



EMBRY-RIDDLE
AERONAUTICAL UNIVERSITY



for the
Florida Department of Transportation Aviation Office
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July 31, 2005

Disclaimer

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the State of Florida Department of Transportation.

Executive Summary



The Florida Department of Transportation (FDOT) Aviation Office extended its contract with Embry-Riddle Aeronautical University (ERAU) through June of 2005 for the purpose of promoting general aviation throughout the State of Florida and providing a framework for new technologies in support of general aviation to be inserted into the Florida Airspace System. Specifically, ERAU and its Southeast SATSLab Consortium members were to accomplish the following:

- Extend the flight test bed to the Northwest (Panhandle) and to the Southwest to provide nearly complete coverage of the state for experimental operations, establishing the world's first real-time Internet Protocol (IP)-based aviation testbed.
- Integrate current FDOT-owned Differential Global Positioning System (DGPS) equipment into the Small Aircraft Transportation System (SATS) Program Plan.
- Conduct planning for a two-phase Florida demonstration of the SATS technologies and potential economic benefits to the state.
- Conduct a "Day-in-the-Life" flight demonstration in conjunction with the opening of the FDOT Aviation Test Center in Tallahassee.

This report documents the accomplishments made under this contract and provides for the FDOT Aviation Office a record of the progress achieved over the past year.

We are pleased to be able to work with the Florida Department of Transportation Aviation Office to provide the State of Florida the opportunity to participate with the Southeast SATSLab Consortium and Embry-Riddle Aeronautical University in the NASA Small Aircraft Transportation System Program. ERAU and the SESLC are honored that FDOT Aviation Office would allow us to play a significant role in improving the aviation system in the State of Florida. ERAU has a long history of, and a deep love for aviation. Our heritage is steeped in aviation, and the future is bright with promise. We sincerely hope that FDOT Aviation Office will continue to use ERAU as a resource for aviation research and development.

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Metric Conversion Chart

A Metric Conversion Chart is provided at the Federal Highway Administration Site: <http://www.fhwa.dot.gov/aaa/metricp.htm>.

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<p>The Florida Small Aircraft Transportation System (SATS) project was conducted in conjunction with the NASA/FAA SATS demonstration project, which had four objectives: to demonstrate that higher volume operations could be conducted safely at non-radar, non-towered airports; to demonstrate that lower landing minima could be achieved at non-radar, non-towered airports; to demonstrate that single private instrument pilots could fly advanced technology aircraft as safely as ATP pilots fly conventional aircraft; to determine the affect that the introduction of SATS into the National Airspace System (NAS) would have on conflicts, delays, and Air Traffic Controller workload.</p> <p>We were able to meet all four objectives, and concluded that the introduction of SATS into the NAS was feasible and potentially beneficial to the efficiency and safety of general aviation flight operations, and economically beneficial to those communities which implemented the technologies and procedures examined under the SATS project.</p>					
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Introduction



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- Integrate current FDOT-owned Differential Global Positioning System (DGPS) equipment into the Small Aircraft Transportation System (SATS) Program Plan.
- Conduct planning for a two-phase Florida demonstration of the SATS technologies and potential economic benefits to the state.
- Conduct a "Day-in-the-life" flight demonstration in conjunction with the opening of the FDOT Aviation Test Center in Tallahassee.
- Provide a final report and presentation of the accomplishments under this contract.

This report documents the accomplishments made under this contract and provides for the FDOT Aviation Office a record of the progress achieved over the past year. Under this contract, four separate technical tasks and a management & administration task were defined. Each of these tasks will be addressed in a separate section, with details of the results contained within the appropriate section. As a reminder, a statement of each task will be provided at the beginning of each section, followed by the results for each task. In this way, FDOT Aviation Office can be assured that all task elements have been addressed and the successful completion of each can be verified.

We are pleased to be able to work with the Florida Department of Transportation Aviation Office to provide the State of Florida the opportunity to participate with the Southeast SATSLab Consortium and Embry-Riddle Aeronautical University in the NASA Small Aircraft Transportation System Program. ERAU and the SESLC are honored that FDOT Aviation Office would allow us to play a significant role in improving the aviation system in the State of Florida. ERAU has a long history

of, and a deep love for aviation. Our heritage is steeped in aviation, and the future is bright with promise. We sincerely hope that FDOT Aviation Office will continue to use ERAU as a resource for aviation research and development.

