

STATEMENT OF WORK
WAKE VORTEX STUDIES

1.0 BACKGROUND

1.1 The Federal Aviation Administration (FAA) Flight Plan and other performance plans require the FAA to safely incorporate new aircraft into the National Airspace System (NAS), evaluate current aircraft wake categories, and establish an acceptable wake encounter standard. The current Aircraft Vortex Spacing System Predictor Algorithm (APA) model that predicts the evolution of vortices from aircraft needs improvement to fulfill the FAA's responsibility for safety and capacity. The improved model will be used to help set the wake separation standards for new aircraft and will be used to help evaluate proposed, new operational procedures.

2.0 OBJECTIVE

2.1 The objective of this contract is to provide for the improvement of existing tools and to develop new tools as necessary that can be used in an operational setting to predict the transport and decay of aircraft wake vortices. This will ultimately support future risk assessments and safety analyses performed by the Flight Systems Laboratory (AFS-450).

3.0 GENERAL REQUIREMENTS

3.1 The contractor shall provide all personnel and services to provide technical support for the enhancement of existing tools and the development of new tools as necessary to be used in an operational setting to predict the transport and decay of aircraft wake vortices. This will ultimately support future risk assessments and safety analyses performed by the Flight Systems Laboratory (AFS-450).

3.2 The contractor shall provide and maintain support personnel with appropriate and relevant skills, including contractor provided ongoing requisite training to successfully complete all required tasks. Training shall be accomplished IAW paragraph 11.0 of this Statement Of Work (SOW).

3.3 The contractor shall update and maintain all pertinent (unclassified only) Government documentation for the requirements as described herein and all other documentation required by Government personnel. Documentation shall be available in hard copy and electronic format.

3.4 The technical services specified are mission critical and time sensitive. The recurring tasks specified in this SOW will be ordered by "task orders" signed and issued by the Contracting Officer, with well-defined deliverables and acceptance criteria for each deliverable, due dates and milestone dates. During the performance of this contract, support tasks will be added that are required and that are within the basic scope of this SOW. These tasks, when identified by the Government, will be funded on a case-by-case basis. The contractor shall fill any vacancies

within a minimum of 5 calendars and a maximum of 45 calendar days after the vacancies occur for existing tasks. When new "task orders" are officially authorized in writing by the CO, the contractor shall have a minimum of 5 calendar days and a maximum of 45 calendar days to provide qualified support personnel for the desired task. The range of 5 – 45 calendar days for filling vacancies includes processing security checks through the FAA Servicing Security Element. The FAA reserves the right to request from the contractor a shorter turnaround time to fill contractor-employee vacancies in certain extraordinary situations.

3.5 The contractor shall provide technical expertise and support for wake vortex studies at FAA Headquarters, Regional, and Flight Standards District Offices. This support shall include participation in team meetings, working groups, program reviews, industry coordination, tracking existing program configuration, and support for development of program status charts, position papers, presentations, etc.

4.0 TASK REQUIREMENTS

4.1 The contractor shall provide the technical expertise and services as needed to perform tasks as directed in writing by individual task orders by the Contracting Officer (CO). Some of the functions/taskings that the contractor may provide are as follows:

- a. Use Aircraft Vortex Spacing System (AVOSS) Predictor Algorithm (APA) with Airbus 380 (A380) and Boeing 747 data,
- b. Assist in validation and installation(s) of the APA numerical model in AFS-450's Airspace Simulation and Analysis Tool (ASAT),
- c. Analyze wake vortex landing data from previous data campaigns and display the resulting data on similar plots,
- d. Develop and test a linear decay APA model,
- e. Assess and improve the wake vortex models currently used in flight simulators,
- f. Improve APA to include additional shear effects of atmospheric shear to agree with observed data,
- g. Analyze and validate new wake vortex model predictions using FAA-provided data,
- h. Evaluate and compare wake vortex models
- i. Analyze and interpret wake vortex data from departing aircraft,
- j. Refine the Optimal Inverse Method for use with departing aircraft
- k. Develop a new APA model for use with departing aircraft.
- l. Develop a new Physics-Based In-Ground Effect (IGE) Numerical Model
- m. Continue testing and evaluating the Université Catholique de Louvain (UCL) numerical wake vortex models.
- n. Score the UCL models and the IGE model against other fast-time numerical wake vortex models
- o. Deliver the model(s) with a Graphical User Interface (GUI) for easy use and application
- p. Determine wake vortex circulation decay for several fast-time, numerical wake vortex models using an inverse model
- q. Assist in the establishment of standard instrument approach procedures (SIAP) and

