



Florida Department of Transportation

JEB BUSH
GOVERNOR

605 Suwannee Street, MS90 Tallahassee, FL 32399-0450

JOSÉ ABREU
SECRETARY

May 30, 2003

Ms. Patricia Graham, Airspace Specialist
FAA - Southern Region
ATTN: ASO-520.10
P.O. Box 20636
Atlanta, GA 30320

RE: Florida Department of Transportation (FDOT)—*Application for Certificate of Waiver or Authorization*—UAV Flight Operations

Dear Ms. Graham:

Enclosed is a completed FAA Form 7711-2—*Application for Certificate of Waiver or Authorization*, by the FDOT Intelligent Transportation Systems (ITS) Office for Unmanned Aerial Vehicle (UAV) proposed flight operations in support of the *Airborne Traffic Surveillance Systems (ATSS) Proof of Concept (PoC) Study*. This study is a research project conducted by a University of Florida Research Team and funded by the FDOT Research Program.

The goal of the study is to integrate remote sensing data, obtained by airborne video surveillance techniques, through the existing FDOT microwave system to FDOT Traffic Management Centers (TMCs) and the State Emergency Operation Center (SEOC). Managers at such facilities could utilize this data as a real-time, realistic resource for traffic-related decisions during hurricane evacuations, other natural disasters, or daily traffic management. Real-time weather information can also be transmitted through these same communications links. Both of these initiatives can provide powerful tools for TMC and SEOC decision makers.

Proposed UAV flight operations are from July 18, 2003 through July 17, 2004, with the initial series of flights for the study from July 18, 2003 through August 1, 2003. The flights will commence at the Tallahassee Commercial Airport (TCA, 68J), fly along the Interstate Highway 10 corridor to the Interstate Highway 10/Interstate Highway 75 interchange area, conduct airborne video surveillance, and return along the Interstate Highway 10 corridor to land at Tallahassee Commercial Airport.

The *Aerosonde Mark 3 Remotely Operated Aircraft (ROA/UAV)*, which was originally developed in 1994 as a meteorological and environmental reconnaissance platform, has been selected as the flight vehicle. Since 1994, *Aerosondes* have accumulated over 4000 flight hours in Australia, Canada, Japan, Taiwan, the Arctic, and the United States. In August 1998, an *Aerosonde* became the first UAV to fly across the Atlantic Ocean, crossing from Canada to Scotland in just under 27 hours. The most recent deployment in the Southeast United States was a NASA-sponsored field research study on hurricane development (Convection and Moisture

Ms. Patricia Graham
May 30, 2003
Page 2

Experiment—CAMEX-4). The *Aerosonde* flights for this study were conducted from Mayport NAS, Florida, during August and September 2001.

The *Aerosonde* weighs 30 pounds and has a nine-foot wingspan; flies between 35-60 knots; and has a range/endurance of 1600 NM and up to 32 hours. The *Aerosonde* employs both UHF and Iridium-based satellite links for both line-of-sight (LOS) and beyond line-of-sight (BLOS) control. Further details of the *Aerosonde* and proposed flight operations can be found in Supplements #1 and #2 of the enclosed application.

ITS development and deployment are critical cornerstones of FDOT's strategy for providing improved transportation services in Florida. Future UAV deployment could lead to improvements in flight safety, law enforcement, forestry management, wildlife opportunities, and a host of "smart" transportation management improvements. Use of *ATSS* and associated technology may prove to be key elements in saving lives, time, and money.

FAA's approval of our June 2001 UAV flight operations from OpaLocka West Airport was greatly appreciated and we look forward to working with you for our proposed flight operations to validate the *ATSS PoC Study*. I would like to thank you for your assistance with our application and support of our staff in addressing any concerns and issues. I may be reached at (850) 410-5600 or chester.chandler@dot.state.fl.us.

Sincerely,



Chester H. Chandler III, P.E.
ITS Office Manager

CHC/lk

Enclosure

cc: Ken Morefield, Florida Department of Transportation
Jim St. John, Federal Highway Administration



US Department of Transportation
Federal Aviation Administration

APPLICATION FOR CERTIFICATE OF WAIVER OR AUTHORIZATION

Form Approved: O.M.B. No. 2120-0027

APPLICANTS - DO NOT USE THESE SPACES

Region

Date

Action

☐ Approved

☐ Disapproved - Explain under "Remarks"

Signature of authorized FAA representative

INSTRUCTIONS

Submit this application in triplicate (3) to any FAA Flight Standards district office.