Small Aircraft Transportation System 2004-5 Research Contract Final Report

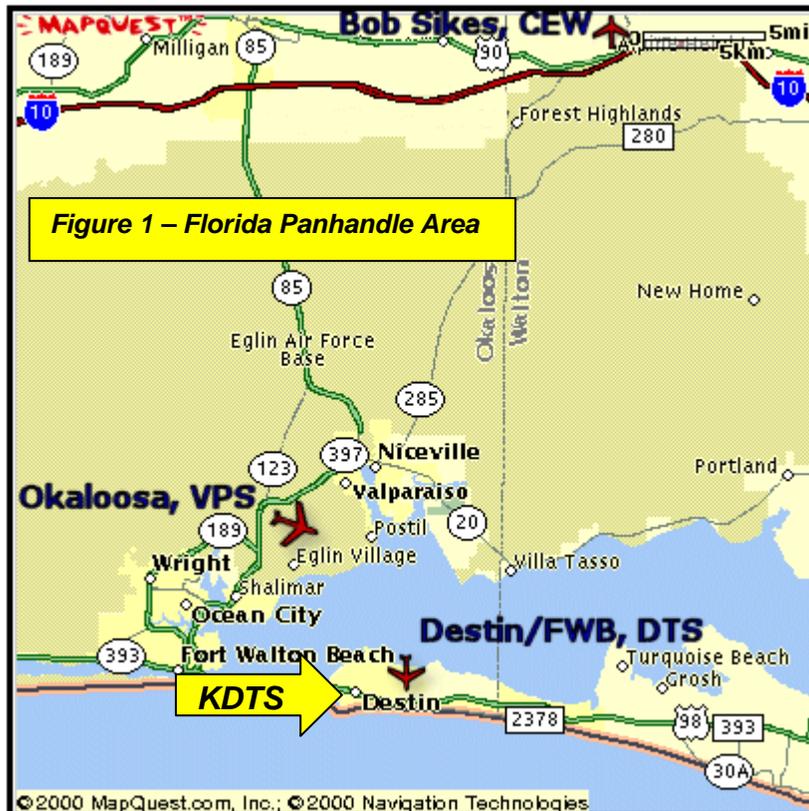
The FDOT Aviation Office Statement of work for Section 1 is divided into individual components and is placed in blue text boxes. Each will be discussed in the following sections:

- Section 2.1: North Florida Operations (Panhandle) – Task 10
- Section 2.2: South Florida Operations (Southwest Florida) – Task 11
- Section 2.3: Integration of FDOT DGPS into SATSLab Experiments – Task 12
- Section 2.5: Regional Demonstration Planning & 2004 Sebring Demonstration - Task 13
- Section 2.6: 2005 Regional Demonstration Tallahassee – Task 23
- Section 2.7: Final Report and Documentation – Tasks 14 & 15
- Section 2.8: Management and Administration of Contract – Task 8.

1.1 North Florida Operations (Panhandle) (Task 10)

10.0 North Florida Operations (Panhandle)

Several airports serve the Panhandle area, and in addition there are two military installations with significant aviation operations, NAS Pensacola, and Eglin AFB. There are two airports located in the Destin-Ft. Walton Beach area, Valparaiso and Destin - Ft. Walton Beach. Valparaiso has limited commercial service, and Destin - Ft. Walton Beach is a single-runway, non-towered general aviation airport. Both are managed by the Okaloosa County Board of Commissioners. After considerable study, and coordination with the airport manager for both sites, we selected Destin-Ft. Walton Beach (KDTS) as the most feasible site for equipment installation in the Panhandle area. (See Figure 1.) This site is located just east of the city of Destin, and provides testbed coverage for the extreme Northwest portion of the state as well as a small portion of Georgia. It was determined that an installation in an existing hangar would be the most practicable approach for Destin. The identified site was also the planned installation site for the FDOT DGPS equipment that was to be relocated from DeFuniak Springs, and the installation site coordinated with the airport manager, and his maintenance specialist.



Systems Engineering and Integration

10.1 Systems Engineering & Integration

Systems engineering and integration necessary and sufficient to determine the requirements for experiment operations and display systems will be conducted for the Panhandle site. This will include site survey and coordination for power, data and voice communications connectivity, safety, security, training, and logistics support of planned proof of concept experiments and demonstrations.

This work has been completed for the selected hangar that was coordinated with the Destin – Ft. Walton Beach Airport Manager and the Maintenance Specialist. Verification that the implementation has accurately captured and satisfied the requirements must await the completion and activation of the site after the DGPS equipment has been relocated from DeFuniak Springs, and can be accomplished by an extension of this contract.

