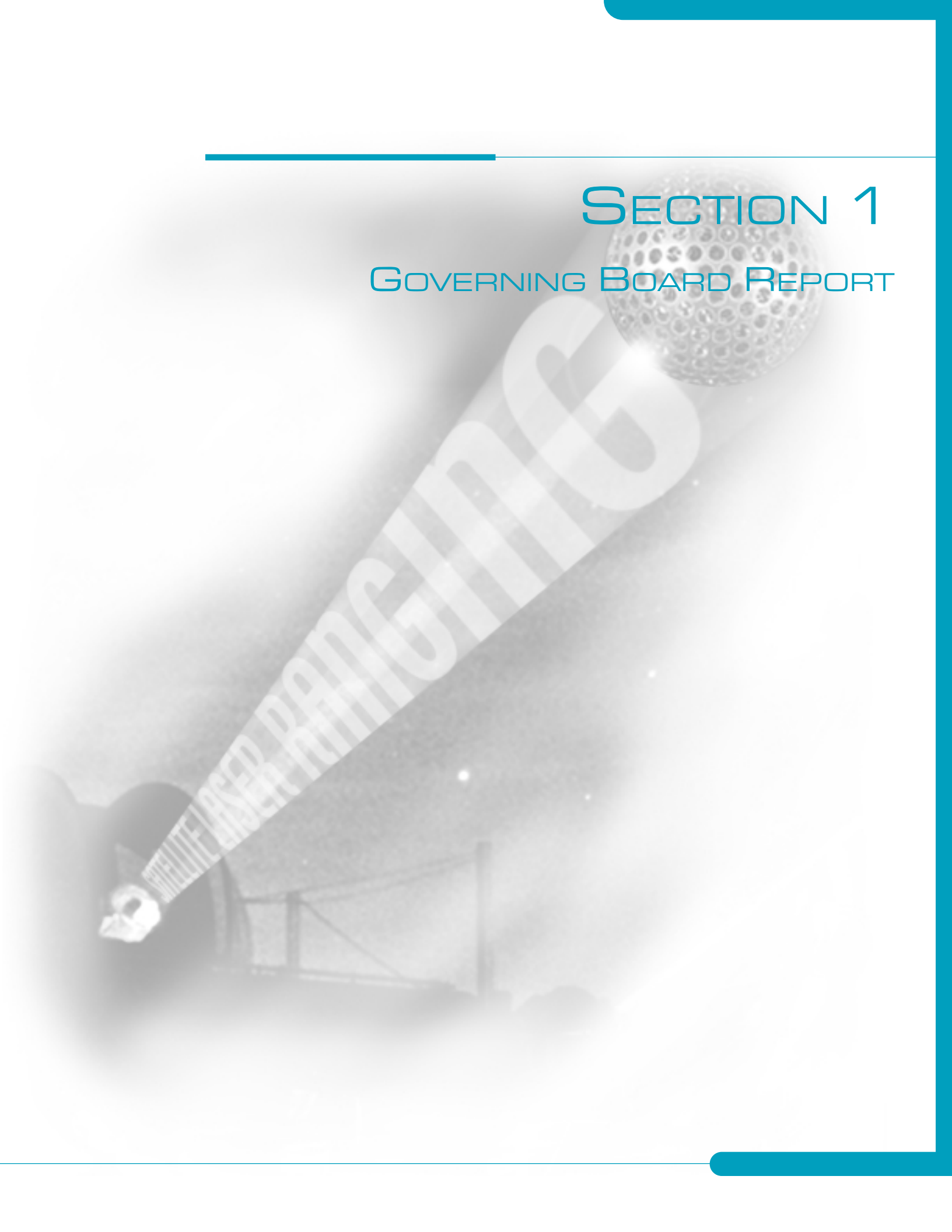
Section 1

Governing Board Report



SECTION 1 – GOVERNING BOARD REPORT

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INTRODUCTION

The Governing Board (GB) is responsible for the general direction of the service. It defines official ILRS policy and products, determines satellite tracking priorities, develops standards and procedures, and interacts with other services and organizations. There are 16 members of the Governing Board (GB) - three are ex-officio, seven are appointed, and six are elected by their peer groups (see Table 1.-1). The first GB completed its two year term in Fall 2000. A new Board was elected over the summer and installed in November 2000 at the 12th International Workshop in Matera, Italy. Table 1.-1 lists the new GB membership, their nationality, and special function (if any) on the GB. At the first meeting of the new Board in Matera, John Degnan was elected by the current GB to serve a second two year term as Chairperson.

