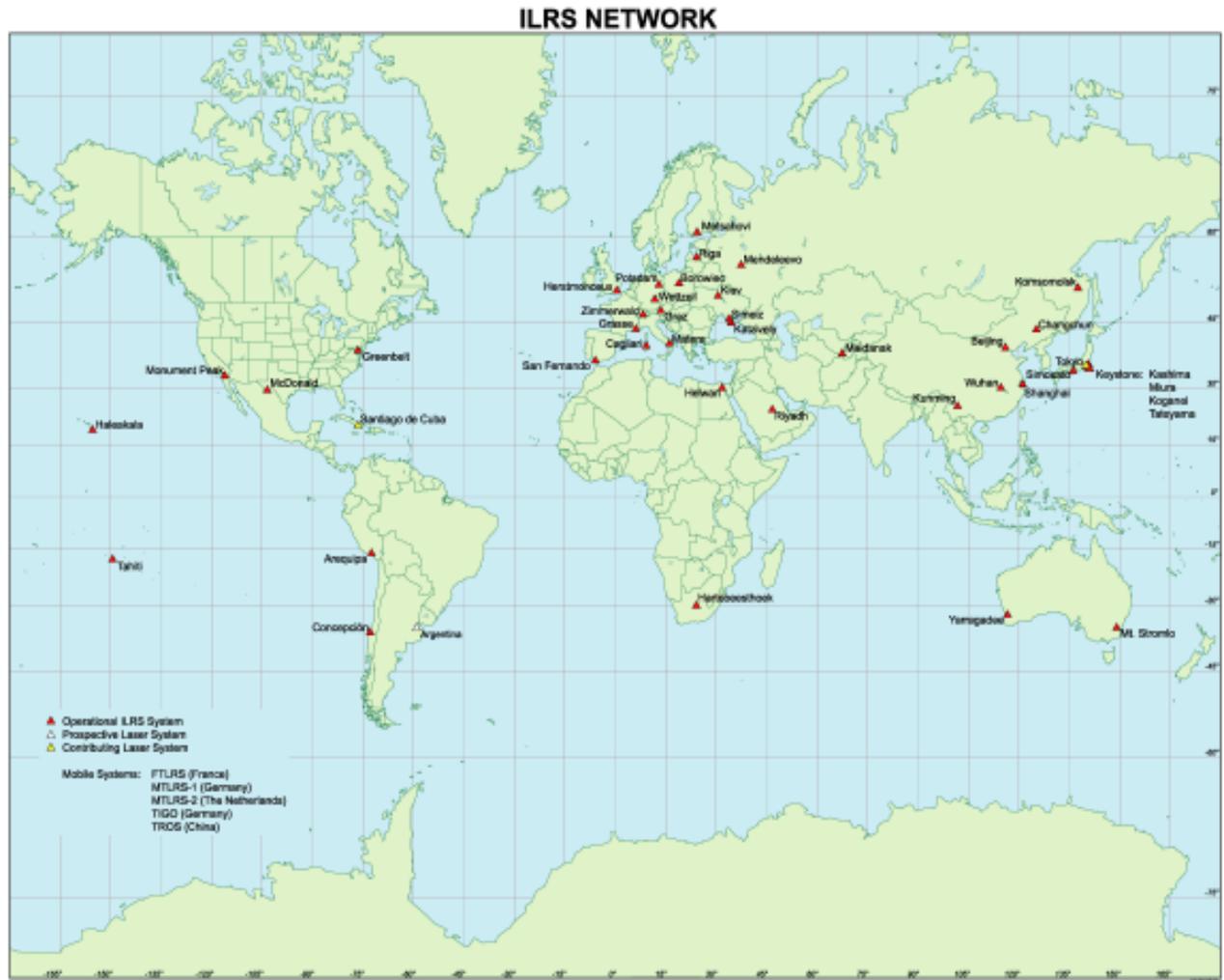


### 3.4.2 International Laser Ranging Service (ILRS)

**Introduction** The International Laser Ranging Service (ILRS), established in 1998, is responsible for the coordination of SLR/LLR missions, technique development, operations, analysis and scientific interpretation. Within the organizational structure of the IERS, the ILRS is one of several Technique Centers, having accompanying responsibilities for the generation and quality assurance of Earth Orientation and related products that are generated within the laser technique. An overview of the network of SLR/LLR stations (status June 2002) is given in Figure 1. Traditionally, the Southern Hemisphere coverage of the network is poor, but it must be noted that the geometric strength has improved recently with the installation of new observing systems in Concepcion (Chile) and Hartebeesthoek (South Africa). The maturity of the ILRS, now into its fourth year, is also reflected in the development of its organization and projects.

