Report of AWG Meeting, Canberra, Australia, October 21, 2006.

Ad 1. Opening

The ILRS AWG members met on Saturday October 21, 2006. The meeting began at 9.10 hrs. The agenda and list of attendance are given in Tables 1 and 2, respectively. Noomen welcomed the participants.

Ad 2. Announcements

Noomen reported that the responsibilities as ILRS Analysis Coordinator and Co-coordinator have been taken over by Pavlis and Luceri, following their recent election as Analysis Centre Representatives to the ILRS Governing Board (originally: Noomen and Appleby, respectively). Considering the short time between the official handover and the date of this meeting, Noomen will chair this meeting and (with Appleby and Shelus) take care of minutes.
Also, Jürgen Müller has been elected as the LLR representative on the AWG, replacing Pete Shelus.

Ad 3. Pilot project "positioning + earth orientation"

This project has developed into an operational weekly procedure to compute an official ILRS product on station coordinates and EOPs. The analysis period has been extended backwards to cover the period 1993.0 – 2003.0 as well, with similar procedures and data input, to provide input for the ITRF2005 model. In a similar fashion, albeit with different data and parameterization, an effort is underway to also include the period 1983-1993.0 (preferably further backwards). Recent results and evaluations on each of these periods will be reported on hereafter.

Ad 3.1. ITRF2005P: reports on quality tests

Altamimi gave a report on the computation of ITRF2005P(IGN), which after minor modifications was selected and approved by the IERS DB Chair as the official ITRF2005 solution. This solution combines input from ILRS, IGS, IVS and IDS. The origin is fully determined by ILRS solutions, whereas the scale is fully determined by the IVS solutions. In view of the questions that this has triggered among the SLR community, he came prepared to give a full account of the procedures and evaluations that lead to these choices and results.

In the ITRF2005 computations, the overall behavior of the system is defined by 14 parameters: origin (3), scale and orientation (3), each of these accompanied by their time-derivative. In principle, a choice has to be made for each of these 14 parameters, based on the quality of each individual technique, to define the proper element in the ITRF2005 solution. Altamimi first mentioned the definition for scale, as was done in the ITRF2000 model: the weighted mean of 5 SLR solutions and 3 VLBI solutions. He commented that looking back, the discrepancies of the SLR solutions were quite large, and probably a different procedure would be followed nowadays when using the same input data.
To evaluate the options for the current product, he first made assessments of the quality and characteristics of each of the input series (official combined time series from each of the Services of weekly position+EOP solutions, covering 1993.0 – 2006.0, and the IVS solutions extending further backwards in time). In order to do so, he compared the combination solutions as provided by the various Technique Centers (ILRS being one of them) with a reference, allowing for systematic differences (i.e. estimating parameters for transformation, scale and orientation; time-derivatives of these are not considered here). As for the ILRS solutions, the results in terms of origin are very consistent, and when

compared to the behavior of corresponding parameters for the other techniques the ILRS solutions clearly stood out as the best input to provide this aspect of the datum definition.
As for the scale parameters, Altamimi recognized 3 different regimes: in the period 1994-1995 the results show a positive drift (-0.10 + 0.39*Δt), the period 1996-2000 shows effectively a non-drift (-0.77 + 0.01*Δt), and the period 2001-2006 shows a negative drift (-1.42-0.35*Δt) (all values in [ppb]). These evaluations were made based on the formal contributions of all stations. It was brought up that there is probably a correlation between "scale" and the network that has been used to assess this value. *Action item Altamimi*: do a similar evaluation based on the core network of high-accuracy SLR "core" stations.
In a similar fashion, he derived scale parameters for the IVS solutions, and showed that these values do not develop into different regimes but show a stable long-term behavior (although with a large yearly variation of up to 10 mm, most likely related to thermal distortion of the antennae). W.r.t. the VLBI solutions, the SLR scale drift as observed since 2001 develops into -10 mm in the heights of the SLR stations given in ITRF2005 when evaluated at 2006.0. This led Altamimi to the decision to use the IVS solutions only for the definition of scale of ITRF2005.

