolutions, and to transmit material collected from the student performance assessments.

Findings 10

MTDS did not provide a summary report containing the items described in Task 10.

Recommendations 10

The IRM QA team recommends the delivery of a summary report by MTDS.

TASK 11

MTDS shall provide supplemental ISP Operations and Follow-up Training to assist one or more ISPs in launching operation; improving Public Telephone Telegraph/ISP staff skills.

Findings 11

The supplemental training is scheduled to commence upon the official launch of the Internet gateway.

Recommendations 11

The IRM recommends MTDS provide a status report upon completion of the training.

TASK 12

MTDS shall provide supplemental Advanced Training in Systems Administration to intensive training in network management and security.

Findings 12

The supplemental training is scheduled to commence upon the official launch of the Internet gateway.

Recommendations 12

The IRM recommends MTDS provide a status report upon completion of the training.

TASK 13

After installation of the Public Telephone Telegraph/ISP system in an African country, the MTDS shall provide telephonic assistance to support technical operations of the Internet gateway and associated hardware and software. The vendor shall establish a system to provide telephonic access to technical support in the form of a telephone hotline. The hotline shall take recorded messages for later retrieval and shall be available 24 hours per day, 7 days per week. The vendor's system shall provide a response to a support request within 24 hours after the request is left on the system. The vendor shall maintain a log clearly identifying the client, problem, resolution, and the time required to service the request. The log shall be summarized on a calendar month base. The most recent monthly summary shall be included in the monthly status report. Detailed logs shall be delivered to SAIC quarterly.

Findings 13

MTDS has set up a telephonic helpdesk hotline to support the ISPs and NOC gateway, unfortunately many of the counterparts were not aware of this facility and were not provided with the helpdesk hotline's telephone number.

The IRM QA team determined that there is no direct international telephone connection from Morocco to Eritrea, i.e. phone calls are unidirectional from Eritrea to Morocco.

The helpdesk service began in April 2000; however, no helpdesk logs are available. In addition, SAIC does not have a quarterly detailed log from MTDS.

Recommendations 13

The IRM QA team recommends all counterparts (ISPs and NOC) be notified of the availability of MTDS's helpdesk.

MTDS should maintain and submit a log.

The IRM QA team recommends a viable and consistent solution be devised to respond to Eritrean helpdesk requests.

Update 13

Additional software (Big brother Bandwidth, MRTG Bandwidth Management) was provided and installed at the NOC.

TASK 14

MTDS will provide one master hard copy and when available a soft copy of all deliverables to SAIC. Soft copy may be transferred by electronic means (e.g., attached to email or placed on an FTP server that SAIC has access to). Deliverable will be written in accordance with the FEDSIM Writer's Guide and directives in the applicable DOR. Acceptance is dependent on final acceptance by FEDSIM. The MS Office tool suite is preferred. Deliverable shall include the following: a) Monthly status reports in the FEDSIM format. The report is due on the first working day following the 20th of the month; b) Trip reports as described in within 7 days of returning; c) Master copies and updates of all training materials produced by MTDS within 30 days of completion of training; d) All materials collected from activities under paragraphs above, with in 30 days; e) Letter of Findings (LOF) as required. This is a flexible format for passing information and raising issues for the customers' consideration, within 30 days of activity.

Findings 14

Ed Miller of SAIC provided four MTDS monthly status reports and one MTDS trip report. The first status report is dated April 2000. Per the status and trip report documentation, the IRM QA team can not determine when helpdesk service began.

The Leland Initiative has tasked for one year of Internet connectivity to Eritrea, along with one year of helpdesk support. To date the Internet gateway has not been inaugurated. (A potential foreseeable problem will be a lack of symmetrical overlap between the inaugurated Internet gateway and the helpdesk support.)

SAIC was not provided with master copies or updates for all training materials from MTDS.

Lastly, no Letters of Findings (LOF) were submitted or provided.

Recommendations 14

The IRM QA team recommends the inauguration of the Internet gateway and one-year of helpdesk support be synchronized.

The IRM QA team recommends MTDS provide SAIC with the incremental documentation as outlined in Task 14.

Lastly, the IRM QA team believes the Letter of Findings (LOF) has been underutilized. A LOF would appear to be a vehicle for raising issues for the customers' consideration, as well as a means for documenting the collaborative effort between subcontractors and customer.

4.2. Review of Regulations

The objectives, policies, and procedures submitted to the IRM QA team by the Communications Department for review and comments on 18 October 2000 were discussed during subsequent meetings with the department. The IRM QA team remarked that the content and spirit of the objectives, policies, and procedures presented were in line with the notion of an independent Regulator adhering to the concepts of: a separation of regulatory and operational functions; freedom from direct political pressure; and fair and transparent procedures.

Based on discussions with the Communications Department and documentation presented, the IRM QA team acknowledges the Communications Department agreement with the following principles: encouragement of private investment, innovation, and infrastructure buildout; promotion of fair competition; management of scarce resources; licensing, rulemaking, enforcement, and adjudication; equipment approval; and telecommunications standards.

The IRM QA team encourages the Communications Department to continue in their efforts with assistance from MTDS, as well as the Leland Coordinator, as well as to continue to refer to the following sources as guidelines for formulating future policies and procedures: the US FCC's *Connecting the Globe: A Regulator's Guide to Building a Global Information Community*, and ESIS Knowledge Base, specifically the *Morocco Regulatory Developments.*

4.3. Review of Pricing

The following documents the potential cost implications and issues involved in this effort.

ASMARA'S DIRECTOR GENERAL COMMUNICATION DEPARTMENT MINISTRY OF COMMUNICATIONS

This fact sheet offers informal guidance on an issue that the Eritrea Government is seeking a method of dealing with the public access to the Internet. The following is not to be considered an endorsement of USAID's Leland Eritrea/Asmara Internet Gateway project.

Recommendations on Internet Access Rates and Charges

This has reference to the issues discussed on 19 October 2000 at USAID with the Department of Communication's Director of Regulatory policies. During the meeting several issues were relating to cost, privacy, contracting with the Gateway Owner, and system capacity. The following are some recommendations that were taken from the current practices in the United States' Federal Communications Commission (FCC):

SECTION A. COST

The research suggests that the access charges applied to the subscribers should come from the ISP. The ISP is considered an 'enhanced service provider' where the regulatory agent does not regulate the rates that enhanced service providers charge to their subscribers.

This allows the ISPs to purchase local phone lines so that customers can call them. The enhanced service providers ISPs are considered 'end users' when they purchase services from local telephone companies. Therefore, ISPs pay the same rates as any other business customer, and these rates are separately determined in each region of Eritrea. This is contrasted by the long-distance charges, which are applied to carriers who pay regional access charges that are regulated by the Ministry of Communication.

Executing this policy would typically require the ISP to purchase 'business lines' from local phone companies. Business lines usually include a flat monthly charge, and a per-minute charge for making outgoing calls; ISPs generally do not pay any per-minute charges for their lines, which is one reason many ISPs do not charge per-minute rates for Internet access. Access charges, by contrast, include per-minute fees for both outgoing and incoming calls. The rate levels of regional access charges are also in many cases higher than the flat business line rates ISPs pay.

With the aforementioned policy this would allow the Gateway Owner to put into practice a graduated pricing structure. That is, the first three months of the Leland Internet Gateway project would be 'free.' After which the balance of the first year would be priced at the same rate as current 'email charges.' If the additional telephone call charge is imposed, then that charge should be at the current 'voice charge' for a local telephone call. Furthermore, during the second and third years of the project the Gateway Owner would impose an enhanced pricing structure. That is, a local telephone call made after 8 PM and on the weekend would be charged at a different rate than a local telephone call made during 7 AM through 8 PM.

Section B. Privacy

Assigning special prefixes for telephone numbers raises concerns about privacy of Internet use. Thus encouraging a market driven economy via a separate solution is necessary to resolve the issue of access. The use of special Internet access numbers gives the Gateway Owner the ability to collect any information on a subscriber.

The growth of the Internet market has a direct relationship with the subscriber's knowing that their use of the Internet is protected by the country's political freedom. Random numbers can be given to the ISPs when they purchase the business telephone line.

In conclusion, the political freedom that a citizen enjoys should translate into same freedom of choice with the Internet.

5.0 TECHNICAL ASSESSMENT

5.1. Overview

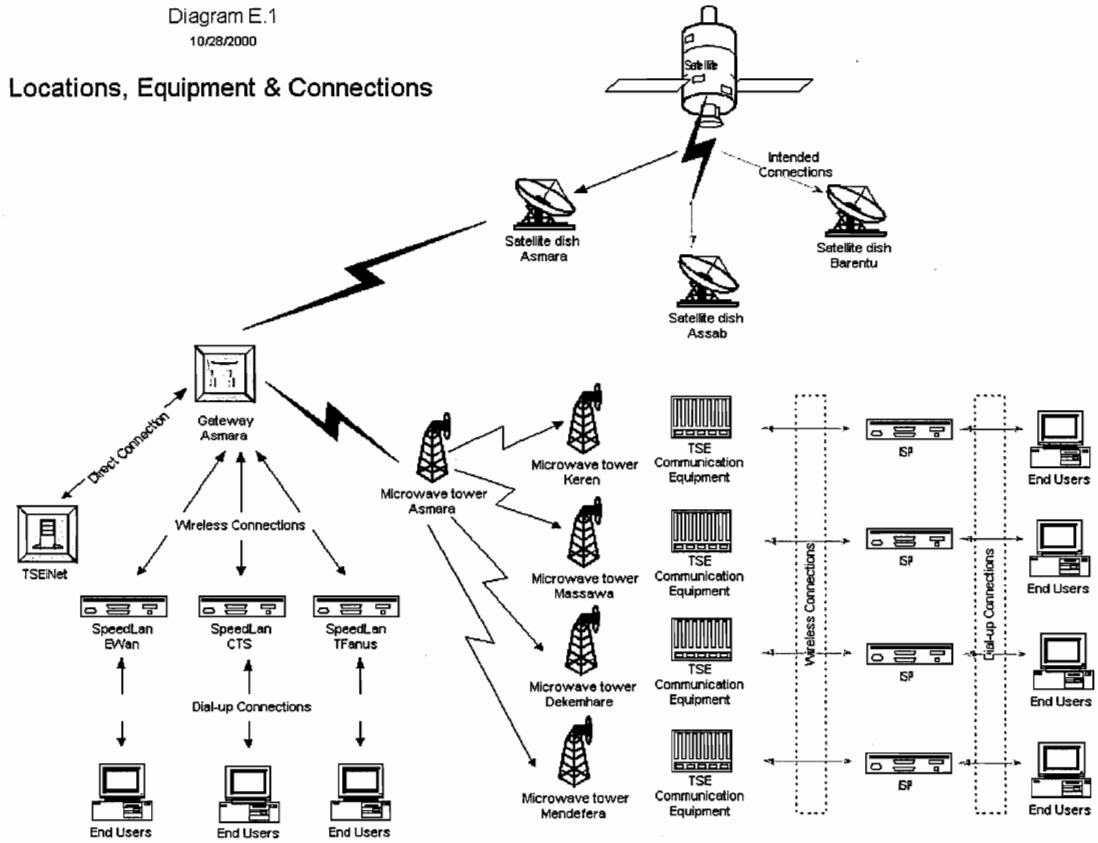
The IRM QA team was tasked with the review of the conceptual/detailed design of the project, system integration, and implementation to date, as well as with providing technical analysis and recommendations for successful, expedient implementation of the effort.

The team's approach to the assessment of the technical design and requirements of the Leland Initiative activities in Eritrea was to review the hardware, software, and telecommunications architecture at each location, and the readiness of all sites for deployment of Information Technology (IT) resources (see Diagram E.1: *Locations, Equipment & Connections*). The IRM QA team requested the site surveys and standard follow-up site preparation inspection documents from the prime contractor and subcontractors; however, they were unable to view the documents during the site visit. As a result the team's assessment resources were limited to a comparison of the original technical design, prepared by Lyman Brothers, with the lists of equipment procured, shipped, installed, commissioned, and configured at each location.

In collaboration with the TSE operations management staff, the IRM QA team defined and used the following terms to uniformly determine equipment status during the site inspections:

On----------equipment turned on
Off----------equipment turned off
Installed by----------the name of subcontractor
Tested by----------the name of subcontractor and/or TSE technical staff
Operational ----------equipment performs its functions with regard to internetworking connectivity and operation
Missing----------equipment procured and not in place
Additional----------equipment installed in addition to the original network design

During the site visits, the IRM QA team has also evaluated the implementation of telecommunications, data networking, and internetworking policies and procedures. This included ascertaining the availability of technical and operational manuals and procedures. The team also noted the presence of technical staff with the appropriate skills and training at each location, and the availability of network operation support information, e.g., maintenance points of contact, warranty, and support services providers.



5.2. Site Visits, Findings, and Recommendations

Following, categorized by primary and secondary cities, is a detailed account of the findings and recommendations of the technical design and requirements site visits for the Leland Initiative in Eritrea.

5.2.1 PRIMARY CITIES

Asmara

The IRM QA team's first in-country site visits were conducted in Asmara. Of the three primary cities, Asmara serves as the central control site for the national gateway and hosts the NOC. As the site of the network hub, all of the country-wide network and gateway activities are monitored at this site. It is the focal point of the system and is critical to operations. The IRM QA team's initial observations of the site and its activities were essentially that the overall physical stability, security, and structure are satisfactory. Detailed findings of the assessment are presented in this section.

