Proposed Sole Source Purchase Form

Pursuant to New Mexico Procurement law, the UNM Purchasing Department will post your completed form on the UNM Sunshine Portal for 30 days prior to purchase of the goods/services.

I. GENERAL INFORMATION. PLEASE PROVIDE THE FOLLOWING:

<table>
<thead>
<tr>
<th>Date of Request</th>
<th>Nov 18 2019</th>
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<tbody>
<tr>
<td>Request Submitted by</td>
<td>Salvador Portillo</td>
</tr>
<tr>
<td>Department</td>
<td>Electrical and Computer Engineering</td>
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<tr>
<td>Phone</td>
<td>277-1311</td>
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<tr>
<td>Proposed Vendor</td>
<td>Specialized Imaging</td>
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<tr>
<td>Estimated Amount</td>
<td>207,800.00</td>
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Buyer Team - See Commodity list at [http://www.unm.edu/~purch/commcodes.pdf](http://www.unm.edu/~purch/commcodes.pdf)

Provide a basic description of goods/services to be provided:

This is for an ultrafast framing camera to take images of plasmas and radiation patterns in the nanosecond regime

Why is this purchase needed?

This framing camera is needed to carry out our sponsored research on multipactor plasmas. These plasmas are transient events that occur in very short time scales. Our principal diagnostics of laser imaging and radiation imaging of these plasmas must have nano second images in order to ascertain the underlying physical principles which is what we are being asked to do by the sponsor

II. BASIS FOR SOLE SOURCE PROCUREMENT. CHOOSE APPLICABLE BOX(ES) AND PROVIDE ADDITIONAL INFORMATION, AS REQUESTED:

☒ Proprietary item, technology or service only available from the proposed vendor. (Check box and describe proprietary component)

This framing camera is the only nano second resolution camera capable of capturing up to 1 billion frames per second AND that has an additional optical port that allows for an external streak camera to be coupled to the framing camera. This is a unique capability that allows for individual images to be taken sequential by the 6 ccd imagers of the framing camera but ALSO capture a streak camera image which is a continuous record of the field of view. This unique capability only offered by this vendor, allows us to investigate a new parameter space in multipactor plasmas which is what we have been tasked by our sponsor. Additional to the fast time requirement (1 billion frames per second, with 12 frames and with 0 ns independent interframe times snf 3ns exposure times or better) and the critical need for an optical port to couple an external streak camera we also need the highest possible pixel resolution and this camera exceeds the 1024x1024 requirement, it has 1360x1024 pixels.

☒ Compatibility requirement with existing item, technology or service. (Check box and describe compatibility requirement)
The optical port which allows for the secondary streaked continuous image is meant to be mated to a specific format and focus length streak camera, namely the optronis model of streak camera. This is our streak camera. The entire system was designed to work together.

☐ Renewal of support/maintenance/subscription of software, technology or other intellectual property. (Check box and describe)

☐ Other Basis for Sole Source: Please describe below:

III. **SUPPLEMENTAL DETAILS. PLEASE PROVIDE ADDITIONAL INFORMATION AS REQUESTED BELOW:**

Describe in detail the unique capabilities of the proposed vendor’s goods/service and/or personnel performing the work and why this constitutes the only source. Focus on what is unique about the goods/service and why no other vendor could meet your needs.

It is critical that we have as much information about the plasma temperature and densities in a multipactor event. In order to do this we need nanosecond imaging, discrete as well as continuous. Each method provides needed information to discern the physics of these plasmas. This is the ONLY camera system in the world that allows for this. It does so by coupling a nanosecond ultra high speed framing camera that takes discrete images at a billion frames per second AND that allows for the coupling of an external streak camera that sweeps the entire time temporal frame thereby providing the discrete images for our interferometry work using the framing camera as well as the continuous streaked spectroscopy data. Both of these data are needed in order to understand the physics of the plasma evolution. Critically, the unique coupling of the streak and framing cameras allow for imaging in the SAME field of view. No other vendor or system is capable of doing this.
Describe the due diligence made to locate other possible sources including communications with other universities, communications with similar providers, web searches, yellow page searches, review of advertisements and trade publications, etc.

These scientific instruments are very difficult to construct and there are only 4 manufacturers of these cameras. These are well known manufacturers by the plasma community at large. No other manufacturers are capable of doing this. The usual web searches of course took place, on top of talking with top scientists from Sandia and Los Alamos about these cameras. We also contacted other scientists in the community and of course only these manufacturers are capable of producing these cameras. Trade publications such as physics today and review of scientific instruments were looked at as well to complete our due diligence.

List the other vendors who were contacted. Please describe the specs/qualifications/criteria that the other vendors were unable to satisfy.

Hamamatsu corporation produces a framing camera that is too slow - it cannot meet the billion frames per second discrete imaging requirement, we spoke with them directly and they are more expensive than the present system even though it does not meet the framing requirement. Additionally, it does not have the critical feature of an optical port for the couple of the fast streak camera.

Stanford research systems, is the 2nd manufacturer. They cannot meet the high pixel resolution nor can they meet the optical port for the streak camera system. We spoke to them at length on this issue and moved on once it was established that they could not meet the critical condition

NAC image technology does not have an external optical port for the framing camera meaning no streak camera can be mated to it an so we cannot take simultaneous imaging with discrete framing images of the interferometer and with the swept imaging of the spectroscopy diagnostics we are fielding.