1.1.1 Experiment Equipment Engineering & Installation

10.2 Communications/Navigation/Surveillance Technology Experiment Equipment Engineering & Installation

Equipment will be installed at the Panhandle site to enable the SESATSLAB to operate flight tests in/around (approximately 40 miles radius) the airport. In addition, this equipment will provide differential correction and WAAS data collection and forwarding to a central location. This capability is necessary to allow research toward a statewide system that would provide landing guidance to any landing facility. Experimental Equipment Systems will be installed providing the following capabilities:

- A ground-air Data Link System to communicate with participating aircraft enabling (METARS/weather graphics), test director/controller messages to-from cockpit and SATS Operations Centers.*
- Traffic Information System providing position reports from participating aircraft, target information from all transponder equipped aircraft to other aircraft and to SATS Operations Centers for Operational Capability Assessments.*
- Flight information processing system with sound/lightning, commercial information, airport configuration and local weather conditions capability in a digital ATIS message (DATIS). In areas where ASOS is available it will be utilized in lieu of a SATS ASOS.*
- System Interruptible Power backup for 30 minutes on power failure.*
- Precision time synchronization of all Local Area Networks and computers to GPS time standard. This is critical for statewide data collection/reduction and report production.*
- VHF AM radio for voice transmission of enhanced ATIS information to participating aircraft.*
- Continuous Data recording providing archive all traffic, FIS, Data Link and system health data.*
- Broadband Data Interface and router/switch and auto upload tasks for automatic update of SESATSLAB Internet site.*
- Direct Data modem interface for interface to other research facilities to provide ground to air capabilities from any facility to any aircraft.*
- DGPS reference station providing 12 channel corrections and WAAS monitoring for a statewide research project.*
- Remote monitoring and maintenance function allowing alarms and system health to be monitored via remote (internet) access.*

Because of delays caused by difficulties in selecting a suitable site in the panhandle area, and subsequent hurricanes (Figure 2), as well as delays in FDOT DGPS equipment relocation from DeFuniak Springs to Destin, the equipment installation has not been completed for this task. We have delivered the equipment, and are prepared to install it in the selected location at the Destin airport which was approved by the airport manager, after the FDOT DGPS equipment has been installed so that we can share communications services.

This installation will require a task extension and additional budget.



Figure 2 – Hurricane Ivan Damage in Destin

There are no flight operations planned for Destin, and this installation delay has had no operational impact on the successful completion of other tasks.

1.1.2 Approach Procedure Development and Flight Operations

10.3 Dynamic Terminal Approach Development

Dynamic Terminal Approach Procedures (TerPs) will be developed for the TBD Regional airport, allowing experimental operations for increased operational volume. These procedures will exploit the improved knowledge of aircraft and runway locations to allow approaches determined by local configuration, weather, traffic conditions, obstacles, airspace and noise abatement restrictions. [Ed. Note: The “TBD” site chosen was Destin (KDTS), and procedures have been developed for that site.]

10.3.1 Technology Integration Planning and Integration

The DTerPs technologies requirements and integration will be determined for the TBD site, allowing multiple approach paths. [Ed. Note: The “TBD” site chosen was Destin (KDTS).]

10.3.2 Procedure Development

Experimental approach procedures will be developed using existing airport, airspace and regulatory information that will allow proof of concept flight tests to be flown showing the feasibility of safe dynamic terminal approach procedures at small airports.

10.3.3 Operations & Simulation Support Training

Operations training will be provided to operations personnel selected for participation in flight tests and simulations.

10.3.4 Flight Operations Support

Engineering and flight operations support will be provided for the SESLC Terminal Approach flight tests and demonstrations conducted at TBD airport. [Ed. Note: Destin (KDTS) was selected as the “TBD” site and no flight operations were conducted at that site.]

No Flight Operations were identified for the Panhandle. The SATS terminal approach procedures have been developed using TARGET, an FAA-approved approach generation tool that facilitates design and simulation of the approaches. We simulated the approaches using a light twin such as the Cessna 310, and a light business jet representative of the new VLJs to assure that the approaches were feasible for multiple classes of aircraft likely to be equipped with SATS technologies in the future.

1.2 Southwest Florida Operations (Ft. Myers) (Task 11)

The Southwest Florida Operations task has been completed within budget and on schedule for the selected site at Ft. Myers, Page Field (KFMY).



