OFFICE OF INSPECTOR GENERAL

M E M O R A N D U M

DATE: December 7, 2000

TO: Inspector General

THRU: Thomas Bennett
Assistant Inspector General for Audits

FROM: Walter Opaska
Director, Information System Audits

SUBJECT: Survey of Wireless Telecommunications Bureau (WTB) Universal Licensing
System (ULS)

As part of the fiscal year (FY) 2000 audit plan, we have completed a survey of the Wireless
Telecommunications Bureau (WTB) Universal Licensing System (ULS). The objective of the
survey was to: (1) obtain information about the ULS development project; (2) evaluate project
documentation to identify weaknesses or inefficiencies; and (3) determine the nature and extent
of any subsequent review work. The purpose of this survey memorandum is to summarize the
results of the survey, document significant observations, and identify areas where additional
audit work should be performed.

REASON FOR SELECTION

One of the major initiatives the Commission is currently implementing is the Universal
Licensing System (ULS). This process is geared towards streamlining through automation the
FCC licensing process for WTB. This initiative represents a significant component of the
Chairman's initiative outlined in the Federal Communications Commission (FCC) Strategic Plan
for creating a paperless FCC that promotes one-stop shopping. The FCC has committed
significant financial resources towards meeting this objective. Because of the Commission's
resource commitment, OIG will perform survey work on the ULS.

BACKGROUND

WTB originally had eleven separate licensing databases and processing systems. These

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databases provided authorization of service for the following wireless services: cellular, land mobile radio, microwave, interactive video and data, narrowband and broadband personal communications, amateur, ship, aviation, restricted and commercial, and coast and ground stations. In addition, the WTB divisions responsible for licensing had databases for FCC support systems such as tower. These different licensing systems required over forty different WTB application forms in order to authorize service.

The Omnibus Budget Reconciliation Act of 1993 gave the FCC authority to award licenses for the use of the electromagnetic spectrum through public, competitive auctions. The auctions process redefined the way the FCC has conducted business. Once a purely regulatory agency, the Commission's role shifted with respect to auction services from regulation to promoter of competition in the communications industry. In the process, the functional requirements for the information systems that support licensing changed dramatically.

To meet these changing requirements, Wireless needed a comprehensive, integrated information system. The unwieldy group of eleven separate databases requiring over forty different forms to file could not efficiently meet the new requirements. To solve this problem, the ULS system development project was established.

The ULS project began in 1996. The ULS is a Wireless Telecommunications Bureau (WTB) project and is one of the FCC's largest systems development efforts ever undertaken. In August, 1996, an initial project plan was developed. In June, 1998, the first wireless service, Paging, was converted to the ULS. ULS has been integrated with such services as Auctions and Tower and allows a user to file licensing forms for supported services on-line from the desktop.

ULS has several goals including the:

- Development of an electronic licensing system
- Consolidation of the eleven Wireless legacy systems into one
- Reduction of manual handling by automation of the license processing function
- Simplification of the licensing process, including the reduction of the number of forms
- Real time retrieval of license information from the desktop

Filings are electronic and the number of forms used has been drastically reduced. Applicants enter basic unchanging data (such as contact information) only once, regardless of the number of filings. ULS also provides searching capabilities that enable Commission employees and the public to view applications and licenses on file with the WTB.

The ULS project is still in development and is projected to conclude in March 2001. A large portion of ULS is already in production. As of December 2000, nine of the eleven Wireless legacy systems have been converted to the ULS.

Conceptually, ULS is an innovative project and has been recognized as such. For example, ULS has received the Hammer Award from the National Partnership for Reinventing Government (NPR). NPR gives Hammer Awards to teams of federal, state, and local employees, and citizens

who develop new and innovative ways to streamline and improve the delivery of government services.

ULS is an expensive project. The total cost of ULS, as of the end of Quarter 1, Fiscal Year 2000, is over $13 million. The projected cost of ULS to the FCC, when completed, will be nearly 16 million dollars. Funding for the ULS has been primarily provided by Auctions revenue.
Only the costs of the Auctions system, another WTB application, exceeded ULS development expenditures.

ULS also became an important part of the FCC's new regulatory model. On March 17, 1999, the Chairman of the FCC submitted a report to Congress entitled "A New Federal Commissions Commission for the 21$^{\text{stt}}$ Century." In this document, the Chairman outlined his views on how the Commission should function. One of major goals stated in this document is "streamlining and automating the FCC licensing process." As part of the Commission's electronic licensing initiatives, ULS is an important part of this initiative.

