IVS Is Established

N. R. Vandenberg
IVS Coordinating Center Director

1. Summary

IVS is the *International VLBI Service for Geodesy and Astrometry*. IVS groups geodesy and astrometry together because they use the same observations and the same analysis gives both types of results.

IVS is established under the International Association of Geodesy's (IAG) Commission VIII – the International Coordination of Space Techniques for Geodesy and Geodynamics, or CSTG, chaired by Gerhard Beutler of the University of Berne, Switzerland.

IVS is the third of this type of service to be established. The first was the IGS (International GPS Service) which has been highly successful as a service for GPS. The second service was the ILRS (International Laser Ranging Service) which started in late 1998.

2. Chronology

This section presents a brief history of the events leading up to the formation of IVS.

In May 1997 the CSTG Chairman initiated discussions about a VLBI service that would operate in a manner similar to the IGS. By September the CSTG VLBI Subcommission, chaired by Thomas Clark of NASA Goddard Space Flight Center, published a draft Terms of Reference. At the end of the year Dr. Clark resigned as chairman of the VLBI Subcommission and James Campbell of the Geodetic Institute of the University of Bonn was appointed as chairman.

Community response to the draft Terms of Reference was strong, and an electronic workshop was convened to re-write the Terms. The workshop members met only via e-mail during February and March 1998. Different members of the workshop with varying areas of expertise re-wrote sections of the Terms and all the members reviewed them. It was at this point that the name IVS was determined, following a lively debate among the workshop members about the mandate for the organization.

In April 1998 the new Terms of Reference were presented to the CSTG Executive Committee for approval at a meeting held in Nice, France. See section 3 for a summary of the Terms. At this time the VLBI Subcommission formed a Steering Committee to do the work of establishing the IVS.

The Steering Committee released the Call for Participation in IVS on 1 June 1998, and proposals were received through the end of September. At its meeting in October in Munich, Germany, the Steering Committee evaluated the proposals and decided to accept all of them. See section 4 for a summary of the results.

In mid-November 1998 the Steering Committee released the Call for Nominations for representative positions on the Directing Board. Also released was the Call for Proposals for the positions of Network, Analysis, and Technology Coordinators. Following the close of nominations the general elections were held via e-mail ballots.

The Steering Committee held its final meeting in January 1999 at Goddard Space Flight

Center to form the initial IVS Directing Board. The Board members were selected based on the proposals for Coordinators, the elections, and nominations for At Large positions. See section 5 for the list of the members of the initial Directing Board.

3. Summary of IVS Terms of Reference

This section provides a summary of the bylaws, or Terms of Reference, by which IVS as an organization is governed. The full text of the Terms of Reference may be found at http://ivscc.gsfc.nasa.gov/org/tor.html.

The objectives of IVS are stated first in the Terms of Reference. They are 1) to provide a service to support geodetic, geophysical, and astrometric research and operational activities; 2) to promote research and development for VLBI; and 3) to interact with users of VLBI products. The service aspect of IVS is meant to serve both outside users and the geodetic and astrometric community itself. Both the contributors and users of data will be served.

IVS provides data and products for the scientific community. Some of the products are a terrestrial reference frame (TRF), the international celestial reference frame (ICRF), and Earth orientation parameters (EOP). All IVS data and products are archived and are publically available. IVS products contribute to research in many areas, including areas such as the solid Earth, tides, studies of the vertical, and VLBI technique improvement.

The goals of IVS are realized through seven types of components:

- Network Stations are high performance VLBI stations that acquire data.
- Operation Centers coordinate the activities of a network of Network Stations.
- Correlators process data, provide feedback to stations, and provide processed data to analysts.
- Analysis Centers analyze data and produce results and products.
- Data Centers distribute products to users, and provide storage and archive functions.
- Technology Development Centers develop new VLBI technology.
- The Coordinating Center coordinates the daily and long-term activities of IVS.

In addition to the above types of components, IVS has the following:

- The Directing Board determines policies, standards, and goals. The Board is composed of elected and *ex officio* members.
- Associate Members are individuals participating in the work of any of the IVS components.
- Corresponding Members are individuals who want to be informed of IVS activities.
- The Network Coordinator is responsible for station data quality and performance standards.
- The Analysis Coordinator is responsible for VLBI product development and delivery.
- The Technology Coordinator is responsible for VLBI technique advancement and system compatibility.

4. IVS Components

At the initiation of IVS there were 73 components, representing 29 organizations in 15 countries. The distribution of types of components is as follows:

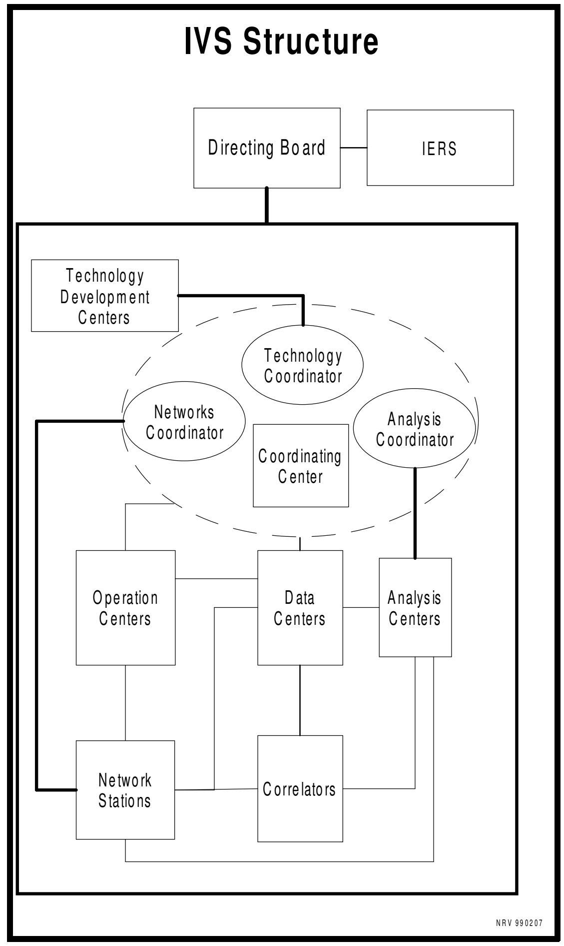
30	Network Stations
3	Operation Centers
7	Correlators
6	Data Centers
17	Analysis Centers
9	Technology Development Centers
1	Coordinating Center

There are 229 Associate Members.

By country, the 73 IVS components are distributed as follows:

Brazil	1
Canada	3
China	3
France	2
Germany	8
Italy	7
Japan	14
Netherlands	2
Norway	3
Russia	5
South Africa	1
Spain	2
Sweden	3
Ukraine	2
USA	17

There are noticeably no IVS components from Australia. This is an issue that the IVS Board is working on.



The structure and interactions of IVS are shown in the figure above. The link to the IERS (International Earth Rotation Service) indicates that the IVS is now the VLBI Coordinating Center for IERS. The Directing Board provides overall guidance. The Coordinating Center and the three Coordinators work closely together. Each Coordinator has a special relationship with the components they work with. All of the components interact with each other on a daily basis.

5. Directing Board

The initial IVS Directing Board is listed in the table below. There are *ex officio* positions for persons representing the International Association of Geodesy (IAG), the International Astronomical Union (IAU), and the International Earth Rotation Service (IERS). The IVS Coordinating Center Director is also an *ex officio* position. The three Coordinators are each Board members. There are five Representative positions and two At Large positions.

The Chairman of IVS is one of the Board members, chosen by the Board themselves. All Board members will eventually serve staggered 4-year terms. Some of the initial terms had to be 2 years to achieve this.

IVS Directing Board				
Name	Affiliation	Country	Position	Term
Gerhard Beutler	Univ. of Berne	Switzerland	IAG Representative	*ex officio*
Wayne Cannon	Space Geodetic Laboratory	Canada	At Large Member	2
Nicole Capitaine	Paris Observatory	France	IAU Representative	*ex officio*
Marshall Eubanks	U.S. Naval Observatory	USA	Correlators and Operation Centers Representative	4
Ed Himwich	NVI, Inc./Goddard Space Flight Center	USA	Network Coordinator	4
Tetsuro Kondo	Communications Research Laboratory	Japan	Technology Development Centers Representative	2
Chopo Ma	Goddard Space Flight Center	USA	IERS Representative	*ex officio*
Shigeru Matsuzaka	Geographical Survey Institute	Japan	Networks Representative	4
Axel Nothnagel	University of Bonn	Germany	Analysis and Data Centers Representative	2
Wolfgang Schlueter	Bundesamt fuer Kartographie und Geodaesie	Germany	Networks Representative, Chairman	4
Paolo Tomasi	CNR Bologna	Italy	At Large Member	4
Nancy Vandenberg	NVI, Inc./Goddard Space Flight Center	USA	Coordinating Center Director	*ex officio*
Alan Whitney	Haystack Observatory	USA	Technology Coordinator	4
tbd			Analysis Coordinator	2

6. First Board Meeting

This section summarizes the highlights of the first Directing Board Meeting.

As its first act the IVS Directing Board elected Wolfgang Schlueter as Chairman. The Board feels that Dr. Schlueter's links to the other techniques and his experience managing a fundamentalstation will be very valuable to the initial growth and collaborations of the new IVS.

The Board named NEOS (National Earth Orientation Service, a joint effort of the U.S. Naval Observatory and NASA's Goddard Space Flight Center for VLBI) as the acting Analysis Coordinator. NEOS will develop an initial plan for IVS product presentation and write a new solicitation for the Analysis Coordinator activities.

Each of the Coordinators and the Coordinating Center presented their initial plans for activities. The plans are:

- The Technology Coordinator will focus on the proposed standard VLBI interface, and visibility of technology at meetings.
- The Network Coordinator will develop written station performance standards and

establish a regular program of station visits.

- The Analysis Coordinator will make existing VLBI products easily available through IVS.
- The Coordinating Center has set up the initial version of the IVS web site and will announce the IVS e-mail service. The IVS web site may be found at http://ivscc.gsfc.nasa.gov. The site aims to be the center of communications and information for all IVS components and members.

The Board discussed the appropriate method for interaction with astronomy organizations such as JIVE, NRAO, and ATNF. Because we use many of the same facilities as the astronomers and share the same reference frames we need to have a formal relationship with these groups.

The Coordinating Center will announce a contest for the IVS logo. First prize will be free t-shirts with the logo on them for all of the Associate Members at the winner's institution. The Board will select the winning entry.

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Nancy R. Vandenberg
NVI, Inc./GSFC Code 920.1
Greenbelt, MD 20771
nrv@gemini.gsfc.nasa.gov
phone 301-286-9019
fax 301-286-0213