1.2.1 Systems Engineering & Integration

11.1 Systems Engineering & Integration

Systems engineering and integration necessary and sufficient to determine the requirements for experiment operations and display systems will be conducted for the TBD site. This will include site survey and coordination for power, data and voice communications connectivity, safety, security, training, and logistics support of planned proof of concept experiments and demonstrations. [Ed. Note: The "TBD" site chosen was Page Field (KFMY).]

The systems engineering and integration for the Page Field site was accomplished in coordination with the airport manager. As a result of discussions about the planned equipment installation, and the perceived needs of the airport users, we decided to alter the form factor of the installed equipment.

1.2.2 Communications/Navigation/Surveillance Technology Experiment Equipment Engineering & Installation

11.2 Communications/Navigation/Surveillance Technology Experiment Equipment Engineering & Installation Equipment will be installed at the TBD site to enable SESLC to operate flight tests in/around (approximately 40 miles radius) the airport. In addition, this equipment will provide differential correction and WAAS data collection and forwarding to a central location. This capability is necessary to allow research toward a statewide system that would provide landing guidance to any landing facility. Experimental Equipment Systems will be installed providing the following capabilities:

- *A ground-air Data Link System to communicate with participating aircraft enabling (METARS/weather graphics), test director/controller messages to-from cockpit and SATS Operations Centers.*
- *Traffic Information System providing position reports from participating aircraft, target information from all transponder equipped aircraft to other aircraft and to SATS Operations Centers for Operational Capability Assessments.*
- *Flight information processing system with sound/lightning, commercial information, airport configuration and local weather conditions capability in a digital ATIS message (DATIS). In areas where ASOS is available it will be utilized in lieu of a SATS ASOS.*
- *System Interruptible Power backup for 30 minutes on power failure.*
- *Precision time synchronization of all Local Area Networks and computers to GPS time standard. This is critical for statewide data collection/reduction and report production.*
- *VHF AM radio for voice transmission of enhanced ATIS information to participating aircraft.*
- *Continuous Data recording providing archive all traffic, FIS, Data Link and system health data.*
- *Broadband Data Interface and router/switch and auto upload tasks for automatic update of SESATSLAB Internet site, connectivity, safety, security, training, and logistics support of planned proof of concept experiments and demonstrations.*
- *Direct Data modem interface for interface to other research facilities to provide ground to air capabilities from any facility to any aircraft.*
- *DGPS reference station providing 12 channel corrections and WAAS monitoring for a statewide research project.*
- *Remote monitoring and maintenance functions allowing alarms and system health to be monitored via remote (internet) access.*

1.2.3 Mini-Operations Center Planning Engineering & Installation

11.3 Mini-Operations Center Planning, Engineering & Installation

Capabilities at this facility at the TBD airport are the same as the complete OPS centers with the exception of the number of workstations and video presentation capabilities. This facility will allow distributed operations to be conducted and monitored at TBD. (Ed. Note: Page Field (KFMY) was chosen as the "TBD'site.]"

The Mini-Ops Center concept was abandoned in favor of the aircrew briefing kiosk, which was determined to have a greater potential impact on Page Field users. The Smart Airport kiosk (Figure 3) was installed along with a wireless LAN capability that allows aircrews to access the internet to get weather information and pilot briefing information. We can utilize this capability to conduct experimental or demonstration flight operations at Page Field should that possibility arise in the future.



Figure 3: Smart Airport Kiosk at Page Field

1.2.4 Digital Mapping

11.4 Digital Mapping

Digital Terrain databases will be developed for flight simulations and experiments at the TBD or nearby airport. These databases will provide navigation and visual information about the selected airport to ground and airborne systems and to pilots.

The digital mapping for the Page Field area has been successfully completed.

1.2.5 Dynamic Approach Planning, Development & Flight Operations

11.5 Dynamic Approach Planning & Development

Dynamic Terminal Approach Procedures (DTERPs) will be developed for TBD airport, allowing experimental operations for increased operational volume. These procedures will exploit the improved knowledge of aircraft and runway locations to allow approaches determined by local configuration, weather, traffic conditions, obstacles, airspace and noise abatement restrictions.

11.5.1 Technology Integration Planning & Integration

The DTERPs technologies will be determined for the TBD site, allowing multiple approach paths.

11.5.2 Procedure Development

Experimental approach procedures will be developed that will allow proof of concept flight tests to be flown showing the feasibility of safe dynamic terminal approach procedures at small airports.