Applicants requesting a Certificate of Waiver or Authorization for an aviation event must complete all the applicable items on this form and attach a properly marked 7.5 series Topographic Quadrangle Map(s), published by the U.S. Geological Survey (scale 1:24,000), of the proposed operating area. The map(s) must include scale depictions of the flightlines, showlines, race courses, and the location of the air event control point, Police dispatch, ambulance, and fire

fighting equipment. The applicant may also wish to submit photographs and scale diagrams as supplemental material to assist in the FAA's evaluation of a particular site. Application for a Certificate of Waiver or Authorization must be submitted 45 days prior to the requested date of the event.

Applicants requesting a Certificate of Waiver or Authorization for activities other than an aviation event will complete items 1 through 8 only and the certification, item 15, on the reverse.

1. Name of organization

Florida Department of Transportation

2. Name of responsible person

Chester H. Chandler

3. Permanent mailing address

House number and street or route number

605 Suwannee St. MS 90

City

Tallahassee

State and ZIP code

FL 32399-0450

Telephone No.

850-410-5600

4. FAR section and number to be waived

5. Detailed description of proposed operation (Attach supplement if needed)

Refer to attached Supplement No. 1

6. Area of operation (Location, altitudes, etc.)

Along Interstate Highway 10, between the Tallahassee Commercial Airport and the Interstate Highway 10/Interstate Highway 75 interchange. Flight operations to be at 1000 ft AGL altitude.

7a. Beginning (Date and hour)

July 18, 2003

b. Ending (Date and hour)

July 17, 2004

8. Aircraft make and model (a)

Pilot's Name (b)

Certificate number and rating (c)

Home address (Street, City, State) (d)

Aerosonde

Greg Holland

*41 Normanby Rd Notting Hill,
Vic 3168 Australia*

ITEMS 9 THROUGH 14 TO BE FILLED OUT FOR AIR SHOW/AIR RACE WAIVER REQUESTS ONLY.

9. The air event will be sponsored by:

10. Permanent mailing address	House number and street or route number	City	State and ZIP code	Telephone No.
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11. Policing (Describe provisions to be made for policing the event.)

12. Emergency facilities (Mark all that will be available at time and place of air event.)

☐ Physician
 ☐ Fire truck
 ☐ Other - Specify _____

☐ Ambulance
 ☐ Crash wagon

13. Air Traffic control (Describe method of controlling traffic, including provision for arrival and departure of scheduled aircraft.)

14. Schedule of Events (include arrival and departure of scheduled aircraft and other periods the airport may be open.)

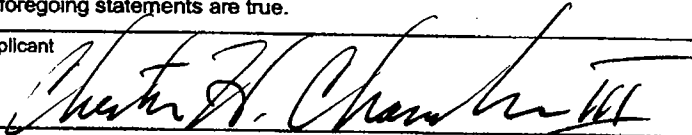
Hour (a)	Date (b)	Event (c)

If sufficient space is not available, the entire schedule of events may be submitted on separate sheets, in the order and manner indicated above.

Please Read

The undersigned applicant accepts full responsibility for the strict observance of the terms of the Certificate of Waiver or Authorization, and understands that the authorization contained in such certificate will be strictly limited to the above described operation.

15. Certification - I CERTIFY that the foregoing statements are true.

Date	Signature of Applicant
5-30-03	

Remarks

The following supplements are attached hereto, and made a part of this application:

Supplement No. 1: Detailed Description of Proposed Operations

Supplement No. 2: UAV Physical Characteristics and UAV Flight Performance Characteristics

Supplement #1 Detailed Description of Proposed Operations

Description and Purpose of the Flights

The overall objective of this Proof of Concept (PoC) study is to investigate the integration of data obtained by the Airborne Traffic Surveillance System (ATSS)—in this case the *Aerosonde Mark 3 Remotely Operated Aircraft (ROA/UAV)*—through the existing FDOT microwave system to appropriate traffic management centers (TMCs) and the State of Florida's Emergency Operation Center (SEOC). The flight portion will validate the transmission of video data obtained by the *Aerosonde* UAV through the existing FDOT microwave system. UAV flights will depart from, and return to Tallahassee Commercial Airport (TCA, 68J)--Leon County, Latitude 30-32-50.31N, Longitude 84-22-25.85W. The departure route will be NNE to Lake Iamonia, then South to Interstate Highway 10 at approximately the SZW 135/15 fix. The UAV will operate at an altitude of 1000 ft. AGL and not above 1200 ft. AGL (will remain in Class G airspace), and then follow the Interstate Highway 10 corridor eastward to the Interstate Highway 10/Interstate Highway 75 interchange area north/northwest of Lake City, Florida. The UAV will return to Tallahassee Commercial Airport along the Interstate 10 corridor and enter the landing pattern to Tallahassee Commercial Airport from the Lake Iamonia area. The *Aerosonde* will generally remain on the right hand side of the Interstate Highway 10 corridor, and remain within 0.5 miles of the roadway. All flight activities will be conducted over sparsely populated and non-urban areas.