SCOPE OF SURVEY WORK PERFORMED

This project was conducted as a survey. A survey is the preliminary audit work done before an audit and is not an audit conducted in accordance with Government Auditing Standards (i.e., GAO "Yellow Book" standards). The purpose of a survey is to gather general working information on important aspects of an entity, activity, or program, such as ULS and to determine the nature and extent of any subsequent audit effort.

The purpose of this particular survey was to examine the progress of the ULS project, report the results to the Inspector General, and recommend the next course of action. To meet this goal, this survey has a series of milestones. The first milestone is to provide an overview of the Universal Licensing System (ULS). The next goal is to analyze and report any identified problems in the ULS development process. The final milestone is to determine if any aspects of ULS need further Office of Inspector General (OIG) involvement and review. The survey report will recommend what, if any, additional action the OIG should take on ULS.

To accomplish the objectives of this survey, OIG auditors used the following methodology. An auditor reviewed ULS project documentation, including contracts, project plans, budgets, and system information. Also, an auditor interviewed employees on the ULS project and in other Bureaus and Offices, such as the Contracts and Purchasing Center and the Information Technology Center (ITC). ITC documentation related to ULS, such as the Quarterly Information Technology Reviews, and relevant Commission and Wireless Bureau documents were analyzed. Other Bureau and Office data, especially copies of systems development contracts, were part of the view. Federal government documents, including federal law, Office of Management and Budget (OMD) circulars and United States General Accounting Office (GAO) reports were reviewed. Finally, an OIG auditor reviewed documentation on how other organizations, such as the state of North Carolina, implemented large-scale integrated licensing systems with characteristics similar to ULS.

SUMMARY OF OBSERVATIONS

As part of the survey process, we evaluated the ULS development project to identify areas where weaknesses or inefficiencies exist which may require more comprehensive audit coverage. ULS is a measurable improvement over the largely manual systems it replaced. However, as part of the survey process, we identified a number of problems with the ULS development effort:

- ULS has limited functionality outside of the Wireless Telecommunications Bureau
- ULS has been subject to widespread delays
- ULS has experienced significant cost overruns
- No formal cost justification of the project was ever developed
- ULS has endured a series of systems development problems that contributed to the project delays mentioned above.

Limited Functionality

Despite its projected nearly 16 million-dollar cost, ULS has only consolidated Wireless Telecommunications Bureau systems. In this respect, ULS represents a classic "stovepipe system." A stovepipe system is one where all system integration is vertical, and is within one organization. Since ULS has included only WTB applications, its utility is limited to only that Bureau.

Other Bureaus & Offices developed separate initiatives that encompassed similar goals to those of ULS. At least three FCC systems development projects, the Equipment Authorization System (EAS), the Electronic Tariff Filing System (EFTS), and the Consolidated Database Management System (CDBS) reproduced, in concept, the electronic filing initiative of ULS and WTB. These three systems can be found in the Office of Engineering Technology, the Common Carrier and the Mass Media Bureaus, respectively. Likewise, a number of Bureaus and Offices have developed paperless office systems similar to ULS. Examples of paperless initiatives outside of Wireless include OSCAR, Operations Support for Complaint Analysis and Resolution, and ARMIS, the Automated Reporting Management Information System.

The overriding characteristic of these systems, including ULS, is that each was developed for a single bureau or office. None can be considered "universal," in the sense that the application covers more than one bureau or office. Some use hardware or software platforms not supported by the FCC's Information Technology Center (ITC). For example, OSCAR uses Lotus Notes, a software package not supported by ITC. ULS is just one system in a number of recently developed electronic filing and paperless office systems at the Commission.

Widespread Delays

ULS is nearly three years behind its original schedule. According to the initial project plan, ULS was to have been completed by May 29, 1998. By December 31, 1998 the completion date slipped to January, 1999. The project plan dated July 9, 1999 lists the final implementation date

of the last module at February 17, 2000. The first quarter, FY 2000, Information Technology Project Review, dated March 21, 2000, states that the last ULS project milestone will be completed in December 2000. As of December 2000, the last ULS module is scheduled to be completed in March 2001. This nearly 3 years longer than the original project plan forecasted.

The largest WTB database, Land Mobile, did come under ULS until December 2000. Some knowledgeable observers estimate that Land Mobile comprises about 80% of all Wireless licenses. Thus, it required over four years and millions of dollars, for ULS to encompass the majority of Wireless licensees. As of the date of this report, two legacy Wireless databases, Ship and Restricted and Commercial, are still not under ULS.