11.5.3 Operations Training & Simulation Support

Operations training will be provided to operations personnel selected for participation in flight tests and simulations.

11.5.4 Flight Operations Support

Engineering and flight operations support will be provided for the SESLC Dynamic Terminal Approach flight tests and demonstrations conducted at TBD airport.

[Ed. Note: Page Field (KFMY) was selected as the “TBD” airport.]

The SATS terminal approach procedures have been developed using TARGET, an FAA-approved approach generation tool that facilitates design and simulation of the approaches.

We simulated the approaches using a light twin such as the Cessna 310, and a light business jet representative of the new VLJs to assure that they were feasible for multiple classes of aircraft likely to be equipped with SATS technologies in the future.

No flight operations at Page Field are planned for the current contract period, but Page Field personnel have been very supportive of demonstration operations at other venues.

1.3 Integration of FDOT DGPS into SATSLab Experiments (Task 12)

12.1 Systems Engineering & Integration

Systems engineering and integration necessary and sufficient to determine the requirements for experiment operations and display systems will be conducted to provide integration of the FDOT DGPS system correction, integrity, and availability information into the SESLC experimental ground infrastructure system.

Under the original concept for reactivating the FDOT DGPS site at the Flagler County airport, we conducted site survey and coordination for power, and data and voice communications connectivity. Subsequent studies indicated that reactivating the DGPS site at the Flagler County Airport would probably not be cost efficient, and that there was an FDOT sponsored, state-wide DGPS program with which we could cooperate that had higher potential for the effective establishment of approach and landing corrections throughout the state. To that end, we replanned this task in coordination with FDOT and decided to integrate our activities with the FDOT state-wide DGPS program. We have implemented a data feed between the state-wide DGPS program and our Mobile Operations Control Center at the Space Coast Executive Airport in Titusville (see Figure 4) and have performed, as part of our NASA-sponsored activities, a study to analyze the improvements to WAAS availability and integrity that we expect to proceed from this integration. We have continued to work in cooperation with the FDOT DGPS project manager, Mr. Scott Harris, to integrate DGPS resources into our experiments and demonstrations, and they have become an integral part of the experimental local WAAS integrity monitoring (LWIM) infrastructure used to provide pilots on approach with indications of WAAS integrity to meet an FAA requirement for notification of integrity degradation within six seconds. This WAAS integrity message is broadcast to the aircraft every second, and displayed on the SmartDeck or other avionics.



Figure 4 Kneeboard Used in Sebring Demonstration Displays WAAS Local Integrity In Colored Bar at Upper Right of Screen. (Integrity shows “Red” Indicating WAAS Approach Not Available.)

1.4 Regional Demonstration Planning (Task 13)

13.1 Phase I Regional Demonstration Planning

Perform the analysis, planning and coordination required to conduct a Florida regional SATS demonstration focused upon key manufacturing and service provider leaders who could form the core business organizations for SATS implementation in Florida and the Southeast.

13.2 Phase II Regional Demonstration Planning

Perform the analysis, planning and coordination required to conduct a Florida regional SATS demonstration focused upon key federal and state legislative and administrative leaders who would potentially support SATS implementation in Florida and the Southeast.

We conducted demonstration planning and coordination meetings throughout 2004, and planned a two-phase regional demonstration that would be carried out in the Fall of 2004 and the Spring of 2005. The two phases were designed to attract the interest of local economic development and commerce leaders, airport authorities, and potential user service providers (Phase I), and state legislators and policy makers (Phase II).

Phase I was designed to be a multi-venue technology and “day-in-the-life” adventure for the participants. The participants were located throughout the state, and flew to the demonstration sites in fifteen aircraft. The first venue was Sebastian (X26) in Indian River County, along the central East coast (Figure 5). At this site the participants were able to see some of the Low Cost Illumination elements and tour the Velocity (Figure 6) advanced technology aircraft plant.



Figure 5 – Sebastian Municipal Airport (X26)



Figure 6 – Velocity RPG in Flight

The destination venue was Sebring Regional Airport (KSEF), in Highlands County in the mid-central portion of the state (Figure 7).



Figure 7 – SESLC & NASA personnel discussing Regional Demonstration outside KSEF MOCC.

There we conducted the first multi-aircraft higher volume operations (HVO) scenario demonstration in which five aircraft were launched from Sebring to positions about 20 miles south of the airport (Figure 8).

