

## JUSTIFICATION FOR OTHER THAN FULL AND OPEN COMPETITION OVER \$150,000

1. This document is a justification for other than full and open competition prepared by the NASA, John F. Kennedy Space Center.
2. The nature and/or description of the action being approved, i.e. sole source, limited competition, establishment of a new source, commercial item test program, FAR 13.501(a)(1)(ii).

This justification provides the rationale for contracting by other than full and open competition for the acquisition of a compact **Mass Spectrometer (MS)** instrument for the RESOLVE project manufactured by O I Analytical. OI Analytical designs, manufactures, markets, and supports analytical instruments used for sample preparation, detection, and measurement of chemical compounds. Market research and RFI responses were used to determine the available volatile detection instruments and based on the requirements there was only one manufacturer of a MS currently available that can demonstrate the detection of low mass species with the required data acquisition rate required by NASA. A O I Analytical MS test unit was purchased and integrated into the RESOLVE system for the Field Demonstration Unit. The next version of the RESOLVE (Vacuum Development Unit) will build based on the Field Demonstration Unit technology and utilize the same GC-MS analytical instrumentation. There is a requirement for commonality as we move forward in our design and technology maturity.

3. Description of what is being acquired (the supplies or services required to meet the Agency's needs) – including the estimated value and period of performance.

Two research-grade engineering test unit mass spectrometers for the RESOLVE LAVA subsystem unit consists of a miniaturized mass spectrometer, electron ionization source, modified IonCam Studio graphical user interface and Analyzer data analysis software, embedded PC, external power supply, and a protective travel case is estimated to have a value of \$350,000. End of Period of Performance is July 1, 2013.

4. Statutory authority permitting other than full and open competition:

The statutory authority permitting other than full and open competition for this action is FAR 13.501(a)(1)(ii). "Prepare sole source (including brand name) justifications using the format at 6.303-2, modified to reflect an acquisition under the authority of the test program for commercial items (section 4202 of the Clinger-Cohen Act of 1996) or the authority of the Services Acquisition Reform Act of 2003 ([41 U.S.C. 428a](#))."

5. A demonstration that the proposed contractor's unique qualifications or the nature of the acquisition requires use of the authority cited:

The IO Analytical Mass Spectrometer is the only integrated compact MS available that has demonstrated the ability to detect the low mass range (1 amu) and collect an entire mass spectra at a rate of 10 hertz or faster. The unique non-scanning nature of the ion charge coupled device (IonCCD) detector is the only detection system for a mass spectrometer that can collect the entire mass spectrum with a high data acquisition speed (greater than 10 Hz). OI Analytical has several patents on this instrument and has improved the detector since the initial transfer of the technology from JPL/NASA. The company has expertise in gas chromatography and mass spectrometry with a range of instruments available for various analytical monitoring. OI Analytical is ISO 9001:2000 certified for the design, development, and manufacture and servicing of analytical instruments.

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

NASA HQ Enabling Technology Development and Demonstration Team (ETDD) released an RFI in May/June of 2010 (NASA Program Announcement Number NNH10ZTT002L). Within this call was a request for a volatiles detection instrument (Mass Spectrometer & Gas Chromatograph) that was capable of detecting compounds of interest for a lunar mission (requirements from RESOLVE). Numerous responses were received from industry, university, and other NASA centers responding to the volatile detection request. The RFI responses were evaluated by a team within in-situ resource utilization (ISRU). Each response had a minimum of three reviewers who reached a consensus on the likelihood of each response being included in the program. Of these responses, there was only one compact instrument that was currently operational and could detect the species of interest. This instrument was the OI Analytical GC/MS, capable of scanning down to the low mass range and separating the like-mass components with the use of a GC. None of the other responses could detect and differentiate all of the species required for this mission.

In addition to the RFI responses, several analytical chemists visited the analytical vendors at the largest chemical analysis convention (Pittcon 2010) where companies displayed their new technology. Three compact GC/MS systems were identified from 3 vendors. Two of the three systems were not able to detect the low mass range, and neither one had the data acquisition scan rate that is required when coupled with the GC. The one system that met both of these requirements was the OI Analytical system.

Finally, research was conducted to identify the volatile detection systems with flight heritage and evaluate their technical capabilities against the project requirements. TEGA, REGA, VAPoR, MSL, several space station instruments and numerous others were evaluated. None of these systems met all of the objectives for the detection of the project, they were either not capable of separating the compounds of similar masses, not capable of detecting the low mass range or the scan rate of the mass range was too slow to allow quantitation from an eluting peak from the GC.

A notice was publicized in NAIS/EPS and FBO as required by FAR 5.2.

7. Determination by the Contracting Officer that the anticipated cost to the Government will be fair and reasonable:

The anticipated cost is fair and reasonable based on value analysis by the technical end user, previous purchase or same/similar item and price lists published by the company.

8. Description of the market research conducted (Part 10) and the results, or a statement of the reasons a market research was not conducted:

NASA HQ released an RFI for several areas within ETDD in May/June of 2010 (NASA Program Announcement Number NNH10ZTT002L). Within this call was a request for a volatiles detection instrument that was capable of detecting compounds of interest for a lunar mission (requirements from RESOLVE). Numerous responses were received from industry, university, and other NASA centers responding to the volatile detection request. In addition to the RFI responses, several analytical chemists visited the analytical vendors at the largest chemical analysis convention (Pittcon 2010) where companies displayed their new technology. Finally, research was conducted to identify the volatile detection systems with flight heritage and evaluate their technical capabilities against the project requirements.

9. Other facts supporting the use of other than full and open competition, such as:

KSC is taking a modified COTS approach with this project; therefore it was determined to use commercial instruments in our Vacuum Development Unit for the RESOLVE project. It is the only commercial MS instrument that has the scan rate capabilities to quantitatively analyze a microGC.

10. A listing of sources, if any, that expressed in writing an interest in the acquisition:

The response to the RFI included several responses for instruments used for volatile detection. None of these systems met the requirements of the detection of the low mass range in addition to the distinction between similar mass species with a COTS system. The proposals either did not address the requirements above or involved the development of a new system. Given the project milestones (a field test rather than a flight unit), a COTS unit is required as there is limited schedule or funding available for the development and research required for a new instrument.

No sources have expressed interest in writing in the proposed acquisition, and no such expressions are anticipated based on the reasons listed earlier. However, should any such sources respond to the notice of proposed contract action required by FAR 5.2, their responses will be considered in planning for subsequent contract action.

11. A statement of the actions, if any, the Agency may take to remove or overcome any barriers to competition before any subsequent acquisition for the supplies or services required: There are no known actions that the Agency may take to remove or overcome barriers to competition before completion of the proposed acquisition. These barriers, as described earlier, are external to the Agency and therefore not in the Agency's control.

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

\_\_\_\_\_  
Janine Captain  
RESOLVE Engineering Team

\_\_\_\_\_  
(Date)

Contracting Officer:

I certify that this justification is accurate and complete to the best of my knowledge and belief.

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Roger MacLeod  
Contracting Officer

\_\_\_\_\_  
3/5/2013  
(Date)