According to the first quarter, FY 2000, Information Technology Project Review, many of the delays can be attributed to external factors. These included changes in priorities and provisions, FCC rule changes, revisions to operational procedures, industry and user feedback, lack of funding, staffing problems, the Year 2000 event, system performance and maintenance problems, and problems with computer off the shelf (COTS) software.

A number of FCC rule changes have adversely affected the ULS implementation timetable. In addition, several rulemakings are in process that could have a significant impact on the ULS database, interfaces, and processing programs. Some of these rules had an impact on the conversion of legacy databases, such as Ship, into ULS.

ULS has sometimes changed its implementation priorities. The implementation of Land Mobile, for instance, has been moved ahead of Ship. Previously, this service was to have been added to ULS before Land Mobile. Also, the ULS systems staff is still determining how to implement all of its services. For example, the ULS Implementation Task Force is analyzing the impact of converting all of Land Mobile Services at one time versus a phased in approach. As of Quarter 1, FY 2000, this decision has not been made.

Frequent changes to the business requirements have been an ongoing cause of slippage in the ULS project. According to ULS project management, these changes resulted from a number of external factors, including FCC rule changes, revisions to the operational procedures, management changes, and industry comments. For example, comments from the Volunteer Examination Coordinators for the Amateur service resulted in multiple changes to the ULS system to accommodate their unique requirements. Other industry comments resulted in the ULS Implementation Task Force modifying ULS forms. These changes will result in delays because the contractor must revise the application search and print preview features of ULS.

Despite receiving millions of Auctions related dollars for development, ULS had a funding problem. The non-auction related licensing modules, Ship and FRC (restricted and commercial), had to obtain additional appropriated funds in Fiscal Year 2000 for new development and maintenance funding. If the ULS project did not receive the non-Auctions funding, then these modules could have been delayed until funding is in place. These two services are among the last to be implemented into ULS. For instance, Ship is not scheduled to go into production until October, 2000.

Competing priorities for staff resources was cited as another reason for the delays in the implementation of ULS. Testing of ULS was delayed because of the lack of qualified staffers. Those employees who qualified as testers were also working on other priority projects, such as backlog reduction. The resulting tester shortage delayed the deployment of ULS modules deployed without proper testing and increased the costs associated with the project. Deployment without testing constitutes a significant risk to successful deployment.

The Year 2000 (Y2K) event was also listed as a factor in delays in ULS deployment. Originally, the ULS development team felt that Y2K would not affect the project at all. The project plan as of December 31, 1998 forecasted that every Wireless legacy system would be converted to ULS by December 31, 1999. Because of this viewpoint, Wireless did not begin extensive Y2K preparations until summer, 1999. Wireless still maintained that the remaining legacy applications, such as Land Mobile, did not have to tested for Year 2000 date compliance because they would be integrated into ULS by the end of the year. When this did not occur, these applications had to be tested for Y2K compliance. This further delayed the conversion of these legacy systems into ULS.

A problem with the discontinuance of an important COTS package was given as another reason given for the delays. The technology initially implemented for the Geographic Information Software (GIS), was discontinued by the vendor. This required the development team to select and implement a new product. A replacement has been selected and this development will begin under the ULS maintenance contract.

Some of the delays were the result of ULS objectives. For example, the Technical Specifications document for ULS set a number of ambitious goals that appear to be very difficult to attain. These included the development of a single consolidated form and a single "mega" flat file to accommodate an electronic file for all Wireless licensing services as diverse as amateur radio, land mobile, and ship communications. Requirements such as these are very ambitious. Because ULS is, in many respects, a state of the art application, these goals add an added level of complexity to an already intricate system. Despite these complications, ULS project management seriously underestimated the complexity of conversion and implementation tasks by originally stating that ULS can be completed in less than 1½ years.

Cost

ULS expenditures have been budgeted at nearly $16 million. The costs incurred, so far, have been close to initial projections. ULS is funded largely, but not entirely, by Auctions revenue. The Fiscal Year 1999 ULS costs are larger than all other current information systems projects combined.

Two reasons can possibly be given for high costs. ULS was not subject to a rigorous cost justification. Also, the project was subject to numerous systems development problems.

Cost Justification

ULS had no formal cost justification performed. Standard investment calculations, such as Return on Investment (ROI) or Internal Rate of Return (IRR) were not performed. The ULS Project Milestone Chart does not list any investment analyses as milestones. The milestone chart only states that several impact benefit statements were produced outlining impacts and benefits of ULS.

