

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 gas chromatograph (GC) instrument from Inficon for the RESOLVE project. Market research and RFI responses were used to determine the available volatile detection instruments and based on the requirements there was only one system, microGC, currently available that can demonstrate the detection of low mass species with the required data acquisition rate. The GC was purchased and integrated into the RESOLVE system for the Field Demonstration Unit. The follow on version of RESOLVE (Vacuum Development Unit) will build on the Field Demonstration Unit technology and utilize the same GC-MS analytical instrumentation. There is a requirement for commonality as the system moves forward in design and technology maturity.

The interface requirements for the GC have been established based on the current system. The COTS GC/MS IonCam2020 from OI Analytical included a microGC module. This microGC was supplied by Agilent Technologies, the Original Equipment Manufacturer (OEM), as a sub component of the GC-MS; however the Micro Gas Chromatography (GC) business line was acquired, effective May 2010, by Inficon. The procurement of the GC requires the specific knowledge only available from an OEM (now Inficon). Procuring the MicroGC will allow NASA to meet the current interface and performance requirements of the GS-MS system.

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 volatile detection instruments consisting of a gas chromatograph to integrate with a mass spectrometer detector are required. The prototype unit, spare parts, diagrams, software and 2 final units are estimated to have a value of \$250,000 with an end period of performance of 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 purchase of this GC is part of an iterative process to ultimately design and build Class D flight hardware that will quantify the amount of water and other volatile components from the lunar and other extra-terrestrial subsurface. The GC is part of a test unit that is in the 4th phase of design. With each test unit, the equipment is tested to determine the optimal design for the following unit. The Inficon GC was utilized on the 2nd test unit and met our requirements (requirements are defined in section 8, paragraph 3). It is critical that this instrument is compatible with the current RESOLVE design in regards to physical, software, and electronic interfaces. The interfaces for each component are proprietary to Inficon; therefore, no other sources' products are compatible. The requested Chromatographs and spare parts are specifically designed to interface with existing hardware redesign which would increase the overall cost and timeline of the RESOLVE project. This system was purchased and integrated into the RESOLVE system for the Field Demonstration Unit. The follow on version of RESOLVE (Vacuum Development Unit) will build on the Field Demonstration Unit technology and utilize the same GC-MS analytical instrumentation.

This microGC has been integrated into the only GC/MS capable of meeting the project requirements of a short analysis time and required data recording rate. This procurement requires information from Inficon that is not available from OI Analytical. Because of this, we are procuring the instrument directly from Inficon who has the OEM technology that was included in the original instrument. This will ensure the interface designed in the system will not require a redesign effort.

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

NASA HQ released an RFI for several areas within Enabling Technology Development and Demonstration (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. The RFI responses were evaluated by a team within 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, 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:

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Evaluation of the GC included obtaining information from vendor websites and NASA experts in GC, MS, and gas detection contacting vendors to discuss instrument capabilities to ensure the technical capability of the instrument was well understood. The technical evaluation of the instruments led to the conclusion that the OI Analytical GC (OEM Inficon) was the only COTS GC/MS instrument capable of detecting the low mass range.

The OI Analytical system integrated an OEM GC with the non-scanning CCD-detector based mass spectrometer to create their GC/MS. The GC in the system was originally manufactured by Agilent Technologies. The Agilent MicroGC module included a TCD and a variable volume injector to allow the integrated system to reach its full dynamic range of detection. Since this GCMS instrument was first manufactured, Agilent merged with Varian Technologies, and as a result of this merger were required to sell off the MicroGC product line. This product line was purchased by Inficon. The GC that was procured in 2010 included the OEM module from Inficon that was identical to the MicroGC module included in the original GC/MS identified as the only system to meet the needs and requirements of the RESOLVE project.

The design philosophy of modified COTS has been adopted by the RESOLVE project as a way to minimize cost and meet our schedule milestones. To this end KSC is precluded from modifying interfaces to minimize design changes. The use of the Inficon microGC product ensures the system can be used within the current architecture of the RESOLVE project. Changing the instrument would impact schedule, budget, and technical functionality of the system, affecting software, electronics, and structural subsystems with any differences in the system design required by the use of a different gas chromatograph.

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

We are taking a modified COTS approach with our project to integrate the GC with the Mass Spectrometer in our Vacuum Development Unit for the RESOLVE project. It is the only GC-MS instrument that has the scan rate capabilities to quantitatively analyze a microGC. The project has a milestone due by the end of FY13 that requires this procurement

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 no time 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.

Justification for Other than Full and Open Competition for
Compact Gas Chromatograph (GC) Instruments.

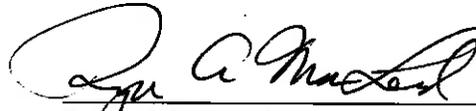
Technical Officer: I certify that the supporting data presented in this justification are accurate and complete.

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.



Roger MacLeod

Contracting Officer

3/5/2013
(Date)