Hermann Drewes	Ex-Officio, CSTG President	Germany
John Bosworth	Ex-Officio, Director ILRS Central Bureau	USA
Michael Pearlman	Ex-Officio, Secretary, ILRS Central Bureau	USA
Werner Gurtner	Appointed, EUROLAS , Networks & Engineering WG Coordinator	Switzerland
Wolfgang Schlueter	Appointed, EUROLAS	Germany
David Carter	Appointed, NASA, Missions WG Deputy Coordinator	USA
John Degnan	Appointed, NASA, Governing Board Chairperson	USA
Yang FuMin	Appointed, WPLTN	PRC
Hiroo Kunimori	Appointed, WPLTN, Missions WG Coordinator	Japan
Bob Schutz	Appointed, IERS Representative to ILRS	USA
Graham Appleby	Elected, Analysis Rep., Signal Processing WG Coordinator	UK
Ron Noomen	Elected, Analysis Rep. , Analysis WG Coordinator	Netherlands
Wolfgang Seemueller	Elected, Data Centers Rep. , Data Formats & Procedures WG Deputy Coordinator	Germany
Peter Shelus	Elected, Lunar Rep., Analysis WG Deputy Coordinator	USA
Georg Kirchner	Elected, At-Large, Networks and Engineering WG Deputy Coordinator	Austria
John Luck	Elected, At-Large, Data Formats & Procedures WG Coordinator	Australia

Table 1.-1. ILRS Governing Board (as of November 2000).

Within the GB, permanent (Standing) or temporary (Ad-Hoc) Working Groups (WG's) carry out policy formulation for the ILRS. At its creation, the ILRS established four Standing WG's: (1) Missions, (2) Data Formats and Procedures, (3) Networks and Engineering, and (4) Analysis. In 1999, an Ad-Hoc Signal Processing WG was organized to provide improved satellite range correction models to the analysts. The Working Groups are intended to provide the expertise necessary to make technical decisions, to plan programmatic courses of action, and are responsible for reviewing and approving the content of technical and scientific databases maintained by the Central Bureau. All GB members serve on at least one of the four Standing Working Groups, led by a Coordinator and Deputy Coordinator.

ILRS NETWORK

The current ILRS Network is shown in Figure 1.-1. Traditionally the network has been strong in the US, Europe, and Australia. Through international partnerships, the global distribution of SLR stations is now improving, especially in the Southern Hemisphere. NASA, working in cooperation with CNES and the University of French Polynesia has established SLR operations on the island of Tahiti with MOBLAS-8. In cooperation with the South African Foundation for Research Development (FDR), NASA has relocated MOBLAS-6 to Hartebeesthoek (which already has VLBI, GPS, and DORIS facilities) to create the first permanent Fundamental Station on the African continent. Both systems are operational. Operations at the new Australian station on Mt. Stromlo, which replaced the older Orroral site near Canberra, are going extremely well in terms of both data quantity and quality.

The NASA TLRS-3 system at Universidad de San Agustin in Arequipa, Peru, has carried the total SLR tracking load for South America in recent years. However, BKG (Germany) has selected Concepcion, Chile, for the site of its newly developed multi-technique Totally Integrated Geodetic Observatory (TIGO). The TIGO- with SLR, VLBI, GPS and absolute gravimetry techniques - will provide a Fundamental Station in South America when it becomes operational in late 2001. In Argentina, NASA has been negotiating a possible transfer of TLRS-4 to the University of La Plata. A possible joint Chinese-Argentine SLR station at the San Juan Observatory in western Argentina, with SLR equipment furnished by the Beijing Astronomical Observatory, is also being discussed .