After having made this selection, the systematics of the various inputs in ITRF2005 w.r.t. the average are the following (2000.0 is the reference epoch): scale(GPS) = 0.86+0.14*Δt; scale(VLBI) = 0.0+0.0*Δt; scale(SLR) = -1.00-0.08*Δt (all values in [ppb]. For comparison, for origin: z(GPS) = -5.2-1.8*Δt; z(VLBI) = -5.2-1.8*Δt; z(SLR) = 0.0 + 0.0*Δt (all values in [mm]). The zeroes are a direct result of the definition. Evaluated at 2006.0, this results in a total difference of 2.5 ppb (1.5 within ITRF2005, plus 1.0 ppb because of the difference between IRF2005 and ITRF2000) for SLR stations compared to the previous internationally recognized solution ITRF2000.

The results of ITRF2005P(IGN) differ remarkably w.r.t. ITRF2005P(DGFI) (DGFI is another official IERS Combination Center; IGN is both IERS Combination Center and IERS Product Center). In the DGFI evaluation, origin is fully determined by SLR (as in the IGN result), but scale is defined by the average of SLR and VLBI, as was the case in ITRF2000. Altamimi made an effort to identify differences between the strategies applied by IGN and DGFI, possibly explaining the differences between the two preliminary solutions.
One of the aspects is the treatment of site ties. In the IGN approach, the full covariance of the site ties is used, and these formal uncertainties are scaled when a too large difference between the nominal value and the data as provided by the various techniques is identified (e.g. formal uncertainties of site ties at Wettzell were increased by a factor 200). DGFI only uses the main diagonal terms of these covariance matrices, but Müller reported that test were performed to compare the impact of this choice versus that of using the full covariance; this amounts to a net effect of about 0.1 ppb only; Altamimi agreed. In the DGFI approach, when site ties do not match the observations, the collocation option is simply ignored and the stations are treated as completely independent of each other. As a result, the DGFI solution used 45 site ties (out of the total of 90) ignoring the DORIS stations) or 75 vs. 175 when including DORIS solutions.
A second difference is the treatment of individual station velocities: in the IGN approach, all contributions from all techniques contribute to a common, unique velocity estimate, whereas in the DGFI approach allowance is made for technique-specific vertical velocities. Significant differences were observed in the vertical motion in particular. It was recognized that in certain cases (earthquakes) allowance should be made for physically different station velocities, but these are typically exceptions.
Altamimi also noted an unrealistic behavior of the EOP solutions coming out of the ITRF2005P(DGFI) solution, when compared to a new C04 solution (based in ITRF2005 input and solutions).
Altamimi made two suggestions, for use by the ILRS community: (1) ILRS should generate its own cumulative long-term solution, and (2) he is prepared to generate a derivative of the ITRF2005 solution

for SLR stations only (selection of SLR stations from the total ITRF2005 solution; apply relevant scale and scale rate).

Next, Müller gave an overview of the DGFI approach and results. The computation is done at the normal equations level, using the DOGS software. The weekly contributions from each technique are stacked to get a set of single-technique normal equations; next local ties are added to arrive at the proper reference points (in a significant number of cases initial test revealed that the local ties were of a too poor quality to be considered as accurate; therefore the particular site could not be collocated with other techniques). The datum was set at SLR (origin), SLR+VLBI (scale), and no-net-rotation w.r.t. ITRF2000 (orientation). Müller showed results of a direct comparison between ITRF2005P(DGFI) and ITRF2005P(IGN). When doing intra-technique comparisons, scale is consistent between DGFI and IGN for the SLR solutions, as well as for the VLBI solutions (without showing up different regimes for scale behavior). However, when comparing with ITRF2005P(IGN) (i.e. the combination solution) scale is not consistent anymore.
In a similar effort to understand the differences, DGFI noticed that a direct computation of the difference between SLR and VLBI solutions is hardly possible because of lack of overlap (co-location sites). Instead, DGFI used GPS solution as an intermediary proxy (GPS-VLBI has 18 common stations, GPS-SLR has 16) to calculate the scale difference. DGFI noticed a net difference of 0.4 ppb between SLR and VLBI solutions when compared in this fashion. DGFI also noted the sensitivity of the network of stations used for mapping one onto the other: in particular the treatment and/or availability of stations in the Southern Hemisphere could easily lead to an effect of 0.8 ppb.

