AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
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2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0002	12 February 1999		

6. ISSUED BY	CODE	7. ADMINISTERED BY *(If other than Item 6)*	CODE
CONTRACTING OFFICER NAVAL RESEARCH LABORATORY ATTN: CODE 3230.MM WASHINGTON DC 20375-5326			

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, country, State and ZIP Code)*	(√)	9A. AMENDMENT OF SOLICITATION NO.
TO ALL OFFERORS		N00173-98-R-CB04 9B. DATED *(SEE ITEM 11)* 19 JANUARY 1999 10A. MODIFICATION OF CONTRACT/ORDER NO. 10B. DATED *(SEE ITEM 13)*
CODE / FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers [X] is extended, [ ] is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning 2 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer x submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(√) A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103 (b).

C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

Any Questions Concerning This Amendment Should be Directed To:
Marita F. Thompson, Code 3230.MM, (202) 767-0666
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Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
15B. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY *(Signature of Contracting Officer)*	16C.DATE SIGNED

The purpose of this amendment is to answer questions, incorporate all the questions herein as Addendum No. 1 to the Statement of Work (SOW) and extend the closing date of the solicitation.

1. The questions and answers are as follows:

Question

With respect to the daylight performance requirements in section 3.1.10.1, in order to assess the impact of sunlight on telescope performance, it is necessary to know the specifics of the thermal environment. Please provide data on the dome, including the material, exterior surface treatment, the presence or absence of insulation, and whether or not the dome is air-conditioned. It is also necessary to know the sun angles relative to both zenith and to the telescope axis during observations.

Answer

The dome is a 15 foot diameter Home-Dome PD-15 make of fiberglass reinforced isothalic resin with a white gel coat. If necessary, the government may install a baffle (not part of the delivered telescope), but would prefer if possible to not do this. This baffle would be positioned for the given satellite trajectory to shield part of the dome slot or the baffle might be a stationary sunscreen. It may ease the contractor requirements to know that use of the telescope in sunlight is primarily for satellite laser ranging and it is understood that this may degrade somewhat the imaging characteristics of the telescope. The bidder should describe any such anticipated degradation. Initially plans are to install the telescope in the above dome, however, for future applications it would be desirable to house the telescope in roll off housing. In this configuration a baffle or sunshade could still be used.

The bidders should describe how he proposes to handle these different circumstances or restrictions on the siting due to his design. Current plans are that the telescope LOS shall not be pointed to within 30 degrees of the sun, but bidders should recommend permissible sun angles for his design. It would be acceptable to require that the telescope LOS be kept somewhat further from the sun than this, but the bidder should so specify his proposed restrictions for consideration by the government. It is of course desirable but not required to allow the telescope to point closer to the sun.

It is possible the bidder may recommend panels for later purchase (or supply them with the telescope) that may be used to cover the telescope tube or not depending on the siting and conditions.

The telescope will be sited initially in the Washington, DC area and the sun zenith angles shall be those that occur at this site, but the telescope may be moved to other locations. The dome may or may not be air-conditioned, but the operational plans are that the conditions inside the dome shall be ambient conditions one hour before use. The bidder may recommend enclosure and constraints appropriate for his design.

Question

Please clarify the option performance requirements. The following requirements are cited in the Statement of Work, Paragraph 3.2.3, System Optical Quality:

“Telescope shall provide lambda over ten (lambda/10) system performance in the field over the field of view (FOV) of the optics.”
“The telescope shall provide diffraction limited performance over the full range of motion of the telescope.”
“The field mounted optical system shall have a single pass transmitted wavefront error of less than 1/13 wave rms at a wavelength of 632.8 nm over the full aperture and full range of motion.”
“The optical quality of the fielded system shall be such that the final on-axis image shall have 80% of the theoretical, diffraction limited, energy in a 0.50 arosec diameter circle.”