At the Interstate Highway 10/Interstate Highway 75 interchange area the *Aerosonde* will provide remote sensing for collection of traffic data through video surveillance. After orbiting the Interstate Highway 10/Interstate Highway 75 interchange area for the planned time period (up to 24 hours), the *Aerosonde* will return to Tallahassee Commercial Airport and land.

The Flight Team is aware of Suwannee Co. Airport (24J) just south of Interstate Highway 10 near Live Oak, Florida. The UAV will avoid this airport by 3 statute miles.

Some test flights will be made at Tallahassee Commercial Airport, with the *Aerosonde* operating in VFR mode within 1 mile of the airport and an altitude up to 3000 ft.

Pilotage Methodology and See & Avoid Considerations

A pilot will be used to control takeoffs and landings, operating visually from the ground. Two Flight Team observers, with direct contact to the pilot, will maintain a clear line-of-sight (LOS) during all takeoff and landing operations. The Tallahassee Commercial Airport manager, Tallahassee Tower personnel and Jacksonville Center personnel will be informed of all flight operations.

For takeoff, *Aerosonde* is mounted on a vehicle roof rack; the vehicle is accelerated to 50 mph; and the *Aerosonde* is released for flight. Once airborne, *Aerosonde* transitions to a SATCOM link for autonomous control. A UHF link provides backup control. The *Aerosonde* follows the programmed flight plan to the video surveillance area and returns

to Tallahassee Commercial Airport. This autonomous flight is accomplished by onboard avionics: GPS, UHF and SATCOM control links.

The Flight Team will file the appropriate NOTAM for the *Aerosonde* UAV flight operations. The Sony surveillance video camera will be used to aid detection of hazards in the forward sector. A strobe beacon will also be operated as required during the flights. *Aerosonde* will provide a Virtual Field Environment to Tallahassee Approach Control and Jacksonville Center to provide real- time tracking of the *Aerosonde* position.

Emergency Contingencies

In the event of lost-link, the mission will be aborted, with the *Aerosonde* returning back to Tallahassee Commercial Airport by following the programmed route of flight; orbiting at an approved holding point; and should the link NOT be reestablished, commence an autoland at the programmed time. Three modes of link operation are available: (1) UHF only; (2) parallel UHF and SATCOM with UHF-owned; and (3) parallel UHF and SATCOM with SATCOM-owned.

Airfields within 15 minutes of the programmed flight path have been identified as emergency alternates. The Flight Team will contact the owners/managers to gain their written permission to use them as emergency fields prior to commencement of *Aerosonde* flight operations.

Coordination, Communication & Compliance with Air Traffic Control/Media

The Flight Team will meet with the Tallahassee Tower manager and other appropriate air traffic control staff to apprise them of the planned flight operations, and coordinate with them for any special traffic activities before beginning flights. The Florida Highway Patrol, Florida Department of Law Enforcement, and other appropriate public safety agencies will also be advised of the UAV flight activities. In addition to issuance of the NOTAM, the Flight Team will advise Tallahassee Tower personnel, and any other appropriate agency, 1 hour prior to commencing UAV flights, and also advise them of completion of flight activity. A media plan will advise local radio, television, and other media of the flight events.