- determining acceptability of specific instruments departure procedures (SIDS);
- r. Process special instrument procedures;
 - s. Conduct airport airspace analysis;
 - t. Assist in Surface Movement Guidance and Control System (SMGCS) approvals
 - u. Assist in other related wake vortex issues
 - v. Attend meetings, make presentations, participate in working groups, and provide other technical and programmatic support as needed
 - w. As required, obtain/exchange selected data from FAA Headquarters, Volpe, NASA, or other FAA Facilities as needed.

5.0 KEY PERSONNEL AND QUALIFICATION REQUIREMENTS

5.1 Key Personnel: The Key Personnel under this contract shall be the Senior Research Scientist/Principal Investigator as identified in clause 3.8.2-17 of the contract providing they meet the minimum qualifications below for the position of Senior Research Scientist/Principal Investigator. No diversion in key personnel shall be made by the contractor without the written consent of the CO and prior to following the procedures outlined in contract clause 3.8.2-17.

5.2 Minimum Experience/Education Requirements: All personnel employed in support of this contract shall meet specified minimum experience and/or education requirements for their respective position, as described in this SOW. Such minimums are specified for each labor category, and the Government reserves the right to review the qualifications of each proposed support personnel under this contract to ensure all stated minimum qualifications established for the position are met for the position designated in the task. The contractor shall, in advance of employees reporting to the work site, furnish to the CO, one summary résumé for each position to be filled or replaced on the respective task; giving the proposed employee's education/training, experience, skill levels, affiliations and other characteristics that relate to requirements/qualifications of the work to be done on the task order. The contractor shall provide any and all factual data (dates, certification, etc.) to the CO with submission of each employee's resume. Any qualification information questioned or requiring verification will be identified to the contractor for action and resubmission. Concurrence of the CO is required for employees to work during verification or revision of their qualification resume. The CO will identify to the Senior Research Scientist/Principal Investigator any qualifications requiring verification or questioned for action or resubmission. The CO may hold negotiations with the contractor after receipt of the response to a task request and the contractor's proposed personnel submission(s). The minimum experience and/or education requirements for all key personnel shall be submitted with the initial proposal.

5.3 Personnel Requirements: The positions and the minimum qualifications considered necessary for performance of the work are as follows:

Sr Research Scientist/Principal Investigator

Qualifications: Master of Science/Doctor of Philosophy (MS/PhD) in Fluid Mechanics with 20 years of experience and intimately familiar with analysis and interpretation of oceanic and atmospheric data and wake vortex modeling studies

Research Scientist III

Qualifications: Bachelor of Science/Master of Science (BS/MS), with 15 years of experience and be intimately familiar with oceanic and atmospheric data and wake vortex modeling studies.

Research Scientist II

Qualifications: BS/MS, with 10 years of experience and be familiar with oceanic and atmospheric data and wake vortex modelling studies.

Research Scientist I

Qualifications: BS/MS, with 5 years of experience and be familiar with oceanic and atmospheric data and wake vortex modelling studies.

Data Entry Clerk II

Qualifications: High School diploma or equivalent required. Prior data entry experience required. Proficiency with computer systems and MicroSoft Office (Word, Power Point, and Excel) required.