Action item Altamimi: visit DGFI and resolve these differences (announced by Altamimi already).

Luceri reported on her evaluations of the ITRF2005 solution. She compared the time-series of ILRS solutions (1993-2006) with ITRF2000, and showed a 3D wrms of the site coordinates differences developing to about 40 mm when considering the entire network (clearly, ITRF2000 is not a good representation for the coordinates of SLR stations that have recently come on line), and 8 mm for the core network. When doing a similar thing w.r.t. ITRF2005, the value develops at a level of about 10 mm for the total network, and 6 mm for the core stations. In both evaluations, Helmert parameters were estimated to remove systematic effects. Looking at the Helmert parameters specifically, the origin results are consistent with ITRF2005 (i.e. effectively zero, which is to be expected considering the datum definition of ITRF2005). The Helmert parameter for scale develops to about 20 mm in 2006, when compared with ITRF2005, and is mean zero when compared with ITRF2000, with the exception of the last 4 months when an anomalous behavior can be seen (the values drop to -12 mm after June 2006).

Pavlis showed some statistics coming out of the IGN evaluations. The ILRS core stations show a typical 3D scatter of about 10 mm, whereas he identified a large number of VLBI stations for which the differences are much larger. Based on theses numbers, he questioned the stability of VLBI solutions and hence their utility to actually assess/define global scale.

Altamimi asked for a 1-page description of the ILRS procedures and computations leading to the official contribution to the ITRF2005. *Action item Luceri*.

Action item AWG: advise ILRS GB on argumentation in letter of concern to IERS DB.
Action item ACs, Altamimi, Drewes: do further testing of quality and sensitivities of ITRF2005P.
Action item Bianco: provide proper description/observation of local site ties + inform members SG.
Action item Altamimi: supply ITRF2005_SLR solution (description to Pavlis; numbers on IGN web site)

Ad 3.2. ITRF200next: ILRS 1983-1992 reports on analysis progress
Noomen gave a brief introduction of this analysis effort. Unlike the situation after launch of LAGEOS-2 (end of 1992), this period is characterized by a limited data availability and weaker observations. It was agreed during the meeting in Vienna (April 2006) that the analysts would perform a number of test, and investigate (sensitivities to|) aspects like satellites used, data weighting, arc length, EOP interval length, bias estimation, and such.

Pavlis reported on his evaluations. As for LAGEOS-1 observations, 2 datasets are available (DGFI and DEOS), but analysts appear to have problems working with these sets (most likely related to a time-reference problem); he allocated a JCET SLR data archive and will provide that to CDDIS for inclusion at the restricted ftp site (*action item Pavlis*). He gave an overview of the tracking history of all stations. Typical orbit fits for LAGEOS-1 range between 800 mm (1976) to 10 mm (1992).
Pavlis used 5-day EOP intervals for the period 1976-1983 and 3-day intervals for 1983-1992. He used different weighting factors for the normal equations (when making combination solutions), as well as different subsets of data (monthly, quarterly, biweekly). The evaluation of the results revealed that the quarterly solutions develop a serious problem in the z-component; the monthly solutions appear to behave much better. Pavlis will generate an overview of the bias (solutions) that he obtained and put these on the CDDIS, for evaluation and comparison purposes by other analysts (*action item Pavlis*).

Luceri gave an overview of the test evaluations done by ASI. She used the ”Eastbourne conventions” as a reference for station treatment, albeit that biases were estimated for 13 stations (based on an evaluation in a long-arc solution). Data used was on LAGEOS-1 only, but the available datasets (DGFI and DEOS) could not be used (probable reason: time-tagging, time-definition and conversion problems); instead she used an ASI version of the data. EOP intervals were fixed at 3 day length (from UTC midnight to UTC midnight), and arc lengths considered were a multiple of this: 15 days and 30 days (single arc computations); counting backwards from January 3, 00.00 hr, 1993. A computation of Helmert parameters for these two types of solutions showed consistent values, albeit that the values for the 15-day solutions were more noisy (as is to be expected); this holds for all translation and scale parameters. RMS station coordinates residuals were typically at the level of 20 mm (core stations: 15 mm) for the 30-day arc solutions, and identical numbers for the 15-day solutions. Coordinates solutions themselves were effectively identical.
Altamimi, as a representative of IERS/ITRF, is in principle open to any type of frequency (15 days, 30 days).