Figure 1: The network of ILRS tracking stations (status June 2002; source: ILRS homepage).



**Activities in 2001**

Although the satellites and stations are indispensable for the ILRS contribution to IERS, this overview will concentrate on analysis activities. Within the ILRS, the Analysis Working Group (AWG) is responsible for the coordination of these activities, including the development of quality control procedures as well as official ILRS analysis products. Two AWG workshops were held in 2001, notably in Nice (March) and in Toulouse (September). Within these workshops, analysis and data product issues are discussed, projects and/or campaigns are initiated and evaluated. As an example, the use of the SINEX format for the exchange of scientific results among the various observational techniques, was mandated for use within the ILRS. This use, internal to the ILRS, led to comments, advisories and suggested modifications. This provided important contributions to the development of the generalized SINEX V2.0 format.

With the development of (an) official ILRS product(s) and the quality control (QC) issue (of observations and products) in mind, the AWG has initiated a number of pilot projects. They are clearly developing with time. One pilot project concerns the harmonization of semi real-time QC results, the quality assessment of the SLR observations in particular. One of the most important conclusions from this project is that the model for station coordinates plays a major role in the diversity of quality „verdicts“ that are generated and distributed to the stations each week. Since the ITRF2000 solution has become fully available during this reporting year, and this model is known to be a state-of-the-art representation of actual station positions, the AWG has strongly recommended to use this model as a common element in the weekly (or more frequent) analyses. So far, more than half of the relevant analysis centers have switched to this model. This, of course, will also have consequences for the semi real-time EOP solutions which are generated and submitted to IERS for inclusion in the weekly Bulletins A (following the current procedures).

The second project is aimed at quality control of the software that is used within the SLR/LLR community. Its purpose is to benchmark the various computer programs and to detect blunders and other possible problems. It focuses on satellite orbits and specific parameter solutions, which may evolve into (the development of) an official ILRS product for satellite orbits.

The third project focuses on two traditional products, i.e. station coordinates and EOPs. The purpose here is to develop an official ILRS solution, initially for EOP only, but also for station coordinates and/or velocities in the future. Such solutions would be based upon various contributions from different analysis groups. This project initially dealt with procedural and organizational issues at first, and, therefore, used a very limited data set (1 month of LAGEOS-1

### 3.4.2 International Laser Ranging Service (ILRS)

data). Since then, it has expanded to cover a full year of LAGEOS-1/LAGEOS-2 data (1999); these are called the „series A“ solutions. In March 2001, Etalon-1 and Etalon-2 were added to the data mix, in an attempt to improve the quality of the EOP solutions. At the request of the AWG an intensive tracking campaign for the Etalon pair was organized. Since the analysis results (designated „series B“) are not finalized yet, the tracking campaign currently runs until October 2002. The initial results show rather modest improvements in the EOP results. However, some analysis groups are reporting more significant improvements. The earth rotation parameters that are currently solved for include the traditional parameters UT1-UTC and x/y-pole, and their time-derivatives. A summary of the various contributors to this project is given in Table 1.

Of course, the analysis activities within the ILRS, related to IERS, are not restricted to just these pilot projects. The ILRS community is providing input to other projects, like the SINEX Campaign, the EOP Alignment Project and the future (IAG) IGGOS Project. Results on these projects can be found elsewhere.

*Table 1: Overview of the various analysis groups that contributed to the series A and B solutions of the AWG pilot project on „positioning and earth orientation“.*

institute	series A	series B
ASI	+	+
BKG	+	+
CRL	+	+
CSR	+	-
DGFI	+	-
Geosciences Australia	+	+
GRGS	+	-
IAA	+	+
NASA/JCET	+	+
NERC	+	+

**Outlook** The AWG pilot projects, that can be considered as the focal point of the ILRS analysis activities, will proceed with the momentum that they have shown so far. For the harmonization project, the results are expected to converge after everyone has switched to the ITRF2000 model (which would take place in 2002). The benchmarking/orbits project has embarked upon a strict and ambitious scheme. Initial results are expected to be presented in October 2002, during another AWG workshop. The project on station position and Earth orientation is entering the stage of an official product combination. A Call for Participation to this extent is scheduled to be released at the same workshop.

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