The Commission had an Information Resources Management (IRM) Steering Committee plan in place. This committee is established by FCC Directive 1400.3, IRM Steering Committee. The Steering Committee was established to meet the requirements of Circular A-130 and to facilitate IRM planning. Its objectives are to review the information resources management program and to provide timely advise and recommendations to the Managing Director on the direction of the program and its implementation priorities. The IRM program includes information technology, records management, and communications. In carrying out these objectives, the Steering Committee will ensure that the IRM program is accomplishing its stated goals in a cost-effective manner. Although FCC Directive 1400.3 established this committee, the Steering Committee was inactive.

The IRM Steering Committee Directive 1400.3 shows that the Commission has acknowledged that the systems need to be developed in a cost-benefit manner. However, the IRM Steering Committee was not empowered to be a rigorous capital investment committee and was inactive. The directive, and presumably the IRM Steering Committee, expired in June, 2000.

No other independent cost review function, such as a capital investment committee, appears to exist at the Commission to manage and approve large expenditures or investments. A capital investment committee would approve large expenditures, like ULS, and functions as a high-level control point for large projects. Other independent federal agencies, such as the United States Postal Service (USPS), have active capital investment committees to control their large projects. The USPS capital investment committee approves and sometimes kills capital investment projects.

Management of the ULS investment did not meet accepted business practices. The multi-million dollar investment that ULS represents was not independently reviewed. Best practices require an independent review if costs exceed 0.5 and 2 percent of organization's information technology (IT) budget. ULS total projected costs exceed 6% of the total FCC Budget (FY 2000).

Federal Laws require investment management of large information systems projects. Office of Management and Budget (OMB) Circular A-130, Management of Federal Information Resources, requires that agencies "prepare and update… a benefit-cost analysis for each information system consistent at a level of detail appropriate for the size of the investment.[1]" A-130 requires that agencies "conduct benefit cost analyses to support ongoing management oversight processes that maximize return on investment and minimize financial and operational

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[1]   OMB Circular A-130, February 8, 1995 section 8.b.(1)(b)(I)

risk for investments in major information systems on an agency-wide basis.[2]" Finally, A-130 states that "agencies shall "acquire information technology in a manner that…maximizes return on investment.[3]"

Other federal documents and laws support the strict investment management provisions of A-130. OMB Memorandum 97-02, Funding Information System Investments, requires that executive agencies show a demonstrated return on investment (including IT investments), and, to demonstrate accountability for project progress. Executive Order 13011 (July 16, 1996) also requires executive agencies to establish a management structure to manage info system investment and implement an investment review process. Finally, the Clinger/Cohen Act states that executive agencies must develop a process to manage IT investment risk. These laws formalize a prudent business practice in systems development.

Best practices in information systems also support this position. The Federal CIO Council states that one of the specific success factors for an information systems project is an active, energized investment review board. The Council also reported that nearly every agency reported success in implementing investment review boards.

A prior audit found similar problems at the FCC. A General Accounting Office (GAO) audit found that the FCC's systems development policies do not require a thorough benefit-cost analysis[4]. The GAO review concluded that because the FCC did not require benefit-cost analyses, it "risks not selecting the best alternative[5]."

Systems Development Problems

ULS has endured a number of systems development problems. These included numerous change orders, lax development criteria, lack of compatibility with other systems, and questionable database integrity and security.

ULS was subject to numerous contract change orders. For example, the original ULS programming contract in December, 1996 was for $400,000. This audit identified eleven change orders totaling $1,671,000, or over four times the value of the original contract. Many changes were small, but some were far reaching.

ULS development criteria did not appear as rigorous as other efforts in some areas. To determine this, ULS contracts were compared with information systems contracts issued by other Bureaus and Offices, including Mass Media and the Office of Engineering Technology. These contracts required such routine specifications as ownership of source code, a Year 2000 certification by the contractor, a compulsory systems development life cycle methodology, and an interface with the fee collection database. One contract even specified compatibility with

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2   OMB Circular A-130, February 8, 1995 section 8.b.(1)(d)
3   OMB Circular A-130, February 8, 1995 section 8.b.(5)(a)
4   Federal Communications Commission , Strategic Focus Needed to Improve Information Resources Management (GAO/IMTEC-90-52, July 20, 1990, p.10)
5   Ibid.

ULS. ULS specifications required none of these items in the contracts and task orders available for review.

ULS did receive the benefit of the Year 2000 certifications that were incorporated into amendments to the ITC's programming services contracts.   However, these amendments occurred in December 31, 1997, over one year after ULS development commenced and only affected contractors on the programming services vendors like Computech.