Asmara Teleport

Asmara Teleport
Outdoor Equipment
Photo E.1A/B

The VSAT and microwave equipment for the Asmara Teleport are securely installed at TSE facilities at Betgiorgis, where the other TSE-owned antennas and microwave tower are located. The required physical conditions of the storage facilities are adequately met. The 3.7-meter satellite dish and related outdoor and indoor equipment have been procured, installed, and commissioned by Lyman Brothers. SAIC procured the UPS and the router.

All of the equipment is operational. The 512/256kb bandwidth is still questionable, as no performance tools or testing equipment have been used to verify the amount of the inroute and outroute communication bandwidth allocated for Eritrea.

- It is the IRM QA team recommendation that Lyman Brothers successfully demonstrate the contracted bandwidth using performance testing tools and a respective network traffic loader, if necessary.

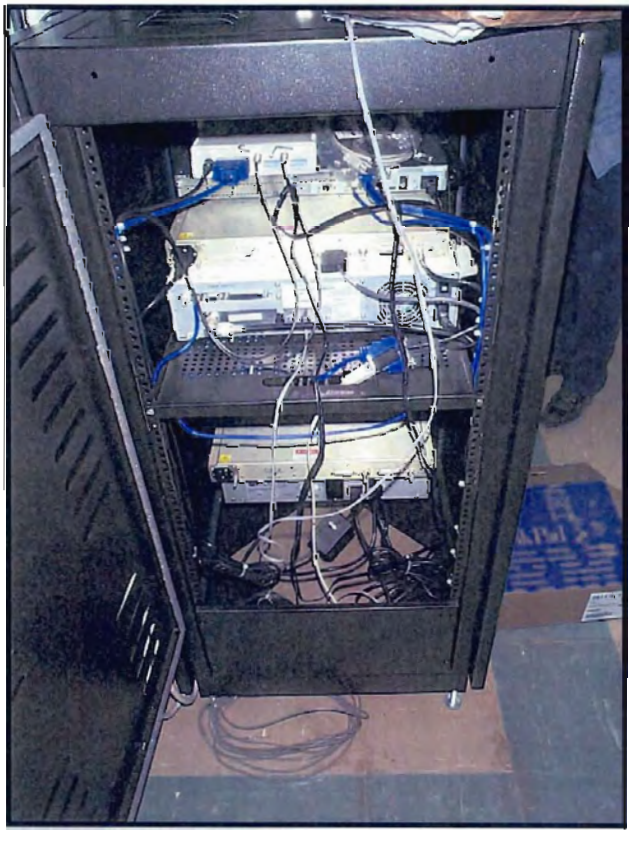
As noted in Photo E.1, the IRM QA team observed that excess equipment cables are laid out on the ground outside of the physical structure housing the equipment. This is unacceptable from both a technical and physical security standpoint.

- The IRM QA team recommends the RG6 and RG8 cables are properly installed to engineering standard.

The "hot" spares procured to support the indoor equipment have not been installed at the Teleport. In fact, they are still packaged in their original boxes at the NOC.

- The IRM QA team recommends that the "hot" spares be mounted, configured, and tested on the original or duplicated rack at the Teleport. Through these actions, the criteria of a maximum four-hour downtime component failure will be met.

Asmara Teleport
Indoor Equipment (Front & Back Site View)
Photos E.2A/B



This site visit and interviews revealed that there are no specialized tool kits in place to support any required physical and/or additional commissioning work on the outdoor satellite equipment.

- The IRM QA team recommends clarification of this matter by Lyman Brothers. If these tools were not included in the procurement list for the three VSAT sites, it should be considered. These specialized tools allow for technicians to gain direct access to equipment in order to complete specific types of maintenance or repairs.

None of the locations have spare UPSs at any of the locations. As the functional attribute of any UPS is to maintain voltage consistency to the piece of equipment it supports, investment in this back up equipment is a cost-effective solution to avoiding damage to system critical equipment.

- The IRM QA team recommends that each site be provided with a back-up UPS.

Standard system support and operations include provision of a means to test and monitor system performance. Currently neither the Asmara Teleport nor the other two VSAT sites have such a system in place.

- The IRM QA team recommends procurement of laptops for each of the sites where the VSATs are to be located in the event that the teleports are located offsite from the NOC.

The operational manuals and procedures supporting normal system operations and troubleshooting are not in place. Additionally, Lyman Brothers and their subcontractor Vortex exclusively provide helpdesk support, however TSE technical staff did not have contact information for this assistance.

- At the recommendation of the IRM QA team Lyman Brothers have agreed to:
  - Provide relevant documents as soon as possible.
  - Provide training as well as training documentation on all VSAT equipment, including maintenance and troubleshooting. Documentation is to include emergency recovery procedures and troubleshooting techniques.
- Upon receipt of these materials, the IRM QA team has advised TSE technical staff to maintain copies of the operating manuals, procedures, and hotline information at the corresponding locations.
  - It should be noted that, as a result of the IRM QA team's recommendation, Ron Hettich gave the Vortex hotline phone number and site ID to the TSE technician during the QA team visit.

Responsibility for warranty services for the equipment are included as part of the Lyman Brothers functions.

- The IRM QA team recommends that Lyman Brothers provide the TSE support staff with necessary warranty contact information and operational procedure in case of any equipment failure.

At the present time, there are two TSE technicians designated to provide the national gateway technical support, one of which demonstrated the readiness to do so. Mr. Abraham G'Medhin, TSE Leland Project Manager, is responsible for providing technical administrative support for the NOC and secondary cities and has been adequately trained; however, he is out of country and his return date is uncertain. As a tentative replacement, Mr. Tekle Hailemariam has taken over this responsibility.

- The IRM QA team recommends that TSE increase the number of the technical support staff at the NOC after external dependency of problems are resolved.

Asmara Network Operating Center (NOC)

NOC equipment was procured by SAIC and installed and configured by Lyman Brothers and MTDS. The facility is air-conditioned and designated only for National Gateway use.

- Per the IRM QA team recommendation, a separate phone line was installed in order to provide proper telephone support services to ISPs and secondary cities.

Hardware and software components at the NOC are non-operational and are noted as follows:

- The Sun servers' backup tape, installation of which is under Lyman Brothers responsibility, is turned off and not used.
- The ServSwitch, set up of which is under Lyman Brothers' responsibility, is turned off and not connected to the system.
- The Checkpoint 1.1 software, installed by MTDS, is not operational. This is due to license expiration. Procurement and installation of licenses have been confirmed by MTDS.

- The IRM QA team recommends placing these items into operation as soon as possible. The importance of producing backup tapes on a regular basis and of firewall existence is obvious and critical, thus their non-operational status is unacceptable.

Lyman Brothers recently introduced and implemented the concepts of using UDP and Cache servers[7] at the NOC in order to optimize, and in this case improve, the insufficient bandwidth provided. Although system integration tests have proven that Web caching and UDP processing make more efficient use of available bandwidth, this fact raises some concerns and issues. Specifically, the question is raised of whether or not 512/256 kb bandwidth is sustainable. In spite of the fact that performance improved after the satellite dish was re-directed to Whitinsville and the bandwidth carrier increased from 1024/128 KB to 2048/256 kb outbound/inbound, the overall improvement was slight. Consequently, the UDP/Cache servers were recommended and used. Nevertheless, certain Web sites (e.g., Hotmail) could not be reached with the UDP/Cache engine in

[7] The concept of proxy cache: users request pages from a local server instead of direct from the source. The local server gets the page, saves it on disk and forwards it to the user. Subsequent requests from other users of the cache get the saved copy, which is much faster and does not consume Internet bandwidth.
User Datagram Protocol (UDP): UDP is traditionally used for real-time applications, such as video and audio, for which lost packets are not critical. Unlike TCP, UDP supplies minimized transmission delay by omitting the connection setup process, flow control, and retransmission.

place. The UDP does not allow transmission error control and as a result there is no real verification of data sent.

- The IRM QA team recommends that Lyman Brothers demonstrate the 512/256 kb bandwidth by using performance testing tools, including a network traffic loader, if necessary. A bandwidth benchmark should be established without the use of a UDP and Cache in place, in order to determine amount of the 'pure' bandwidth. This benchmark should be incorporated into an acceptance clause between both Lyman Brothers and USAID/Leland, and USAID/Eritrea and GSE and TSE.

Installation of the UDP and Cache servers required use of a separate hub. An additional hub was not been provided; therefore, the spare hub was used. Additionally, one of the three spare SpeedLAN wireless transmitters is defective.

- The IRM QA team recommends:

  - Procurement and delivery of a new spare hub.
  - Return and replacement of the faulty equipment which is a contractual responsibility of Lyman Brothers.

Although the Task Order requires one spare set of documentation manuals in addition to working copies, no operational and/or technical manuals and configuration sheets are available for the UDP server, Cache engine, or any of the other equipment. There are no daily or emergency recovery procedures in place and the backup/restore feature has never been implemented.

- The IRM QA team highly recommends development of an operational procedure on how backup/restore processes are to be performed and implemented.

NOC operators received one month of UNIX training in the United States and one week of installation training by MTDS. Follow-up support training has been discussed and should be delivered by MTDS trainers by mid-November.

Barentu

The IRM QA team visited the originally proposed VSAT location (Photo E.3) in Barentu. The Barentu TSE facility is small and old. It operates with solar power, which was temporarily out of order. There is a manual switchboard, less than 100 telephones, and about 50 computers on site. Due to external dependencies, the VSAT equipment procured and shipped to Barentu has not been installed and is safely stored at the TSE warehouse in Asmara.

Barentu
Proposed VSAT Location
Photo E.3A/B

The team also visited TSE facilities in Akordat; the next big city between Keren and Barentu. TSE is installing VSATs in both cities. The Akordat TSE facility is quite a substantial and new structure with plans to install a new telephone system. The TSE manager indicated that due to the war and the destruction in Barentu, the government offices have moved from Barentu to Akordat.

- The QA team recommends performing a new site survey regarding the changed environment and evaluating a possible re-location of the VSAT equipment and use of microwave and wireless links.

ASSAB

The VSAT equipment in Assab has been installed but has not been used. Due to time constraits the IRM QA team was not able to visit Assab.

5.2.2 SECONDARY CITIES

Equipment for all of the secondary cities has been installed by Lyman Brothers and configured by MTDS. Although the equipment is supposed to be mounted on racks, at each site it has been stacked inappropriately on tables (Photos E.4-7). Additional commonalities for all of the secondary cities include:

- Wireless connection to the ISPs in these cities was not configured and tested thus the current status of those connections is considered non-operational.
- Laptops procured for the sites are "safeguarded" at the Asmara NOC.
- MTDS is responsible for the helpdesk support and the warranty services are under Lyman Brothers responsibility.
- Warranty and maintenance points of contacts have not been given to the TSE staff.
- Standard operating procedures are not in place.
- The local TSE technical support staff has not yet been designated.

The primary distinctions between the status of equipment in the four secondary cities are specifically noted below.

DEKEMHARE

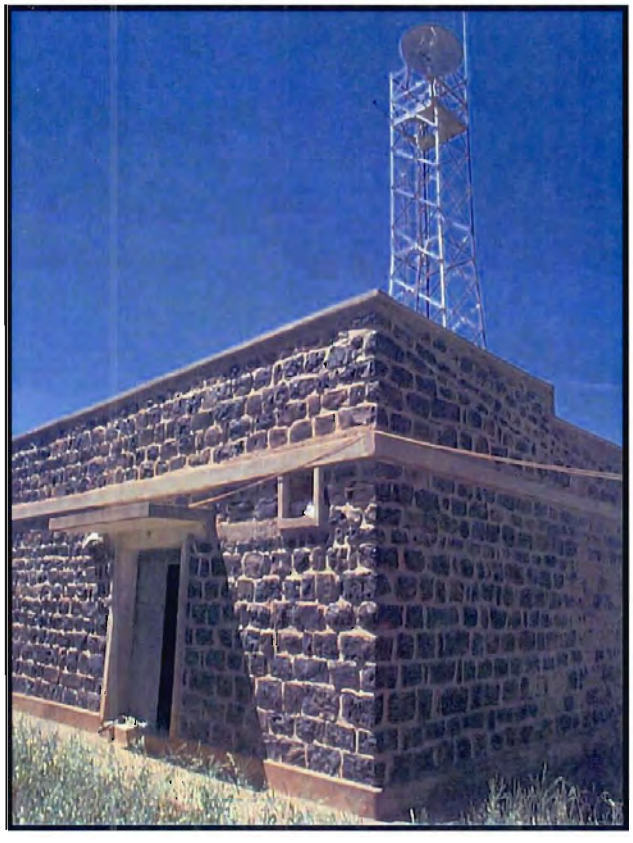
All of the equipment for this location is on and considered operational except:

- SpeedLAN, which is off and has not been tested, and
- 3COM remote access server (RAS), which is on and connected to the network but has not been tested.

Dekemhare
Microwave Tower & Indoor Equipment
Photo E.4A/B

MENDEFERA

Although all of the equipment was on, it was not possible to clearly define its operational status due the microwave tower failure. TSE resolved the problem on Friday, 27 October 2000, as part of their microwave connection responsibilities. Additionally, both SpeedLAN and 3COM RAS are connected to the network but have not been tested.



Mendefera
Microwave Tower & Indoor Equipment
Photo E.5A/B

MASSAWA

All equipment is on and considered operational except:

- UPS unit, which fell during the installation. Lyman Brothers will return the unit to manufacturer for determination of replacement.
- The SpeedLAN equipment, which has never been turned on, configured and/or tested. As a result, the status of the wireless connection to the ISPs in the city is considered currently non-operational.

