

LASER RANGING ARCHIVING AND INFRASTRUCTURE SUPPORT THROUGH THE ILRS DATA CENTERS AND WEB SITE

Carey Noll
NASA Goddard Space Flight Center
Greenbelt, MD 20771, USA

Mark Torrence
SGT, Inc.
Greenbelt, MD 20770, USA

Wolfgang Seemueller
DGFI, Abt. I
D-80539 Muenchen, Germany

ABSTRACT

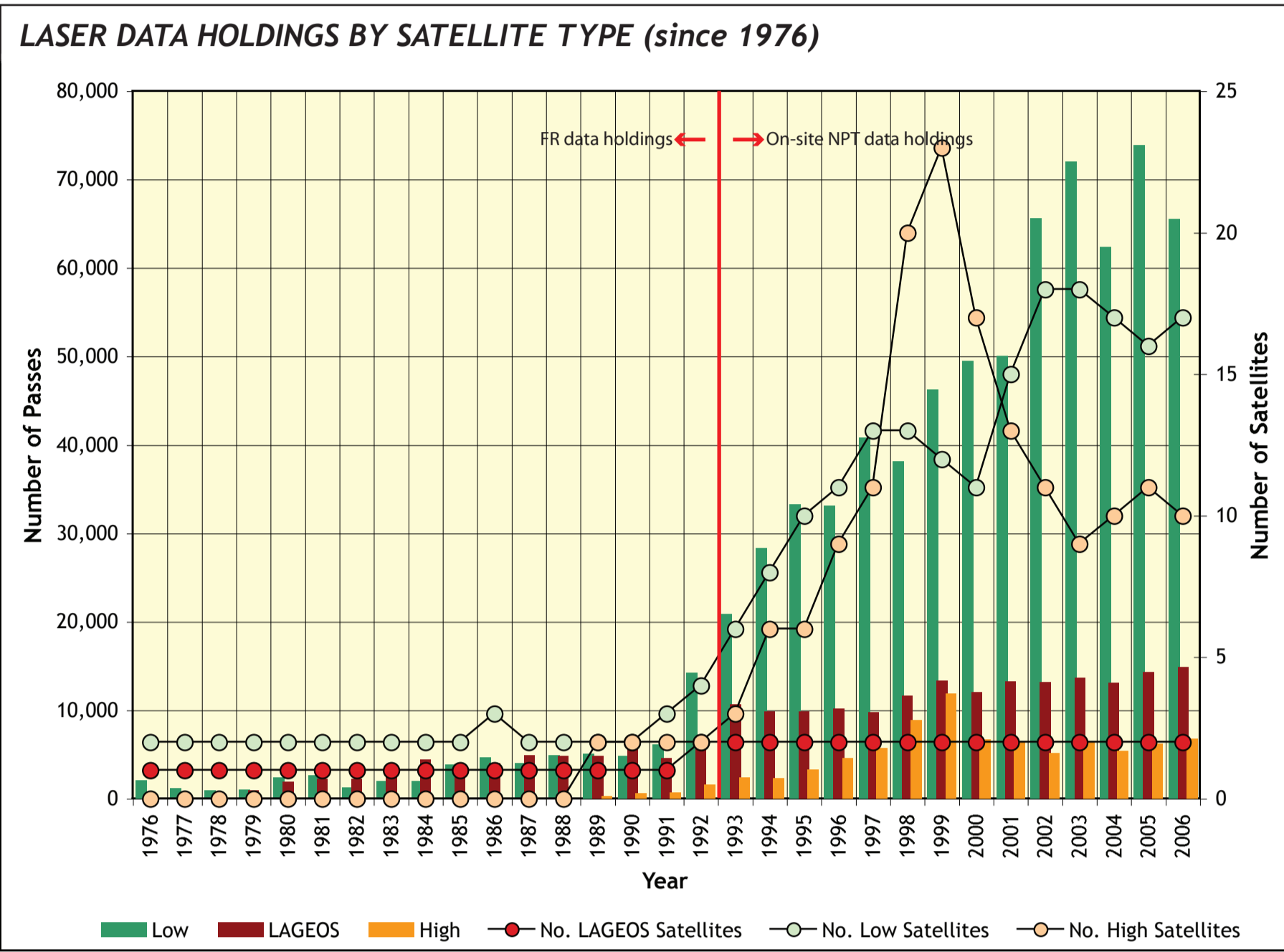
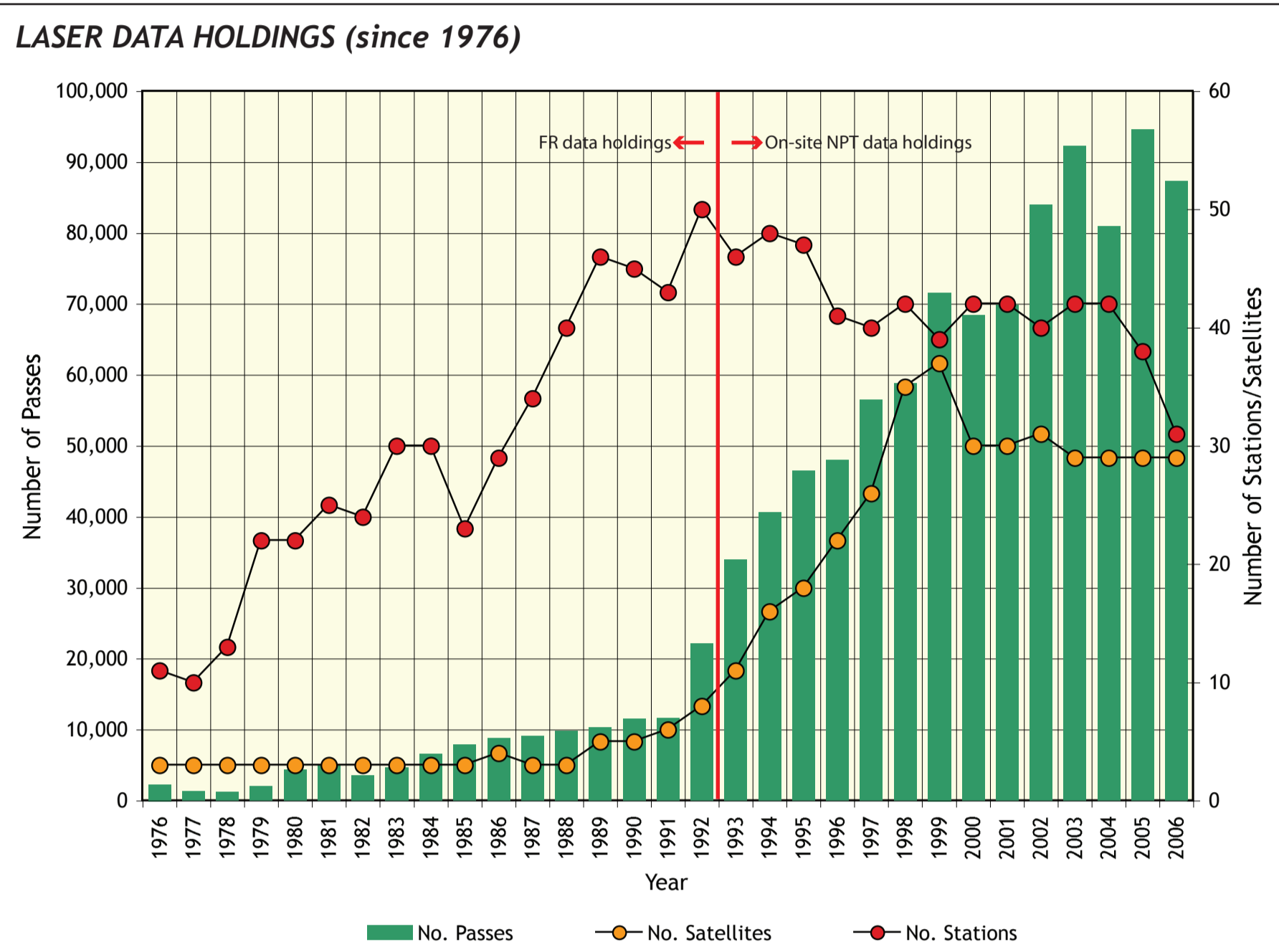
Two global data centers have supported the International Laser Ranging Service (ILRS) since its start in 1998. The Crustal Dynamics Data Information System (CDDIS), located at NASA's Goddard Space Flight Center, and the Eurolas Data Center (EDC) are active archives of laser ranging data and products derived from these data. The laser data sets consist of on-site normal points and full-rate data. The official ILRS products, currently station positions and EOP, are also made available to the user community through these data centers. Infrastructure support for the ILRS include reports of data holdings and quality, satellite predictions, and station configuration information. This presentation will describe this laser ranging archive available at the ILRS data centers and plans for future enhancements.

