Minutes of the fifth GBOG meeting

held in Uppsala, Sweden on 27-28 April 2009

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Abstract

Reports on ground based observations in the different CUs and discussions on GBOG related topics are presented. The GBOG WG has agreed on a policy for raw and reduced data. There was an invited presentation by G. Gilmore focussing on the early verification of science alerts and on the future of european small and medium size telescopes.

Contents

Participants

C. Allende Prieto, MSSL - London
M. Altmann, ARI - Heidelberg
P. Bendjoya, Nice University
A. Bragaglia, OABO - Bologna
G. Clementini, OABO - Bologna (by telecon)
Y. Fremat, ROB - Brussels
G. Gilmore, IoA - Cambridge (invited the first day)
U. Heiter, Uppsala University
E. Joliet, ESAC - Madrid
E. Pancino, OABO - Bologna
C. Soubiran, LAB - Bordeaux

The following table has been generated from the on-line Gaia acronym list:

Acronym	Description
AIP	Astrophysikalisches Institut Potsdam
AP	Astrophysical Parameter
ARI	Astronomisches Rechen-Institut (part of ZAH, Zentrum für Astronomie, Heidelberg)
ASAP	As Soon As Possible
CCD	Charge-Coupled Device
CU	Coordination Unit (in DPAC)
DPAC	Data Processing and Analysis Consortium
DPCE	Data Processing Centre ESAC
EPC	Ecliptic Pole Catalogue
ESAC	European Space Astronomy Centre (VilSpa)
ESO	European Southern Observatory
ESP	Extended Stellar Parametriser
FLAMES	Fibre Large Array Multi Element Spectrograph
GBOG	Ground-Based Observations for Gaia (DPAC)
GBOT	Ground-Based Optical Tracking
GREAT	Gaia Research for European Astronomy Training
GSP	Generalised Star Parametrisation (Parametriser)
GSPphot	Generalised Stellar Parametriser PHOTometry
GSPspec	Generalised Stellar Parametriser SPECtroscopy
GST	Gaia Science Team
ICD	Interface Control Document
ICRF	International Celestial Reference Frame
IGSL	Initial Gaia Source List
IoA	Institute of Astronomy (Cambridge; also denoted IOA)
LAB	Laboratoire d'Astrophysique de Bordeaux
MDB	Main DataBase
MM	Man Month
MSSL	Mullard Space Science Laboratories (UK)
NEP	North Ecliptic Pole
NTT	New Technology Telescope (ESO)
OABO	Osservatorio Astronomico di Bologna
OGLE	Optical Gravitational Lensing Experiment
OHP	Observatoire de Haute Provence (France)
PI	Principal Investigator
PhD	Doctorate in Philosophy
QSO	Quasi-Stellar Object

ROB	Royal Observatory of Belgium
RVS	Radial Velocity Spectrometer
SDSS	Sloan Digital Sky Survey
SED	Spectral Energy Distribution
SEP	South Ecliptic Pole
SN	SuperNova
SPSS	Spectro-Photometric Standard Star
TB	TeraByte
TN	Technical Note
VLBI	Very Long Baseline Interferometry
VLT	Very Large Telescope (ESO)
VLTI	Very Large Telescope Interferometer (ESO)
VO	Virtual Observatory
WFI	Wide-Field Imager (ESO 2.2-m telescope)
WG	Working Group

Presentations are available on svn :

`http://gaia.esac.esa.int/dpacsvn/DPAC/WG/GBOG/meeting/GBOG_M05/.`

1 Invited presentation by G. Gilmore

On the first day of the meeting, Gerry Gilmore (CU5, Cambridge), gave a presentation on potential new GBOG programs needed. The first half of the talk was future observatory planning, i.e. Gaia follow-up after launch, and thus not directly related to GBOG work. However, he presented information about the "European Telescope Strategy Review Committee", an AstroNet body being formed to review Europe's 2-4m telescopes (`http://www.strw.leidenuniv.nl/2to4mtelescopes/`). This requires input from the whole astronomical community, including DPAC members.

The second part of the talk was dedicated to a future GBOG activity which has to be planned, namely the verification of early flux alerts. A flux alert is a change in brightness detected during data processing. The limit in magnitude difference (Δm) is not yet decided (it could include e.g. eclipsing binaries with Δm $\approx$0.1 mag). The alerts are to be identified within 8 to 24 hours of observation, and should go public about 2 months after launch. This needs an alert verification process, which is DPAC/GBOG internal. This concerns only verification of the first few weeks/months of candidate alerts detected by the Gaia alert system, to verify that the alerts are reliable, before the alert system is "turned on". Once alerts are public they are no longer relevant to DPAC/GBOG. The DPAC can define priorities for the "alert stream" (objects we are interested in) in order to optimise the trade-off between completeness and reliability. Some types of alerts will be more significant than others. For example, about 1 SNe per hour are expected, whereas only few microlensing events or gamma-ray bursts are expected over the whole mission. As test cases, SN Ia detection as well as eclipsing binary simulations were presented.

