

Subject: Modifications to 45' Access Hatch
 Date: 94 December 13
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Overview

This document describes modifications made to panel # 6 of the Green Bank Earth Station (GBES) 45' antenna. OVLBI memo 52 describes the "Plans for Modifications to 45' Access Hatch" [1].

Modifications

Two new ribs were added to panel 6, one just inside the rib holding the "B" mounting point, and the other behind the old access hatch. Panel 6 was then cut into two pieces, a long piece containing the old access hatch, and a short piece which serves as the new access hatch. The attachment points were fabricated as described in [1]. The rib behind the old access hatch was bolted in place, and the old access hatch attached to the panel with screws. This allows removal of the old hatch, should that be necessary. However, in order to remove the old hatch, the panel would need to be accessed from above *and* below, making this operation difficult.

Radial Panel Measurements

Panel 6 radial curvature was measured in the manner described in [1] three times during the modifications. These measurements were made 1) before any changes to the panel, 2) after adding the ribs to the panel, and 3) after cutting the panel into two sections. The results of the measurements are given below.

Point	Nominal Depth (in.)	Before Changes (in.)	Before Error (Nom-Dep)	After Ribs (in.)	After Error (Nom-Dep)	After Cut (in.)	After Error (Nom-Dep)
D Left	0.473	.466	0.007-/+ .005	.456	0.017	.464	0.009
D Right	"	.466	0.007	.462	0.011	.466	0.011
C Left	0.511	.514	-0.003	.512	-0.001	.530	-0.019
C Right	"	.520	-0.007	.510	0.001	.516	-0.005
B Left	0.539	.558	-0.019	.548	-0.009	-	-
B Right	"	.567	-0.028	.569	-0.030	-	-
Hatch Middle				.442		.448	
Hatch Left				.451		.463	
Hatch Right				.452		.462	

The Hatch curvature was measured by placing the center of the straight edge at the center of the hatch. This value was then compared with the values measured (at the same radial distance) to the left and right of the hatch. From these measurements, center of the hatch appeared to be 0.015 in *higher* than at the edges of the panel.

Tangential Panel Measurements

As shown in figure 4 of [1], the tangential curvature of panel 6 at the center of the old hatch and at the location of the new "B" rib was calculated. This curvature was also measured. After correcting for the orientation of the straight edge during measurement, the predicted depth of the straight edge at the new "B" rib was 0.044 in, when the ends of the straight edge are suspended 6in from the center. The measured depth was 0.037 in. This was considered very good agreement.

At the center of the old access hatch, the predicted depth of the hatch is $0.281 * \sin(73) = 0.269$ in, when the ends of the straight edge are suspended 15 inches from the center. The measured value was 0.272 in, indicating the center of the hatch was *lower* than required, by 0.003 in. This is inconsistent with the radial measurement, but both the tangential and radial error measurements were considered to be tolerable.

Panel Mounting

On 94 December 9, the longer section of panel 6 was installed on the antenna. The shorter section was also installed to test the fit. It was then removed and stored. Note that the "A" point adjusting points for the short section of the panel were raised by the width of the washer used at this point. The short section of the panel will, from this point on, be mounted to the antenna *without* the washers between the hollow threaded rod and the mounting point on the panel. This change was made to make installation and removal of the hatch easier.

Reference

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- [1] OVLBI memo 52, "Plan for Modifications to 45' Access Hatch" by Glen Langston, dated 94 December 12.