ULS development goals were very ambitious. Sometimes, they appeared to lack rigor. For example, the Technical Specifications document stated that "no 'bad' data will be accepted into the database." This vague specification appears impossible for a developer to meet. I tested this development goal by successfully entering a license application with invalid identifiers into the ULS Internet license application forms. This included a both an invalid social security number (SSN) for an individual application and a taxpayer identification number (TIN) for a commercial application.

There is no provision in ULS contracts for compatibility with other systems. ULS contracts that were reviewed appear to focus only on the management of wireless applications. ULS contracts and task orders examined did not require compatibility with any other systems. This contrasts with other Bureaus that saw the need for interrelationships other Bureau and Office systems. The Mass Media Bureau, for example, required compatibility with the ULS system in its contracts.

An example of this problems the use of the Taxpayer Identification Number (TIN) as the key for much of the ULS database. The TIN is limited as a unique database key. For example, the TIN cannot be used to correlate receipts of licensing fees with the ULS database. Like other FCC systems, ULS needs to be integrated with the Commission Registration System (CORES). Because of this, ULS must retrofit the CORES FCC Registration Number into the system. This required a system impact analysis and affected the ULS timeline and budget. Integration with CORES will add an estimated $43,200 to the costs of ULS.

Security appears to need strengthening. The successful entering of the transaction with an invalid SSN or TIN as a key calls database security and integrity into question. The FCC Computer Security Officer never reviewed ULS security before implementation. As a result, security problems exist. For example, some ULS password practices are poor. The ULS system allows a user to create a password that is was the same as the TIN. All numeric passwords that are the same as the username are easily guessed and vulnerable. Also, ULS uses the standard FCC platform similar to Auctions and may have some of the security issues the Office of Inspector General has identified in prior security audits

ULS system development problems continue into Fiscal Year 2000. For example, ULS has experienced difficulties in system performance. Its servers had to be upgraded substantially by installing more powerful equipment.

With ULS partially implemented, a new problem, resource competition from maintenance, has

appeared. Now that seven of the eleven systems have been converted to ULS, resources must be shifted from development to maintenance. The continual requests for enhancements by internal FCC staff and external users of the system is hampering the development effort for the remaining services and can effect established deadlines.

The Licensing Group Task Force and ULS

In 1999, the Chairman announced the Draft Strategic Plan of the Federal Communications Commission. The plan included an objective that the Commission restructure and streamline its licensing activities. One of the overall goals and objectives of the Commission published in the Draft Strategic Plan is to "create a model agency for the digital age." The plan views the FCC of the future as being very "different both in structure and mission. Increased automation and efficiency will enable the FCC to streamline its licensing activities, accelerate the decision making process, and allow the public faster and easier access to information. The FCC will be a "one-stop, digital shop" where form-filing and document-location are easy and instantaneous." An important policy initiative of the Draft Strategic Plan is the consolidation of the authorization of service/licensing functions across the agency in order to achieve economies of scale in the administration of our core responsibilities. Consolidation of licensing functions will provide one-stop shopping facilitating access and timeliness. One of the important policy initiatives of the Draft Strategic Plan is to establish common forms where possible and streamline the application processes.

After holding public forums to solicit input, participants identified four goals associated with this objective. They include (1) the removal of requirements for redundant filings; (2) improvement of the speed of service; (3) an optimization of resources to conduct market analyses; and (4) the ability to conduct timely and accurate status checks.

In December 1999, the Commission formed a working group to conduct a high level review of current licensing and authorization of service processes. This licensing group, composed of in-house experts and Union representatives, was further tasked with identifying the best options available to achieve the goals expressed in the Draft Strategic Plan and by the Public Forum participants.

The working group reported on their findings in a March 24, 2000 report titled "Improving the Commission's Licensing and Authorization of Service Functions." This report identified three options for consideration: (1) continue improving existing processes within the current structure; (2) establish a "virtual" licensing bureau with a single electronic entry point; and (3) reorganize and create a "one stop" Licensing and Authorization of Service Bureau. The working group did not recommend one of the three options. Instead, the group recommended further studies and additional public forums to discuss and explore the alternatives in-depth.

