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20. Abstract

The Geodetic Institute, Uppsala University, took part in the second European Doppler Observation Campaign (EDOC). A comparison between 887km chord obtained by Doppler and the distance calculated from the Finnish geodimeter and steller tringulation observations along the transverse, gave a discrepancy of only 0.7ppm. A number of Doppler observations are in progress in Scandinavia including those in conjunction with the US VLBI-Doppler campaign.

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This technical report has been reviewed and is approved for publication.

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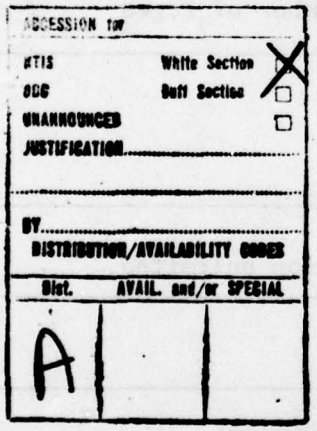

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Work on contract AFOSR-75-2849B.

The institute took part in the second EDOC campaign (April-May) with its own Doppler receiver (Magnavox Geoceiver II). It was also responsible for the computation of preliminary results from seven participating station, which had used Magnavox instruments. (Michael O'Shaughnessy).

Of special interest is the result of the translocation between the terminals of the Finnish geodimeter and stellar triangulation traverse Jänhiälä ($61^{o}.1$ lat., $28^{o}.6$ long. E. Gr.) - Kaamanen ($69^{o}.1$, $27^{o}.2$), using broadcast ephemeries for a number of Transit satellites. A comparison between the 887 km distance (chord), obtained by Doppler and the distance calculated from the Finnish geodimeter and stellar triangulation observations along the traverse, gave a discrepancy of only 6 dm, which means, that the two determinations of the distance agree to within 0.7 ppm. The mean error in the terrestrial result amounts to ±1.2 dm only (precision).

A common interpretation of available simultaneous Doppler observations at Trondheim, Uppsala, Jänhiälä and Kaamanen is going on, and the result is expected to give relative coordinates for these stations to within 0.5 m. It is already planned to start an extended geometrical and semidynamical (geocentric coordinates) activity over whole Scandinavia with receivers located also at suggested VLBI-stations of the USA VLBI-Doppler project (see below) and other stations in the Northern Block of the RETRIG-area. A joint proposal from Hällby, the geodetic department of the Land Survey of Sweden (LMV) and the institute of geodesy at the Technical University in Stockholm will be presented at the 8th meeting of the Nordic Geodetic Commission, Oslo 2-6 May, 1978.

Recently - February 1978 - we were engaged in the European VLBI-Doppler section of the USA VLBI-Doppler campaign. Measurements were made with our Doppler equipment (point-fixing mode WGS 72) at the Råö VLBI-station south of Gothen-

burg. Later on, a translocation between Råö and the Effelsberg VLBI-station in West Germany will be carried out in cooperation with the Geodetic institute at the university of Bonn.

During 1977, a continuous recording of Transit Doppler observations for obtaining changes in polar coordinates, has started, using a stationary ITT receiver, on loan from the Defense Mapping Agency (DMA) in Washington D.C., USA. The observation tapes are being sent to DMA for interpretation. It is, however, hoped that we - later on during 1978 - shall be able to perform, ourselves, the computations of the coordinates of the pole, by means of a standard programme, available from DMA.

In the future, the interest in Polar Motion (PM) studies will probably dominate the geodynamical space research at Hällby. For comparison it is planned to determine polar coordinates also with improved astronomical instruments and methods (long-focus zenith telescope + a special time-micrometer, constructed by J. Kakkuri, Finnish geodetic institute, Helsinki). Furthermore, we have applied for funds to purchase a precision astrolabe, the observations with which should be a third, partly independent means of studying accurately PM.

Multilateral participation in Polar Motion studies with laser-ranging to certain satellites is planned, as soon as the equipment at the Mårtsbo observatory, belonging to the geodetic department of LMV, with which organization we already have a very close cooperation, will be installed and capable of observing on a continuous basis. (Leendert Aardoom).

From this report it can be concluded, that the institute is now actively and continuously involved in several Doppler projects for geometrical and dynamical studies. The geometrical and semidynamical (geocentric coordinates) studies are done by our participating (with our Magnavox Geoceiver II) in several multilateral campaigns. The Polar Motion studies, which we have started with the stationary ITT Geoceiver 5500, on loan from DMA, will be continued, as far as we can keep the instrument at Hällby also in the future. It is intended to build up

here a PM-station, consisting of the Doppler equipment, a long-focus zenith telescope and a modern astrolabe, which should observe on a regular basis. It is therefore important, that we have the ITT instrument available, say, for two years more.

This means, that we are going to ask for a renewed contract with AFOSR, and also that we shall make an application to DMA for a prolonged leasing period of ITT 5500.

Uppsala, March 31, 1978

Erik Tengström