Müller reported briefly on the evaluation of the data from the same period. DGFI tried to obtain solutions with the same procedures and parameterization as applied for the operational product and the 1993-2003 re-computation: weekly arcs and 1-day EOPs. The results turned out to be useless.

Appleby reported on preliminary tests, done with the data from 1984 and 1985 only. He used 14-day arcs, and applied 3-day EOPs. He tried to use the data as provided by DGFI and DEOS, but had difficulty obtaining convergence, in particular for the European stations (again: a probable time-tagging problem). He will use the JCET data for his further evaluations of the 1980-1992 time frame. He had also been working with P. Moore at Newcastle on LAGEOS-1 orbital comparisons, as that AAC works towards submitting solutions to the ILRS effort.

Based on these first experiences, it was decided to stick to a number of common aspects for further evaluations: 15-day data arcs, 3-day EOP intervals, and JCET LAGEOS-1 data. *Action item Pavlis*: provide JCET LAGEOS-1 data to CDDIS. *Action item Pavlis*: provide file with solutions for station biases to CDDIS. *Action item ACs*: do further evaluations of the procedures to compute pos+eop solutions for this time frame, testing with models, satellites, data weights, procedures and such.

Ad 3.3. Operational product (ILRSA/B technique issues, quality/refining product)
Luceri briefly reported on the activities concerning the combination of the individual solutions. The operational process is ongoing, with stable solutions. NSGF appears to develop as an outlier (*action item Appleby*), and ACs are urged to pay attention to adherence to the SINEX format; if not, the automatic procedure will prematurely end, requiring (unnecessary) manual intervention and causing delays. (*action item ACs*)

Pavlis mentioned that the standard analysis of LAGEOS-1/2 and Etalon-1/2 continues uninterrupted. He has developed his website for evaluation purposes further, and added a new metric: the relative weight of individual contributions w.r.t. the combination. He made comparisons of the (individual) JCET solutions and the (combination) ILRSA solution, w.r.t. ITRF2000, and concluded that the quality of the two is effectively the same. He did observe a trend in the scale parameters w.r.t. ITRF2000 in recent solutions, possibly related to a problem in the longitudinal component of the solutions for Yarragadee

Kelm brought up recent experiences and developments in the rigorous variance component estimation (VCE) which is being used for automatic bias detection and assessment (developing pass/fail criteria). In an ideal case, the variance values would be more-or-less identical, but sometimes relatively large excursions are being observed (in particular for NSGF and BKG) (*action item Appleby, Mareyen*). Other indications of (possible) problems with the solutions are negative values on the main diagonal of the covariance matrix, negative values, or unrealistically small or large positive values for the variance factors of VCE. In each case, a relation to weakly determined stations in one or more solutions can be unambiguously found by numerical search algorithms. The standard solution is to delete the station(s) that caused such problems. Kelm monitors the scale of the weekly solutions w.r.t. ITRF2000, both of the individual solutions and of the ILRSB solution. The latter is a good average, but he sees scale developing. The scale differences w.r.t. ITRF2005 of the ILRSB solutions have developed to about 2 ppb, whereas the differences w,r.t. ITRF2005P(DGFI) are currently at about 1 ppb.

Ad 3.4. New products
Pavlis reported on the development of a new AWG POD product. Rather than using the well-known SP1 and SP3 formats, this new product will be provided in the most recent SP3(C) format. *Action item Gurtner*: coordinate names of ”our” geodetic satellites with “owners” of format. The format should have provisions for time systems other than GPS-time. *Action item Pavlis*: inform ACs of development. *Action item ACs*: prepare software to express orbit solutions in SP3(C) format. *Action item Pavlis*: inform CDDIS to prepare for new POD solutions. *Action item CCs*: prepare for combination of POD solutions (making allowance for differences in the reference system, as shown in solutions for Helmert parameters for the station/EOP component). The step-size for provision of the solutions for the LAGEOS-1/2 orbits is set at 2 minutes; for the Etalons this is to be 15 minutes.