This study indicates that the Commission is actively pursuing alternatives to the current Bureau /Office method of filing licenses. In its report, the Licensing Working Group has identified many of the same problems for licensing in the Commission that this survey did for ULS. For example, the report states that most of the licensing automation efforts appear to be focused on

the mission of a particular Bureau or Office rather than as part of an integrated, Commission-wide plan. Despite common objectives and similarities in processing procedures, Commission licensing processes are mostly independent of each other. Further, the report states that maintaining separate systems imposes significant costs and inefficiencies on both the Commission and its customers. Many of these systems perform related or overlapping functions, or contain duplicate information. In addition, many of the entities that the Commission regulates file applications or submit data in multiple systems.

The Licensing Working Group has identified many of the same problems as those that exist in ULS, but on a Commission wide basis. The working group has identified a set of viable alternatives and solutions to the Commission's present system of processing licenses that could apply to all Bureaus and Offices.

CONCLUSION

Based on the results of this survey, the Office of Inspector General should not perform any additional audit work on the ULS system. Instead, the OIG should focus on Information Technology (IT) Capital Planning and should continue to monitor the progress of the proposed Licensing Bureau's working group. An audit of ULS development would just reiterate the findings of this survey, only in more detail. Further audit work by the OIG solely on ULS would most likely duplicate the work being done to streamline the licensing process. Also, a focus on one system in a single Bureau is counterproductive to the goals of the Draft Strategic Plan.

Although we identified weaknesses and inefficiencies with ULS and the ULS development effort, we believe that the Commission's recent adoption of a Commission-wide Systems Development Life Cycle (SDLC) will address causal factors that contributed to the problems with the ULS development process identified during our survey. Further, we believe that an audit of Information Technology (IT) capital investment planning[6] scheduled for this fiscal year will address additional factors that contributed to the weaknesses and inefficiencies we identified. Finally, the Draft Strategic Plan for the Federal Communications Commission included a plan for the Commission to restructure and streamline its licensing activities. This goal resulted in the establishment of the Licensing Working Group. The group developed a set of viable alternatives for streamlining the licensing function. The group documented its findings in its report, "Improving the Commission's Licensing and Authorization of Service Functions." The Office of Inspector General should continue to monitor the progress of the Licensing reorganization process. The OIG will observe these activities to determine if they are consistent with the goals of the Draft Strategic Plan consistent with its audit mission of providing an independent, systematic assessment of an FCC program.

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6   The objective of the IT capital investment planning process is to determine its effectiveness and its compliance with Office of Management and Budget (OMB) Circular No. A-130.

DATE: February 1, 2001

TO: Walker Feaster III
               Inspector General

FROM: Gerald Vaughan
               Deputy Bureau Chief, Wireless Telecommunications Bureau

SUBJECT: Response to the Inspector General's Memorandum on the Survey of the Wireless
               Telecommunications Bureau's Universal Licensing System

The Inspector General's December 7, 2000 Memorandum to the Chief of the Wireless
Telecommunications Bureau (WTB) regarding a survey of the Universal Licensing System
(ULS) requested the Bureau provide insight into lessons learned from the ULS development.
The memo also asked for any comments regarding the funding of systems development projects.
Additionally, it identified a number of weaknesses and inefficiencies with ULS and the
development effort.   We will address each of these points.

Clearly, the Universal Licensing System project has provided the Bureau with valuable lessons
regarding major systems development initiatives.

1. Technology, functional requirements and government regulations will change. With those
   changes, project timeline and costs will be impacted.

2. Every aspect of a major systems development initiative will take longer than you initially
   thought.

3. Competing projects, initiatives and reorganizations will take place during the project life
   cycle and will impact the timeline and costs associated with the system deployment.

4. An emphasis on change management, training and outreach is a critical part of the overall
   deployment of the system. Conversion from the legacy systems caused user concerns that
   had to be addressed this is key component that impacted the schedule.

5. Input from users, both internal and external is very limited until you have a concrete
   prototype of the system.

6. Holding off on further phases is critical if fixes or enhancements to earlier releases will
   reduce frustration of users or improve efficiency.

Each of these lessons has been extremely important in the deployment of ULS. As the ULS
project team encountered changing requirements and competing demands they needed to
continually revise their project strategy and timeline to achieve a balance between the goals of

deploying the system and meeting customer needs.

Managing changing requirements has a significant impact on the funding of any systems development project. Any cost justifications developed for major systems development projects must allow for flexibility as requirements change, technology advances and customer needs are further identified. Using the Commission-wide Systems Development Life Cycle (SDLC) approach that was recently implement should assist the Bureaus in meeting these competing demands.