Massawa
Microwave Tower & Indoor Equipment
Photo E.6A/B

KEREN

All equipment is on and considered operational except the wireless connection to the ISPs. As in the other secondary cities this connection has not been tested and the current status is considered non-operational. In addition, part of the wireless equipment (RF Amplifier) is not in place.

Keren
Microwave Tower & Indoor Equipment
Photo E.7A/B

The IRM QA team makes the following overall recommendations for each of the secondary cities:

- Connection, configuration, and testing of all equipment by Lyman Brothers and MTDS respectively, so that each city is fully prepared and in operational status for internetworking.
- Lyman Brothers to correctly mount and install equipment on racks.
- Relocation of each laptop procured for secondary cities to the corresponding city once local technical support staff has been designated.
- Lyman Brothers and MTDS to provide TSE technical support staff with all information required for smooth networking operations and maintenance: hot-line telephone numbers, points of contact, operational manuals, and procedures for normal operations and in case of any failures.

- TSE designate a local support staff with appropriate technical skills once external dependence problems are resolved.

5.3. Internet Service Providers

EWAN TECHNOLOGY SOLUTIONS INC.

EWAN is a private limited IT company registered in Eritrea. Its current business services portfolio includes networking; software development; radio-based telecommunications systems; entertainment and security systems; IT consulting services; and e-mail service. EWAN is a COMPAQ computer retailer and distributor of SpeedLAN, TELEMOBILE and BARRETT communications products. EWAN has 18 technical staff members with significant experience in computer and communications areas. Their customers include individuals and private business, as well as government and non-government institutions.

EWAN currently has a sophisticated computer network operating and is ready to start and provide full Internet access. In fact, the managing director has clearly stated that EWAN is ready and would like to put in place its own international link using VSAT system. EWAN expects all current e-mail clients to become Internet service customers with an additional 50 percent increase in the customer base. They are interested in Internet connections in the major cities, especially Massawa where they already have an established client base.

COMPUTER TECHNOLOGY SERVICES (CTS)

CTS is a registered IT company in Eritrea. Their motto, "The Total Solution Provider," reflects their approach as a service provider. The CTS portfolio includes consulting services, training, networking, software development, computer hardware/software sales, maintenance, and annual service contracts. CTS is a Dell Computer and Microsoft Certified Solutions service provider.

CTS started e-mail service in 1994 and ceased in 1997 as it became very expensive to support for the limited number of e-mail users at that time. They have set up a wide area network for institutional users. Over the past five years CTS has installed and maintained 14 local area networks. They expect to connect all current users to the Internet and their latest survey shows the number of full Internet access customers almost doubled. CTS currently provides service to the regional offices of Ministries of Agriculture and Education and has expressed interest in Internet connection in all major cities.

TFANUS ENTERPRISES

TFanus Enterprises is a computer-based solutions company providing services for individual and business needs. The company challenge is "Bringing the World to You" through the Internet, especially to make the Internet available to as many young Eritreans as possible.

The business areas of TFanus are: e-mail services since 1997, database solutions for various Ministries and the private sector, Geez and Arabic languages software solutions for Windows applications, networking solutions, training, walk-in services, equipment rentals, and monthly maintenance service contracts. As a Hewlett Packard authorized distributor, TFanus offers computers, printers, supplies, and accessories.

TFanus has 10 full-time and 5 part-time specialists, 7 of the specialists are technical (4 full-time and 3 part-time). TFanus has a separate office space set up for e-mail and Internet services. Multi Router Traffic Grapher (MTRG) is used to monitor system performance.

TFanus expects all of its e-mail users to transfer to full Internet access and this number to double within one year. Ninety-seven percent of the current clients are in Asmara.

TSEINET

TSEiNET is a new Internet Service Provider and a part of Telecommunications Services of Eritrea. Their objective is to strictly provide Internet-related services as follows: e-mail, World Wide Web, Web site hosting, file transfer, discussion groups, IT consulting, and Cyber Café.

TSEiNET has a very sophisticated local area network, built with one of the latest models of the Sun Microsystems servers, a 3COM remote access server, and IBM computers. Checkpoint-1 firewall is used as a network security protection.

TSEiNET staff consists of 6 people: 2 marketing and 4 technical staff (one of which is out of country). The technical personnel took part in UNIX training in the United States and a subsequent one-week training with NOC operators. One of the technicians also visited Morocco for technical discussions with MTDS.

Based on a survey done in March-April 2000, TSE i NET expects most of their clientele, ninety to ninety-five percent, to be in Asmara.

5.4. System Integration Test

Based on the review of the available documentation and meetings with the main parties, the IRM QA team found no information about any tests performed, neither after the installation and commissioning of the VSAT, nor after establishing the connectivity to the NOC, secondary cities, and ISPs. Thus, the quality of the bandwidth received at the teleport and passed through the connection lines within the country was not demonstrated.

Since the installation and commissioning of the VSAT system by Lyman Brothers in March, an outstanding bandwidth allocation problem remains. In order to improve the inadequate system performance level, Lyman Brothers took a few actions in August/September:

- The VSAT has been re-directed from Goonhilly to the Whitinsville hub, and
- The UDP and Cache servers have been installed at the NOC.

The IRM QA team found that there was no formal, standard system integration test available for the counterparts to utilize. Consequently, the IRM QA team suggested, introduced, coordinated, and executed a system integration test. The QA team formulated the system integration performance test incorporating the Lyman Brothers' verification test, TSE, and team specified requirements. The ISPs were also asked for their input, but no responses were received.

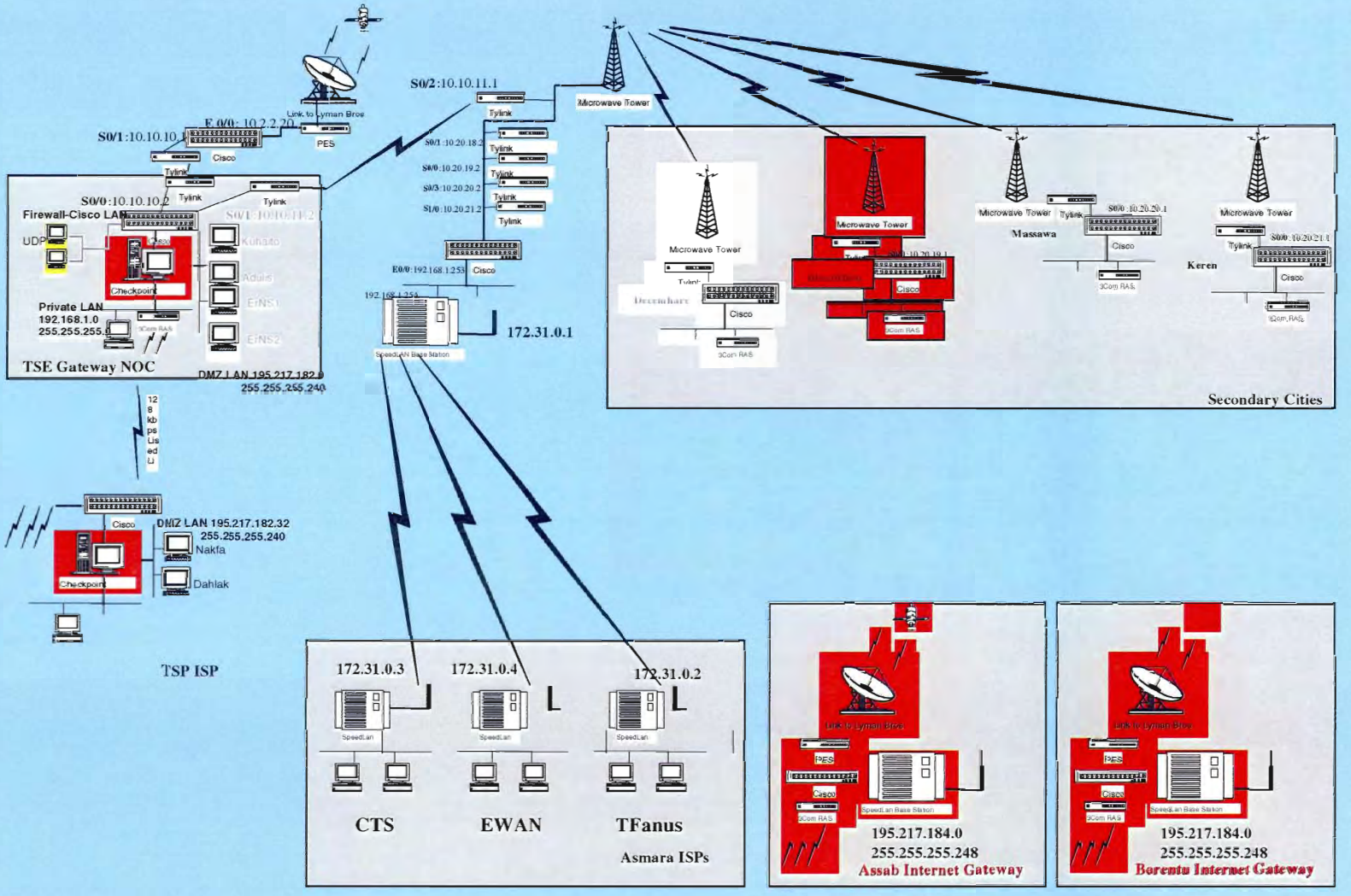
The IRM QA team approach was to review and inspect the existing system integration and to validate the available network capacity starting from the Asmara Teleport through wireless and microwave links down to the respective ISPs and secondary cities. There were two system integration tests performed within two consecutive days covering different time periods of the day. The first test was conducted with the UDP/Cache solution in place and the second was performed without the benefit of the UDP/Cache solution.

The participants in the actual testing were as follows:

- Ron Hettich and Randy Holman ----------Lyman Brothers
- Karl Stanzsick----------MTDS
- Bobby Jefferson and Siika Zhivkova----------IRM QA team
- Ghirmai Tsege, Tsegay Desta, Tekle Hailemariam -------TSE
- Menghis Samuel, Yohannes Ghebrehiwot ----------EWAN Technology Solutions
- Tewelde Stephanos ----------TFanus Enterprises
- Alazar Hailemichael----------Computer Technology Services
- Efriem Negash----------TSEiNet

All of the participants reviewed and agreed on a standard equipment platform, test configurations, and test procedures. It was clearly stated and agreed that <u>the test was not an acceptance test</u> but a <u>snapshot of the system performance status</u> during the two testing days. All of the parties had the opportunity to add their requirements, to attend and take part in the performance tests to the extent that they wanted, and to make comments before signing the final test results.

Eritrea Internet Gateway Network Design



5.4.1 LELAND ERITREA/ASMARA INTERNET GATEWAY PERFORMANCE TEST 1

The first performance test of the Eritrea National Internet Gateway was conducted on Tuesday, 24 October 2000, from 11:30AM to 2:45PM and from 6:00 PM to 9:45PM. This test was accomplished with the UDP/Cache solution in place. It included the following components:

- File Transfer Rate (FTR) at Asmara NOC and ISPs:
  - The file sizes proposed by Lyman Brothers were not available on their FTP server; therefore, three other files had been used for the file transfer: 1.5 MB, 2.3 MB, and 12 MB sized files.
- Ping IP addresses configured at NOC, secondary cities, and ISPs
- Check Hotmail availability

All parts of the test were performed without the firewall protection in place due to the improper configuration and unavailability of Checkpoint 1 Firewall software (reference Diagram 2: Eritrea Internet Gateway Network Design).

The SpeedLAN equipment was also not configured at the time of the test to restrict the bandwidth size allocated to the ISP, e.g., there were no restrictions in place for 128 KB or 64 KB bandwidth to each ISP. This should be taken into consideration as it impacts the test results analysis.

The test resulted in the following:

- The file transfer rate measured during the test reached a minimum 2.04 kilobytes/s in the late afternoon to a maximum of 74.68 kilobytes/s at lunchtime. The graphic (Chart 1) shows a significant time dependency on the network performance during different hours of the day due to the fact that this is a shared bandwidth system.

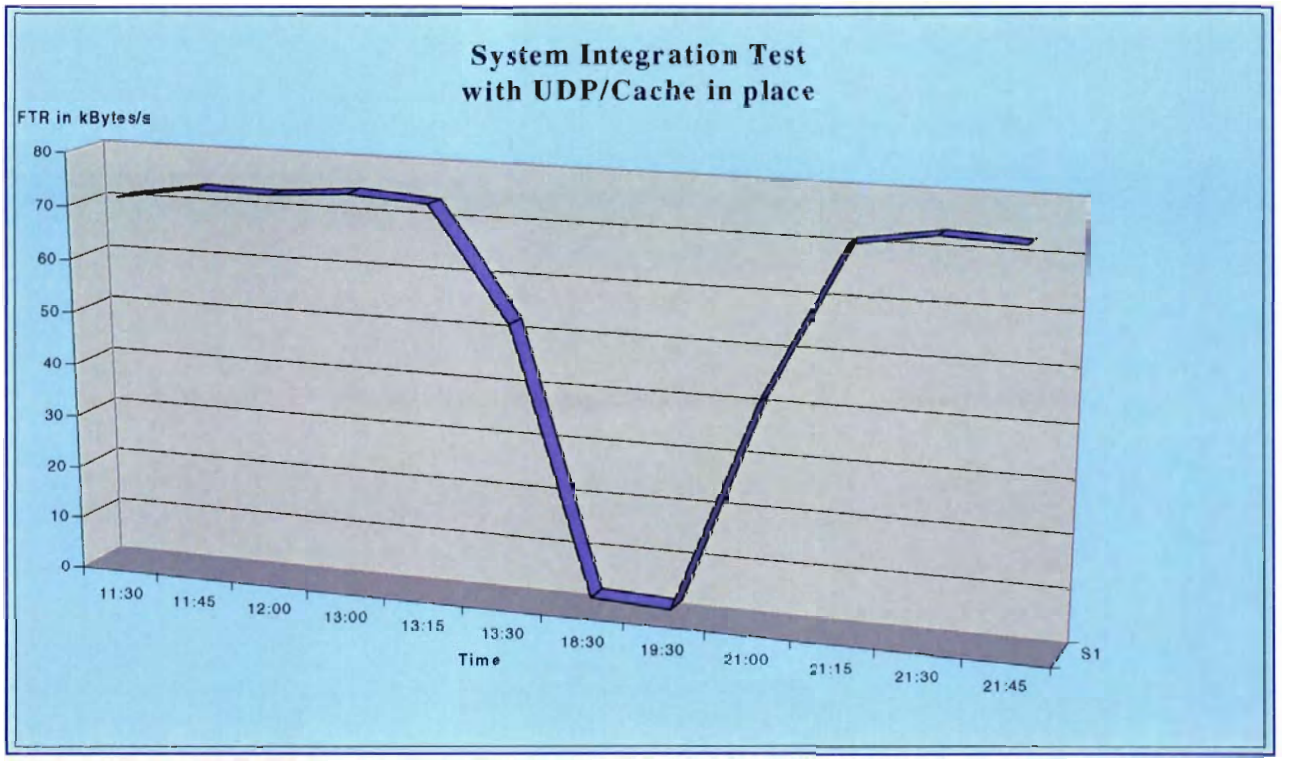
- The average value of the aggregate outbound during this test was under 75 kilobits/s with only one exception: around 2:00PM when it went up to 283 kilobits/s for seconds and the corresponding measured file transfer rate was 52.76.

