# FFI Analysis Center

*Per Helge Andersen*

**Abstract**

FFI's contribution to the IVS as An Analysis Center focuses primarily on a combined analysis at the observation level of data from VLBI, GPS, and SLR using the GEOSAT software. This report briefly summarizes the current status of analyses performed with the GEOSAT software. FFI is currently an Analysis Center for IVS and ILRS and a Technology Development Center for IVS.

## 1. Introduction

A number of co-located stations with more than one observation technique have been established. In principle, all instruments at a given co-located station move with the same velocity, and it should be possible to determine a single set of coordinates and velocities for each co-located site. In addition, a constant eccentricity vector from the reference point of the co-located station to each of the individual phase centers of the co-located antennas is estimated using constraints in accordance with a priori information given by ground surveys. One set of Earth orientation parameters (EOP) and geocenter coordinates can be estimated from all involved data types. The present dominating error source of VLBI is the water content of the atmosphere, which must be estimated. The introduction of GPS data with a common VLBI and GPS parameterization of the zenith wet delay and atmospheric gradients will strengthen the solution for the atmospheric parameters. The inclusion of SLR data, which is nearly independent of water vapor, gives new information which will help in the de-correlation of atmospheric and other solve-for parameters and will lead to more accurate parameter estimates. These, and many more advantages with the combination of independent and complementary space geodetic data at the observation level, are fully provided by the GEOSAT software developed at FFI.

The Norwegian Mapping Authority (NMA) and FFI have started a close cooperation in the analysis of space geodetic data using the GEOSAT software. NMA has initiated a collaboration with the IVS with a goal of becoming a full IVS Analysis center with contributions obtained from VLBI data using the GEOSAT software. Dr. Per Helge Andersen is responsible for the maintenance of the software. Dr. Halfdan Kierulf (also with NMA) will be responsible for the daily analyses. A software package has been written to transform the output from GEOSAT to SINEX format. A large number of session-by-session SINEX files have been combined with solutions from the IVS Analysis centers, and the results seem quite encouraging.

## 2. Staff

Dr. Per Helge Andersen—Research Professor of Forsvarets forskningsinstitutt (FFI) and Institute of Theoretical Astrophysics, University of Oslo.