We need to organise the alert verification process now, because it will need a lot of observing time, much of it to identify sources of no special interest (asteroids, blends...), and possibly special arrangements with observatories. Hopefully, after a short time, real alerts will dominate. Full details of alert release will be decided in CU9, but the planning of the verification program must start now. Some open questions were posed: "Should the scanning law be taken into account?" and "How will Gaia behave in crowded regions?". In some areas (high latitudes) SDSS gives a good first-look check.

2 GBOG update by C. Soubiran

A summary of actions and news since the previous GBOG meeting in Bologna in October 2008 (see minutes on Livelink) was given. A message was sent to the whole DPAC to request for information about ground based observations programs (current and future) related to DPAC needs. CU3 representatives have clarified the status of the QSO observing programme by Alexandre Andrei. CU8 proposal on SEDs for AP stars at ESO/NLTT/EFOSC2 was finally accepted. CS was contacted by Laszlo Szabados from Hungary and Nevena Markova from Bulgaria who offer observations on their 1-2m telescopes in support of Gaia. Their messages were forwarded to CU3, CU4 and CU7 who are dealing with networks of small telescopes. The GBOG WG has a new CU4 representative : Philippe Bendjoya from Observatoire de la Côte d'Azur. Emmanuel Joliet improved significantly the GBOG Information center (GBOG wiki pages and svn repository). The wiki pages have been restructured. A discussion page on raw data storage was created, as well as an ICD summary table. The GBOG proposal table is now sortable. There is also a projects lookup table. We got no news about the "calibration category" for ESO proposals and contacts between T. Prusti and ESO executive. There are currently 4 proposals running at ESO for CU3, CU4, CU5, CU8 + several non-DPAC proposals within CU8. The aims of the meeting are, as usual, to report on the activities of each CU about on-going programmes, new proposals, long term plan and communication, to have discussions on these topics, as well as on data policy, storage and future documents, and to agree on actions. A new discussion topic is about the role of GBOG during the mission in relation with alerts and their verification.

3 CU reports

3.1 CU1 report by E. Joliet

It has been decided to include the cross matching of auxiliary catalogues directly into the application to ingest the data into MDB as part of the ingestion process. The web tool developped and deployed at DPCE (ESAC, Madrid) is still active and public (http://gaia.esac.esa.int/igslxm/igsl/). The aux tables will keep their own internal id to ensure that they use their own cross match and numbering scheme for internal processes purposes. The MDBExtractIngest application (CU1 tool) has been extended and can now take optional argument to let the ingestion cross match the catalogue with IGSL through user-defined properties such as database definition, coordinates name, id xm column name, radius of search,etc. The tool needs to have access to the IGSL database and the input is the auxiliary catalogue class datamodel defined by his ICD. It fills in the idxm data with the result of the cross match and ingest the data into the destination database (MDB i.e.). The other action taken from CU1 was to plan to allocate and estimate the amount of data coming from auxiliary catalogues. It has been discussed among GBOG representatives on the role of CU9 as the centralized and delivery entity of such data. The storage estimation is 3 TB and will be included in DPCE storage plan for coming years. This value needs to be

updated to fix the prevision plan for the next years. Again, GBOG guesses that CU9 will be involved in such task. Finally, CU1 actions were done on the GBOG wiki improvements: sort tables have been created and tidied up.

3.2 CU3 report by M. Altmann

There are 5 programmes within CU3 dealing with earth bound data, the EPC creation, the GBOT, the QSO catalogue, the IGSL compilation and the ICRF alignment programme.

The EPC programme has had mixed fortunes in recent times. On the positive side, the multipassband ($BVRI$) imaging of the SEP field could be completed in January 2009 with the acquisition of excellent data. These data are currently being reduced. In order to really complete the imaging of the SEP-field we have additionally applied for NOAO-CTIO-Mosaic2 time to observe the U-band, which is far more efficient than using WFI. In mid 2008 a spectroscopic proposal for FLAMES-GIRAFFE+UVES at Paranal was accepted as priority C, unfortunately due to the heavy pressure on this telescope/instrument no data were collected. This proposal was replaced, the outcome of which is still pending. The next proposals to be submitted are the third epoch NEP proposal due in September/October 2009 and the WFI second epoch proposal for the SEP in August 2010. Overall the EPC programme is on track.