- All IP addresses configured at the main servers and routers were pinged with acceptable reply time except Mendefera, where the microwave link was later found to be faulty.

- The Hotmail Website and mail service were available for downloading only through Netscape Navigator v.4.5 with a special exception list of hotmail.com, hotmail.msn.com and hotmail.passport.com setup under Proxy server properties. Hotmail was not available through Internet Explorer v.4.0.

System Integration Test Results

Chart 1



Participants' notes and comments are reflected below.

TSE - *"In the existing configuration, the ISPs and secondary cities are before the NOC firewall. TSE proposes the NOC Firewall be configured in such a way that all ISPs and secondary cities come under its supervision."*

"TSE staff have observed a max of 75 kbps of aggregate outbound at S0/1 (NOC Router)."

"Response time of Ping IP within the national network is performed (measured) while response time to the Internet backbone is pending."

EWAN - *"The hotmail problem with UDP encapsulation is probably symptomatic of a general problem with interactive pages. It is unacceptable to work through exceptions in the browser settings. This alone probably rules out the UDP encapsulation for us. A simple solution must be found if UDP encapsulation is to be acceptable."*

CTS - *"The national gateway, DNS, IP addresses resolving for CTS mail server is not tested."* (Note: This test requirement has not been requested by CTS.)

MTDS - "The rule base in the NOC firewall has not been updated to include a rule to allow the "UDP" proxy to receive incoming ftp traffic, since the "UDP" server was added to the network after the security policy was established". (Note: Checkpoint 1 Firewall software was unavailable during the IRM QA team visit. The team requested MTDS representative Karl Stanzick to fix the problem, and/or to suggest a test

to prove the software status, as this is a part of MTDS responsibilities. There was no input received regarding thus issue before the end of the TDY.)

5.4.2 LELAND ERITREA/ASMARA INTERNET GATEWAY PERFORMANCE TEST 2

The second test of the Eritrea National Internet Gateway was conducted on Wednesday, 25 October 2000, from 2:45PM to 11:15PM.

This test was performed without the UDP/Cache solution in place. According to the agreed upon test configuration it included the following:

- Space Link Performance at Asmara Teleport:
  - TDMA Outroute/Inroute carrier's signal strength
  - Out of Band (OOB) carrier's signal strength
- File Transfer Rate (FTR) at Asmara NOC and ISPs
- Ping IP addresses configured at NOC, secondary cities, and ISPs
- Check Hotmail availability

All parts of the test were performed without the firewall protection in place due to the improper configuration and unavailability of Checkpoint 1 Firewall software (reference Diagram 2: Eritrea Internet Gateway Network Design).

The SpeedLAN equipment was also not configured at the time of the test to restrict the bandwidth size allocated to the ISP, e.g., there were no restrictions in place for 128 KB or 64 KB bandwidth to each ISP. This should be taken into consideration as it impacts the test results analysis.

The test resulted in the following:

- The Space Link Performance test consisted of a commissioning process and measuring of the required parameters' values after commissioning. The received signals' values were adequate and over the minimum required. It's important to note that the satellite circuit was configured at 2048/1024 kbps outbound/inbound capacity. There were no restrictions for 512/256 kbps at the Whitinsville hub for the Eritrea gateway as specified by the Task Order.

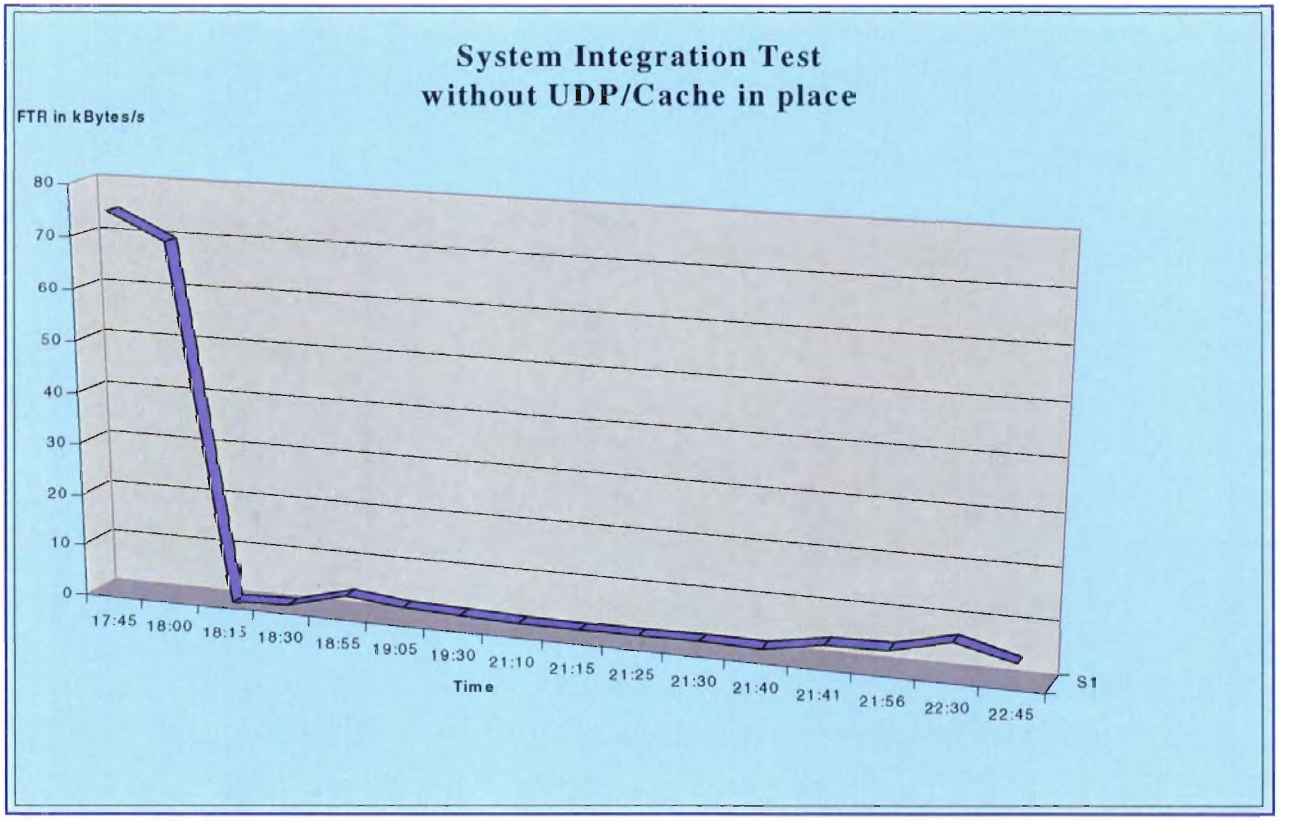
- In addition to the 1.5 MB, 2.3 MB, and 12 MB sized files, arbitrary files were downloaded during the FTR test and the average transfer rate was recorded. The minimum rate of 0.35 kilobytes/s was measured around 6:15 PM. The maximum rates of 74.68 and 69.43 kilobytes/s were observed for about 15 minutes at 5:45PM. As shown in Chart 2, there is a significant decrease of the throughput levels when the UDP server and Cache engine are not used.

- The aggregate outbound was between 44 kilobits/s and 198 kilobits/s. The minimum expected value of 200 kilobits/s was not reached.

- All IP addresses configured at the main servers and routers were pinged successfully with acceptable reply times except Mendefera, as occurred the previous day.

- The hotmail web sites and mail service were available for downloading through Netscape Navigator v.4.5 and Internet Explorer v.4.0.

Chart 2



Participants' notes and comments for this test performance and results are reflected below.

TSE - *"The demodulator is configured for 2048 kbps, however we are not sure of the bit rate of the received signal."*

"If the UDP is an option, we recommend the routing policy has to be made."

"All FTR measurements at all sites are made without the UDP and Cache, and the FTR at the client side is reduced drastically, while the aggregate outbound values between 72 and 198 kbps."

"Tests 1 and 2 are performed for assessment purposes only and do not constitute acceptance tests. We recommend acceptance tests be performed before start of service."

"For reliable data transfer, TSE recommends connection-oriented protocol, i.e. TCP/IP."

"With the tests so far performed, a minimum rate of 200 kbps FTR is not yet observed."

5.4.3 OVERALL TESTS RESULTS AND ANALYSIS

- Although the satellite circuit was configured at 2048/1024 kbps outbound/inbound capacity instead of 512/256 kbps and there were no restrictions in place for 128 kbps or 64 kbps bandwidth to each ISP; the minimum expected value of 200 kilobits/s was not steadily reached.
- A significant decrease of throughput levels was observed when UDP/Cache solution was not in place.
- Hotmail was available only with certain restrictions' settings when UDP encapsulation was used.
- There were throughput variances at specific time intervals due to the shared bandwidth technology that was implemented.

As a result of the testing and analysis, and given the current system status and Internet demand, the IRM QA Team recommends that:

- The National Internet Gateway can be opened on November 15, 2000 upon completion of the agreed upon deliverables by the subcontractors.

- Lyman Brothers should demonstrate the committed bandwidth by using system performance-testing tools. These pending test results should be used as acceptance/non-acceptance clauses between both Lyman Brothers and USAID/Leland, and USAID/Eritrea and GSE and TSE.

- Lastly, a system (including bandwidth, software, and hardware) upgrade should be performed on the existing technical design to meet the increasing Internet demand in Eritrea.

5.5. Technical Conclusions for Gateway Launch

In a confidential polling of ISPs in Eritrea, the IRM QA team queried each ISP regarding the initial customer base of subscribers anticipated and planned for upon the opening of the Gateway. Further, the ISPs were asked to plan and project their expected needs for six-month and one-year business plans. The initial total estimated ISP subscriber base was projected to be approximately 1380 users. The network capacity ten-percent rule was employed for estimating network demand. This rule asserts that generally, only ten-percent simultaneous or concurrent users process any single web or Internet requests at any one time. In planning their own technical resources and pricing structure to meet the increasing customer demand base, the ISPs anticipate an aggregate subscriber base of 3120 from six-months to one-year after the opening of the Gateway. The original Leland initiave planned for network capacity to meet a subscriber base of 1750 users.

The IRM QA team's assessment revealed that upon completion of outstanding deliverables, the current technical network design of the Internet Gateway is able to serve the current subscriber demand for the next six months. Although the current Gateway configuration is restrictive in performance, scalability, and flexibility, with the proper installation of equipment and delivery of training, it should adequately serve the needs of the initial subscriber base. The IRM QA team, however, strongly recommends a thorough technical and business assessment and network redesign in order to upgrade of the system's capabilities to meet the one-year projected demand.

5.6. Special Issues

5.6.1 IP ADDRESSING, SUB-NETTING, AND ROUTING

The IRM QA team found that there was only one /24 (Class C) IP address assigned to the entire country, which is not enough for adequate internetworking with the expectation of fast expanding ISPs and increasing number of ISPs.

The IP addresses and sub-netting were implemented as follows:

32 IP Addresses allocated to Leland NOC
96 IP Addresses allocated to TSEiNet (TSE/ISP)
32 IP Addresses allocated to TFanus
32 IP Addresses allocated to CTS
32 IP Addresses allocated to EWAN
8 IP Addresses allocated to Dekemhare
8 IP Addresses allocated to Mendefera
8 IP Addresses allocated to Massawa
8 IP Addresses allocated to Keren

In order for the ISPs and other organizations to acquire additional contiguous /24 subnets or larger subnets (/21 or /19 etc), each of them individually have to apply to IANNA using the standard application forms showing their existing network and justifications for requesting additional or larger subnet addresses. The IRM QA team recommends that MTDS, as per their contractual obligations, assist TSE and ISPs to apply for their own IP addresses, and help them with

IP sub-netting and routing. The national gateway will thus be able to serve more ISPs, which will be setup in a fair and efficient manner, and will have scalable networks as their businesses grow.

