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IN REPLY REFER TO.

May 29, 1981

Mr. J. Marymor, Contracts Manager
National Radio Astronomy Observatory
Edgemont Road
Charlottesville, VA 22901

Gentlemen:

We wish to inform you that ESSCO is interested in fabricating the reflector panels for resurfacing the 36 foot radio telescope at Kitt Peak in accordance with your letter of May 21, 1981. We have been producing millimeter wave (MMW) radio telescopes for over ten years and have the expertise, tooling and measuring equipment required for construction of the 12 meter surface panels to the required accuracy.

Tooling for a 13.7 meter surface having a focal length of 200 inches is available at ESSCO and would be used to produce the complement of 72 panels for the 12 meter aperture having a nominal f/D ratio of .42. Presently, this tooling is being utilized in the beginning stages of surface panel fabrication for a 13.7 meter MMW Radar that ESSCO is building for MIT Lincoln Laboratory to be used as a primary tracking radar on the Kwajalein Missile Range. We are constructing these MMW Radar reflector panels to a surface tolerance specification of .05mm rms or better and, in fact, the first few panels we have made have exhibited surface tolerances below .05mm rms.

Control of tooling fabrication and surface panel measurement at ESSCO is obtained through use of a 3-axis coordinate measuring machine (CMM) that has a measurement capability of 180 inches in X, 70 inches in Y and 24 inches in Z. All axes of the CMM are equipped with Farrand linear inductosyn position transducers to obtain position readout and visual display with a resolution of .0001 inches (2.54 μm). We have recently measured and aligned the CMM using a laser interferometer and jig transit to determine that position accuracies of ±.00025 inches (6.35μm) in Z, ± .0003 inches (7.62μm) in Y and ± .000875 inches (22.23 μm) in X are obtained over full travel. Readout repeatability was also measured and found to be better than ± .0001 inches (2.54μm).

We are in general agreement with the specifications in your letter and would like to offer a few brief comments with regard to some specific requirements that differ from our standard methods as outlined below;

1) Circular edge shape for the aperture -- our standard edge shape is a 48 sided figure (48 outer panels are used)

2) 1mm panel gaps -- our standard tooling produces a panel gap of 2.54mm (.100 inches)

3) Center hole of 1.4 meters (54 inches) in diameter -- our standard tooling produces a center hole that is nominally 1.2 meters (48 inches) in diameter

4) Panel work points -- we normally use the panel surface adjacent to the theodolite target mounting holes to align each panel for measurement and do not define exact work points on the surface

5) Panel area of 100 cm^2 (16in^2) per surface measurement -- our standard measurement grid allows approximately 290 cm^2 (45in^2) per measurement point

6) Coating and painting of the panels -- we normally furnish panels without any surface treatment. (As previously supplied to you.)

The above comments will be covered in more detail in our proposal but all are relatively benign and may be easily reconciled with some discussion.

The experience we have gained in producing a .06mm rms surface (in aggregate) for the 13.7 meter radio telescope at FCRAO, our most recent efforts (early 1981) in making a 7 meter aperture with an aggregate surface tolerance of .05mm rms for our own use and the early results from the MMW Radar project indicate that ESSCO can produce surface panels for the 12 meter aperture with tolerances better than .05mm rms. We look forward to receiving your RFP and working with you on this project.

Very truly yours,

ELECTRONIC SPACE SYSTEMS CORPORATION

Luther E. Rhoades
Engineering Manager

LER/bcp