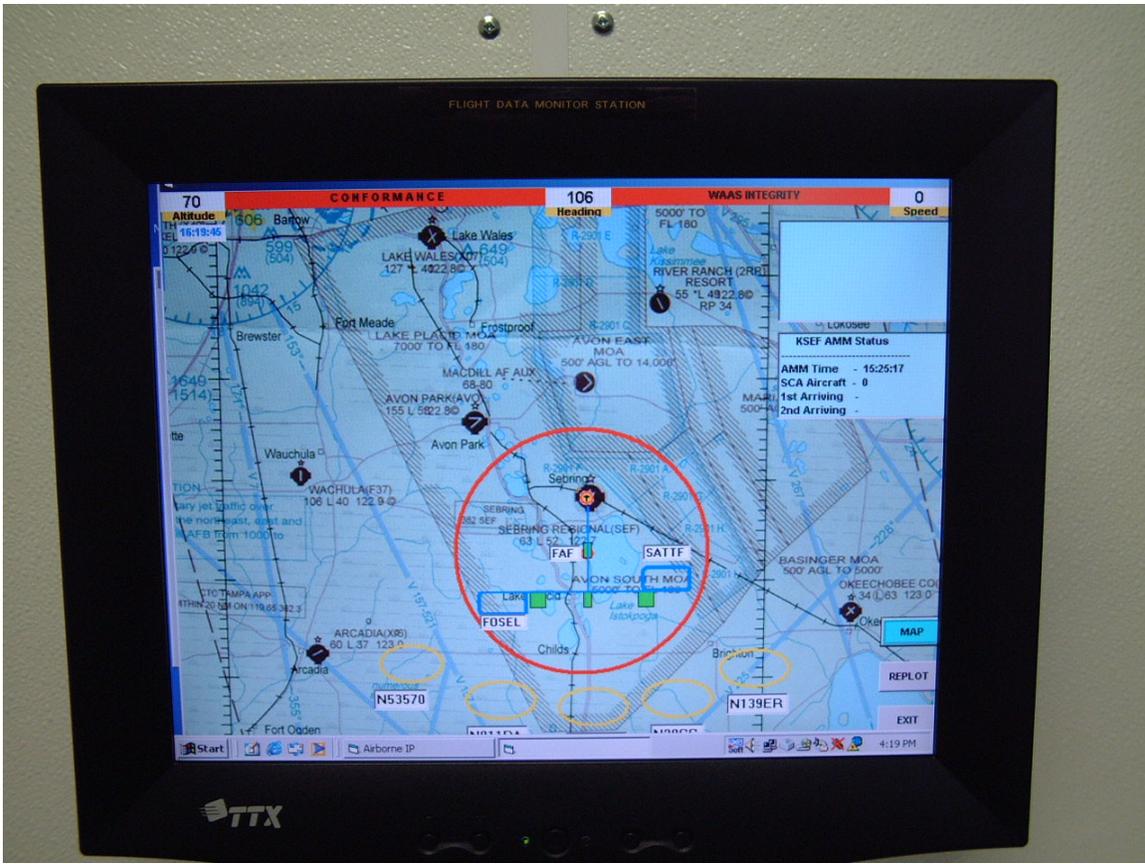


Figure 8 – KSEF Demonstration SCA Display showing Five Staging Areas South of the Airport

From there they requested sequences for approach and were automatically sequenced according to the NASA LaRC concept of operations for HVO. We were able to show by this demonstration that the enabling technologies and procedures could increase the capacity of non-towered, non-radar airports at least fivefold (Figure 9).



Figure 9 – Cessna 172 on approach to Sebring During HVO Demonstration

The Demonstration audience participants were also able to view static displays in an exhibit area containing the SmartDeck simulator, real-time display of the HVO scenario, the NCAM technology trailer, and the SESLC Enhanced Vision System (EVS) and Low Cost Illumination (LCI) trailer (Figure 10).



Figure 10 – Sebring Demonstration Participants viewing HVO Demonstration Progress and Static Exhibits

They were also able to participate in the U. S. Sport Aviation Expo which was being held at the same time. They were then able to return home the same day. This was a feat impossible to achieve using scheduled commercial air transportation carriers or by driving. This demonstration was conducted on October 28 through 30, 2004, was well attended, and is considered to be successful, both as a regional demonstration, and as a precursor to the NASA/NCAM project demonstration to be held in June, 2005, where a similar HVO scenario will be flown and similar static displays will be exhibited.