5.6.2 DOMAIN NAME SERVER (DNS) MANAGEMENT

Per the IRM QA team meeting with the director of Eritrea Information Systems Agency, Eritrea applied for and was given a domain name in 1997. Since then the domain name administration has been located in San Francisco, California and has been used in facilitating dial-up e-mail services for the country.

There have been recent discussions on transferring the domain name administration to Eritrea once the national gateway access to Internet was established. In May 2000 a letter regarding this activity was submitted but the request was cancelled when the war started.

The QA team recommends that SAIC task and coordinate DNS management training for domain name administration as it is proposed in the MOU.

On 22 November 2000, the (ER) domain name was transferred to the GSE from a private individual.

6.0 SHORT-TERM RECOMMENDATIONS

6.1. Government of the State of Eritrea (GSE) and Telecommunication Services of Eritrea (TSE)

6.1.1 PROJECT MANAGEMENT

a) GSE, TSE, USAID, and local ISPs should continue to utilize the working group in order to provide weekly updates on the system's performance and discuss concerns or apprehensions.

6.1.2 TECHNICAL

a) The TSE technical staff should keep the operating manuals and procedures provided by Lyman Brothers and MTDS at each site/location, along with the necessary hotline information in case of any equipment failure.
b) Increase of the number of TSE technical support staff at the NOC after the external dependency problems are resolved.
c) Designate a technical support staff with appropriate skills in secondary cities.
d) Re-location of each laptop procured for secondary cities to the corresponding city once the local technical support staff has been designated.

6.2. USAID/Eritrea Mission and USAID/Leland

6.2.1 PROJECT MANAGEMENT

a) USAID/Eritrea and USAID/Leland should continue to work closely with GSE, TSE, and the local ISPs in order to monitor the initial stages of the Internet gateway.
b) USAID/Eritrea and USAID/Leland should pressure SAIC to provide frequent updates, as well as a copy of all the appropriate documentation associated with this effort, i.e. status reports, trip reports, Letter of Findings, etc..

6.3. SAIC

6.3.1 PROJECT MANAGEMENT

a) SAIC needs to be specific in its technical requirements for subcontractors with regard to actual technical approach, managerial approach, deliverable products, and individual responsibilities.

6.3.2 TECHNICAL

a) Procurement of specialized tool kits for outdoor satellite equipment for the three VSAT sites if these tools are not included in the procurement lists.
b) Provision of back up UPS per each site/location.

c) Procurement of laptops for VSAT teleports (Asmara and the other two sites in case the teleports are located off site of the NOC) for purposes of testing and monitoring the system performance.

d) Procurement of a spare hub to replace the one used for UDP/Cache servers at the NOC.

e) Task and coordinate execution of a new site survey regarding the changed environment in Barentu and evaluate possible relocation of the VSAT equipment and use of microwave and wireless links.

f) Task and coordinate DNS management training for domain name administration as it is proposed in the MOU.

g) Evaluate and implement a network management tool for monitoring system performance at the NOC, secondary cities, and ISPs in order critical points of failure such as routers, switches, and wireless equipment be constantly monitor with triggers or alarms setup before severe degradation occurs. Examples of such tools are:

- MAX Network Management System, NetTasking Inc., version 1.5
- Cisco Works for Windows or Cisco Works2000, Service Management Solution
- HP OpenView network, performance, and internet services management products
- SNMP, supported also by SpeedLAN equipment.

6.4. Lyman Brothers

6.4.1 PROJECT MANAGEMENT

a) Lyman Brothers should be tasked by SAIC to produce a physical site survey in Eritrea, specifically for Barentu and Assab. SAIC needs to coordinate this effort with firm delivery dates and verification through documentation in both hard and soft copy. (A "telephone" site survey is inappropriate when conducting technical and physical assessments for the design and configuration of equipment.)

b) Lyman Brothers should investigate and resolve the problems surrounding their inability to achieve 512/256kb of bandwidth. (The use of UDP and Cache Servers are merely masking the underlining problems.)

c) Lyman Brothers should resolve the problem of downloading different types of web pages, e.g., Hotmail.

d) Lyman Brothers should install the appropriate "hot spare" equipment at the Teleport.

e) Lyman Brothers should disseminate each of the four laptops to their intended sites.

f) Lyman Brothers should determine if the SpeedLAN warranty will be honored by the local SpeedLAN vendor in Eritrea.

g) Lyman Brothers should deliver the support training obliged to the TSE NOC.

6.4.2 TECHNICAL

a) Demonstrate the 512/256kb bandwidth by using performance-testing tools and a respective networks traffic loader, if necessary. The follow-up test results should be used for the

acceptance/non-acceptance clauses between both Lyman Brothers and USAID/Leland, and USAID/Eritrea and GSE and TSE.

b) Proper installation of extra cabling that has been laid out on the ground outside at the Asmara teleport.

c) The "hot" spares of the indoor equipment should be mounted, configured, and tested on the original or duplicated rack at the Teleport in order to meet the criteria of the expected down time from component failure not to exceed four hours.

d) Provide TSE technical support staff with all information required for smooth network operation and maintenance: hot-line telephone numbers, points of contact, operational manuals, and procedures for normal operations and in case of any failures.

e) Provide the operational procedure on backup/restore process.

f) Provide operational and/or technical manuals and configuration sheets for all equipment, including UDP server and Cache engine.

g) Provide one spare set of documentation manuals.

h) Provide training as well as training documentation on all VSAT equipment, including maintenance and troubleshooting. Documentation is to include emergency recovery procedures and troubleshooting techniques.

i) All equipment be connected, configured, and tested per each location, so that each site is fully prepared and in operational status for internetworking:

- Sun server backup tape at NOC
- ServSwitch at NOC
- RF Amplifier in Keren
- 3COM remote access server in each secondary city
- SpeedLAN equipment, respectively wireless connections to ISPs in secondary cities

j) Replace the faulty spare SpeedLAN wireless transmitter.

k) Replace the faulty UPS in Massawa.

l) Proper mounting and installation of the equipment in secondary cities on racks.

Note: Please see attached **Appendix I – Checklist of Completion, Corrective Measures and Commitments** (as of November 20, 2000) for updated information reference short-term recommendations.

6.5. MTDS

6.5.1 PROJECT MANAGEMENT

a) MTDS should demonstrate to SAIC its involvement and participation in facilitating the MOU and providing guidance in deriving a pricing structure.
b) MTDS should demonstrate to SAIC their participation and involvement in assisting the local ISPs with conducting business plans. The evidence should be in the form of written documentation.
c) The QA team recommends MTDS complete a communication assessment review of the following areas: the existing telecom sector policy framework, institutional setting, existing infrastructure, human resources deployment, promotion, range of services, pricing, and identification of telecom sector modernization projects. The review should be monitored closely by SAIC and strict deadlines and deliverables.
d) MTDS should conduct a site survey formulated to ensure proper support planning and connectivity activities.
e) MTDS should troubleshoot and resolve any IP sub-netting and routing problems.
f) MTDS should provide technical support for major demonstrations and trade shows.
g) MTDS is recommended to complete training to local ISPs, as contractually obligated.
h) MTDS should demonstrate to SAIC and USAID an interactive web site that examines the knowledge level and performance ability of the students training under this initiative.
i) MTDS should deliver a detailed summary report describing all training activities in detail, including identifying students, instructors, and encountered problems and resolution, and a transmitting of material collected from the student's performance assessment.
j) MTDS should provide SAIC and USAID with a detailed status report on the supplemental ISP Operations and Follow-up Training.
k) MTDS should provide SAIC and USAID with a detailed status report on the Advanced Training in System Administration.
l) MTDS should notify the local ISPs about the availability of a 24x7 helpdesk, as well as how and when to use it. In addition, MTDS should devise a strategy for addressing the problem of outbound international telephone calls from Morocco to Eritrea.
m) MTDS should make clear to SAIC and USAID precisely when the one year of support helpdesk began or will begin.
n) MTDS is encouraged to utilize the Letter of Findings throughout the course of their work in order to keep both SAIC and USAID abreast of their activity.

6.5.2 TECHNICAL

a) Proper install and setup of Checkpoint 1.1 Firewall software at the NOC.
b) Provide follow-up support training to NOC operators.
c) Provide one week of training to ISPs, with special emphasis on routing and on some basics of NOC operations.
d) Provide TSE technical support staff with helpdesk support information: hot-line telephone numbers and points of contact.

e) All equipment that MTDS is responsible for should be configured, and tested per each location, so that each site is fully prepared and in operational status for internetworking.

f) Assist TSE and ISPs with the application for their own individual /24 IP addresses and help them with IP sub-netting and routing.

Note: Please see attached **Appendix J – Checklist of Completion, Corrective Measures and Commitments** (as of November 22, 2000) for updated information reference short-term recommendations.

6.6. ISP

6.6.1 PROJECT MANAGEMENT

The local ISPs are advised to continue to participate in the working group with GSE and TSE during this initial stage of the Internet gateway, as well as to address questions or concerns surrounding the regulations and licensing agreement put in place.

7.0 LONG-TERM RECOMMENDATIONS

7.1. Government of the State of Eritrea (GSE) and Telecommunication Services of Eritrea (TSE)

a) GSE, TSE, and ISPs, are encouraged to meet regularly in order to address issues on the horizon such as:

- Newly formulated regulations;
- Changes in pricing structure;
- Increased demand for bandwidth;
- The introduction of new network and wireless services;
- The expansion or rollout of ISPs to secondary cities.

b) TSE and ISPs are encouraged to utilize the working group to address infrastructure issues regarding subscriber connectivity and faulty wiring.

c) The GSE is encouraged to maintain their consistent market approach to regulations and measures.

7.2. USAID/Eritrea Mission and USAID/Leland

a) The USAID/Eritrea Mission and USAID/Leland are encouraged to continue close cooperation with the various counterparts and to verify the quality of service being provided to the client by SAIC and subcontractors.

b) USAID/Leland is encouraged to hire a full-time coordinator to fill Jonathan Metzger's position with a candidate with the technical qualifications to verify contract deliverables.

c) USAID/Eritrea and USAID/Leland are recommended to acquire additional funding for the upgrade of the system.

7.3. SAIC

a) SAIC is encouraged in its engagement of the Leland Initiative in Eritrea to monitor the deliverables of its subcontractors, as well as meet with the client (GSE, TSE, and local TSE) and establish a professional rapport to verify customer satisfaction.

b) SAIC is encouraged to be alert for scheduling and maintaining deadlines.

c) SAIC should function as a repository for hard and soft copies of all status and trip reports, as well as training materials.

d) SAIC is encouraged to take a more active role in documented auditing, change management, and requirements' management.

7.4. ISPs

a) The ISPs are encouraged to continue to participate in the working group with GSE in order to express their concerns or to seek clarity on issues surrounding pricing structure and regulations.

7.5. Next Steps

a) A thorough technical and business assessment should be conducted shortly after the system's inauguration to prepare for a network redesign due to the changing requirements in both subscriber base and bandwidth demand.

b) Based on the assessment results' analysis, a flexible and scalable re-design should be generated to incorporate the latest communication technologies.

c) The implementation should follow a strict delivery schedule for deliverables using a phased approach.

8.0 APPENDICES

8.1. Appendix A – Scope of Work for IRM QA Team

USAID - Leland Internet Gateway Eritrea

SCOPE OF WORK FOR IRM TECHNICAL ASSISTANCE

I. BACKGROUND

USAID/Eritrea and the Government of the State of Eritrea (GSE) signed a Memorandum of Understanding (MOU) for the Leland Initiative on August 6, 1999.

In general, the MOU formed the basis of establishing an internet gateway in Asmara patterned after similar installations and approaches elsewhere in Africa.

Shortly after the MOU was signed, Leland Initiative agreed working with the GSE, to produce a Plan of Action to implement the MOU. This laid out the major actions – procurement, delivery, installation, staff hiring, training and system testing – on a timeline aimed at opening the gateway by the end of 1999.

Later, with the approaching end of fiscal year 1999, the Mission agreed to allocate the funding needed to supplement the national gateway with a wider, national network. The secondary cities agreement envisioned the installation of similar systems in Keren, Massawa, Dekemhare, and Mendefera. TSE, Telecommunications Services for Eritrea, of the Ministry of Transport and Communications, agreed to complement the secondary cities expansion with satellite dishes in Assab and Barentu and free digital microwave connection in the four other cities.

> The current Internet architecture in Eritrea is based upon a combination of satellite dishes and microwave links. The four secondary cities are expected to allow Internet users access to the Internet via dedicated links in the country's long distance network through the satellite dish in Asmara. The Leland Initiative is expected to encourage and establish private sector Internet Service Providers who would connect to these access points in all seven cities. The connections would be established through wireless links that will eliminate the need to install dedicated copper wire leased lines. The primary audience, i.e. the Internet users, would then access these private ISPs by dialing in to their facilities through standard telephone lines. Major institutional users such as businesses, NGOs, universities or others may want to set up their own leased line to the ISPs or directly to the Satellite dish, in order to get higher speed access than is available through a dial-up modem.

At the time of the system architecture for the national gateway in Asmara was designed, the demand for internet access in Eritrea was estimated to be similar to that of other African countries where the Leland Initiative had been implemented. That was in mid-1999 and the estimate demand was based on assessments during the three years immediately prior to the signing of the MOU.

It was expected that there would be 1,000 dial-in users and potentially one or more leased lines to major firms and installations after the gateway was in operation for approximately a year or so.

However, since that time, the expectations for demand have changed drastically. First the Government decided to explore ways to use the Internet circuit to transmit heavier Internet traffic from Eritrea (such as streaming video). Second, following the May 2000 armed conflict with Ethiopia, a large international peacekeeping contingent is scheduled to be in place by November 2000. Third, donor agencies have already begun to expand their activities and will be a factor for increased demand. While there is not enough data for a definitive estimate, it is clear that demand in Asmara will grow more quickly than was anticipated a year ago.