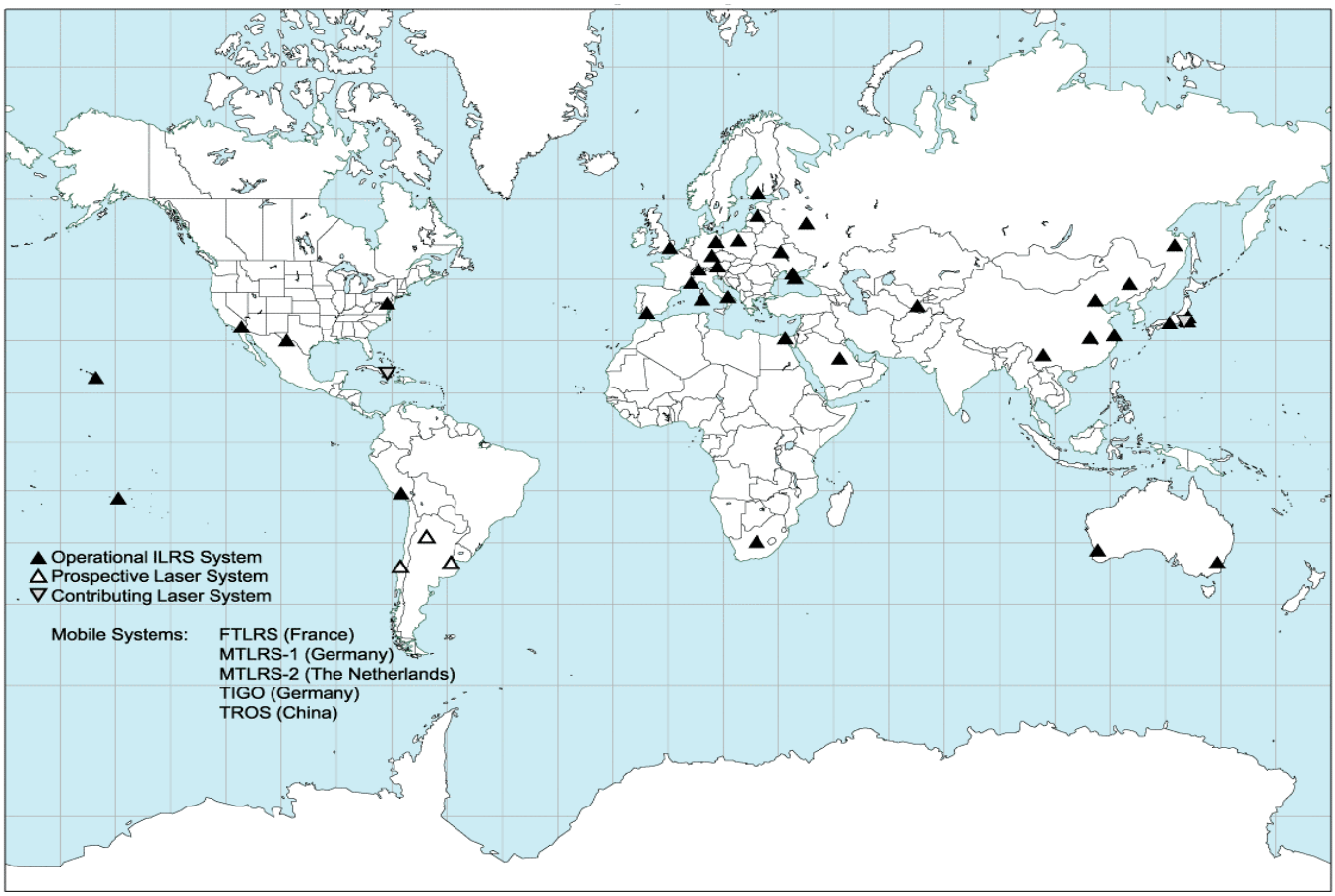

Figure 1.-1: ILRS Network.

The Peoples' Republic of China has made substantial investment in SLR stations and technology over the past two years. The SLR station in Kunming was recently re-established, bringing the total number of Chinese permanent sites to five (Shanghai, Changchun, Wuhan, Beijing, and Kunming). The data quality and quantity from the permanent Chinese stations continue to improve, most notably at Changchun. The Wuhan SLR station has been recently moved to a site outside the city where there is significantly better atmospheric seeing, and construction is nearing completion on two mobile Chinese SLR stations which will occupy additional sites within China, as part of a national geodetic program. The new Russian SLR station started operations near Moscow in 1999, and permission is being requested from the Russian government to integrate it into international SLR operations. A Russian SLR station in Novosobirsk has recently applied for ILRS membership.

