

Request for Information (RFI): Low-cost Mirrors for Interferometers

IARPA-RFI-20-01

The Intelligence Advanced Research Projects Activity (IARPA) Amon-Hen program is seeking information on research efforts in the area of low-cost optics and rapid, low-cost mirror fabrication techniques. This request for information (RFI) is issued solely for information gathering and planning purposes; this RFI does not constitute a formal solicitation for proposals. The following sections of this announcement contain details of the scope of technical efforts of interest, along with instructions for the submission of responses.

Background & Scope

The IARPA Amon-Hen program is developing novel, low-cost approaches to passive optical imaging of satellites in Geosynchronous Earth Orbit (GEO) from the ground. Currently funded efforts for Amon-Hen utilize interferometric collection techniques. Due to the program's emphasis on lowering overall system costs, Amon-Hen is interested in lowering the cost of each of the collection apertures used in the interferometer. Because the individual apertures in an interferometer collect light from only a single mode (light within the resolvable spot size of an aperture) the full field of view of the aperture can be very small with no loss of utility to the mission. Spherical apertures are an obvious choice in this case and the manufacture of spherical mirrors provides several opportunities to significantly lower fabrication cost, fabrication time, and mirror mass. As with the Amon-Hen program itself, however, this RFI does not seek to constrain the approaches that might be taken to address this need. Responders to this RFI are encouraged to share all existing capabilities and theoretical approaches to solving this challenging task.

This RFI seeks ideas on low-cost, efficient manufacture of low-mass, large diameter mirrors. Existing applications or areas of interest to IARPA include optical interferometry.

IARPA also has interests in:

- Optical Communications
- General light collection
- Mirror coating techniques/materials that improve mirror efficiency
- Alternatives to glass mirror substrates

This RFI seeks approaches to rapidly manufacture large (>2m) light-weight, low-cost mirror apertures.

Responses to this RFI should answer any or all of the following questions:

1. What are your existing capabilities to rapidly manufacture low-cost, low-mass optical apertures? Quantify rapid, low-cost, and low-mass.
2. What, if any, new capabilities will you have to develop if you do not have existing capabilities in these areas? What will it cost and how long will it take to develop those capabilities?

3. What, if any, environmental limitations exist for your apertures? Specifically, what are the temperature operability and survivability extremes? Are the apertures vacuum compatible? What environmental restrictions like humidity, chemical degradation, etc., exist for your apertures?
4. Describe rigidity and support requirements for your apertures: e.g., must they be actively supported, how are they affected by gravity, etc.?
5. Specify RMS mirror error both for final static, supported mirrors and after any active, adaptive surface corrections applied to the primary to achieve acceptable mirror figure during operation.
6. If more than one approach is presented please submit them separately.

Preparation Instructions to Respondents

IARPA requests that respondents submit ideas related to this topic for use by the Government in formulating a potential program. IARPA requests that submittals briefly and clearly describe the potential approach or concept, outline critical technical issues/obstacles, describe how the approach may address those issues/obstacles and comment on the expected performance and robustness of the proposed approach. If appropriate, respondents may also choose to provide a non-proprietary rough order of magnitude (ROM) estimate regarding what such approaches might require in terms of funding and other resources for one or more years. This announcement contains all of the information required to submit a response. No additional forms, kits, or other materials are needed.

IARPA appreciates responses from all capable and qualified sources from within and outside of the US. Because IARPA is interested in an integrated approach, responses from teams with complementary areas of expertise are encouraged.

Responses have the following formatting requirements:

1. A one page cover sheet that identifies the title, organization(s), respondent's technical and administrative points of contact - including names, addresses, phone and fax numbers, and email addresses of all co-authors, and clearly indicating its association with RFI-20-01;
2. A substantive, focused, one-half page executive summary;
3. A description (limited to 5 pages in minimum 12 point Times New Roman font, appropriate for single-sided, single-spaced 8.5 by 11 inch paper, with 1-inch margins) of the technical challenges and suggested approach(es);
4. A list of citations (any significant claims or reports of success must be accompanied by citations);
5. Optionally, a single overview briefing chart graphically depicting the key ideas.

Submission Instructions to Respondents

Responses to this RFI are due no later than 5:00 p.m., Eastern Time, on **14 February 2020**. All submissions must be electronically submitted to dni-iarpa-rfi-20-01@iarpa.gov as a PDF document. Inquiries to this RFI must be submitted to dni-iarpa-rfi-20-01@iarpa.gov. Do not send questions with proprietary content. No telephone inquiries will be accepted.

Disclaimers and Important Notes

This is an RFI issued solely for information and planning purposes and does not constitute a solicitation. Respondents are advised that IARPA is under no obligation to acknowledge receipt of the information received, or provide feedback to respondents with respect to any information submitted under this RFI.

Responses to this notice are not offers and cannot be accepted by the Government to form a binding contract. Respondents are solely responsible for all expenses associated with responding to this RFI. IARPA will not provide reimbursement for costs incurred in responding to this RFI. It is the respondent's responsibility to ensure that the submitted material has been approved for public release by the information owner.

The Government does not intend to award a contract on the basis of this RFI or to otherwise pay for the information solicited, nor is the Government obligated to issue a solicitation based on responses received. Neither proprietary nor classified concepts or information should be included in the submittal. Input on technical aspects of the responses may be solicited by IARPA from non-Government consultants/experts who are bound by appropriate non-disclosure requirements.

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