Müller brought up the status of the "slr_discontinuity" file. This file is to be used for two purposes: definition of entries in the SINEX files for pos/EOP solutions ("PT" and "SOLN" entries), but also (by means of a new block "SOLUTION/DATA HANDLING") by describing the data treatment (e.g. the estimation of range biases, application of specific center-of-mass values other than standard, and such). The file is already in use by DGFI in the development of their contribution to the GGOS project. *Action item Müller*: extend this file to cover the full period 1993.0 – 2007.0.

Bianco brought up the suggestion to prepare an official ILRS product "geocenter", in this case based on the geometric solutions as derived by ASI. *Action item Luceri*: develop the format (and use) of such a geocenter solution (time-series) further.

Ad 4. New MP refraction model

Pavlis reported on further developments of the MP model. This has been validated with data from the AIRS atmospheric infrared sounder instrument on the NASA Aqua satellite, to include corrections for horizontal and vertical gradients using ray-tracing techniques.
Application of the standard MP model leads to a significant reduction in the variance of the residuals of LAGEOS-1, but no major effect for LAGEOS-2 (study done by Ries). Other evaluations by JCET and DGFI show similar positive effects. The standard value for GM (fractional number .4415) is to be retained (solutions using the MP model do not lead to significant changes w.r.t. the Marini-Murray based value). The standard MP model (i.e. without corrections for gradients) is to be included in the software used in the generation of our operational product, and a new series of solutions for the period 1993.0 – 2007.0 is to be delivered by January 1, 2007; from that day onwards it is a mandatory element of the weekly operational analyses (*action item analysts*).
It is expected that Herstmonceux will soon release an SLRMail describing the correction to be made to range data from the station following its investigation into non-linearity effects in the Stanford counters used at the station (action item Appleby/Gibbs). A preliminary investigation carried out by Noll and Lemoine during the Workshop suggests that very few stations, perhaps only Herstmonceux, that use Stanfords are also AWG core stations and would thus not normally have RB solved-for; this must be confirmed and the ACs informed before the re-analysis runs are carried out (action item Appleby/Gibbs). The combination centers are to deliver a new time-series of solutions, based on these new solutions, before February 1, 2007 (*action item combination centers*). It should also be included in the development tests that are being done for the period 1983-1992 (*action item analysts*).
Action item Pavlis: update the description of tropospheric corrections in the IERS 2003 Conventions.

Ad 5. Benchmark project: status

Pavlis reported on the status of recent submissions to pass this threshold, to contribute to our official ILRS "pos+eop" product. GA has submitted the "blind" solution on August 23, and will be handled first in his evaluations. GRGS submitted their "D" test (the first hurdle to be taken) on August 4. NCL also submitted a "D" solution, on August 23. Because of time constraints and other obligations, Pavlis will address these solutions in the period June-July and December-January only. Kelm and Sciarretta have offered to assist Pavlis in these evaluations.

Ad 6. Project "harmonization"
Müller reported that Mareyen (BKG) repeats her invitation to organize a (2-day) meeting in Frankfurt to discuss particular aspects on definition, procedures, formal mathematics , statistics and such. The invitation is welcomed, but Noomen advised her to come up with a proposal for one or more specific subjects. *Action item Mareyen*

Ad 7. Miscellaneous
Various brief agenda items.

Ad 7.1. SLR tracking network (status, weekend effect)
As has been visible in various presentations and discussions during this week (workshop, ITRF2005 discussion), the network of SLR stations is and remains a general point of concern. This refers to the global distribution of stations, but also the operation of them. Based on an inventory done earlier this year, there appears to be a weekend-effect on the LAGEOS data in the order of a reduction of about 25% for weekend days when compared to normal days. Since it might play a role in the quality of our products, this remains an aspect of interest for our community. However, the re-deployment of NASA systems at Arequipa and on Hawaii was of course welcomed, as was the excellent Chinese station in San Juan, Argentina.

Ad 7.2. Consistency QC reports
A long-standing action item of the AWG is to bring more homogeneity in the various QC reports. The model for station coordinates that is in use for this purpose has been identified as a major source of error (difference) a long time ago. Most of the analysis groups involved in such analyses have switched to the ITRF2000 model by now, but MCC is an exception here (*action item Glotov*). Considering the current state of discussion on the new ITRF2005 product, the introduction of this model is postponed to somewhere in (early) 2007. A special point of concern is the number of parties involved in such analysis: it appears that CSR has stopped completely, whereas the daily analyses done by DEOS have come to a halt since last Summer because of computer and manpower problems (*action item Noomen*). The analysis groups involved should be encouraged to pick up their activity as soon as possible. Gurtner reported that he has approached König (GFZ) to initiate a similar QC product, to strengthen the database for such activities.