In Japan, The Communications Research Laboratory (CRL) in Tokyo continues to operate two of its four Keystone sites at Kashima and Tateyama in the Tokyo area. The future of the Koganei and Miura sites is unclear. The Simosato site, operated by the Japanese Hydrographic Institute, will continue to provide data in this technically highly interesting region. The Japanese Space Agency, NASDA, is also negotiating for the construction of a new state-of-the-art SLR station.

Sites in the United States and Europe have been relatively stable over the past several years, with efforts continuing to improve overall performance or reducing the cost of SLR operations. The new state-of-the-art Matera Laser Ranging Observatory (MLRO) with both SLR and lunar ranging capability has now been installed at Matera and is presently undergoing final acceptance testing. The new French Transportable Laser Ranging System (FTLRS) is undergoing checkout in preparation for tracking support of JASON and other active satellite missions from a site in the Mediterranean region. The unmanned SLR2000 prototype is nearing completion at NASA and field tests are expected to begin in Fall 2001.

ILRS TRACKING PRIORITIES AND CAMPAIGNS

The ILRS is currently tracking about two dozen targets, including passive geodetic (geodynamics) satellites, Earth remote sensing satellites, navigation satellites, engineering missions, and lunar reflectors (see Table 1.-2). The newest missions include the German CHAMP mission (GFZ), which was added in July 2000, and the oceanography mission, GFO-1 (US Navy), which was recently elevated from campaign status to permanent tracking. In addition, three new GLONASS (72, 79, and 80) satellites are being tracked in support of the IGLOS campaign. Recently, Etalon 1 and 2 were elevated in priority at the request of the ILRS Analysis Working Group in order to ascertain whether or nor SLR's determination of Earth Orientation Parameters (EOP) could be improved.

The ILRS assigns satellite priorities in an attempt to maximize data yield on the full satellite complex while at the same time placing greatest emphasis on the most immediate data needs. Priorities provide guidelines for the network stations, but stations may occasionally deviate from the priorities to support regional activities or national initiatives and to expand tracking coverage in regions with multiple stations. Tracking priorities are set by the Governing Board, based on application to the Central Bureau and recommendation of the Missions Working Group.

During the past year, tracking campaigns have included: (1) ERS-1 to support tandem Synthetic Aperture Radar (SAR) experiments with ERS-2; (2) the GEOSAT Follow-on (GFO-1) altimetric mission, (3) the South African SUNSAT remote sensing satellite, and (4) revived Beacon-C tracking for gravity field improvement .

Since several remote sensing missions have suffered failures in their active tracking systems or have required in-flight recalibration, the ILRS has encouraged new missions with high precision orbit

requirements to include retroreflectors as a fail-safe backup tracking system, to improve or strengthen overall orbit precision, and to provide important intercomparison and calibration data with onboard microwave navigation systems.

Priority	Satellite	Sponsor	Altitude (Km)	Inclination	Campaign Ends
1	CHAMP	GFZ	470	87.3	
2	GFO-1	US Navy	790	108.0	
3	ERS-2	ESA	800	98.6	
4	TOPEX/Poseidon	NASA.CNES	1,350	66.0	
5	Starlette	CNES	815 – 1,100	49.8	
6	WESTPAC	WPLTN	835	98	
7	Stella	CNES	815	98	
8	Beacon-C	NASA	950 – 1,300	41	31 December 2001
9	Ajisai	NASDA	1,485	50.0	
10	LAGEOS-2	ASI/NASA	5,625	52.6	
11	LAGEOS-1	NASA	5,850	109.8	
12	Etalon 1	RSA	19,100	65.3	
13	Etalon 2	RSA	19,100	65.2	
14	GLONASS 80	RSA/IGLOS	19,100	65	
15	GLONASS 72	RSA/IGLOS	19,100	65	
16	GLONASS 79	RSA/IGLOS	19,100	65	
17	GPS 35	US Air Force	20,100	54.2	
18	GPS 36	US Air Force	20,100	55.0	

Priority	Lunar Targets	Sponsor
1	Apollo 15	NASA
2	Apollo 11	NASA
3	Apollo 14	NASA
4	Luna 21	RSA

Table 1.-2. ILRS Tracking Priorities (as of April 2001).