DATA CENTER ARCHIVE CONTENTS

Currently, the ILRS data and product archive consists of both normal point and full-rate data, satellite prediction information, and site positions and velocities. Data since mid-1976 are available at the data centers; ILRS products from January 1993 to the present are also available.

ILRS Data:
Normal point data is the primary ILRS station data product, gradually replacing on-site sampled data and later full-rate data as the primary data product starting in 1991. Normal points are generated on-site very shortly after the satellite pass and transmitted rapidly (within a few hours) to the ILRS operations centers.

Full-rate data was the prime SLR product in the 1970's and early to mid 1980's. In late the 1980's, the normal point generation process was refined and normal points were generated from the full-rate data during post-processing. In the 1990's, on-site normal point generation became the accepted process. In the mid 1990's, the SLR/LLR CSTG subcommission agreed that there was no formal requirement for full-rate due to the transition and acceptance of on-site generated normal points as the prime and only station data product. Many stations, however, continue to provide full-rate data to the ILRS data centers since they are sometimes required for specific needs (e.g., center-of-mass analysis, retroreflector experiments, co-location analysis, etc.). The plots below summarize the data holdings (full-rate or on-site normal point) of the CDDIS archive.



Satellite Prediction Information:

The ILRS currently provides satellite predictions for the network in two formats: Tuned Inter-Range Vectors (TIRVs) and the newer Consolidated Prediction Format (CPF). The newer CPF is now considered the operational format for prediction providers and network stations. However, TIRVs continue to be generated by the prediction providers and made available through email and at the data centers to accommodate stations that are continuing efforts to transition to the CPF.

The CPF information accurately predicts positions and ranges for a much wider variety of laser ranging targets than had been previously possible. Rather than using the tuned IRVs with an integrator, the new predictions provide daily tables of X, Y, and Z positions for each target which can then be interpolated for very accurate predictions. CPF provides an expanded format capability and greatly improves tracking on low satellites because the full modeling potential of the orbit computation at the prediction center will be passed on to the stations. Drag files and special maneuver files are no longer necessary. These predictions are available via email or via anonymous ftp from the data centers.

Official ILRS Products:

Six ILRS analysis centers (ASI/Italy, BKG/Germany, DGF1/Germany, GFZ/Germany, JCET/USA, NSGF/UK) produce weekly solutions on LAGEOS-1 and -2 for global station coordinates and EOP. These solutions are merged into an official ILRS Combination Product by ASI (official ILRS Combination Center) and DGF1 (backup ILRS Combination Center). This combination product is furnished to the IERS on a weekly basis for its multi-technique Combination Pilot Project and its Bulletin A.

ARCHIVE STRUCTURE

OVERVIEW OF DATA CENTER FTP STRUCTURE FOR SLR DATA, PREDICTIONS, AND PRODUCTS

Path	File Name	Description
/cpf_predictions	/current	Current CPF prediction files
/data	/fr	Full-rate data
/slr	/npt	Normal point data
/products	/pos+eop	Position and Earth Orientation Parameters
/products	/ac	Analysis Center description files

DATA CENTER FTP STRUCTURE FOR SLR DATA

Path	File Name	Description
/cpf_predictions	/current	Current CPF prediction files
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DATA CENTER FTP STRUCTURE FOR SLR PREDICTIONS

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SUBSTITUTION CODES FOR DIRECTORIES AND FILENAMES

Code	Description	Range	Example
yyyy	4-digit year	1976-present	2006
yy	2-digit year	76-present	06
mm	2-digit month of year	01-12	01
dd	2-digit day of month	01-31	01
h	1-character UTC hour of day	a-x (a=00, b=01, ..., x=23)	01
satname	official satellite name	N/A	lagoes1
stn	4-digit station number	N/A	7105
type	type of TIRV prediction file	drag-drag functions	ephemeris
nnn	3-digit ephemeris version number (currently D01=500, D01 when TIRVs no longer produced)	1-366 (501-866)	501