The weakness and inefficiencies the Inspector General identified were as follows:

- ULS has limited functionality outside of WTB
- ULS has been subject to widespread delays
- ULS has experienced significant cost overruns
- No formal cost justification of the project was ever developed
- ULS has endured a series of systems development problems that contributed to the project delays mentioned above

We address these points, in turn, below.

ULS has limited functionality outside of WTB.

The Inspector General's memorandum states that ULS has only consolidated WTB systems. When the ULS was initially conceived in 1995, the Wireless Bureau hoped to include all licensing functions that the Commission is responsible for in a single system. This ambitious goal would have created the "one stop, digital shop" that the Commission identified in its draft Strategic Plan in 1999 as an important goal. Back in 1996, the other Bureaus in the Commission that were responsible for licensing functions did not wish to become part of the single untested and yet to be developed system. The Wireless Bureau had 11 separate systems covering 43 services that were indeed stovepipe vertical systems representing over 80% of all licensing in the agency. The Universal Licensing System met its goal of creating a horizontal system to process its various radio services. This success proves that distinctly different licenses can be effectively and efficiently processed through a single system.

Specifically, the universal concepts within ULS allow for consistent handling of electronic data filing and associated payments, return and dismissal procedures, speed of disposal accountability, fee sufficiency and international processing of frequency clearances for all WTB services. Additionally, the public has on-line access to application and license data for all services, purposes and tracking of data transaction changes including the history of previous filings.

Widespread delays.

The Inspector General's memorandum states that the ULS deployment is nearly three years behind its original schedule. WTB management and the ULS development team realize the original schedule was extremely ambitious. We were working with 43 services with little or no existing written processing documentation, in a period where the Communications Act and all of our rules were and are undergoing significant change. Early in the project, management made a conscious decision to revise the schedule based on what was known and allowed the management team the flexibility to reverse, adjust and amend the schedule as the team reviewed each service and system. To conduct a full requirements study with full and proper documentation of the existing systems would have delayed the project for years. The lessons learned provide a number of the reasons for the current ULS implementation schedule. In addition to those reasons the following factors had major impact on the original deployment schedule:

- Duing the requirements and system design phases of the project, there were limited in-house Government subject matter experts to develop full requirements, answer technical questions posed by the contractor's analyst during the system design phase, and test functionality. A number of key personnel moved to the Gettysburg call center during the initial requirements and systems design phases of the project resulting in missing and misunderstood requirements. In addition, key project management personnel changed positions and responsibilities during the life cycle that resulted in subsequent changes in specific components of the project.

- Schedule changes also occurred due to the coordination of numerous universal functions that crossed the eleven different services. For example, the electronic filing options prior to ULS were available to the public with limitations based on application purpose, such as renewal, and radio service, now all application purposes and radio services can file electronically. Reducing and recognizing license's interaction with ULS was always a priority over any schedule goal.

- The Y2K moratorium that was set up by the Managing Director's office had an impact on the deployment schedule. During the moratorium, no code changes could be implemented.

- Several major regulatory changes occurred during the project life cycle that resulted in shifting priorities. In addition the development and coordination with other systems development efforts surrounding CORES and RAMIS had significant impact on the deployment schedule for the conversion of wireless legacy systems.

Cost overruns.

The Memorandum states that the ULS project has experienced significant cost overruns. However, it also states no formal cost justification of the project was ever developed, and that the ULS expenditures to date have been close to initial projections. The Bureau recognizes that no formal cost justification was provided. The SDLC, which requires a cost benefit analysis,

was not implemented until FY 2000.   The project team annual develops a ULS budget and the project has always been under budget as shown below.

ULS Project Cost Summary

Year	Projected Costs	[1] Actual Costs
FY 1997	$600,000.00	$580,513.00
FY 1998	$6,647,000.00	$5,655,595.15
FY 1999	$8,185,000.00	$7,254,528.82
FY2000	$4,697,607.80	$2,933,974.80
Total Project Costs	**$20,129,607.80**	**$16,424,611.77**

ULS Project Costs by Category

Category	FY97	FY98	FY99
Software Development	$579,318.00	$1,204,773.92	$3,760,216.00
System Hardware		$1,527,113.04	$599,822.22
Implementation Support		$1,171,389.00	$1,328,446.60
Project Management Support		$130,000.00	$150,000.00
Off-the-Shelf Software		$121,924.14	$254,519.48
PC Upgrades		$825,722.31	$478,701.00
Network Operations		$247,781.56	$62,592.99
Database Management Spt		$336,000.00	$495,000.00
Travel	$1,195.00	$7,834.91	$10,294.38
Miscellaneous		$63,056.27	$114,936.15
Total	**$580,513.00**	**$5,635,595.15**	**$7,254,528.82**
		$6,646,904.00	**$8,185,260.00**

Budget Submission

In addition to the broad weakness addressed above, the memorandum also identified several specific inefficiencies or issues on which we would like to provide additional information and clarification.