While we understand that in the case of a conflict, the most stringent specification applies it is not clear why the requirements identified (a) and (c) have both been imposed? Perhaps requirement (a) is for predicting performance at the operational site and (c) is for performance demonstrated by factory testing. In any event, both of these specifications are very tight compared to the primary mirror specification in Paragraph 3.2.4.

Can the optical specification be simplified by eliminating the component level specifications and only imposing the system level wavefront and encircled energy?

Answer

The desired specification is that the telescope have lambda over ten (lambda/10) system performance in the field. so the interpretation that "requirement a. is for predicted performance at the operations site" is correct.

Specification b. should read that the telescope shall provide the indicated level of performance over the full range of motion of the telescope rather than the telescope shall provide "diffraction limited" performance over the full range of motion of the telescope.

In section 3.2.4 it is intended that the primary mirror have at least lambda over 20 (lambda/20) or 0.05 lambda wave front error performance or better. Note that there may have been some confusion due to the four methods of specifying the error as either surface figure or wave front error and as a multiplicative or divisional factor. The rationale for this lambda over 20 requirement is that the primary mirror should not be a major contributor to the system error.

The primary mirror component specifications are to be maintained and are still a requirement as are the surface qualities of the mirrors. With these exceptions, and the exception of the roughness requirements of the coudé mirrors (section 3.2.7.2), the specifications may be simplified by eliminating the component level specifications and only imposing the system level wavefront and encircled energy requirements for the fielded telescope. However, all requirements for mounting precision (in tilt and

location) and adjustments of the optical mounting and any other non optical-surface effects should still meet all requirements specified in the Statement of Work.

Question

In the Statement of Work, Paragraph 3.4.1.3, Functional Level Gimbal Dynamics Analysis, it appears that the government is requesting that the contractor provide a commercial control systems analysis program. Is this the case?

Answer

The government is requiring that the contractor use a commercial control system analysis program such as MATLAB/Simulink. The contractor need not deliver this program with the telescope, but must specify the version number of the program that was used so that the government may use an existing copy of the program or purchase one.

This ruling applies to sections 3.4.1.3 and 3.7.4.

Question

Is the Tip Tile Secondary mirror option discussed in paragraphs 3.1.8 and 4.1.3 to be used for static alignment correction or the some dynamic operation?

Answer

Section 3.1.8 describes the secondary mirror mount that must be delivered with the telescope. As stated in paragraph two of section 3.1.8, this mount shall allow for manual centration and tilt adjustment, to align the secondary or as stated in the question for "static alignment correction".

Section 4.13 (note typo which incorrectly indicated that this was section 4.1.3) on the other hand concerns an optional secondary mirror and any mounting and controls which is to be delivered only if this option is exercised. This optional secondary is for "dynamic operation" as a first order adaptive optics correction for atmospheric tilt effects.

Question

3.3.8 Cables

Table 3.3.8.1 specifies 4 lines of 110 VAC power, switchable at the TUI, paragraph 3.3.8.1 specifies that "the Contractor shall provide 6 115 V grounded AC outlets" and that they should be "mounted on the telescope structure". Paragraph 3.4.2.1 specifies that "At a minimum, there should be power available at M2, the headring periphery, both yoke tines, and the base of the telescope."

Do the lines in Table 3.3.8.1 feed the outlets in paragraph 3.3.8.1?

b) Are the four locations mentioned in paragraph 3.4.2.1 the destinations for the lines in Table 3.3.8.1?

c) How are the 6 outlets to be distributed among these four locations, only two of which are on the telescope structure?

d) Are the four lines to be individually switched?

e) Could the intent of this requirement be met by providing six switched outlets at one location on the trunion box or yoke tine?

Answer

The power circuit specifications to the telescope had been left as they were because the Government wished to leave open the possibility of changing these when the ICD is drawn up after the contract is signed. The Government still wishes to leave open this possibility, however, for bidding purposes the following table may be used.

