



ADVANCE CONTRACT AWARD NOTICE (ACAN)

1. Title

Development of High-Resolution Hourly Cloud Datasets to Support the Development of Surface Solar Resource Datasets for the Canadian North.

2. Definition

An Advance Contract Award Notice (ACAN) allows departments and agencies to post a notice, for no less than fifteen (15) calendar days, indicating to the supplier community that it intends to award a good, service or construction contract to a pre-identified contractor. If no other supplier submits, on or before the closing date, a Statement of Capabilities that meets the requirements set out in the ACAN, the competitive requirements of the government's contracting policy have been met. Following notification to suppliers not successful in demonstrating that their Statement of Capabilities meets the requirements set out in the ACAN, the contract may then be awarded using the Treasury Board's electronic bidding authorities.

If other potential suppliers submit Statement of Capabilities during the fifteen calendar day posting period, and meet the requirements set out in the ACAN, the department or agency must proceed to a full tendering process on either the government's electronic tendering service or through traditional means, in order to award the contract.

3. Background

High-resolution solar resource data across all of Canada is necessary for detailed analysis of solar and building energy applications. NRCan's CanmetENERGY-Ottawa is leading the development of a validated satellite-derived hourly solar resource datasets for Canada. This solar resource database is comprised of two datasets: one for the southern regions of Canada (South of 58° latitude) and the other is for the North (north of 58° latitude). The southern region dataset is considered high quality data and the solar resource information is provided at a high resolution of 0.1 x 0.1 degree (10km grid). The existing dataset for the northern region is a low resolution 100 km grid at 1 x 1 degree, and not at a level of sufficient detail and quality to support investment decisions. Where high resolution solar resource data was previously limited to geostationary satellites that become less accurate North of 58° latitude, the NASA Langley research center now has the technology to routinely produce high-resolution (4-5 km) cloud data products from geosynchronous and polar orbiting satellite imager data sources for all of Canada.

4. Objective

The objective of this present contract is to produce high-resolution gridded hourly cloud data products to support the development of a high-resolution (4-5 km gridded) solar irradiance dataset for the Canadian North spanning 58° – 85°N latitude and 50 - 145°W longitude. This will be done by making a special adaptation to the NASA Clouds and Earth's Radiant Energy System (CERES) fusion data production system in order to develop calibrated imager data and cloud retrievals required by the State University of New York (SUNY). The plan is to produce at least 20 years worth of hourly high-resolution gridded cloud and ancillary information corresponding to the time period of team ranging from 2000 (corresponding to the NASA Terra satellite) through 2021. This dataset will be used mainly by SUNY, NRCan-Contractor under a separate contract, for the development of high resolution gridded solar irradiance dataset in the same format and consistent with the existing high-resolution solar resource dataset for the Canadian south, previously developed by State University New York (SUNY).

5. Scope of Work

To achieve the above objective, the following subtasks will be performed:



- **Tasks 1:** *Begin to assemble* high-resolution (tentatively 4-5 km) hourly cloud properties by mining and fusing MODIS, AVHRR, GOES, and/or VIIRS platforms data using global cloud composite (GCC) framework briefly described above. Specific NASA tasks are:
 - 1.1 Assess all data potential GEO/LEO satellite inputs for consistency and inclusion into the GCC production system back to 2000 for the Canada region. Identify data products with data quality and/or other calibration issues and assess impact to hourly sampling.
 - 1.2 Receive data requirements for SUNY solar algorithms and ancillary data products; begin coding for subsetting GCC for Canada region.
 - 1.3 Adapt and specially process a limited pilot subsetted GCC parameter set for specified time period for evaluation by SUNY.
 - 1.4 Assemble and assess ancillary data set for selected period (at a minimum AOD 700nm, angstrom coefficient and precipitable water).

- **Tasks 2:** Assess pilot GCC and ancillary data products.
 - 2.1 Delivery of the extend pilot data set to SUNY containing derived satellite radiance and cloud properties at 4-5 km and ancillary data using a custom subsampled data format (targeting years 2016 and 2017).
 - 2.2 Joint assessment with SUNY of various data products from common period. Evaluate cloud products and assess impact of sampling and data filling where needed.
 - 2.3 Implement feedback from above tasks and complete long-term processing of the first batch of cloud and ancillary data products
 - 2.4 Exchange specifications with NRCAN about delivery of selected cloud and other ancillary parameters to NRCAN. Begin to deliver files to NRCAN.

- **Tasks 3:** Long-term Cloud, Solar Resource and Assessment
 - 3.1 NASA completes long-term production and delivers to SUNY and to NRCAN (through 2020 and extending into 2021 if possible).
 - 3.2 Validation and submittal joint publication via a peer reviewed journal and/or key conferences.

6. Schedule and Deliverables

Deliverables	Delivery Date
The planned major milestones for the activities	4 months after signing of contract
Final cloud products report	1 year after signing of contract

7. Contractor's Responsibilities

1. Produce high-resolution (4-5 km x 4-5 km) multi-satellite radiance fused hourly cloud products with ancillary data suitable for processing by SUNY to produce solar irradiances;
 - i. The radiance and cloud products are to cover an area ranging from 50-85 degrees in latitude North and from 50 to 145 degrees in longitude West;
 - ii. The time data period will span as much of the period from 2000 to 2020 as possible and reasonable given sampling and satellite constraints;

2. Jointly assess, with NRCAN and SUNY, various data products for a specified test period;



3. Exchange specifications with NRCAN about delivery of selected cloud and other ancillary parameters to NRCAN;
4. Evaluate cloud products and assess impact of sampling and data filling where needed;
5. Implement feedback from SUNY and NRCAN for above tasks and complete long-term processing of the first batch of cloud and ancillary data products; and
6. As necessary for SUNY solar irradiance validation, deliver similar data products for selected small regions corresponding to known US surface measurement locations;
7. Contribute to the submittal of a joint publication via a peer reviewed journal and/or key conferences.