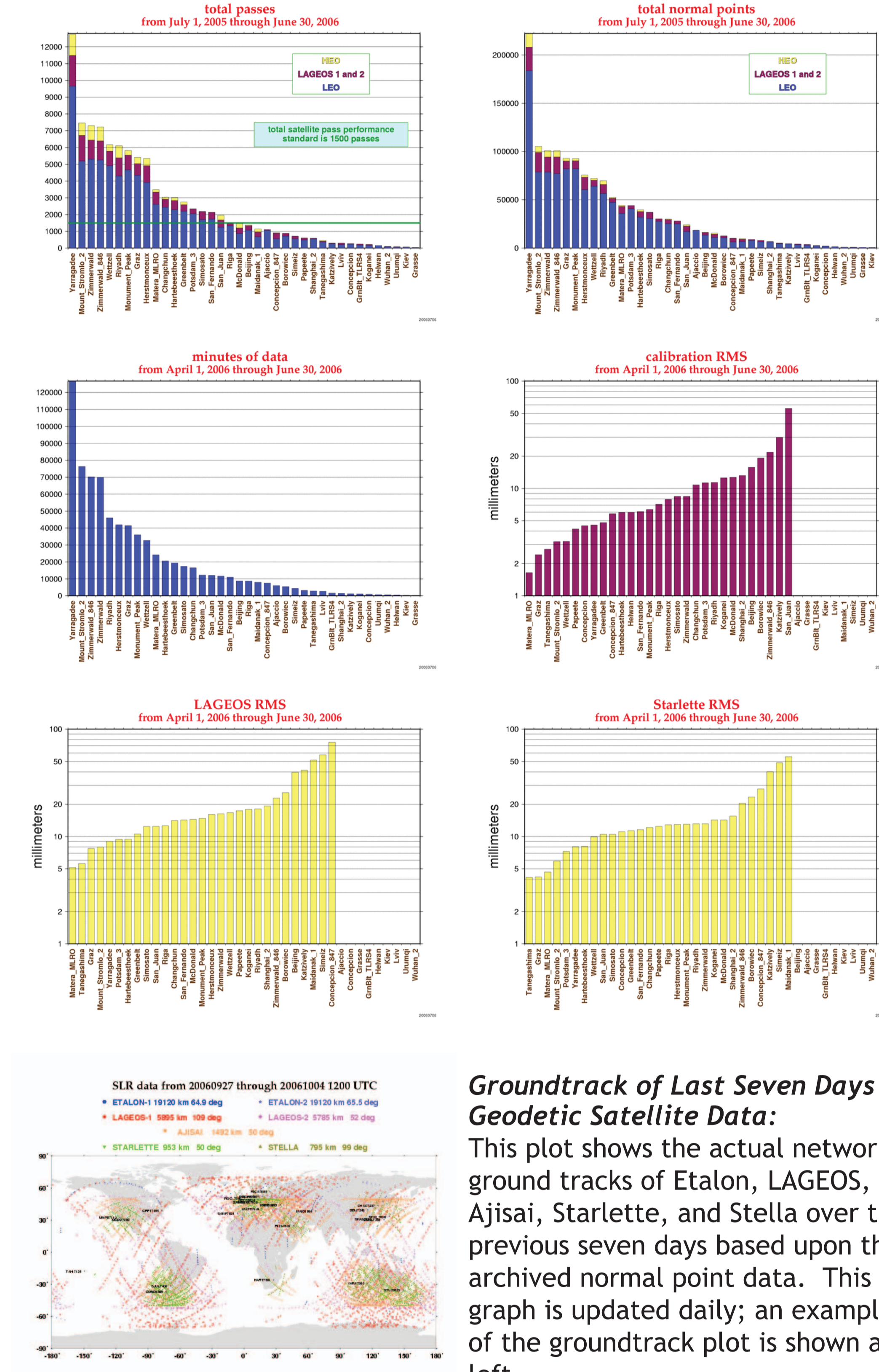
SLR Data/Product Type	Location of Example File in CDDIS ftp Archive
Monthly full-rate LAGEOS-1 SLR data for 01/2006	ftp://cddis.gsfc.nasa.gov/pub/slr/data/fr/lagoes1/2006/lagoes1_a.0601.Z
On-site LAGEOS-1 normal point data received on 01/01/2006	ftp://cddis.gsfc.nasa.gov/pub/slr/data/npt/lagoes1/2006/lagoes1_060101
Monthly on-site LAGEOS-1 normal point data for 01/2006	ftp://cddis.gsfc.nasa.gov/pub/slr/data/npt/lagoes1/2006/lagoes1_0601
LAGEOS-1 CPF from NSGF for 01/2006	ftp://cddis.gsfc.nasa.gov/pub/slr/cpf_predictions/2006/lagoes1/lagoes1_cpf_060101_5011_gsf
Official ILRS SINEX file (latest version) ending on day 01/07/2006	ftp://cddis.gsfc.nasa.gov/pub/slr/products/pos+eop/060107/llraa_pos+eop_060107.v1.smx.Z