Telescope Circuits and Outlet Plugs

LOCATION	CIRCUITS	PLUGS
Base	1 non-switched 15 A	4 plugs
Coudé Tine	2 switched min of 10 A each	2 plugs each circuit
Nasmyth Tine	2 switched min of 10 A each	2 plugs each circuit
Trunnion Box	2 switched min of 10 A each	2 plugs each circuit
Head Ring	1 switched min of 10 A each	2 plugs

For bidding purposes this table may be taken to supersede the instrument power line requirements of the previous tables and answers the questions about power lines for instruments on the telescope. Specific answers to the questions are:

a) Yes.

b) The "power available at M2, the headring periphery, both yoke times, and the base of the telescope" mentioned in section 3.4.2.1 are further detailed in Table 3.3.8.1 and Table 3.3.8.2 with respect to power to the yoke and trunnion box, but the table above should be used for bidding power lines.

c) See table above.

d) See table above.

e) See table above.

Question

3.3.10.2 Brakes

This paragraph requires that safety interlock switches be installed on "each yoke tine, at four positions on the pedestal base, and at the electronic console".

a) Are these the same as the "mushroom" buttons referred to in paragraph 3.4.5?

b) Is it the government's intention that six of these switches be installed on the telescope as discussed in paragraph 3.3.10.2?

c) Are these switches in addition to the safety shutoff discussed in paragraph 3.3.10.4?

Answer

a). Yes.

b). The intent of this specification is that there be a safety mushroom button readily available to personnel working around the telescope or on instruments on the tines while the telescope is operational. It is now recognized that a safety switch can be make mobile so that the requirement of four switches on the base is hereby replaced by two switches on or near the base: one movable and one stationary on the base.

c). This could be but need not be. The safety shutoff switch discussed in section 3.3.10.4 is intended to be a switch that can be padlocked in the off position to prevent the telescope from moving while work is being done on or around the telescope.

Question

3.4.8 Mirror Cover Controls

This paragraph states that opening and closing shall be performed "via the MCU, the external interface or manually." In paragraph 3.1.12 it states that the cover "can be opened locally thru the MCU at the telescope and remotely from the operator's console"

May we assume that operating the cover thru the MCU meets the requirement for manual operation in 3.4.8?

Answer

No. It is intended that the cover be able to be opened and closed manually without electrical power to the telescope.

Question

3.5.3.1 TUI Graphical User interface

This paragraph states that "This program shall obtain barometric pressure from the user." To perform the requested mount modeling operations, it is also necessary to know the temperature and relative humidity.

a) Will the barometric pressure be provided manually or from a remote sensor?

b) Will the government provide temperature and humidity data, and in what form?

Answer

The barometric pressure in millibars, the humidity in percent relative humidity, and the temperature in degrees Celsius will be provided by the Government from it's sensors. The system should allow both manual keyboard entry and automatic input thru an Ethernet or RS232 connection. It is envisioned that these data will be placed into the ECS via an RS232 serial connection. Provisions for entering these data automatically into the TUI will be worked in the ICD. It could be that an Ethernet connection would be the better route to enter this data into the TUI. If automatic data entry is not available at the time of acceptance testing of the telescope manual entry may be used.

Question

3.5.4 Acceptance Test

The specified pointing accuracy (2 arcsec RMS in a factory environment)seems inconsistent with (and more reasonable than) the requirement in paragraph 3.1.6 (1 arcsec RMS in direct sunlight).

What is the required pointing accuracy?

Answer

The requirement is 1 arcsecond RMS or better at the coudé focus both at the factory and at night at the field site. In addition to other dynamic and static tests the Factory Acceptance Tests should include test(s) slewing from target to target which demonstrate residuals equal to or better than 1 arcsecond RMS. In addition to other dynamic and static tests, the field acceptance test should include a star calibration over 50 stars 20 or higher above the horizon and covering all regions of valid LOS which demonstrates 1 arcsec or better RMS residual at night. Daytime performance for this test may be best effort.

2. The closing date of the solicitation is hereby changed from 4:00 pm local time, 18 February 1999 to 4:00 p.m. local time on 25 February 1999.