II. LEVEL OF EFFORT

IRM will nominate and field a Quality Assurance (QA) team, which will conduct:

a) an assessment – in layman's terms – of the original Leland Initiative Gateway architecture for Asmara; and
b) the options available for its improvement.

The QA will provide USAID Eritrea with the technical and management analysis and recommendations necessary to insure that, once it is formally inaugurated and placed in operation, that the Gateway – whether as originally configured as justifiably modified – will adequately serve the current demand for internet access, maintenance and support services.

If the original configuration, as recently improved by the visiting Lyman Bros. is found inadequate, the QA will provide the advice and recommendations needed to improve it sufficiently to serve the present demand for internet access. This set of recommendations should include, at a minimum, the equipment and software needed, acquisition costs, delivery schedules, installation and testing timelines, staff and budgetary implications of operation (whether USAID or GSE), continuing training and support needs and critical assumptions and measures needed to insure long term sustainability.

It bears noting that the current perception held by the Mission, TSE, as well as the community of potential users of the Internet whether ISPs, institutions or donors, is that the original architecture will not long be able to meet the demand if put into operation. Opening the gateway under these circumstances does not further the foreign policy objectives of the United States Government (USG) and is therefore not acceptable. If an "enhanced system" is warranted, i.e., one linked to a satellite providing dedicated bandwidth then the QA is expected to clearly lay out the pros and cons of such an alternative. The objective is to establish an Internet access/user environment for a duration sufficient (12 - 18 months at present demand levels) so that the GSE could plan on providing the budgetary, staffing, training, and equipment upgrades needed for complete ownership and sustainability.

III. Specific Tasks/Activities

1. Provide Pre-TDY Support

Evaluate SOW for system implementation

Assess implementation strategyAssess implementation strategyAssess implementation strategy

Prepare QA presentation for USAID/Mission

Prepare/present draft QA plan

Review proposed IT configurations and implementation up to now

2. QA Management

Staff QA team as needed

Interact with SAIC and subcontractors to prepare QA methodologies

Participate in daily meetings

3. Review conceptual/detailed design of the project

Review hardware, software, and telecommunications architecture

Review location of VSAT, microwave and ISP sites

Review data flows

Review readiness of sites for deployment of IT resources

4. QA for Education and Training Strategies

Evaluate Training Needs Plan

Evaluate Materials/Schedules

Evaluate Training Manuals and Reference Materials (scope, availability, ease of use, and adequacy)

Define methodology for measure effectiveness of training

Select sample of key users to evaluate effectiveness

Education/Training

Conduct evaluations Conduct evaluations Conduct evaluations

Conduct evaluations

Prepare reports with findings and recommendations

5. Deliver final report and provide a power point presentation on findings and recommendations to the USAID Mission, selected donors, and the Government of Eritrea in Asmara, and a summary presentation to AFR/EA in Washington, DC.
6. Approach

- Review System Integration
- Review implementation of telecommunication, data networking and internet working policies and procedures
- Review operational procedures and subcontract agreements
- Plan and schedule a test of existing communication links to validate network capacity
- Final Report
- Concrete results for implemenation

The final report to the Mission will evaluate the feasibility of the current technical design for sustainability, scalability, and capacity to support Mission objectives and Leland Initiatives. The team will also provide critical recommendations to ensure the long-term viability and transparency of the project.

8.2. Appendix B – Bibliography

Bibliography (Contracts/Reports/Emails/Presentations)

MOU - Government of Eritrea and USAID

Subcontract (SAIC to Lyman Brothers)

Subcontract (SAIC to MTDA)

MTDA Reports by Karl Stanzick

Leland and Eritrea Summary of Findings and Recommendations by Jonathan Metzger (August 1999, January 2000)

Lyman Brother's Technical Data for Eritrea Internet Gateway – Eritrea Internet Gateway via Hybrid Satellite Connection (November 9, 1999 and January 13, 2000)

"Establishing the Internet in Eritrea" by Mehret Ghebreyesus

Correspondence emails between Ed Miller and Rodger Lyman

Correspondence emails between Ed Miller and Jonathan Metzger

Correspondence email from Lane Smith to Bill Garvelink, Jeff Allen, Ed Miller

Correspondence email from Jonathan Metzger and GSE/TSE counterparts

SAIC - Options Paper for Eritrea Internet Gateway

SAIC – Wide Area Renovation Project WARP PowerPoint Presentation

SAIC – Commercial Procurement Invoice

Jonathan Metzger's Illustrative Timeline and Email Status Report

Email from Randy Holman to Jonathan Metzger

Email from Carol Horning to Ed Miller

Parts List for one Remote Station – Lyman Brothers

Lyman Brothers – Commercial Invoice to Eritrea

Task Order 323 – MOU signed August 6, 1999; Request for Technical Assistance

Statement of Work for Morocco Trade Development Services (MTDS)

Statement of Work for Lyman Brothers

Lyman Brothers VSAT Technical Bulletin (May 2000, June 2000, and August 2000)

8.3. Appendix C – Scope of Work for SAIC

SECTION C - DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

C.1 BACKGROUND

The United States Agency for International Development T.USAID) is an independent Government agency that provides economic development and humanitarian assistance to assistance US economic and political interests overseas. The Bureau for Africa within USAID is responsible for the Africa Global Information Infrastructure (Gil) Gateway Project, the core element for implementation of the USAID Africa Bureau strategy known as The Leland Initiative: Empowering Africans in the Information Age. New technologies (known as telematics) which make information more accessible, transferable, and manageable are catalysts transforming the economic and social structure around the world and supporting fast-paced sustainable development. African countries face formidable constraints on continued development in such areas as environment, disease prevention, literacy, and private sector development. Africa needs access to such telematics to adapt its development programs.

The purpose of the Leland Initiative is to increase access of African countries to information on the Internet and other GII technologies which the Africans can use to promote sustainable development activities.

USAID Africa Bureau's three Strategic Objectives for the Leland Initiative are:

Strategic Objective I - Create an Enabling Policy Environment

The project will promote policy reform to permit the introduction of telematics and reduce barriers to open connectivity. The results are expected as follows: 1) allocation of space on the communication spectrum to Internet Service Providers (ISP): 2) liberalization of policy environment to encourage open market access by private sector providers; and 3) creation of a policy climate conducive to broad expansion of the user base.

Strategic Objective 2 - Create a Sustainable Internet Service Provider Industry

The project will provide appropriate hardware and assist private sector ISPS for full Internet connectivity. The results are expected as follows: 1) indigenous ISPS, trained in marketing and business plan development, offering full access to Internet and better communication between

counterparts in Africa and the world; 2) country-wide access, with special attention to extension issues; and 3) low cost computer networking sustained by user revenues.

Strategic Objective 3 - Enhance User Applications for Sustainable Development

The project will increase the ability of African societies to use information and communication to capitalize on the benefits of the GII. The results are expected as follows: 1) local and international partnerships for sharing, information related to sustainable development in manufacturing, business, the environment, health, democracy, education, and others. 2) indigenous partnerships to create and maintain new information resources based in the African experience which feed the Gil-, 3) increased African capacity to use telematics information in decision-making and in managing scarce resources. 4) broadened user base for information systems and telematics services: and 5)indigenous training capacity for users and service providers.

Given the extreme variety to be found in both telematics policy and physical infrastructure across the African continent, the L.I. Project will require the technical program support and assistance of a number of institutions in order to achieve success. These include State/EB/CIP for policy, NASA, USAID/IRM, US Navy, and GSA for technical support and USAID/G Bureau sector projects for development applications. USAID will establish and chair a Steering Committee to serve as the principal coordinating mechanism for this endeavor. All significant contributors to the L.I. Project will be represented on the Committee. Among the activities of this Committee will be the approval of country selections, review of SOWs and teams for assessments, review of the Country Action Plans, and guidance of all implementation.

USAID and the Governments of several African countries are in the process of executing Memoranda of Agreement to implement the Leland Initiative and establish Internet connectivity for each country. As part of these bilateral agreements, each country agrees to implement a series of policy reforms related to affordable tariffs, free and open Internet access, and the delivery of retail Internet services by private sector ISPS. USAID agrees to acquire and install Internet gateway equipment (e.g., satellite dishes. web servers, compilers, routers, UPSs, and other Internet-related equipment), to train technical staff in each country on the operations of an Internet Gateway, and to furnish connectivity via satellite and links into an ISP in the United States (US).

USAID currently anticipates working with the following countries: Benin, Botswana, Cote d'Ivoire, Eritrea. Ethiopia. Ghana. Guinea-Bissau, Guinea-Conakry. Kenya, Madagascar, Malawi. Mali, Mozambique, Namibia, Rwanda, Senegal, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe.

C.2 OBJECTIVE

The Africa GII Gateway Project seeks to achieve broad based utilization of information and global information technologies within USAID's development partner community to promote sustainable development in Africa. The objective of the Project is to promote policy reform to permit the introduction of telematics (a combination of telecommunications and informatics) and reduce barriers to open connectivity, provide appropriate hardware, work with private sector service providers, and increase the ability of African societies to use information now becoming available. The project is being implemented in phases, beginning with those African countries closest to achieving telematics connectivity.

C.3 STATEMENT OF WORK

USAID is working with several Government agencies to implement the Leland Initiative and project responsibilities will vary by country. In some cases, the contractor shall be responsible for performing all

tasks described below. In other cases, the contractor shall perform a subset of the tasks. The actual tasks to be performed in each country will be identified prior the start of work for that country.

C.3.1 Task I - Conduct Country Assessment

The L.I. Project will begin its activities in each country with an assessment of all aspects of the telematics environment, from policy to possible service providers to actual and potential makeup of a sustainable user base. The contractor shall work with USAID or another L.I. Project Partner to select target countries in which the L.I. will be implemented. The contractor shall work with USAID to conduct the country assessment. The assessment will include the L.I. Project priorities, the potential for Internet demand, the Internet policy and regulatory environment, and the existing telecommunications infrastructure.

C.3.2 Task 2 - Develop Country Action Plan

The contractor, in conjunction with L.I. Project experts, shall use the Country Assessment to prepare and implement a Country Action Plan, including components addressing policy, hardware/software, and user base development, for achieving full Internet connectivity. The plan shall also include cost estimates for network development and implementation in each country. The cost estimates shall include estimated recurrent system operations and maintenance costs.

The Country Action Plan may take from one to three years to be fully implemented. All in-country activities shall be conducted in concert with and under the overall supervision of the USAID Mission.

C.3.3 Task 3 - Implement Technical Solution

Based on the Country Assessment and following the Country Action Plan, the contractor shall identify, procure, ship, install, and test all required system components (i.e., hardware, software. telecommunication. and satellite links). The contractor shall provide technical assistance in the actual specification, budgeting, procurement, and installation of hardware, software, and telecommunication links. The contractor shall configure and install the telecommunication links, provide sufficient satellite capacity, and assure all hardware, software, satellite, and telecommunication connections are operating correctly.

The contractor shall develop prototype systems as needed to demonstrate system functionality. The contractor shall provide technical support for the evaluation, design, implementation, operation, and maintenance of communications networks.

Attachment A contains an illustrative list of equipment that might be required to provide Internet access in an African country. The list is meant as a sample only to provide the contractor with an idea of what might be required for an installation.

C.3.4 Task 4 - Conduct Training and Workshops

The contractor shall coordinate and provide training for two to four in-country personnel in UNIX, TCP/IP, and basic telecommunications skills. Upon completion of training, in-country personnel will be expected to configure and manage all aspects of an Internet Gateway.

The contractor shall assist in the creation of national Internet Societies (ISOC) that will provide additional training to Internet Service Providers (ISP). The ISOC will work with sponsors and oversee the establishment of national and sub-regional African Internet Societies or analogous organizations that would ultimately take responsibility for training and technical consultation.

C.3.5 Task 5 - Provide Planning Support

The contractor shall provide overall planning support for the Leland project. The contractor shall prepare a Plan of Operation for each country to describe the ongoing use and maintenance of the system. The plan shall be prepared in draft and final versions. Additional planning support shall be determined on a country-by-country basis.

C.3.7 Task 6 - Provide Technical Support

The contractor shall provide on-site or telephonic assistance as required to support technical operations of the Internet Gateway and associated hardware and software. The assistance shall be available 24 hours per day, seven days per week to respond to user problems. Telephonic access to technical support shall be in the form of a telephone hotline. The hotline shall take recorded messages for later retrieval. The contractor shall respond to hotline messages with a corrective response within 24 hours of the time the request for assistance is left on the machine.

The contractor shall maintain a log of technical support activities (both requests and problem resolution actions).

C.3.7 Task 7 - Provide End-User Assistance

The contractor shall evaluate optimal methods for Non-Governmental Organizations and Private Voluntary Organizations (NGO/PVO) partners which can utilize the benefits of the Internet. This may include, but not be limited to, providing end-user training in the use Internet email, listservs, and as appropriate Telnet, FTP, Gopher, and WWW.

8.4. Appendix D – Scope of Work for Lyman Brothers

Attachment I to Subcontract 4600001943

EXHIBIT A
Lyman Brothers Statement of Work for
The Leland Initiative: Africa GII Gateway

Lyman Brothers, here after identified as the vendor, shall be responsible for the following tasks in support of the subject procurement:

1. Systems Engineering and Planning

The vendor shall complete the systems engineering initiated acessment phase for the candidate Public Telephone Telegraph (PTT)/Internet Service Provider (ISP) systems to be installed in Africa during the project. Following completion of the engineering design and approval by SAIC, the vendor may develop a prototype to demonstrate the system's capability. If required by SAIC, the prototype be developed and demonstrated in SAIC facilities in the Northern Virginia area. This task is complete upon approval of the design and acceptance of the prototype by FEDSIM.