1.5 FDOT Aviation Test Center Flight Demonstrations (Task 23)

Systems Engineering

The SESLC team will perform the systems engineering and integration activities necessary to conduct a selected flight demonstration in conjunction with the opening of the FDOT Aviation Test Center.

Flight Demonstration Planning

The SESLC team will plan and coordinate the aircraft, personnel and facility resources necessary to conduct the selected flight demonstration. This will include scenario and procedure development, and coordination with cognizant FDOT, airport management, and ATC authorities. Additional efforts required to accommodate third party experimental equipment not developed by SESLC, or airport data not already possessed by SESLC or furnished to SESLC as government furnished data will be beyond the scope of this task.

Flight Demonstration Conduct and Reporting

The SESLC team will lead the conduct of one one-hour flight demonstration. This will include flight readiness review, SESLC Operations Center staffing and infrastructure engineering support, aircraft and pilots.

Conduct of the demonstration “A Day in the Life of SATS” and will include:

- *High Volume Operations using multiple member aircraft*
- *Low Cost Laser Illumination Demonstration*
- *Reports/Presentations on activities completed during the 2003/4 program activities.*

The second phase of the SESLC regional demonstration was planned to coincide with the Florida legislature sessions and the initial operating capability of the FDOT Aviation Test Center at the Tallahassee Regional Airport (KTLH). There, we established a virtual “day-in-the-life” SATS flight where invited participants were given “passports” explaining the SATS exhibits and technology accomplishments. They were assigned in small groups to “tour pilots” who escorted them through the exhibits, outlining the importance of each of the contributing technologies and letting them witness a fast-time recreation of the hour-long Sebring HVO scenario.

Their tour began with arranging a SATS flight using the Air Traffic Distribution System prototype. They then visited the SESLC EVS and LCI trailer (Figure 11), where they viewed real-time EVS imagery and examples of the Low Cost Illumination LED elements (Figures 12 & 13). The ramp tour continued with the ERAU Cessna 310, the principal testbed aircraft for the SESLC (Figure 14) which is equipped with a SmartDeck prototype display suite (Figure 15). Finally, the participants were conducted on a guided tour of the NCAM technology trailer by NCAM personnel supporting the demonstration.



Figure 11 – SESLC EVS & LCI Trailer at Tallahassee Regional Demonstration



Figure 12 – EVS Prototype Imagery



Figure 13 – Low Cost Illumination Elements in SESLC EVS-LCI Trailer



Figure 14 – ERAU Twin Cessna with Dr. Steven Hampton, SESLC Executive Director



Figure 15 – SmartDeck Prototype Installed in ERAU Twin Cessna

They were then shown the FDOT promotional movie (Figure 16), highlighting some of the Florida plans for aviation research, development and operations in the 21st century.



Figure 16 – FDOT Officials discussing the movie describing Florida’s plans for 21st Century Aviation at Tallahassee Demonstration

Following this, they visited the Aviation Test Center work and display areas where they could see the SATS workstations (Figure 17) and the Sebring scenario recreation (Figure 18).



Figure 17 – SATS Workstations at FDOT Aviation Test Center



Figure 18 – HVO Demonstration Recreation at Tallahassee Regional Demonstration

Following that, they were invited to “fly” the SmartDeck simulator (Figure 19) to get a hands-on experience of the new technologies that will enable greater personal mobility in the near future. Finally, their “tour pilot” explained some of the research project activities we accomplished during the 2003/4 period (Figure 20).



Figure 19 – SmartDeck SATS Simulator at Tallahassee Regional Demonstration



Figure 20 – Large-Scale Posters display 2003-4 SESLC Project Progress

1.6 2004-5 Final Report and Documentation (Tasks 14 & 15)

14.1 2004 FDOT SATS Program Presentation

Prepare an oral presentation of the key progress made during 2004 against the assigned tasks. This presentation will be given to key FDOT personnel at a time after the completion of the tasks and convenient for the FDOT personnel.

14.2 2004 FDOT SATS Program Report

Prepare a written report documenting the key task approaches, features, issues, and results for the assigned 2004 tasks. This report will be delivered to Mr. Chuck Arnold, or his designee, after completion of the tasks, nominally by July 31, 2004. [Ed. Note: this schedule was revised with the extension.]

1.6.1 Overview of Final Presentation and Report

This document represents the successful completion of the Draft of Tasks 14 and 15, covering all of the 2003/4 activities, as well as the Phase II Demonstration conducted February 7 at the FDOT Aviation Test Center at Tallahassee Regional Airport. The presentation materials are being submitted as a separate document. No Program presentation to key FDOT personnel has been scheduled as of this publication date.