UPCOMING MISSIONS

At one time, the main task of the international SLR Network was the tracking of dedicated geodetic satellites (LAGEOS, Starlette, etc.). Although we have had requests to revive tracking on older satellites already in orbit (e.g. Beacon-C) to further refine the gravity field with improved accuracy laser data, new requests for tracking are now coming mainly for active satellites. The tracking approval process begins with the submission of a Missions Support Request Form, which is accessible through the ILRS web site. The form provides the ILRS with the following information: a description of the mission objectives; mission requirements; responsible individuals, organizations, and contact information; timeline; satellite subsystems; and details of the retroreflector array and its placement on the satellite. This form also outlines the early stages of intensive support that may be required during the initial orbital acquisition and stabilization and spacecraft checkout phases. A list of upcoming space missions that have requested ILRS tracking support is summarized in Table 1.-3 along with their sponsors, intended application, and projected launch dates.

Once tracking support is approved by the Governing Board, the Central Bureau works with the new missions to develop a Mission Support Plan detailing the level of tracking, the schedule, the points of contact, and the channels of communication. New missions normally receive very high priority during the acquisition and checkout phases and are then placed at a routine priority based on the satellite category and orbital parameters. After launch, New Mission Reports with network tracking statistics and operational comments are issued weekly. The Central Bureau monitors progress to determine if adequate support is being provided. New mission sponsors (users) are requested to report at the ILRS Plenary meetings on the status of ongoing campaigns, including the responsiveness of the ILRS to their needs and on progress towards achieving the desired science or engineering results.

Mission Name	Support Requester	Planned/Actual Launch Date	Mission Duration	Altitude (km)	Inclin-ation (Deg)	Received Mission Request Form	Application
H2A/LRE	NASDA Japan	Aug. 2001	1 month campaign	250 - 36000	28.5	Yes	Test new launch vehicle for placing satellites in geosynchronous transfer orbit
Starshine II	NASA USA	Oct. 2001	3 - 5 yrs	360	39	Yes	Promote math and science to classroom students
JASON-1	CNES/NASA France/USA	Sept. 2001	5 yrs	1336	66	Yes	Environmental change
Envisat-1	ESA Europe	Nov. 2001	5 yrs	800	98.5	Yes	Environmental change
GRACE	NASA GFZ	Nov. 2001	5 yrs	500 - 300	89	Yes	Gravity field modeling
ADEOS-II	NASDA Japan	Feb. 2002	3 yrs	803	98.6	Yes	Ocean circulation; atmosphere-ocean interaction
ICESat (GLAS)	NASA USA	May 2002	3-5 yrs	600	94	Yes	ice level and ocean surface topography
Gravity Probe B *(GP-B)*	NASA-JPL USA	May 2002	1-2 yrs	400	90	Yes	Relativity

Table 1.-3. New Missions and Campaigns Planned for 2001-2002).

MEETINGS AND REPORTS

The ILRS organizes semiannual meetings of the Governing Board and General Assembly. General Assembly Meetings are open to all ILRS Associates and Correspondents. The 4th ILRS General Assembly was held in April 2000, in Nice, France in conjunction with the EGS Symposium. The 5th ILRS General Assembly was held in November 2000 in Matera, Italy, in conjunction with the 12th International Workshop on Laser Ranging. Detailed reports from past meetings can be found at the ILRS web site.

The 6th ILRS General Assembly will be held in March 2001 in conjunction with the EGS Symposium in Nice, France. The 7 th General Assembly will be held in Toulouse France (September 17-21, 2001). The Symposium will include a session on Laser Radar Techniques (Sept. 17-18) as well as open ILRS - sponsored Working Group sessions and calibration workshops.

ILRS Analysis Center reports and inputs are used by the Central Bureau for weekly review of station performance and to provide feedback to the stations when necessary. Special weekly reports on on-going campaigns are issued by email. The CB also generates Quarterly Performance Report Cards and posts them on the ILRS web site. The Report Cards evaluate data quantity, data quality, and operational compliance for each tracking station relative to ILRS minimum performance standards. A catalogue of diagnostic methods, for use along the entire data chain starting with data collection at the stations, has emerged from this process and will be made available on the ILRS web site. The evaluation process has been helpful in comparing results from different Analysis and Associate Analysis Centers, a role soon to be assumed by the Analysis Working Group.