The preparation of the GBOT has continued with additional observational testing, taking place throughout the year 2009. Additionally we have begun to start with software development and also initiated the contact making. One of the main problems is the unknown and uncertain brightness of Gaia. Within the GBOT group it has been agreed to make a telecon once a month to foster collaboration. With still many problems to solve the GBOT effort is also advancing on time.

The QSO catalogue compilation has now found about 100000 QSO in available optical catalogues. Current efforts are to measure proper photometric redshifts, which has delivered first results, but many issues are still to be solved. Another topic is the morphology of the mostly bright host galaxies, and the change of the barycentre of light as the QSO varies in brightness. A project to study the astrometric and photometric variabilities of a sample of bright QSOs is underway using WFI at ESO-La Silla.

The programme aiming at aligning Gaia to the ICRF studies Radiosources (mostly QSO) with VLBI. So far 450 sources were studied, about 10% of the ICRF sources only are actually suitable. Fainter sources will be added to the catalogue. The VLBI measurements are proceeding as planned.

Finally the IGSL project, which aims at compiling a complete snapshot of all data available for each object to be observed with Gaia, has released a first version, with the second version being due in November 2009. The main problem still is the crossidentification of objects on several

catalogues, or later on between the ground based data collected here and Gaia. Overall, this project is proceeding well.

3.3 CU4 report by P. Bendjoya

CU4-GBOG activities are the following :

1) Surface brightness assymetries in Mira variables and supergiants: A threat to accurate Gaia parallaxes ?
PI A. Jorissen (Université libre de Bruxelles, Belgium)
aim: detection of photospheric spots on star surfaces and their influence on photocenter shift for micro arcsecond astrometry
instrument: VLTI VISA+AMBER
status: P83 done 3 nights on belgium guaranted time, P84 new proposal submitted

2) Spectroscopic observations of asteroids as a support to the Gaia mission
PI: P. Tanga
aim : sample taxonomic population of main belt asteroids in order to generate gaia-like spectra for automatic classification strategy.
instrument: TNG-Dolores
status: 2 nights observed in October 2008 , data reduced..

3) Ground-based observations for Gaia's calibration: high angular resolution imaging of selected main-belt asteroids
PI: P. Tanga
aim: calibration of offset photocentre/center of mass and calibration of Gaia algorithms for size, shape, mass determination.
instrument: VLT- NACO
status: proposal submitted for P84

3.4 CU5 report by E. Pancino

E. Pancino presented the status of observations for CU5. Her presentation was devoted to DU13 since the science alerts observations of DU17 were presented by G. Gilmore. Main news on the management front are that DU13 now reached the 5 MM/yr manpower, although at least 1.5 MM in the past year were provided by Ph.D. and Master students. For the observations, with the addition of the NTT and with some much better weather, we are now roughly at 50% of the total needed observing time, and we expect to finish observations around 2012 or so. For the data reductions, protocols are being finalized and the Instrument Familiarization Plan (CCD linearity,

shutter times, calibration frames stability and quality control, second order contamination and so no) is proceeding smoothly. Those tests are also producing all the calibration frames needed for a massive data reduction. With the full manpower now available, we are trying to reach a level in which data reductions proceed in a routine mode within the end of 2009 - beginning of 2010.

