

STEERABLE TRACKING ANTENNA SYSTEM
RFP #NNK12394994P
SOLICITATION QUESTIONS AND ANSWERS

1. **Question:** The requirements documents use the term "auto-tracking". Is this antenna required to autonomously track using tracking receivers? If so, what are the type, and quantities of tracking receivers to be interfaced with?

Answer: Yes, autonomous or "auto-tracking" is required. The specification was purposely developed such that the requirement is defined, but the type of tracking technique or its implementation is left to the bidder. See answer to Question 10.2.b for information on receivers.

2. **Question:** Are there to be slave tracking requirements. If so, can the slave data format be made available to the bidders?

Answer: No, slave tracking of antennas is not required.

3. **Question:** Is there a preferred list of approved contractors that NASA can suggest for installing the antenna systems at the base?

Answer: No.

4. **Question:** Do you have some sample safety and occupational health plans that have been used by other contractors and are acceptable for us to review? (or can you direct us to someone who may have such a plan?).

Answer: Sample safety and occupational health plans are not provided by NASA, as they are unique to each contractor's safety approach.

5. **Question:** The requirement for the antenna Figure Of Merit is quoted as being 12dB/K at 2 GHz. Is this value a mandatory minimum value? In the event that the antenna is used for receiving data from a nearby launch pad, we have concerns about saturating the Low Noise Amplifiers, (this close-in work would require a large dynamic range for the 12 dB/K antenna).

Answer: The Figure of Merit is being reduced to mandatory minimum value of 9dB/K. An addendum to the specification will be released.

5a. Question: Is there a maximum signal level requirement for receiving data from the launch pad. (or a dynamic range requirement for the antenna?)

Answer: No maximum signal levels or dynamic ranges are specified.

5b. Question: Would NASA be interested in a multiple gain arrangement for the antenna whereby large (close-in) signals are accommodated by a supplemental low gain antenna incorporated into the system design?

Answer: We will consider any designs that meet the requirements as identified in the specification and will satisfy our objectives to provide

communications to a launch vehicle located on the launch pad and to track during a launch.

6. **Question:** In Automatic tracing mode, are the set of position commands given to the controller for the pedestal to follow?

Answers: See Question 1.

7. **Question:** What alphanumeric data would need to be entered via a Keyboard?

Answers: It is anticipated that other than the primary purpose of the antenna (receiving/transmitting RF signals and object tracking) that there are other pieces of "data" that need to be inputted to the system for things such as system configuration, operation and administration. We require that we be able to enter this type of information via a standard alphanumeric keyboard.

8. **Question:** What system commands and events need to be logged?

Answer: This is a system implementation issue based on the system proposed. The requirement is that the system provides at a minimum date and timestamp of commands and events sent to/from the antenna system that the vendor has implemented in their system. See Question 1 and Question 9.

9. **Question:** How much storage is required in the antenna control system?

Answer: This is a system implementation issue based on the system proposed. The storage requirement should be enough to provide for the necessary operating system programs and configuration data, system health and status information, error messages, alarms and the system commands and events information as implemented in their system.

10. **Question:** Please confirm that the Steerable Antenna Pedestal and Antenna Control System are to be affixed to the highlighted Rooftop Antenna Platform in Figure 3 below.

Answer: Confirmed. Figures 2 and 3 identify the existing antenna platform on which this system will be installed. There are three possible locations for the system to be installed. Each is identical as far as structural, electrical and communications interfaces. The first antenna will be located on the corner antenna pad (Furthest from view in Figure 3.) Figure 1 depicts the control room and equipment racks which will house the remote-end electronics of the system.

(1) The specification identifies specific metrics for antenna selection. Is there a Commercial Off The Shelf (COTS) equipment that the authors of the spec had in mind? **Answer:** No.

a. If so can you provide manufacturer and part number?

Answer: No. We did not research potential parts.

(2) The specification does not provide great detail regarding the microwave radio that is to be used with the system.

a. Is this radio to be provided by NASA or included in the proposal? If provided by NASA, is this COTS equipment or proprietary? **Answer:** Yes, the receivers, transmitters and power amplifiers will be provided by NASA. There is no need for the bidder to cost these items. The receivers/transmitters are COTS equipment.

b. If COTS equipment can you provide the manufacturer and part number? **Answer:** To be clear, the RFTS facility is going to be operated and maintained during the entire life cycle of numerous programs here at KSC. Therefore, it is anticipated that over the life cycle of the facility, there could and most likely will be swapping out of receivers, transmitters and other radio equipment due to equipment obsolescence and changes in state of the art.

Currently, we have SEMCO Model RC400-2 receivers. The transmitters are Summation Research Model SE-5310. The power amplifiers have not been procured.

(3) What is the required cable length between Figure 1 RFTS Control Room and Figure 2 LCC Rooftop Antenna Platform (Far View)?

A: 500 feet. All RF Heliax cables and Fiber Optic communications cables are already in place.



Figure 1 RFTS Control Room



Figure 2 LCC Rooftop Antenna Platform (Far View)



Figure 3 LCC Rooftop Antenna Platform (Near View)

11. **Question:** There is mention of uplink signal yet no power requirements are defined; amplifier size and specification?

