Observations of ITALSAT with the Effelsberg 100-m

Date: April 28, 1995 from UT 12h to UT 17h

Central frequency: 18.625 GHz
2 Channels with IF-Filters of 2 MHz and 10 MHz

Special Setup by J. Neidhöfer:
[observer.neidhöfer]italsat.pro (Setup)
[observer.neidhöfer]italsat.cross (Cross-Scan)
[observer.neidhöfer]italsat.map (Map)

Fokus-Setting 3C84: SFC2 -23.18

Predicted and fitted positions of ITALSAT: Fig. 1. The telescope was always pointed to the fitted positions. The HPBW at this frequency is about 50″.

The actual position of ITALSAT was derived by several Cross-Scans. COL* and NULE as a function of time is shown in Fig. 2 and Fig. 3.

The fitted amplitudes from the Cross-Scans are shown in Fig. 4. Variations up to about 40% are indicated.

Beam-maps have been observed: size 10’x10’ or 41x41 pixels at 15″ sampling. With VAZM=10’, one map takes about 50min. Two maps have been observed in-focus (Fig. 5 and 6) and one map off-focus by +1 λ (Fig. 7). The maps have a dynamic range of up to about 35 dB.

Consequences:

a) We need a filter of about 100 kHz width for constant signal strength from ITALSAT. These filters are under construction at Effelsberg.

b) We need a special detector for a higher dynamical range up to 70 dB. This is under construction.

c) The time for mapping is not short enough to rely on a constant pointing. For a pointing better than about 2″ in each coordinate, a check of the satellite position is necessary about every 15 min. Differences of the two in-focus maps show clear variations of the sidelobe positions (Fig. 8) due to changes in the pointing.

W. Reich
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Amplitude vs. UT [h]

Fig. 4
in-focus

first contour 35.5 dB

Fig. 5