

National Aeronautics and  
Space Administration  
  
Langley Research Center  
Hampton, Virginia 23681-0001



August 26, 2014

Reply to Attn of 12

**TO:** 12/Contracting Officer, Science and Flight Projects Contracting Branch  
**FROM:** 468/DAWN Instrument Scientist and Langley Principal Investigator  
**SUBJECT:** Justification for Other Than Full and Open Competition (JOFOC) for Atmospheric Dynamics Mission (ADM) Underflights and Polar Winds: Exploratory Expeditions

**1. The nature and/or description of the action being approved**

NASA Langley Research Center (LaRC) proposes to award a sole source contract to Simpson Weather Associates (SWA) to conduct two planned NASA aircraft campaigns based in Greenland. Both campaigns will address the following purposes: 1) perform a series of pre-launch exercises in anticipation of the European Space Agency's (ESA) launch of its Atmospheric Dynamics Mission (ADM); and 2) perform a series of exercises to increase the confidence that the NASA LaRC wind sensor, the Doppler Aerosol WiNd (DAWN) Lidar, will contribute to Arctic warming and ice loss science in future, larger scope campaigns. DAWN is a pulsed, coherent-detection, 2-micron lidar system which is a state-of-the-art Doppler Wind Lidar (DWL). SWA will serve as the Science Principal Investigator (PI) and be responsible for the detailed design, execution and post-flight analyses of the two Arctic aircraft campaigns using LaRC's DAWN wind lidar. SWA will provide campaign flight planning, DAWN wind lidar operation, and DAWN wind lidar data analyses.

**2. Description of the supplies or services required, including an estimated value**

The objectives of the aircraft campaigns are: 1) demonstration of the contribution to the science of arctic warming of the airborne wind lidar measurements using the LaRC DAWN lidar, 2) demonstration of the capability of the airborne DAWN wind lidar to assist ESA's ADM wind lidar space mission with calibration and validation measurements, 3) demonstration of the readiness of LaRC's DAWN wind sensor, and 4) refining of the techniques for calibration/validation between a space-based lidar and an airborne set of sensors using underflights of currently orbiting sensors. The DAWN lidar is used to meet each objective. To plan and perform the services under this contract, the contractor must have experience and expertise with the LaRC DAWN lidar.

The two campaigns are slated to occur in the fall of 2014 on the UC-12B aircraft and in the spring of 2015 on the DC-8 aircraft. The first of the two campaigns is currently scheduled for

October/November 2014 and will be conducted out of Kangerlussaq, Greenland using DAWN on NASA's UC-12B aircraft. The second aircraft campaign is scheduled for the May/June 2015 timeframe and will likely be conducted out of Thule, Greenland using DAWN on NASA's DC-8. SWA's responsibilities include planning, developing detailed descriptions of flight paths and altitudes with corresponding science goals and priorities and weather considerations, ensuring mutual agreement by the LaRC DAWN and LaRC UC-12B and Armstrong Flight Research Center DC-8 campaign teams, optimizing all flight plans by considering the capabilities of the aircraft and sensors, operating the DAWN wind lidar, conducting all campaign operations to include Polar Winds and ADM calibration/validation objectives, performing data collection, analyzing all data, and generating reports for both campaigns.

SWA is a world recognized leader in lidar wind measurement simulation on airborne and space platforms. SWA possesses exclusive experience in computer simulation of both direct detection wind lidar (e.g., ADM) and coherent detection wind lidar (DAWN) and in advanced processing methods for coherent lidar airborne wind data. SWA's simulations include highly sophisticated atmospheric modeling. In addition, SWA is also the only company which has processed DAWN raw data. All of this experience possessed only by SWA is critical to performing the proposed contract.

The total contract period of performance is expected to be from summer 2014 through August 2016. The ADM related tasks will be performed through the first 12 months since those efforts are driven by the expectation of an ADM launch in late 2015 followed by a Cal/Val program. The Government estimate for the contract value is \$800,000 with \$400,000 for the fall 2014 campaign and \$400,000 for the spring 2015 campaign.

### **3. Statutory authority permitting other than full and open competition**

Authority for the Justification for Other Than Full and Open Competition is 10 U.S.C. 2304(c)(1), as implemented by Federal Acquisition Regulation (FAR) 6.302-1, "Only One Responsible Source and No Other Supplies or Services will Satisfy Agency Requirements." SWA is the only contractor with the DAWN lidar capabilities necessary for the performance of the proposed contract. Award of this contract to any other source would result in substantial duplication of cost to the Government that could not be recovered through competition as well as unacceptable delays in fulfilling the agency's requirements.