Answer: Section 3.1.3 identifies a minimum transmitter power of 10 watts. See response to Question 10.2 for equipment details.

12. **Question:** Is it a requirement that the antenna track object in space base on a beacon frequency? If so then a Beacon Tracking Receiver would be required.

Answer: Beacon type tracking is not required of this system. See Question 10.2.b for identification of current COTS receivers/transmitters.

13. **Question:** Should media conversion devices be supplied by vendor? If so do you have specific requirements?

Answer: Yes, the context of media conversion requirements are for communicating between the control room and antenna pedestal controls. Per the Statement of Work there currently exists a fiber optic cable plant between the control room and the antenna rooftop platform. The fibers are terminated with LC-type connectors. If the bidder implementation of the communications interface is not fiber optic then media conversion will be required to be provided by the bidder system.

14. The velocity and acceleration requirements are very high and imply an antenna tracking a very high speed target. This is not typical for an ascending rocket (satellite) being tracked from a distance or of any application other than a landing aircraft at right angles to the antenna at close range. In the case of a landing aircraft, it would only be available for tracking at high speed for a few seconds, since it would quickly come to a stop. **Question:** Is it possible to lower the tracking speed to 5 degrees per second?

Answer: No. The required values for pedestal velocity and accelerations are in the specification in Section 3.4.3.

15. The ability to manually point or track is not a difficult (expensive) process. The ability to automatically point is also not a difficult (expensive) process. The ability to automatically "track" a moving target (satellite telemetry or aircraft telemetry) is very complicated when the speed of the vehicle is variable across a large scale (especially fast). Tracking of this nature requires a feedback loop from the receiver to the tracking systems which must react very quickly. This type of tracking is employed in tracking satellites in low earth orbit, or on weapons systems to track aircraft and is relatively expensive (x10) compared to the manual pointing / tracking and automatic pointing requirements. **Question:** Is it mandatory that this requirement include high speed auto tracking?

Answer: See response to previous Question 14. The application here is to track ascending rockets from launch to loss of signal. We are including options to acquire multiple antennas, some of which, if purchased will be deployed to track vehicle landings at the Shuttle Landing Facility. We will also be required to track the geosynchronous TDRS satellite constellation.

16. The antenna G/T of 12db/k seems very high for the application. **Question:** What is the minimum acceptable G/T for this system.

Answer: See answer to Question 5.

17. The antenna transmit gain requirement is 31 db at 2.0 GHz. **Question:** Can this specification be relaxed to 29.5 db.?

Answer: No.

18. **Question:** Can NASA provide a drawing showing the antenna mounting plate dimensions and mounting hardware, along with a drawing or photograph(s) showing the relative positions of the closest obstructions to the plates (for purposes of evaluating antenna the feed and reflector clearance)

Answer: No. A design phase is defined in the Statement of Work to finalize the antenna installation. Based on the specifications we identified there are no obstruction or clearance issues expected.

19. **Question:** Is this an auto-track antenna (namely closing a tracking loop on the received signal) or simply a programmed tracking antenna using external real time commands or a preloaded program into the ACU?

Answer: See answer to Question 1.

20. **Question:** Does this antenna receive and transmit simultaneously and if so how is the antenna to discriminate between the receive and transmit signals (frequency sharing, polarization sharing, etc.)?

Answer: Yes, receive and transmit occur simultaneously but on different frequencies. However, the polarization is the same for receive and transmit signals.

21. **Question:** What isolation is required between the receiving and transmitting channels?

Answer: See previous response to Question 20. Currently, the specific spacecraft and launch vehicle frequencies have not been identified except that we know they will be in the S-Band.

22. **Question:** SF 1449 Box #1 says pages 56, but no page 56 included. Is it a blank page, or the number a typo?

Answer: This is a numbering error, pages should read 55.

23. **Question:** SF 1449 Box #10 says 100% set-aside, but no box checked to designate the set-aside. Is it Small Business?

A: This requirement is 100% small business set-aside.

24. **Question:** We cannot locate within the solicitation documents the requirement for a Validity period for the proposal. Please point us to that, or provide the Governments requirement for the Validity of the proposal. Our normal proposal Validity is 90 days from the date of submission. Would that be adequate?

Answer: Proposals must be valid for 90 days from the date of submission.

STEERABLE TRACKING ANTENNA SYSTEM
RFP #NNK12394994P
SOLICITATION QUESTIONS AND ANSWERS

Page 8 of 8

25. **Question:** The NASA cover letter with proposal instructions dated November 30th references a Kennedy Space Center Lift Plan for Construction Contracts as being attached. I cannot find it, please advise where I might obtain a copy?

Answer: Solicitation was updated 12/12/11 to include lift plan document.

26. **Question:** The delivery is quoted as four months ARO. Is this delivery a mandatory need of NASA, or is it negotiable. Will the contractor be penalized or disqualified for offering a later delivery?

Answers: Modification 3 revised the delivery and installation date to six months after receipt of order. This is a firm delivery schedule. If you are unable to meet this schedule your proposal will be considered unacceptable.