NETWORK PERFORMANCE

The ILRS Central Bureau staff has developed various reports and plots to monitor network performance. This information is updated on a frequent basis dependent upon the type of report. Station operators, analysts, and other ILRS groups can view these reports and plots to quickly ascertain how individual stations are performing as well as how the overall network is supporting the various missions. All plots and reports can be accessed through the station pages on the ILRS Web site at URL <http://ilrs.gsfc.nasa.gov/stations>.

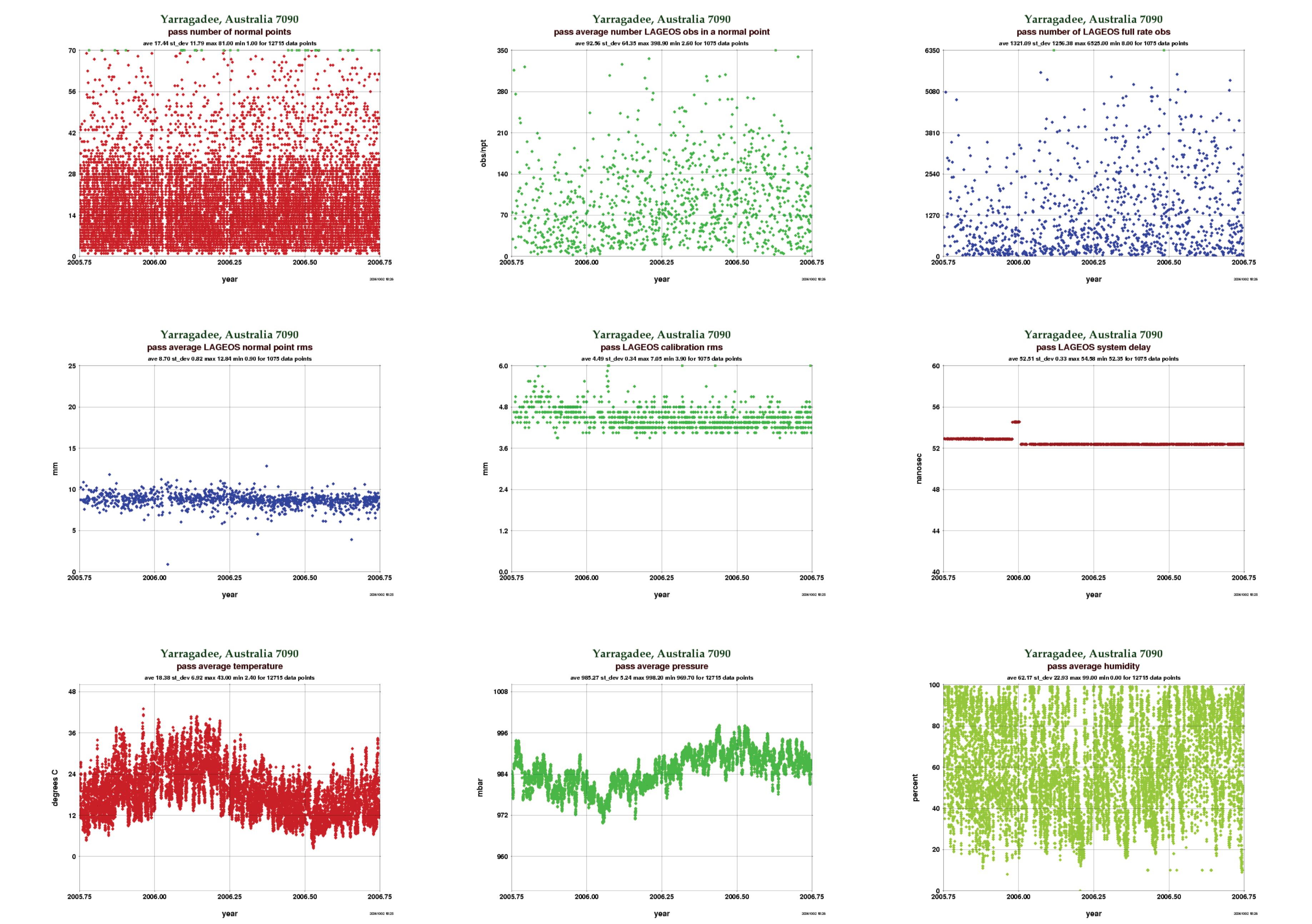
Global "Report Cards":