### **4. A demonstration that the proposed contractor's unique qualifications or the nature of the acquisition requires use of the authority cited**

SWA has singular expertise and capabilities on the DAWN system that are necessary for performance of the unique lidar based aircraft campaigns. Through purchase orders for NASA's Genesis and Rapid Intensification Processes (GRIP) data analyses and DAWN calibration at LaRC, as well as many previous DOD, NASA, and NOAA contracts, SWA has developed specialized capabilities unique to the DAWN system including (1) the sole non-NASA scientists in the world with expertise on the entire DAWN system, (2) singular expertise on the DAWN system's modes of operation and understanding of its measurement performance, (3) the specialized coherent wind lidar data processing methods, and (4) sophisticated modeling of DAWN performance in their unique computer simulation of lidar system wind measurements. SWA has accumulated exclusive and unique experience in understanding and creating sophisticated performance predicting computer models that are specialized for direct (e.g.,

ADM) and coherent (e.g., DAWN) pulsed wind lidar systems and their differences and complementarities. This includes specialized airborne field campaign experience utilizing coherent wind lidar similar to DAWN and experience with Observing System Simulation Experiments (OSSE) computer simulation of numerical weather prediction (NWP) improvements utilizing DWL data including specifically DAWN lidar behavior.

Additionally, SWA developed unique computer models to perform detailed simulation of both coherent and direct wind lidar behavior, realistic atmospheric behavior including Monte Carlo fluctuations of atmospheric parameters, aircraft and spacecraft flight patterns, and lidar scan patterns. SWA also developed novel and unique coherent wind lidar signal processing algorithms to maximize measurement performance and science knowledge from coherent wind lidar data.

SWA is the only firm which possesses the unique combination of expertise, experience, tools, models, algorithms, and simulations required to perform the proposed work. Therefore, no other contractor could perform the required work without substantial duplication of cost that could not be recovered through competition. Any other source would be required to obtain years of knowledge specific to DAWN and develop complex models and other tools necessary to support this specialized lidar aircraft campaign. This makes SWA the only source capable of providing the required services within the timeframe required, without duplication of cost and without substantial risk to the success of the campaigns. Therefore, SWA is the only source with the unique capabilities necessary to provide the services required to meet the campaign needs.

**5. Description of the efforts made to ensure that offers are solicited from as many potential sources as practicable:**

Following approval of this JOFOC, a synopsis of our requirements will be published on the NASA Acquisition Internet Service (NAIS) as well as on the Federal Business Opportunities (FEDBIZOPPS) website announcing LaRC's intention to negotiate with SWA on a sole source basis, as required by FAR 5.201(b).

**6. Description of the market research conducted, and the results, or a statement of the reasons market research was not conducted:**

Market research is not required as DAWN is a unique LaRC lidar and the scientists at LaRC are intimately aware of the capabilities of companies' expertise with DAWN. In particular, the LaRC DAWN Principal Investigator (PI) (Dr. Michael J. Kavaya) has been in this field for several decades and can attest that SWA has the only non-Government scientists in the world that are familiar with the entire DAWN system.

**7. Other facts supporting the use of other than full and open competition:**

None

**8. Sources, if any, which expressed an interest in writing in the acquisitions:**

If sources express an interest in response to the synopsis (see item 5), NASA will review the capabilities of each source and will document its findings.

**9. The actions the agency may take to remove or overcome any barriers to competition before any subsequent acquisition for the supplies or services required:**

At this time, a subsequent acquisition is not anticipated.

**10. Determination by the Contracting Officer of Fair and Reasonable Costs**

With assistance of the NASA Contracting Officer's Representative, the Contracting Officer will conduct a thorough review of the contractor's proposal to ensure that the anticipated cost to the Government will be fair and reasonable.

**Technical Officer Certification:**

I certify that the supporting data presented in this justification are accurate and complete.

\_\_\_\_\_  
Michael J. Kavaya  
DAWN Instrument Scientist  
and Langley Principal Investigator

\_\_\_\_\_  
Date

**Contracting Officer Certification:**

I will ensure that the cost to the Government is determined fair and reasonable prior to award and I certify that this justification is accurate and complete to the best of my knowledge and belief.

\_\_\_\_\_  
Connie Snapp  
Contracting Officer

\_\_\_\_\_  
Date

Concurrence:

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Rosemary C. Froehlich, Head, Science and  
Flight Projects Contracting Branch

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Date

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Office of Chief Counsel

\_\_\_\_\_  
Date

\_\_\_\_\_  
David H. Jones  
Acting Procurement Officer

\_\_\_\_\_  
Date

Approval:

\_\_\_\_\_  
David E. Bowles,  
LaRC Competition Advocate

\_\_\_\_\_  
Date