Ad 7.3. Procedure for assessing quality of new SLR system
The ILRS has a categorization of contributing SLR stations: based on their performance statistics (quantity, satellites, quality), stations can be given the status of “core”, “contribution” or ”associate”. In addition, and on a more private level the AWG also distinguishes between stations and gives the top-performing stations the ”AWG core” status, with preferential treatment of their data in the official analysis (ILRS AWG internal only). Each of these status assessments needs to be reevaluated regularly, e.g. one per year.
PROCEDURE: It was agreed that the CB would continue its roughly annual review of stations’ performances, based on ‘report card’ statistics. This analysis would inform the ILRS station categorization.

In relation to that, the question was brought up how to handle new stations; specifically in relation to AWG activities: treatment in the operational product, and in the various QC analyses (a consistent coordinates model reduces the discrepancies in the range bias values as reported in the various reports). Müller already offered to (coordinate the) evaluate new stations. This could be done in a step-wise approach: evaluate the information/solutions obtained during e.g. the first month of observation (technical quality, station coordinates solutions) and report this back to station and analysts), and e.g. after 6 months with an ”epoch position + velocity” model as an outcome and maybe further updates). It is expected that such a procedure is necessary for the upcoming new deployments of systems in Hawaii and Arequipa (and possibly also for other new stations, such as South African, Chinese, Korean, etcetera). Standing *action item Müller*).

Shelus remarked that a similar procedure should be followed for (or that the procedure should be capable to also include) (new) LLR stations. It was recognized that this of course depends on the measurements that are taken by such LLR stations (LAGEOS data is a necessity, both from the point of view of official ILRS categorization and from the point of AWG use). *Action item Jürgen Müller*: develop validation plan for (new) LLR stations

Ad 7.4. Station performance card
Not much to report here, other than that the 3rd quarter 2006 report card is out.

Ad 7.5. Analysis documentation
The analysis groups involved in the generation of the weekly ILRS product have been asked to give a description of their techniques and modeling efforts in a well-described document, and make this available through the ILRS web pages (the INDIGO project). Five out of 6 have done so, and the missing one (NSGF) has finished the documentation and only has to submit it to CDDIS.
It was suggested that this effort should be extended to all ILRS groups involved in some form of analysis of SLR analysis. (*action item CB*).

Ad 7.6. Special issue Journal of Geodesy
Noomen has been in contact with the Editor-in-Chief of the Journal of Geodesy (William Featherstone) before the Summer break, and he has welcomed the idea of a special issue on ILRS. *Action item Noomen*: organize a guest editorial board, and further develop the procedures to come to such a special issue.

Ad 7.7. Upcoming changes in SLR/LLR/+ data formats
Noomen announced that the ILRS DFPWG is in the process of developing a new format for laser range observation. This format should be able to store current SLR data, but also LLR data, transponder data, dual-wavelength data, and satisfy more stringent requirements on resolution (epoch, travel time). The format is expected to become used by the community in beginning 2007, and will see an overlap period (with data being available in this new format as well as in the current ILRS Normal Point format) for a number of months. Analysis groups should prepare for this transition (*action item analysts*).

Ad 8. Next meeting

The next AWG meeting will be held in conjunction with the next EGU meeting in Vienna (April 15-20, 2007), preferably for a full day prior to that meeting. Details should be arranged with Harald Schuh.

Ad 9. Action items
See Table 3. Completed action items from the meeting in Vienna (April 2006) were removed, and new ones added.

Ad 10. Closure
The chairman thanked the participants for their contributions and support over the past 8 years. He wished the new Analysis Coordinator (Pavlis) and Co-coordinator (Luceri) success in fulfilling their new tasks. The meeting adjourned at 18.30 hrs.