The ILRS performance "report cards" are generated on a quarterly basis and show data volume, data quality, and ILRS operational compliance information. The statistics are presented in tabular form by station and sorted by total passes in descending order; the latest version of the report card is shown in the web page figure at right. Plots of data volume (passes, normal points, minutes of data) and RMS (LAGEOS, Starlette, calibration) are created from this information and available on the report card Web site; example plots from the latest report card are shown below.



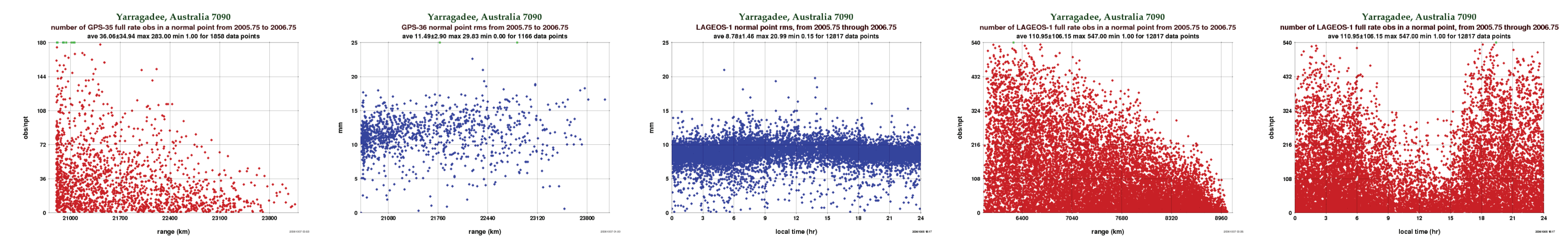
Station-Specific Performance Charts:

Plots of station performance and environment are generated each week. The plots are sorted by station and come in two forms: for data from the past year and for data since the year 2000. The information presented in these plots for each station in the ILRS network are: total number of normal points, total number of full-rate points, average number of data points per LAGEOS normal point, LAGEOS normal point rms, and system delay, and station temperature, pressure, and humidity (as recorded in the normal point data). Examples of these plots for the Yarragadee station are shown below.



FUTURE PLANS

Additional plots of station performance are under development for the ILRS Web site. These plots include statistics for all currently-tracked satellites and all operational stations as a function of time; full-rate observations per normal point and normal point rms are also computed as a function of range and time. Examples of the new charts for the Yarragadee station are shown below.



FOR FURTHER INFORMATION

Carey Noll
Manager, CDDIS
NASA Goddard Space Flight Center
Code 690.5
Greenbelt, MD 20771
USA
Carey.Noll@nasa.gov
ftp://cddis.gsfc.nasa.gov/pub/slr
http://cddis.nasa.gov

Mark Torrence
ILRS Central Bureau
SGT, Inc.
NASA Goddard Space Flight Center
Greenbelt, MD 20770
USA
Mark.H.Torrence.1@gsgc.nasa.gov

Wolfgang Seemueller
Manager, EDC
Deutsches Geodätisches Forschungsinstitut (DGFI)
D-80539 Muenchen
Germany
seemueller@dgfi.badw-muenchen.de
ftp://ftp.dgfi.badw-muenchen.de/pub/laser (old)
ftp://ftp.dgfi.badw-muenchen.de/slr (new)
http://www.dgfi.badw-muenchen.de/edc