6.0 KEY PERSONNEL LINES OF COMMUNICATION

6.1 The contractor, primarily through its assigned Sr. Research Scientist/Principal Investigator for each individual Task Order, shall communicate only through the Government's CO and/or the CO's Technical Representative (COTR) regarding all tasks, unless the CO otherwise specifically approves, in writing, another named Government individual.

7.0 DELIVERABLES

7.1 The contractor shall coordinate with the FAA Task Manager (or designated Point Of Contact[POC]) on all reports, letters, memoranda, project documentation, monthly reports, and other written material. All documents shall be coordinated through the COTR or designee prior to distribution. Further, all documents that shall be distributed or posted electronically inside or outside the FAA shall be reviewed for sensitive and/or classified information prior to any distribution of either drafts or final versions of those documents.

7.2 All documents prepared by the contractor shall be on the behalf of the FAA. The contractor shall not independently publish or distribute any document without prior written permission from the CO. The contractor shall review and provide written comments on the

technical accuracy and completeness of each document. No documents, reports, information, etc. shall be released to the public or provided to any party other than the FAA and its contractors without Security Sensitive Information and classification review by the COTR and written approval of the CO.

7.3 In support of the identified tasks and subtasks, the contractor shall comply with existing and evolving FAA AFS Information System Security (ISS) guidance, policies and procedures.

7.4 The COTR, CO, or CO-designated personnel will have ten business days to inspect the work and either report deficiencies or accept the deliverable as meeting all requirements. The contractor shall correct deficiencies that are not a result of a change in user requirements or specifications and redeliver the document(s) to the Government within ten days of notification by the Government that deficiencies were found.

7.5 The following are the minimum required documents identified for delivery:

ITEM	TITLE	DESCRIPTION	SCHEDULE	APPROVAL
7.5.1	Work Plan	Submit a work plan for each major initiative that includes a project POC, planned tasks, schedule, and an estimated cost/price.	Submit to COTR & CO electronically and in hardcopy within 5 workdays after requested by the Govt.	Coordinate with COTR prior to submittal. Govt approval required.
7.5.2	Monthly Status Report (MSR)	Submit a MSR that describes the work accomplished during the reporting period for each major task, work planned for the next period, discuss problems encountered and corrective actions taken, and identify pending issues.	Submit to COTR & CO electronically and in hardcopy no later than the tenth calendar day of the following month	Govt comments/ approval within 10 business days after receipt.
7.5.3	Monthly Financial Report (MFR)	Submit a detailed monthly and cumulative breakdown of funds expended for each major assigned task, including a breakdown of the labor hours utilized by the contractor and any subcontractor, associated labor costs, material costs, and other direct costs incurred. The report shall include the status of funding levels, expenditures, and a comparison between actual and planned expenses.	Submit to COTR & CO electronically and in hardcopy no later than the tenth working day of the following month.	Govt comments/ approval within 10 business days after receipt.
7.5.4	Project List	Maintain a list of project assignments that includes the	Submit hardcopy and electronic copy with	Approval not required.

		project number, title, status, employees assigned, and project completion date.	the MSR.	
7.5.5	Other Deliverables	The appropriate AFS-450 Technical Representative may assign other deliverables as required through Letters of Technical Direction coordinated with COTR/CO. Delivery/Task orders issued by the CO will also define any additional deliverable requirements such as special reports, briefings, analyses, training, databases, position papers, etc.	Delivery date will be included in the DO.	As required.

8.0 OTHER DIRECT COSTS

8.1 As directed and authorized by the CO, any additional supplies, equipment, and materials purchased will be reimbursed at actual costs incurred. Other direct costs may include software, hardware, telecommunications or other program-related functions and items in accordance with the individual Task Order SOW.