December 4, 2006
R. Noomen, G. Appleby, P.J. Shelus

Table 1: Agenda

1. opening
2. announcements
3. pilot project "positioning + earth orientation"
   3.1. ITRF2005P: reports on quality tests
   3.2. ITRF200next: ILRS 1983-1992 reports on analysis progress
   3.3. operational product
      (ILRSA/B technique issues, quality/refining product)
   3.4. new products
4. new M-P refraction model
5. benchmark project: status
6. project "harmonization"
7. miscellaneous
   7.1. SLR tracking network
      (status, weekend effect)
   7.2. consistency QC reports
   7.3. procedure for assessing quality of new SLR system
   7.4. station performance card
   7.5. analysis documentation
   7.6. special issue Journal of Geodesy
   7.7. upcoming changes in SLR/LLR/+ data formats
8. next meeting
9. action items
10. closure

Table 2: Attendance

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Table 3: action items

ACs	experiment with satellites, models and procedures for pos+eop solutions 1983-1993
ACs	check (perfect) adherence to SINEX format definitions
ACs	prepare for new format SLR data
ACs, Altamimi, Drewes	further testing of quality and sensitivities of ITRF2005P
ACs	implement M-P tropospheric correction model and recompute time-series for 1993-date (January 1, 2007)
ACs	include conversion of orbit solutions into SP3(C) format (step-size 2 minutes for LAGEOS; 15 minutes for Etalon)
Altamimi	test ITRF2005-like solution with SLR core stations only (see Eastbourne conventions for names)
Altamimi	visit DGFI to discuss ITRF2005P differences
Altamimi	supply ITRF2005_SLR solution (description to Pavlis; numbers on IGN web site)
Appleby	investigate reasons for degradation of NSGF contribution to operational product
Appleby, Gibbs	inform community about RB in Herstmonceux data 1992-date, following work on Stanford counters. Investigate other stations potentially affected.
AWG	re-assess AWG core stations status + general ILRS classification
AWG	make overview of station activities 1993-2005, based on eccentricity file and "pos+eop" info
AWG	advise ILRS GB on argumentation in letter of concern to IERS DB
Bianco	proper description/observation of local site ties (=> ILRS GB?) + members SG
CCs	deliver new combination product based on M-P tropospheric correction model (February 1, 2007)
CCs	prepare for combination of SP3(C) files
Central Bureau	extend INDIGO documentation to all ILRS analysis efforts
Deleflie	submit blind test benchmark project (old action item Exertier)
Glotov	use ITRF2000 in QC analyses
Gurtner	coordinate use of SP3(C) with "owners" (coding LAGEOS-1,2)
Luceri	send Altamimi description of procedure for computation ILRS contribution to ITRF2005 (1 page)
Luceri	develop format for geocenter solutions
Mareyen	develop 2-day analysts getting-together in Frankfurt
Mareyen	investigate reasons for degradation of NKG contribution to operational product
Müller (Horst), Pavlis	exchange and compare orbits in SP3(C) format
Müller (Horst)	develop procedure for station qualification (ILRS level, AWG use) + position model for new stations
Müller	develop slr_discontinuities file further (1992-2006)
Müller (Jürgen)	develop validation plan for (new) LLR stations
Noomen, Pearlman, Gurtner	homogenization of QC reports
Noomen	get letter expressing general support for ILRS activities from IERS chairman
Noomen	have ASI and DGFI develop plain format for pos+eop results

Noomen, Luceri, Gurtner	develop report with pos+eop use for stations and managers
Noomen	organize guest editorial board for JoG special issue
Noomen	check IERS procedure for station documentation after earthquakes and such
Noomen	get Delft QC procedure running again
Noomen, Appleby, Shelus	minutes of AWG meeting
Pavlis	update description of pos+eop products and procedures
Pavlis	evaluate blind test benchmark project results GA and GRGS
Pavlis	monitor experimenting of ACs of 1983-1993 data
Pavlis	provide JCET version of LAGEOS-1 data 1976 – 1992 to CDDIS
Pavlis	provide overview of bias solutions 1983-1992 to CDDIS
Pavlis	inform analysts of development of SP3(C) product
Pavlis	contact CDDIS for preparation for SP3(C) products
Pearlman	remind Simosato to become IGS station

(*ACs = Analysis Centers; CCs = Combination Centers*)