Following completion of the systems engineering and prototyping, SAIC and the vendor will jointly develop an action plan for installing the PTT/ISP systems in Africa. The plan will define the countries in which the systems are to be installed, the locations in each country in which each system is to be installed, any local support required for installing the system, and provide a schedule for acquiring, integrating and delivering the systems for demonstration in the United States and subsequently in each subject country in Africa.

2. Acquire, Integrate, and Demonstrate Systems for Installation in Africa

In accordance with the plan and schedule developed in Task 1, the vendor shall acquire the necessary equipment and subsystems to develop an PTT/ISP system for each of the countries defined in the installation plan. The equipment shall be installed and integrated into an PTT/SP system in an SAIC facility in northern Virginia and demonstrated to SAIC, FEDSINI, and USAID representatives according to an acceptance test plan developed jointly by SAIC and the vendor. After successful demonstration to and acceptance by the Government, the equipment will be disassembled and packaged for shipment to the appropriate country in Africa.

3. Install Systems in Africa

Upon arrival of the equipment and subsystems for an PTT/ISP system in Africa, the vendor shall travel to the appropriate country and install and integrate the components into an PTT/ISP system. The system shall be demonstrated to be operational to US Government and local in-country representatives using the same acceptance test plan applied during Task 2 in the United States. This task is completed on a site by site bases as the FEDSIM representative accepts each installation.

4. Provide In-Country Support

After installation of the PTT/ISP system in an African country, the vendor shall provide training and telephone assistance to support SATCOM and/or terrestrial communications with associated hardware and software. The vendor shall establish a system to provide telephonic access to technical support in the form of a telephone hotline. The hotline shall take recorded messages for later retrieval and shall be available 24 hours per day, 7 days per week. The vendor's system shall provide a response to a support request within p 6 hours after the request is left on the machine. The vendor shall maintain a log clearly identifying the client, problem, resolution, and time required to service the request. The log shall be summarized on calendar month bases as an addendum to the monthly status report

5. Miscellaneous Engineering Support

The vendor shall provide Engineering Support Services on a level-of-effort fixed-price per day bases. Support may be required for site surveys and country assessments, special events, trouble shooting existing communication systems and other activities as directed.

6. Travel

(CLIN 02)

The vendor shall obtain prior approval from SAIC for trips that are cost reimbursable under this contract. The traveler shall file a trip report, using the attached format, within 7 days of returning. Travelers are encouraged to submit interim reports by e-mail at least weekly when on multi-week trips.

7. Tools

(CLIN 03)

During installation, the vendor may purchase locally, hardware and/or materials required completing the installation. Purchases totaling more than $500 per site require pre-approval by the buyer.

Purchase of equipment and shipping may be required under task orders issued on this contract.

8. Other Direct Cost (CLIN 04)

Communications, visa fees, shipping, and seminar cost may be charged to this CLIN. These cost will be reimbursed or fixed price as other direct charges (ODCS) under CLIN 04.

9. Deliverables

The vendor will provide one master hard copy and when available a soft copy of all deliverables to SAIC. Soft copy may be transferred by electronic means (e.g. attached to e-mail or placed on a ftp server that SAIC has access to). The MS Office tool suite is preferred. Deliverables shall include the following:

a. Monthly status reports in the FEDSIM format (sample attached). The report is due on the first working day following the 20th of the month.
b. Trip reports as described in paragraph 5.
c. Copies and updates of all engineering drawing and technical materials produced.
d. Telephone help desk logs.
e. Letter of Findings (LOF) as required. This is a flexible format for passing planning information and raising issues for the customers' consideration.

Contract Line Item Summary:

CLIN 01 - Labor
CLIN 02 - Travel
CLIN 03 - Tools
CLIN 04 - ODCs

8.5. Appendix E – Scope of Work for MTDS

Attachment 1, Subcontract 4600002148
EXHIBIT A
MTDS Statement of Work for
The Leland Initiative: Africa GII Gateway

1.0 Background:

Morocco Trade Development Services (MTDS) is a member of the Science Applications International Corporation (SAIC) team that was awarded a five year contract in February 1997 to support the Leland Initiative sponsored by the United States Agency for International Development. MTDS is a key member of this team, providing on-continent training and technical support from its base in Rabat, Morocco.

Earlier work was performed under a fixed price per task. This contract puts in place an instrument for Indefinite Delivery Indefinite Quantity (IDIQ) Task Orders (TOs). All work is performed under TOS.

2.0 Scope:

MTDS shall provide support in the areas of Country Planning, Post Installation and Supplemental Training, and On-site Technical Assistance. After coordinating with MTDS, SAIC will issue a written Task Order Request (TOR) that will define the work, labor skills, scope, and deliverables for the task. All tasks performed under this contract shall have a written TO in place before work commences. Travel and report preparations are to be included within the resource constraints of scope and the not to exceed price. Task orders will be in the following functional area:

2.1 Country Assessments and Implementation Planning Support:

2.1.1 TMTDS shall support the following activities:

a) Conduct policy visits to facilitate Memorandum of Understanding (MOU) signing, establishment of PTT pricing structure, ISP selection, PTT/ISP convention adoption and other problem resolution.
b) Perform Pricing and Business Plan Facilitation to foster Pricing and Business plan development for PTT/ISP operator.
c) Perform Communications Assessment to review of existing telecom sector policy framework, institutional setting, existing infrastructure, human resources deployment, promotion, range of services, pricing, and identification of telecom sector modernization projects.
d) Conduct site survey to country to support planning or connectivity activities.

2.1.2 Scope range: One to three staff members, one to three weeks duration.

2.1.3 Deliverables: Draft and Final MOUS, Meeting reports; Draft Plans, Draft Assessments

2.2 On-site Technical Support

2.2.1 TMTDS shall support the following activities:

a) Make ISP preparatory visits to inform selected ISP's (up to five) of the installation action plan, answer questions and concerns, examine ISP equipment and, locale and provide recommendations or technical requirements.

b) Site assistance visit to assist PTT staff in establishing PTT/ISP connectivity in a fair and efficient manner, to include IP sub-netting and routing to ISP'S.

c) Promotion Support to provide technical support for major demonstrations and trade shows.

2.2.2. Scope range: One to two staff members, one to three weeks duration.

2.2.3 Deliverables: Draft Plans, Meeting/Activity Reports, and Problem Assessments

2.3 Training

MTDS shall maintain up to four personnel who have participated in the Leland Initiative train-the-trainer program. All trainer candidates must be both fluent and literate in the French and English languages.

Following the train-the-trainer course, the candidates are expected to demonstrate the skills and proficiency required for certification as an Africa GII Gateway trainer.

2.3.1 Conducting Post Instillation Training

MTDS shall coordinate and provide training to new Public Telephone Telegraph (PTT) or Internet Service Providers (ISPS) in support of the USAID Africa GU Gateway. Subject matter shall include but not be limited to UNIX, TCP/IP, basic telecommunications skills, IPS operations, and business practices. Training may be conducted on a country or regional basis for groups of up to 25 students. From two to eight in-country personnel will be trained following installation of gateway and ISP's equipment at each of the location. Upon completion of training, the in-country personnel will be expected to configure and manage all aspects of an Internet gateway or ISP operation.

MTDS shall support student knowledge and performance measurements by insuring that survey, test, and evaluation exercise are completed by the students and reported. These actives will include but not be limited to the following:

- Student Critique Forms - student critique form with each copy of the student texts provided.
- Pre-Class Survey - a questionnaire will be developed and included with each copy of the student texts provided in item 2 above. This questionnaire is used to determine the students' background and prerequisite experience at the beginning of the class. This will assist the instructor in determining the level at which the class is to be taught and which students may require additional assistance.
- Post Class Knowledge Measurement - This is an examination that will measure the students' knowledge level of the subject material just taught. It will be in the form of an interactive Web Page.
- Post Class Proficiency Measurement - This is an interactive Web Application measurement that will assist in determining the students' ability to perform the essential functions required to operate and maintain an ISP.

MTDS shall provide a report following training at each site to summarize the training activity, identify all students and the instructors assessment of each, identify problems encountered and resolutions, and to transmit material collected from the student performance assessments.

2.3.2 Supplemental Training

TMTDS shall support the followings activities:

a) ISP Operations and Follow-up Training to assist one or more ISP's in launching operations; improving PTT/ISP staff skills.

b) Advanced Training in Systems Administration to intensive training in network management and security.

2.3.3 Scope range: One to two staff members, one week duration.

2.3.4 Deliverables: Draft Plans. Meeting/Activity Reports, Problem Assessments, and Student Assessments.

2.4 Provide On-continent Project and Technical Support

2.4.1 Project Management and Administration

MTDS shall provide project management and administrative support for all task orders under this contract. Activities shall include (but not limited too) planning, scheduling, coordinating, arranging travel, report preparation and quality control.

2.4.2 Helpdesk Support:

After installation of the PTT/ISP system in an African country, the MTDS shall provide telephonic assistance to support technical operations of the Internet gateway and associated hardware and software. The vendor shall establish a system to provide telephonic access to technical support in the form of a telephone hotline. The hotline shall take recorded messages for later retrieval and shall be available 24 hours per day, 7 days per week. The vendor's system shall provide a response to a support request within 24 hours after the request is left on the machine. The vendor shall provide this support for one year after installation of the PTT/ISP system. The vendor shall maintain a log clearly identifying the client, problem, resolution, and tune required to service the request. The log shall be summarized on a calendar month base. The most recent monthly summary shall be included in the monthly status report. Detailed logs shall be delivered to SAIC quarterly.

2.4.3 Scope: One to IO staff/days per month of various skill levels.

2.4.4 Deliverables:

MTDS shall provide one master hard copy and when available a soft copy of deliverables to SAIC. Softcopy may be transferred by electronic means (e.g. attached to e-mail or placed on an ftp server that SAIC has access to). Deliverable will be written in accordance with the FEDSIM Writer's Guide and directives in the applicable DOR. Acceptance is dependent on final acceptance by FEDSIM. The MS Office tool suite is preferred. Deliverable shall include the following:

a. Monthly status reports in the FEDSIM format (sample attached). The ret3ort is due on the first working day following the 20'h of the month.
b. Trip reports as described in within 7 days of returning.
c. Master copies and updates of all training materials produced by MTDS. Within 30 days of completion of training.
d. All materials collected from activities under paragraphs above, within 30 days.
e. Letter of Findings (LOF) as required. This is a flexible format for passing information and raising issues for the customers' consideration within 30 days of activity.

3. Travel (CLIN 02)

MTDS shall obtain prior approval from SAIC for trips that are cost reimbursable under this contract. The traveler shall file a trip report, using the attached format, within 7 days of returning. Travelers are encouraged to submit interim reports by e-mail at least weekly when on multi-week trips.

5. Tools and Training Materials (CLIN 03 & CLIN 04)

The purchase of tools (CLIN 03) requires pre-approval from SAIC and will be accounted for as Government furnished property. MTDS shall be required to reproduce some of the training materials locally from masters provided or developed by the instructor. These cost will be reimbursed as other direct charges (ODCS) under CLIN 04.

Contract Line Item Summary:

CLIN 01 - Labor
CLIN 02 - Travel
CLIN 03 - Tools
CLIN 04 - ODCs

8.6. Appendix F – List of Interviewees

List of Interviewees

USAID/Eritrea

William Garvelink	Mission Director for Eritrea	Falls Church, VA
Jeffrey Allen	Deputy Mission Director for Eritrea	Asmara, Eritrea
Carol Horning	Sup General Development Officer	Asmara, Eritrea
Tsega Ogbarebi	Project Manager	Asmara, Eritrea

USAID/Leland

Lane Smith	Leland Initiative Coordinator	Washington, DC
Jonathan Metzger	Leland Manager for Eritrea (former)	Washington, DC

SAIC

Edward Miller	Project Manager	McLean, VA
Michael Matthews	Project Manager	McLean, VA

Lyman Brothers

Bill Raney	Satellite Segment Broker	London, UK
Ron Hettich	Director, Satellite Engineering	Washington, DC
Randy Holman	Project Manager	Salt Lake City, UT
Roger Lyman	Program Manager	Salt Lake City, UT
Andre Finlinson	Satellite Engineer	Salt Lake City, UT

MTDS

Karl Stanzick	Program Manager	Rabat, Morocco

GSE

Estifanos Afeworki	General Director	Asmara, Eritrea
Ato Saleh Idris Kekia	Program Advisor	Asmara, Eritrea
Mekonnen Fesshazion	Director Regulatory Division, Communications Department	Asmara, Eritrea
Tewelde Gebreab	Eritrean Information Systems Agency, Director	Asmara, Eritrea

TSE

Goitem Ogbazghi	General Manager	Asmara, Eritrea
Bereket Habteab	Head of Traffic Branch	Asmara, Eritrea
Aemro Araya	Telecom and Regulatory	Asmara, Eritrea
Tecle Woldeselasse	Power and Civil Engineering Branch	Asmara, Eritrea
Abraham Arefaine	Traffic Branch	Asmara, Eritrea
Ghirmay Tsige	Engineer	Asmara, Eritrea
Tecle Hailemariam	Internet Project Technical	Asmara, Eritrea
Tekle Ghebremariam	Regional Branch Manager	Asmara, Eritrea
Tsegay Desta	Engineer	Asmara, Eritrea