8. NRCAN's Responsibilities

NRCAN will use reasonable effort to:

1. Provide specifications for the data parameters and formats required to the production of solar irradiance;
2. Provide evaluation and feedback on resulting project progress based on initial progress reports to be delivered by the Contractor;
3. Provide necessary data requirements to enable data product production;
4. Provide any specifications to the Contractor in case that NRCAN wishes to archive the cloud and ancillary data products; and
5. Allow the Contractor to retain and use the data produced and/or delivered in any manner the Contractor deems appropriate.

9. Period of the Contract

It is anticipated that the contract will begin upon date of award and end **March 31, 2021**.

10. Estimated Cost

The approximate cost of this requirement is \$131,811.00 USD (approximately \$185,000.00 CAD). Customs duty included and Applicable Taxes exempt.

11. Trade Agreements

Applicable Limited Tendering Provision under NAFTA (Article 1016.2)

1016.2(b) - where, for works of art, or for reasons connected with the protection of patents, copyrights or other exclusive rights, or proprietary information or where there is an absence of competition for technical reasons, the goods or services can be supplied only by a particular supplier and no reasonable alternative or substitute exists;

Applicable Limited Tendering Provision under Canada-Chile (Article Kbis-09)

Kbis-09 (b) - where, for works of art, or for reasons connected with the protection of patents, copyrights or other exclusive rights, or proprietary information or where there is an absence of competition for technical reasons, the goods or services can be supplied only by a particular supplier and no reasonable alternative or substitute exists;

Applicable Limited Tendering Provision under CFTA (Article 513.bi)

506.12(b) – where there is an absence of competition for technical reasons and the goods or services can be supplied only by a particular supplier and no alternative or substitute exists;

Applicable Limited Tendering Provision under Canada-Honduras (Article 17.11)

17.11.2 b) a good or service being procured can be supplied only by a particular supplier and a reasonable alternative or substitute does not exist because:



- (i) the good or service is a work of art,
- (ii) the good or service is protected by a patent, copyright or other exclusive intellectual property right, or
- (iii) there is an absence of competition for technical reasons;

Applicable Limited Tendering Provision under Canada-Panama (Article 16.10)

16.10.1b) a good or service being procured can be supplied only by a particular supplier and a reasonable alternative or substitute does not exist because:

- (i) the good or service is a work of art,
- (ii) the good or service is protected by a patent, copyright or other exclusive intellectual property right, or
- (iii) there is an absence of competition for technical reasons;

Applicable Limited Tendering Provision under Canada-Columbia and Canada-Peru (Article 1409.b)

b) Where the goods or services can be supplied only by a particular supplier and no reasonable alternative or substitute goods or services exist for any of the following reasons:

- a) The requirement is for a work of art,
- b) The protection of patents, copyrights or other exclusive rights, or
- c) Due to an absence of competition for technical reasons;

Applicable Limited Tendering Provision under Canada-Ukraine (Article 10.13.b)

(b) if the goods or services can be supplied only by a particular supplier and no reasonable alternative or substitute goods or services exist for any of the following reasons:

- (i) the requirement is for a work of art;
- (ii) the protection of patents, copyrights or other exclusive rights; or
- (iii) due to an absence of competition for technical reasons

12. Exception to the Government Contracts Regulations and applicable trade agreements

Sole Source Justification - Exception of the Government Contract Regulations (GCR):

- (d) Only one person or firm is capable of performing the contract

The Supplier must be able to meet all of the following criteria:

- Owns a unique data archive developed over time based on routinely collecting and processing satellite observations from the world's geosynchronous (GEO) and low Earth orbiting (LEO) satellites for input into NASA satellite mission data production and analysis at the global scale.
- Developed a unique method to intercalibrate measurements from imagers on the GEO and LEO platforms and methods to fuse and stitch these measurements using advanced methods for data quality assurance and signal processing techniques for data fusion.
- Developed a unique and comprehensive system for retrieving cloud properties from the intercalibrated radiances from GEO and LEO satellite platforms.
- Owns a unique set of polar orbiting satellites and a satellite-derived weather surface models used to generate the raw datasets to be used for the development of high-resolution hourly time series of cloud datasets for the Canadian north resource datasets.

The identified provider is the only one able to meet all of the criteria identified above.



13. Name and Address of the Proposed Contractor

The National Aeronautics and Space Administration (NASA)
Langley Research Center 21 Langley Blvd., M.S. 420
Hampton, VA
23681, USA

14. Inquiries on Submission of Statement of Capabilities

Suppliers who consider themselves fully qualified and available to provide the services/goods described herein, may submit a Statement of Capabilities in writing, preferably by e-mail, to the contact person identified in this Notice on or before the closing date and time of this Notice. The Statement of Capabilities must clearly demonstrate how the supplier meets the advertised requirements.

15. Closing Date

Closing Date: May 19, 2020
Closing Time: 2:00 p.m. EDT

16. Contract Authority

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