

# 25 Meter Millimeter Wave Telescope Memo #115

NATIONAL RADIO ASTRONOMY OBSERVATORY

February 12, 1979

TO: B. Peery  
FROM: S. C. Smith  
SUBJECT: Millimeter Panels on Site

We have six mm panels on hand at the present time: two 65 meter panels, two 25 meter panels, one Essco panel from the U. of Mass. antenna, and one von Hoerner panel. We also have two blank castings for the 25 meter panels.

It was decided to remeasure the two 65 meter, two 25 meter, and the Essco panels during the winter of 1978 and 1979 to see how their surfaces were holding their shape.

We will then store all the panels in their wooden boxes in the barn west of the Grade School except the 01 25-meter panel which will be boxed up for possible shipment to the West Coast for some study.

The two 65-meter panels were purchased from the Philco-Ford Company in December 1972. These two panels are numbered 1 and 2. The number one panel was painted white and stress relieved during manufacturing. The number two was not painted or stress relieved.

Philco-Ford measured the panels before shipping them to us (see Table 1). We received the panels in December 1972. Both panels were laid out and measured by us in January 1973 (see Table 1). We then sent panel #2 to Rohr to be measured (see Table 1). Then in late 1974 we measured the panels again (see Table 1).

In November 1977, 5 inches of insulation was placed on the bottom side of panel No. 1. We then placed the panel on the bank on the south side of the 40-foot control building, for some temperature studies. The panel was then placed inside the 40-foot control room till remeasured in January 1979. We found that the panel had flattened out (see Table 1).

The Essco panel B050 was purchased in the summer of 1976. See Table 2.

The 25-meter panels were purchased from Aeronutronic Ford Corp. in October 1976. The panels are numbered 01 and 04. See Table 3.

All raw data of data in Tables 1, 2 and 3 are on file in the engineering offices in Green Bank.

Table 1

RMS of 65 Meter Panels in  $\mu$

Panel	Philco Ford 1972	NRAO 1973	Rohr 1973	NRAO 1974	NRAO 1979	Remarks
No. 1	[1] 63.5 $\mu$	[2] 63.5 $\mu$		[4] 61 $\mu$	279 $\mu$	This panel has flattened out.
No. 2	[1] 33 $\mu$	[2] 33 $\mu$	[3] 76 $\mu$	[4] 51 $\mu$	47 $\mu$	

$$\text{RMS} = \sqrt{\frac{\text{Total of } \Delta^2}{N}}$$

$\Delta$  = difference between a point on the theoretical curve and a corresponding actual point on the panel.

Note: After we measured panel No. 2 in 1973 and before shipment to Rohr this panel was placed in the barn west of the Grade School without protection. When we shipped it to Rohr, it had some 1/32-inch deep cuts in it. Most likely the panel was deformed some.

Table 2

RMS of Essco Panel B050 in  $\mu$

Date	RMS	Remarks
April, 1976	[5] 40 $\mu$	By Essco by $\cos \theta * \text{rms} (\Delta - \bar{\Delta})$
July, 1976	[6] 96 $\mu$	By NRAO by $\text{rms} (\Delta)$
Feb., 1977	[7] 57 $\mu$	By Essco by $\cos \theta * \text{rms} (\Delta - \bar{\Delta})$
March, 1977	[8] 65 $\mu$	By NRAO by $\cos \theta * \text{rms} (\Delta - \bar{\Delta})$
* Feb., 1979	72 $\mu$	By NRAO by $\cos \theta * \text{rms} (\Delta - \bar{\Delta})$

$\Delta$  Difference between a point on the theoretical curve and corresponding actual point on the panel.

$\bar{\Delta}$  The total difference between + and - of  $\Delta$ .

$\theta$  Angle formed by the panel with a plane normal to the telescope zenith axis.

\* Panel placed on the south side of the 40-foot control building during the summer of 1977 for temperature studies.

Table 3

RMS of the 25-Meter Panels in  $\mu$

Panel	Report 216 Points	Report 58 Points	NRAO 58 Points 1976	NRAO 58 Points 1979	Remarks
01 <sup>A</sup>	[9] 34 $\mu$	[9] 38 $\mu$	[10] 41 $\mu$	48 $\mu$	
04 <sup>B</sup>	[9] 31 $\mu$	[9] 27 $\mu$	[10] 41 $\mu$	35 $\mu$	

A = Alloy A 356

B = Precedent 71A

$$\text{RMS} = \sqrt{\frac{\text{Total of } \Delta^2}{N}}$$

$\Delta$  = Difference between a point on the theoretical curve and corresponding actual point on the panel.

- [1] AUI-140 (Final Report Surface Panel Fabrication and Test 65-Meter Homology Antenna.
- [2] S.C.S. memo of February 26, 1973.
- [3] Rohr Industries, Inc. report (Manufacturing Surface Accuracy Verification of the PF-X-2-7 Homology panel.
- [4] W.-Y. Wong memo of August 13, 1974 to the 25-mm Wavelength Telescope Design Group.
- [5] Report from Essco to Buck Peery.
- [6] S.C.S. memo of November 5, 1976.
- [7] Essco Document D77-22 (Evaluation of NRAO Panel Measurement Program).
- [8] S. von Hoerner Memo No. 81 of March 24, 1977 to 25-m Telescope (Accuracy and Thermal Deformation of Essco Panel).
- [9] Aeronutronic Ford report of October 15, 1976.
- [10] S.C.S. memo of Dec. 27, 1976 (Surface RMS of Aeronutronics' Panels 01 and 04).