



IGS

I N T E R N A T I O N A L G P S

S E R V I C E

F O R

G E O D Y N A M I C S

1998
TECHNICAL
REPORTS

NOVEMBER 1999

IGS Central Bureau

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California U.S.A.
<http://igscb.jpl.nasa.gov/>

Edited by
K. Gowey
R. Neilan
A. Moore

This publication was prepared by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

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Abstract

Applications of the Global Positioning System (GPS) to Earth Science are numerous. The International GPS Service (IGS), a federation of government agencies and universities, plays an increasingly critical role in support of GPS-related research activities. Contributions from the IGS Governing Board and Central Bureau, analysis and data centers, station operators, and others constitute the 1998 Technical Reports. This report has a companion publication, the 1998 Annual Report. Hard copies of each volume can be obtained by contacting the IGS Central Bureau at the Jet Propulsion Laboratory.

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Preface

The Global Positioning System has become, and will remain for some time, one of the most important geodetic measurement systems. The contributions of GPS to geodesy and geophysics are truly revolutionary, encompassing diverse results from crustal deformation investigation to the constitution of the ionosphere. When one considers the accuracy and resolution obtainable with GPS and the low cost for acquiring this technology (taking the space system for granted), the full impact of GPS after the millennium is still difficult to estimate.

The primary motivation, however, in planning the IGS was the recognition ten years ago that the most demanding users of the GPS satellites, the geophysical community, were purchasing receivers in exceedingly large numbers and using them as black boxes (still sometimes an unfortunate practice), utilizing software packages which they did not completely understand (ditto). The observations as well as the subsequent analyses were not based on common standards; thus the results could not be compared and, therefore, trusted. Standards, including an accessible terrestrial reference frame, were needed.

The other motivation was the generation of precise ephemerides for the GPS satellites together with by-products such as earth orientation parameters and clock information.

Thus, by the end of 1989 the time appeared to be ripe for the International Association of Geodesy (IAG) to get into action and start planning the IGS. The planning phase started on 1 January 1990 with a letter from the author (then President of the IAG) to Gerry Mader (Chair of the GPS sub-commission of CSTG), Bill Melbourne (GPS Coordinator for IERS), and Bernard Minster (Committee on Geodesy, NRC) inviting them to a meeting and prepare a proposal. This phase ended, after exploring the proposed concept by means of observation and analysis campaigns, on 1 January 1994, when the IGS became an official IAG Service.

Great progress since then has been extensively reported in the IGS report series, such as this volume. Although some of these reports have been published in a somewhat untimely fashion, they are still extremely valuable as the record of the past for future use. It is sufficient to say that the results, thanks to the unparalleled good will in international cooperation, exceeded all expectations. However, new challenges are appearing above the horizon, and after a decade, IGS has to assess its strengths and weaknesses and engage again in a (long-term) planning activity to assure that it will continue to serve the scientific community effectively in the new millennium.

As far as the author is concerned, after serving initially for two years as Chair of the IGS Planning Committee and since then as the IAG liaison ("watchdog") to the Governing Board, this decade-long involvement in IGS is coming to an end on 1 January 2000, when Tom Herring will take over as the IAG liaison to the IGS Governing Board. Thanks to the ever-present collegial friendships this has been a wonderful decade of professional experience and a deeply satisfying learning opportunity.

1 November 1999
Ivan I. Mueller