1.7 Management and Administration of Contract (Task 8)

8.0 Management and Administration of Contract

8.1 Financial Management and Administration

SESLC Team activities for the SATS Demonstration Program are currently managed by Embry-Riddle Aeronautical University. These responsibilities include day-to-day financial, subcontract, administrative, and general, non-technical coordination of the Program Plan. Currently, the Business Manager individually supports these administrative and financial elements, as well as reacting to other administrative support or coordination requirements. For Management and Administrative Services, Embry-Riddle will charge 10% administrative fee on each monthly invoice.

8.2 Financial Responsibility

Embry-Riddle will submit its monthly reports and invoices to FDOT by the 15th of each month for payment of the previous month's expenses. Each participating SESLC Team member company is responsible for reporting monthly technical progress reports and financial activity reports (SESLC Form 533M) to Embry-Riddle, who will summarize these reports and submit the monthly report to FDOT. The reports are to include expenditures of government funds, work-force hours, company contributions, anticipated expenditures for the next two months, and estimated dollars to complete their task. All costs must be in compliance with allowable expenses as delineated in the Joint Sponsored Research Agreement (JSRA) dated September 1998. In order for the consortium to have reports and monthly invoices to FDOT by the 15th of the month, members are encouraged to submit their progress reports, along with any invoices, to the SESLC by the 10th calendar day of the month. Financial management is accomplished by using the University's accounting system in addition to the SESLC's accounting system. The SESLC Business Manager reports consortium financial activity to the Board of Directors through the SESLC Treasurer.

8.3 Contractual Responsibility

Each participating member is bound to the financial reporting requirements through a subcontract agreement. These subcontracts consist of three major elements. A statement of work is formulated delineating the task elements to which the subcontractor has agreed to perform. A budget is created based on the tasks laid out in the statement of work. As part of the subcontractor's agreement, several of the larger incorporated firms request Proprietary Information Exchange Agreements. Even though SESLC operates on the premise that intellectual property will not be exchanged, this addition to the agreement further protects sensitive technical and financial data exchange.

The actual contract acts as the legal document joining all of the preceding attachments together.

The SESLC Business Manager works with both the University and SESLC legal council in order to assure proper language. After executing these bilateral agreements, management works with the ERAU's purchasing department to assign purchase order numbers to which member invoices are submitted. In response to the continuing evolution of the program, Engineering Change Requests (ECR) are also processed allowing participating members to expand their statement of work to include additional responsibilities. The SESLC manager works with subcontractors after contract execution in order to insure all services are in accordance with applicable codes, laws, rules, regulations, orders and standards of federal common law, state, regional, local and municipal government agencies. Additionally, management will work with FDOT and subcontractors to provide interpretation of provisions and conditions contained in the contract for the FDOT SATS Research Contract.

8.4 Quality and Performance Control

The SATS Technical Coordinating Council (TCC) for purposes of progress reporting approves the SATS Demonstration Program R&T Plan, a task outline (Work Breakdown Structure - WBS) will be generated. This WBS will be used by the members proposing SESLC task involvement in order to outline individual Statements of Work (SOW). This SOW should correlate directly to the WBS.

The Technical Manager will use this information for the purpose orchestrating and bringing deliverables together. The Business Manager will utilize this information in order to coordinate consortium needs with anticipated award dollars, NASA, FDOT and other.

As part of the monthly technical/financial report it is suggested that members outline their level of activity in terms of percentage completed. The intention of this method is to measure project performance. This will assist management by indicating how much of the budget should have been spent in view of the amount of work done so far, and the baseline cost for the task, assignment, or resource. Additionally, biweekly or monthly teleconferences will be employed for quality control purposes. In addition to being used internally for best tracking program progress, results of these progress reports, based on top-level information, will be passed along to NASA, FDOT, and other awarding agencies.

We have successfully completed all necessary management and contract administration tasks.

1.8 Findings and Conclusions

We were able to meet all of the high level objectives for this project. Our experiments and demonstrations showed the efficacy of the technologies and procedures developed under the SATS project with FDOT and with NASA/FAA. Our “day-in-the-life” and Higher Volume Operations demonstrations were successful and well received by participants, audience, and key decision makers. Our analyses indicated that SATS technologies implemented at non-towered, non-radar airports will provide economic benefits to the communities, as well as safety and efficiency benefits to the using pilots.