

JUSTIFICATION AND APPROVAL

Estimated Price \$180,000.00

Justification for Other than Full and Open Competition

1. Contracting Agency and Activity. The Department of the Interior, United States Geological Survey (USGS), Office of Acquisition and Grants (OAG) Sacramento, plans to contract by means other than full and open competition. This document sets forth the justification and approval as required by FAR 13.106-1.

2. Nature of Action Being Approved.

The USGS requires a firm fixed price contract to produce cropland mapping for Africa using Google Earth Engine (GEE) computing using MODIS and Landsat data by developing automated cropland classification algorithms (ACCA's), random forest algorithm, and isoclass/k-means clustering, all developed and run on GEE. The anticipated awardee is BAER, Inc.

3. Description of Supplies or Services.

The U. S. Geological Survey is currently leading a global food security support analysis data at 30 m (GFSAD30) project. The **overarching goal** of GFSAD30 project is to produce consistent and unbiased estimates of global agricultural cropland products such as:

- 1) Cropland extent/area;
- 2) Crop types with focus on 8 crops that occupy 70% of the global cropland areas;
- 3) Irrigated versus rainfed;
- 4) Cropping intensities: single, double, triple, and continuous cropping;
- 5) Cropland change over space and time: 1990-2017.

These cropland products are to be produced year after year from year 2000 to present as well as in the future using ACCAs at 30m and 250m for the entire African continent. These products will be developed through the ACCAs developed by BAER, Inc.

4. Estimated Dollar Value. \$180,000.00

5. Statutory Authority. The proposed action may be awarded without full and open competition under FAR 13106-1.

6. Rationale Supporting Use of Citation in No. 5.

The Government requires croplands products of Africa as a part of the global food security project (<http://geography.wr.usgs.gov/science/croplands/>). Work under this effort, funded by NASA, has been in progress for three years, and the fourth/next-to-last year is soon to begin. The

products required must be generated using ACCAs, which have already been developed by BAER, Inc. Further, producing these products at Landsat 30m resolution repeatedly year after year means massive computation which is being completed using cloud computing in Google Earth Engine (GEE). (Over the course of this project, the Government has developed many algorithms based upon the GEE global cropland classification. The time and resources invested on GEE effort in big data computing is enormous. If the Government were to migrate to another host, the whole project will be in jeopardy as there will be a need to re-invest time and resources on any migration.)

BAEI, Inc. is uniquely qualified to meet the Government's minimum needs for this requirement as:

1. The Government requires highly skilled remote sensing expertise in Python, java script, and GEE algorithms which have been in use on this project since inception. African agriculture is complex and requires great knowledge of its various dynamics. Even great expertise in remote sensing without intimate knowledge of African agriculture (e.g., crop types, cropping intensities or seasonalities) will make it extremely time consuming for a vendor to ramp-up to perform this requirement. BAER Inc. has these skill sets as a result of working on this project (through a separate award with NASA) for the last 3 years.
2. BAER Inc. has developed proprietary ACCAs, which required considerable effort in development, testing, and accuracy assessment. These ACCA algorithms are novel, unique, and advanced. Recreating any such algorithm would be redundant and a waste of resources already expended. The last two years of this project are based upon the ACCAs already developed.
3. Cropland products produced using ACCA algorithm and remote sensing is a new approach to conventional tedious data collection involving thousands of farmers. As a result, the development of the last few years need to be taken to next level by further testing, and validating products rather than "reinventing the wheel".
4. BAER Inc. has successfully worked on this project for last 3 years. In order for another vendor to ramp-up would require replication of all previously completed work which will take years of effort (estimated to exceed \$500K) and would create unacceptable project delays. Savings hoped to be achieved through competition at this point would not overcome the total loss of initial investment in the project.

7. Other Information.

The Government requires project completion within a 2 year period (April 5, 2016 through May 31, 2018).

8. The Efforts to Identify Additional Sources Including the Market Research Conducted.

No other sources are known to possess the unique and essential qualifications outlined in Paragraph 6 of this justification. The work done by BAER Inc. for the NASA GFSAD30 project over the past three years has led to the development of the very unique science described above. Their customized modeling framework, on which this existing project is based, is proprietary and does not exist anywhere else. Through market research the Government has identified other vendors who could potentially work on the project if the project was at the point of inception.

However, any new vendor at this point would not have access to the proprietary information/process discussed in paragraph 6 and would be unable to perform and execute project completion within the Government's timeframe.

9. Future Plans to Permit Competition. Through identification of other products generated using cloud computing and high resolution remote sensing for Africa or elsewhere (if/when they come on the market), future requirements will be competed to the maximum extent practical.

10. Recommendation and Certification from Program Office

Based on the above, I recommend this acquisition be conducted on the basis of other than full and open competition. I certify that technical data which form a basis for this justification that are the responsibility of technical or requirements personnel are complete and accurate.



Research Geographer

3-29-16
Date

11. Certifications from the Contracting Officer:

- a. The Contracting Officer will compare pricing structure with the previous order and other contracts of a similar nature to determine prices fair and reasonable.
- b. This justification is accurate and complete to the best of my knowledge and belief.

12. Approvals



Theodore W. Peck, Contracting Officer

3/29/2016
Date

**JENNIFER
KELLEY**

Digitally signed by JENNIFER KELLEY
DN: c=US, o=U.S. Government,
ou=Department of the Interior,
ou=Geological Survey, cn=JENNIFER KELLEY,
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Date: 2016.03.30 09:06:45 -0400

Jennifer Kelley, Bureau Competition Advocate

Date