The memorandum also states that Land Mobile applications represent 80% of the wireless licenses. In fact, it represents approximately 20% of the wireless licenses. Currently, 95% of all Wireless licensees are issued through ULS.

The memorandum states that changes were made to the implementation priorities. These changes in schedules and priorities were fully expected from the day the project was approved. This flexibility, as opposed to adhering to a theoretical schedule, is why ULS is so successful.

As with any major system development in a regulatory environment that is constantly changing, adjustments are anticipated and changes are made to ensure that the deployment runs smoothly and that licensees and processing staff are not adversely affected by the transition. For example, our decision to implement land mobile in stages was finalized in July 2000 well before the implementation dates. We published this phased approach at that time so that licensees could plan accordingly. Ship was deployed in the middle of land mobile as a result of the phased implementation of Land Mobile services.

In a subsequent section of the Inspector General's memorandum, it states that ULS development criteria did not appear as rigorous as other efforts in some areas. Specifically it states that routine specifications such as ownership of source code, a year 2000 certification by the contractor, a compulsory systems development life cycle methodology and an interface with the fee collection database were missing from the ULS contracts and modifications thereto. The programming services contract specifically states that the FCC owns the source code developed under the contract and therefore, the task order issued did not need to duplicate that requirement. As the Inspector General points out in the document, amendments were incorporated into the ITC's programming services contracts to address the Year 2000 certifications and for this reason, the ULS team did not duplicate the contract requirement in it task order modifications. A systems development life cycle methodology was only developed in the last year, and the programming services contract has always required necessary components of a life cycle methodology such as requirements analysis documentation, systems design specifications, database layouts and definitions, source code, testing plans, development plans, etc. Finally, the task order and modifications did require interfaces with all FCC support systems, including but not limited to the fee collection system.

The Inspector General also states that there is no provision in ULS contracts for compatibility with other systems, contrasting it with the Mass Media Bureau contracts. . The reason why the Mass Media Bureau required compatibility with the ULS system was because the ULS contains data on Antenna Structures that cross all bureaus. In order for Mass Media to grant licenses in their system, they are required to ensure that the antenna structure is properly registered in ULS. There is no such requirement for ULS to check any data in Mass Media's database in order to award licenses. Furthermore, the ULS does include system interfaces with all other FCC systems such as the fee collection system, CORES, and the International Bureau's COSER system used for Canadian coordination where such interfaces are necessary or desirable.

When the ULS system was originally conceived of in 1995, the Bureau was attempting to build out functionality in its 11 stovepipe, vertical systems. For example, the Bureau hoped to have full electronic filing, automated processing of straightforward applications, speed of disposal accounting, fee sufficiency, and paperless processing of more complicated applications. The Bureau was spending millions of dollars annually in an attempt to meet some of these basic functional requirements. It was obvious to the Bureau management that modifying 11 separate systems in this way would cost more and take longer than consolidating the processing systems, while reengineering the process and reducing the number and complexity of the 40+ forms that the Bureau required its licensees to fill out. It became increasingly apparent that the Bureau

would need to reengineer its process, reduce the number of forms and simplify its application processing in order to continue to provide customer service with a staff that was about to be reduced dramatically in Gettysburg due to the FCC call center. The Bureau simply could not keep up with the demands on the 11 separate systems and had to move quickly to consolidate the systems and align the rule parts associated with its wide range of radio services that it licensed.

During the reengineering process and forms reduction stage, it was estimated that the industry would save 10's of millions of dollars annually through paperwork burden reductions. In addition, it was estimated that system maintenance would ultimately reduce as well by millions of dollars. Moreover, reducing the size of the Bureau by 50 employees at $89,000 per person saved the agency $4,450,000 annually.

In addition, we will continue to reap benefit from the ULS system. Once fully deployed, the maintenance costs will reduce and be much lower than if we'd continued with the existing legacy systems. We have also reaped intangible benefits from the ULS development to help the Commission realize its ultimate goal of one-stop digital shopping having successfully integrated a vast array of telecommunications services under a universal processing approach.

Finally, had the Bureau continued to enhance its existing systems, the wireless licensees would not have realized the benefits of automated processing and speed of disposal rates would have increased instead of decreased.

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