9.0 TRAVEL

9.1 The contractor shall travel, as tasked, to support the program. All travel shall be accomplished in accordance with Contract Travel Clause(s) and in accordance with Federal Travel Regulations. Travel will be well defined and approved IN ADVANCE of actual travel performance. A completed Travel Authorization Form shall be coordinated through the COTR with final approval given by the CO. The approved Travel Authorization Form shall be submitted with the invoice. The Government will not reimburse the contractor for travel costs incurred by the replacement of personnel, when such replacement is accomplished for the contractor's or employee's convenience.

10.0 CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (COTR)

10.1 The COTR is formally designated this responsibility by the CO to provide technical direction and Government oversight to the contractor on matters related to this contract.

10.2 The COTR for this contract is:

Karen Durao
Federal Aviation Administration
Flight Standards Service
Management Operations Branch, AFS-405A

6500 South MacArthur Blvd.
STB-Annex, Bldg 26
Oklahoma City, OK 73169
Phone # 405-954-7595

11.0 TRAINING

11.1 The contractor shall provide fully trained employees, shall have an ongoing training program, and shall be responsible for contractor employees acquiring the knowledge and skills necessary to support new technology.

11.2 When advantageous to the Government, training may be provided by the Government at no cost to the contractor or paid for by the contractor and reimbursed by the Government if the training course is not commercially available and falls into one of the following categories:

11.2.1 Unique to the FAA: The Government is providing training exclusively for tasks that are required to be performed at FAA facilities or for any unique FAA requirements. In these instances, the FAA will pay direct hourly charges associated with the number of hours spent in training; or

11.2.2 Directed/Mandated by the Government: The class is directed/mandated by Government regulation, FAA Administrator (AOA-1), or an FAA Security Element.

11.3 Prior to attending any FAA-sponsored training, all support contractors are required to submit the "Support Contractor Authorization – FAA Sponsored Training" form to the COTR with final approval by the CO.

11.4 The contractor shall reimburse Government-paid training costs if a contractor employee does not remain in the position for a year from the date of training. The contractor shall provide to the COTR a Training Report within 14 calendars after training completion.

12.0 ELECTRONIC COMMUNICATION

12.1 The contractor shall have an electronic means for communicating with FAA personnel. The contractor shall ensure that the communications are compatible with the FAA electronic mail system. The contractor shall also ensure that the contractor's electronic mail has the capability to send, receive and retrieve attachments.

13.0 GOVERNMENT FURNISHED EQUIPMENT

13.1 The Government may provide hardware and/or software during the period of performance to the contractor to complete assigned tasks.

13.2 The Government is entitled to retain hardware/software media/tools provided as Government Furnished Equipment as stated herein or purchased under the Other Direct Cost line

item of this contract.

14.0 GOVERNMENT FURNISHED FACILITIES/SERVICES/DATA

14.1 Facilities: For work required at a FAA facility, the Government will provide contractor personnel with the following services and equipment needed to conduct routine tasks: all necessary utilities, telephones and telephone service, desk space, computers, access to the computer network, access to the internet/intranet, and other routine expendable office supplies. Access to some office equipment and services shall be on a shared-use basis with FAA employees. The FAA, when applicable, will provide to the contractor, access to referenced regulations, orders, handbooks, forms, manuals, etc., required for task performance. The FAA will provide the contractor with access to or copies of specialized application software or databases required for task performance.

15.0 ADMINISTRATION

15.1 Conduct: Contractor personnel shall follow and adhere to all policies and procedures established by the Government, including the DOT, FAA, and AFS. Information on such requirements will be provided to the contractor upon request.

15.2 Supervision: This contract was not formed as nor is it to be administered or performed as a personal services contract. Accordingly, the contractor shall designate appropriate and sufficient supervisory personnel to meet task outcomes. Contract supervisors will provide day-to-day supervision of all contract personnel including, but not limited to, work assignments and performance monitoring, payroll records, leave approval and monitoring, etc. At no time will contractor personnel be supervised by FAA managers or other FAA personnel. The FAA will provide, as needed by the contractor and its employees, limited assistance in the form of technical and policy guidance through the assigned COTR.