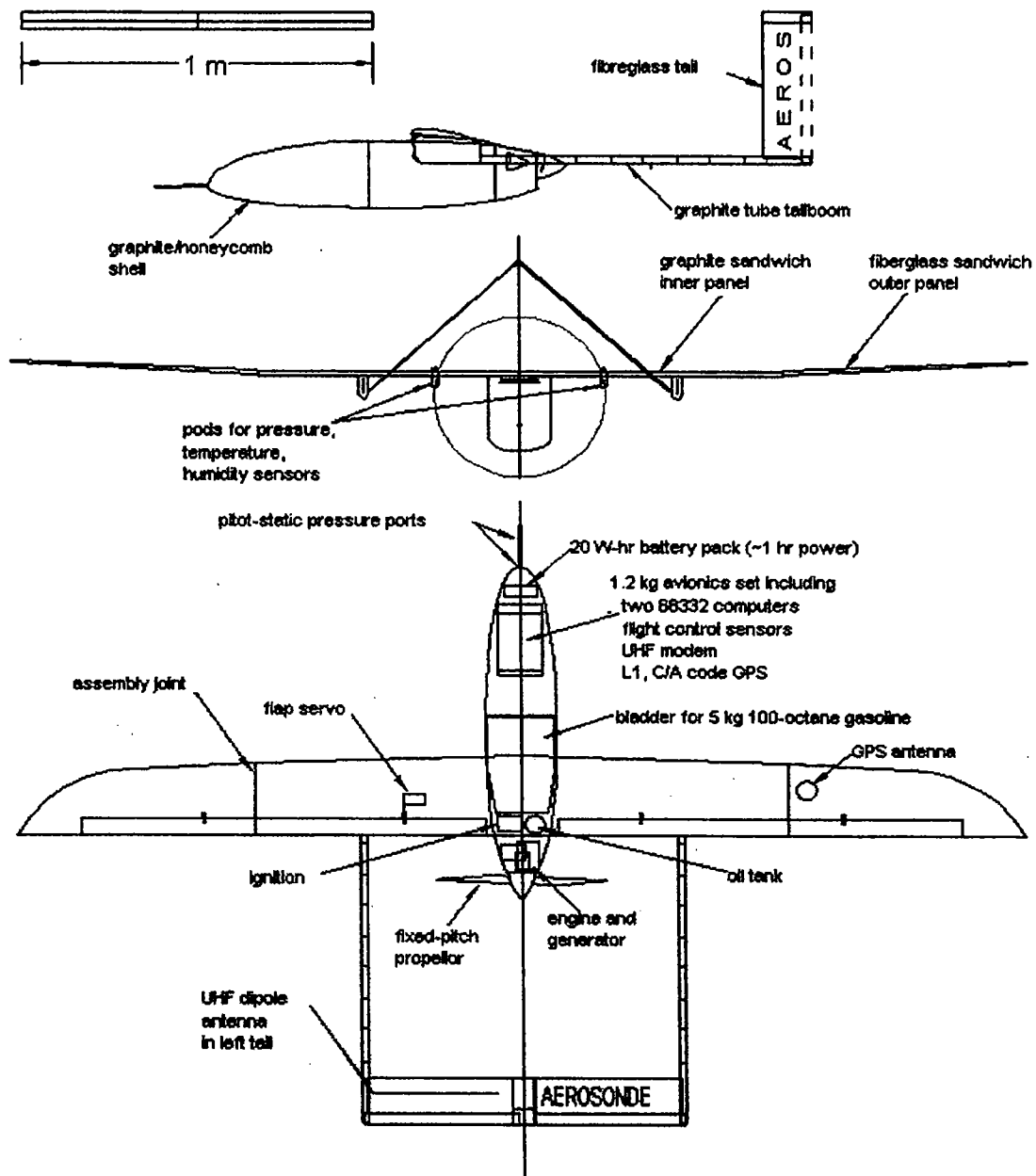
SuplUAV

Supplement #2 UAV Physical Characteristics and UAV Flight Performance Characteristics

PHYSICAL CHARACTERISTICS	
Weight	30 lbs gross
Wing span/Length	9.5 ft/6.2 ft
Engine	24 cc, 1.3 hp, fuel injected (Aerosonde Type H) or carburetor (Aerosonde Type G)
Navigation	GPS
On board power generation	Maxon generator providing 18VDC @ 1A
Payload Computer	Supports serial interface input
Main Payload Bay Area	3.9 in. Length; 4.7 in. Width; 7.0 in. Depth
Fuel	Either 100 Octane LL Avgas or premium unleaded gasoline
OPERATIONS	
Staff for launch/recovery	3: Controller, Engineer, Pilot/Maintenance
Ground Equipment	Proprietary staging box, personal computer, GPS antenna
Flight	Fully autonomous, under base command
Launch/Recovery	Launch from car rack (catapult option), land on belly, autonomous or with pilot
Ground & Air Communications	UHF/SATCOM to Aerosonde; VHF to field staff and other aircraft; Internet to command center
PERFORMANCE	
Speed/Climb	35-60 kts., 350 ft/min
Range/Endurance	1600 nm +, 30 hrs +
Altitude	300 ft—20,000 ft
Payload	Maximum 4.4 lbs with full fuel load
Max Winds	Takeoff/landing—no more than 15-20 kt crosswind component. Takeoff/landing direction easily changed
SAFETY	
Night Flight Capable	Yes
Chase Aircraft Required	No
Contingency Plan	Private airfields will be requested as alternate landing sites.
Takeoff/Landing observers	Two Flight Team observers, to maintain a clear line-of-sight (LOS) during takeoffs and landings. Coordination with applicable airports, towers, other agencies.
Flight rules	VFR flight rule conditions

See and Avoid	Aerosonde will carry a Sony surveillance video camera, which will be used to aid detection of hazards. Strobe beacon will be operated as required.
Lost-link procedures	Abort the planned mission; follow the programmed route of flight back to TCA, orbiting at an approved holding point until links are reestablished. If not successful, commence autoland at the preprogrammed time.
Communication links	Three modes of links provide redundancy: UHF-only; parallel UHF and SATCOM with UHF-owned; and parallel UHF and SATCOM with SATCOM-owned.

Sup2UAV



Aerosonde Diagram