ISPs

Efrem Negash	TSE/ISP	Asmara, Eritrea
Teumzghi Bahta	TSE/ISP	Asmara, Eritrea

Abraham Arefeayne	TSE/ISP	Asmara, Eritrea
Menghis Samuel	EWAN Technology Solutions, Managing Director	Asmara, Eritrea
Yohannes Ghebrehiwot	EWAN Technology Solutions, Operations Manager	Asmara, Eritrea
Twelde Stephanos	Tfanus Enterprises, Business Developing Manager	Asmara, Eritrea
Alazar Hailemichael	CTS, Managing Director	Asmara, Eritrea

Intelsat

Mehret Ghebreyesus	Independent Consultant	Washington, DC

8.7. Appendix G – Agenda for IRM QA Team

IRM QA Team Agenda

Date	Time	Purpose	Place	Participants
Monday October 16,	11: 05 p.m.	IRM team arrival on Lufthansa	Asmara airport	Gebremeskel Rental car driver
Tuesday October 17	9:30 a.m.	Briefing at USAID	USAID Conference room	Jeffrey Allen, Linda Lou, Kathrine, Carol Horning Horning, Tsega Ogbarebi
	11:00 a.m.	Briefing	USAID Conference Room	Collet/USIS, Isham/DAO, Hunter/ POL
	2:30 p.m.	Meeting with TSE Communication Department, Government of Eritrea	TSE/Communication Department	Goitom/TSE Director, Estifanos Afeworki CD, Tecle H.M, Mekonnen Fesshazion Asmelash, Carol Horning, Tsega Ogbarebi
	3:30 P.M.	Visit Asmara sites; gateway at Betgiorgis and the Network Operating Center at TSE office	TSE, Communication Department	Teckle H.M., Carol Horning Horning, Asmelash, Tsega Ogbarebi

Date	Time	Purpose	Place	Participants
Wednesday October 18	9:30 a.m.	Joint meeting with ISPs	USAID Conference Room	Carol Horning, Alazar/CTS, Yohannes/ Ewan, Tewolde/Tfanos, Ephrem/TSE, Tsega Ogbarebi
	3:00 p.m.	Briefing with the Director of Communication Department	Office of CD	Estifanos Afeworki Afeworki, Carol Horning, Jeffrey Allen, Mekonnen Fesshazion, Asmelash
Thursday October 19	8:00 a.m. 9:30 a.m.	Equipment Inventory & Test Donors meeting	NOC- Teleport USAID Conference Room	Bobby & Siika UN agencies, World Bank, Italian Co-op.
	12:00 a.m.	Ewan ISP	Ewan ISP Office	IRM Team
	2:00 p.m.	T-Fanus ISP	T-Fanus ISP Office	IRM Team
	3:00 p.m	CTS ISP	CTS ISP Office	IRM Team
	3:45 p.m	TSE ISP	TSE ISP Office	IRM Team
	5:00 p.m.	GSE		IRM Team, Mekonnen Fesshazion GSE
Friday October 20	7:30 a.m.	Trip to Dekemhare and Mendefera		Asmelash, Tecle H.M. Tecle G.M, Tsega Ogbarebi
Saturday October 21	7:30 a.m.	Trip to Massawa		Carol Horning, Tecle H.M, Tecle G.M. Mekonnen Fesshazion

Sunday October 22	5:00 a.m.	Trip to Barentu & Keren		Tecle H.M, Tecle G.M., Mekonnen Fesshazion
Monday October 23	9:30 a.m.	IRM QA Team Presentation Preparation	USAID Mission	TDY Team
Tuesday October 24	8:00a.m. 9:30a.m. 4:00p.m. 6:00p.m.	System Integration Test 1 GSE Donors Meeting System Integration Test 1 (continued)	Teleport-NOC-ISP Ministry of Comm. USAID	TSE, ISP, Lyman & MTDS Carol Horning, Tsega Ogbarebi, UN Agencies, World Bank, Italian Co-op. TSE, ISP, Lyman & MTDS
Wednesday October 25	9:00 a.m. 11:00a.m 2:00 p.m. 2:30 p.m.	MTDS and ISP Goitom Ogbazghi System Integration Test 2 GSE	USAID TSE Building Communication Department	ALL ISP Goitom, Tecle H.M, Tecle G.M, Abraham, Carol Horning, MTDS TSE, ISP, & Lyman TSE, ISP, Lyman
Thursday October 26	9:00a.m. Morning	ER Domain Eritrea IS Agency Preparation for debriefing	USAID USAID	Tewolde Gebreab, Carol Horning, Tsega Ogbarebi

	11:00a.m.	GSE	Ministry of Communication	ISP,TSE, CD, Carol Horning, Tsega Ogbarebi
	4:00 p.m.	Debriefing	Embassy	Ambassador, DCM, Carol Horning, Jeffrey Allen
Friday October 27	10:00a.m.	Debriefing with power point presentation	USAID	Carol Horning, Tsega Ogbarebi, GSE (Estifanos Afeworki, Mekonnen Fesshazion, Mihret & Yordanos),TSE (Tecle H.M., Ghirmay Tsige, Tsegay Desta)
	2:00p.m.	Visit warehouse	TSE warehouse	Bobby Jefferson, Siika Zhivkova
	3:30p.m.	Debriefing for USAID	USAID	Carol Horning , Tsega Ogbarebi
	5:00p.m.	Revision of the test results	All ISPs	
Departure Saturday October 28				

8.8. Appendix H – Exit Presentation for USAID/Eritrea Mission

IRM QA Exit Presentation (PowerPoint Presentation formatting modified for inclusion into this report. Original formatted report and graphics on file with IRM.)

IRM Quality Assurance (QA) Assessment
on
Leland Initiative Gateway
in Asmara, Eritrea

Presented by Freddy Blunt,
Bobby Jefferson, Siika Zhivkova, and Daniel Maly
USAID/IRM
What is the Leland Initiative?

Objectives

- Create an Enabling Policy Environment
- Create a Sustainable Internet Service Provider Industry
    - Enhance User Applications for Sustainable Development
-

Definition of Quality Assurance

- Verification of contractual roles and responsibilities
- SAIC (Prime Contractor)
- Overall Responsibility

Definition of Quality Assurance

- Lyman Brothers (Subcontractor)
- Field Site Surveys
- Create Technical Schematics
- Coordinate with SAIC
- Coordinate on Evaluations and Tests of Wireless Modems
- Install National Internet Gateway and Secondary City Equipment
- Install Gateway (Asmara)

Definition of Quality Assurance

- Install Secondary City Equipment (Keren, Massawa, Dekemhare, Mendefera)
- Provide 1 Year Worth of Bandwidth Service at 512Kb / 256Kb
- Test all equipment and tools
- Demonstrate Connectivity
- Demonstrate ability to download web pages
- Successful VSAT installation certification
- Equipment requirements including spares

Definition of Quality Assurance

- Morocco Trade and Development Services - MTDS (Subcontractor)
- On-Site Technical Assistance
- Perform Pricing and Business Plan Facilitation
- Review existing telecom policy
- Review existing infrastructure
- Site assistance visits to assist TSE staff in establishing TSE/ISP connectivity in a fair and efficient manner
- Provide "train-the-trainer" course
- Coordinate and provide training to the TSE and each of the ISPs

Definition of Quality Assurance

- Supplemental Training to support the following activities:
- ISP operations
- Follow-up training to assist 1 or more ISPs in launching operations
- Improving TSE/ISP staff skills
- Advanced training and systems administration
- Intensive training in network management
- Intensive training in network perimeter security

Definition of Quality Assurance

- Provide On-Continent Project and Technical Support
- Project Management and Administration
- Provide project management and administrative support which shall include:
- Planning
- Scheduling
- Coordinating
- Arranging travel

Definition of Quality Assurance

- Report preparation
    - Helpdesk Support and Log Report

Definition of Quality Assurance

- Expectations / Measurability (Speed & Performance)
- 1a) Expectation
- Bandwidth: Inbound 512Kbps / Outbound 256Kbps
- 1b) Measured Performance
- Shared Bandwidth: Inbound (Min. 200Kbps / Max. 800Kbps) / Outbound 256Kbps

Definition of Quality Assurance

- 2a) Expectation
- Network Capacity anticipated 1750 subscribers
- 2b) Measured Performance

- The initial projected 1380 subscribers can be supported, but may increase to 3120 within 6 months

Definition of Quality Assurance

- 4a) Expectation
- Flexible and Scalable Network Design
- 4b) Measured Performance
- Limiting, Inflexible, and Inefficient Network Design

Definition of Quality Assurance

- 5a) Expectation
- Readiness of Sites and ISPs for Operations
- 5b) Measured Performance
- Incomplete Configuration of Equipment
- Lack of Equipment Documentation
- Lack of Operational Procedures
- Incomplete Training

Definition of Quality Assurance

- A lack of Regulations / Contractual Obligations / Service Agreements
- Poor Coordination amongst Ministry of Communication, TSE, ISPs, and Subcontractors

Definition of Quality Assurance

- 6a) Expectation
- Contract Management
- 6b) Measured Performance
- Lack of Acceptance Criteria or Verification of Deliverables
- Lack of Coordination in Change Management

Definition of Quality Assurance

- 6b) Measured Performance
- Scheduled Variance
- Budget Variance
- Performance Variance

Definition of Quality Assurance

- "Does it work?"
- No, not fully operational yet
- Asmara
  - NOC - Technicians require documentation and training on the current configuration
- Mendefera
  - Equipment is not fully functional
- Assab
  - TSE has dismantled part of the equipment for safe-keeping; further delays are expected

Definition of Quality Assurance

- Barentu*
  - Equipment is not on site; phone system will not be operational until June 2001 per TSE

Definition of Quality Assurance

- System Integration Test
- (coordinated effort between VSAT, TSE, ISPs, IRM team and Subcontractors)
- Snapshot of system performance
- Measurable Results
  - All Inroute bound data
  - All Outroute data
  - Carrier's Signal Strength
  - Download speeds from the internet
  - The bandwidth allocated to each ISP
  - Determined "Single Points of Failure"

Recommendations

- What needs to be done to have the system operational?
- Completion of Lyman Brothers and MTDS contracted deliverables (by mid-Nov, except Assab and Barentu)
- GSE Establishment of Policy and Regulations (by mid-Nov)
- Additional GSE Human Resources (technical skills and training by mid-Nov)

Recommendations

- Managing Expectations
- How to meet increasing demand in regards to Donor program requirements
  - UPGRADE
- How and when do we upgrade?
  - Funding Dependencies

External Dependencies

- Peace Agreement
- Demobilization of Military
- TSE Pricing Regulations
- Contract Agreements between TSE/ISPs

Q
&
A

8.9. Appendix I – Lyman Brothers Checklist of Completion, Corrective Measures, and Commitments (developed by USAID/Eritrea)

Eritrea: Internet Phase I

Checklist of Completion, Corrective Measures and Commitments
As of Nov. 20, 2000

Lyman Brothers

✓ The VSAT and SpeedLAN training materials (4 copies each) and equipment specifications (3 copies) have been provided and signed for by the TSE for eventual use at the three VSAT locations (Asmara, Assab, Barentu).

✓ The trainees for each of the courses were specifically selected by the TSE and the decision to restrict the courses to TSE personnel was made by that institution.

✓ The VSAT and SpeedLAN courses have been completed to the TSE's satisfaction. 16 TSE technicians (8 for VSAT and 8 SpeedLAN) attended the training.

✓ The equipment installations at the Teleport and NOC in Asmara, at the stations in Massawa, Dekemhare, Mendefera and Keren have been completed, including the installation of racks and UPS; and

✓ The equipment at the above sites has been inspected and certified in writing as operational by both Lyman and TSE.

✓ Connectivity at the router was certified by TSE and Lyman between each of the secondary cities and the NOC on the following dates:

Dekemhare	November 17, 2000
Mendefera	November 17, 2000
Keren	November 18, 2000
Massawa	November 19, 2000

✗ SpeedLAN connectivity has not been certified for Secondary cities;

✗ No information, specifications or training on UDP and Cache server was provided during this training; despite repeated oral and written commitments from Lyman to do so. This needs to be provided on a follow-up visit.

Meeting Attendees:

Carol Horning, GDO USAID
Teckle H. Mariam, TSE
David Williams, Lyman Brothers
Tsega Ogbarebi, USAID
Date: Nov. 20, 2000

8.10. Appendix J - MTDS Checklist of Completion, Corrective Measures and Commitments (developed by USAID/Eritrea)

Eritrea: Internet Phase I

Checklist of Completion, Corrective Measures and Commitments
As of Nov. 22, 2000

MTDS

• By Nov. 25, get certification from TSE and CD that:

✓ Permanent license for the Checkpoint firewall provided to TSE on November 22, 2000.

✓ The NOC II training materials (3 copies) and the equipment specifications have been provided and signed for the by the TSE for use at the NOC in Asmara, and for eventual use at the NOCs in Assab and Barentu.

✓ The trainees for the NOC courses were specifically selected by the TSE and the decision to restrict the courses to TSE personnel was made by the institution.

✓ The NOC II training course has been completed to TSE's satisfaction.

✓ The transfer of the ER Domain name to the Communications Department, Ministry of Transport and Communications was completed on November 21, 2000.

✓ Additional software (Big brother Bandwidth, MRTG Bandwidth Management) was provided and installed at the NOC.

x Rapid Assessment Report on actual demand since Internet launch needs to be provided.

Meeting Attendees:

Carol Horning, GDO USAID
Teckle H. Mariam, TSE
Franck Horlaville, MTDS
Adil Bikarbass, MTDS
Tsega Ogbarebi, USAID
Date: Nov. 22, 2000