3.5 CU6 report by C. Soubiran

The final list of radial velocity standard star candidates is now completed. It includes 1420 stars. The starting point was given by $\sim$ 42000 F5-G-K stars extracted from HIP with V$\geq$6 and Grvs$<$10 rejecting double and variable stars. These stars have been checked for their neighbourhood (to avoid deblending RVS spectra) within the astrometric catalogue USNO-B1 (r $>$ 80" for Δm $<$5); 20% stars were rejected because of neighbours. Objects from the conjugate field which may affect the Gaia standards on a particular visit have not been considered.. Then the intersection with RV lists (Nidever, Nordstrom, Famaey, UAI-std), keeping only stars with at least 3 RV-measurements and adjusted by hand gave the final list. Observations of asteroids and the first part of stars will continue until 2011, then follow-up of stars will be organized during the mission. Each semester we have 2 nights on NARVAL, 5 nights on SOPHIE, 1.5 nights on CORALIE (South) with a good support of French TACs (national funding) and Geneva Observatory. Gérard Jasniewicz goes to Chile; there are 3 volunteers for OHP and NARVAL is in service mode. The reduction pipeline for measuring radial velocities by cross-correlation from NARVAL spectra was written by G. Jasniewicz; on-line reduction is available for the others. Spectra, RVs and other APs are put in CU6-CU8 database maintained by Lionel Veltz at AIP (Germany) : 4800 spectra are currently available. On SOPHIE we had 5 runs from 2006B to 2009A, corresponding to 25 nights, 712 targets, 159 asteroids, 35 spectra/night. On NARVAL we got 3 runs from 2007B to 2008B corresponding to 6 nights, 113 targets, 42 asteroids, 26 spectra/night (low rate explained by the slow rotation of the dome + bad wheather). The 2009A run on-going in service mode. On CORALIE we got 2 runs in 2008A and 2008B corresponding 3 nights, 179 targets, 7 asteroids, 62 spectra/night (high rate due to the automated telescope). The 2009A run is scheduled in May. We found 1065 useful measurements for 292 targets in the ELODIE archive. ELODIE archive released recently several thousands of spectra which were not yet public. More than 31000 spectra are now public. The manpower is short for analysis of all these data. Plans for the next runs are to continue the same programme on SOPHIE and CORALIE, but the TBL being slower and NARVAL being more sensitive than SOPHIE and CORALIE, it is optimial for a RV programme at the NEP on fainter stars (submitted for 2009B semester). We have built a list of RV-STD (or test stars) at the NEP : 29 GK stars from Tycho2, with V$<$11.5, 0.85 $<$ B-V $<$ 1.25, where we expect to have a high fraction of stable giants (Bizyaev et al. 2006, Hekker et al. 2006). We plan to get 3 observations until launch to verify the stability of these stars at better than 300 m/s.

3.6 CU7 report by G. Clementini

The collection of observations for CU7 has not started yet. At present we are using existing ground-based/satellite catalogues such as: the Hipparcos, OGLE, HAT, SDSS, WET, etc. catalogues, which were put into the CU7 software system in Geneva, to check the software being developed within CU7. Additional observations of specific groups of variable objects are planned in the future to prepare and complement our knowledge of the Gaia sources, for checking/optimizing the data analysis and calibration of specific algorithms being developed in CU7, and to determine rate of mistakes and biases of our analysis using data of the 6 month solution.

These observations include: (i) photometry of selected Cepheids/RR Lyrae stars to follow period changes and to predict ephemerides valid for the time interval of the Gaia measurements; (ii) observation of very long period Cepheids (P>100 days) which are saturated in the existing databases (e.g. OGLE); (iii) photometry of the ecliptic pole regions; (iv) spectroscopy of LPVs (Miras, Ir variables) in the spectral range of the RVS at resolution around 1000; and (v) photometry of small-period variables that may be detected on a per-ccd photometry or from the knot-points of the Gaia scanning law. These programs will be carried out with the CU7 network of small-medium size telescopes which currently lists more than 20 telescopes, of which 12 are of 1-2 m size. A major issue is to keep these facilities still running for the time Gaia will produce its data-flow, since several of them might be in risk of being shut. To this purpose the entire Gaia/GBOG community should push to maintain in operation the facilities that can be useful for Gaia.

At the last CU7 review meeting it was agreed to use the 1-2m telescopes of the CU7 network for real-time alert verification, to tune the Gaia alert system being set-up within CU5.

3.7 CU8 report by U. Heiter and Y. Frémat

Ground-based observations are needed in CU8 for two purposes: 1) Calibration and testing of the General Stellar Parametrizers (dealing with “normal” stars, GSP-phot using BP/RP data and GSP-spec using RVS data), and 2) Calibration and testing of the Extended Stellar Parametrizer (ESP, dealing with emission line stars, abundance anomalous stars, chromospherically active stars, etc.). This is matched by two GBOG-dedicated work packages (GWP-S-811-20500 : Ground-based observations for GSP, led by U. Heiter and GWP-M-835-01000 : Ground-Based Observations for ESP, led by Y. Frémat). The **GSP**-related work package has obtained high-resolution spectra for benchmark star candidates and is currently waiting for some preparatory tasks to be concluded before applying for further observations – defining calibration data needs, selecting candidate AP reference stars and assessing useful archive data. Relevant documents are UH-001 and CBJ-044. The purpose of **ESP**-related observations is to define and test color indices in the BP/RP and RVS to detect peculiarities and identify extreme stars, and to build templates for artificial networks. A relevant document is CDM-002. The status of CU8 observing programmes since GBOG-M04 is given in Table 1.

Instrument	Telescope	Observatory	Period	PI
Completed				
HARPS	3.6m	ESO	Oct 2007 to Mar 2008	Heiter
FGK-type benchmark star candidates				
NARVAL	TBL	Pic du Midi	Jul/Oct 2008, Apr 2009	Soubiran
calibration stars for ESP				
Executed				
CRIRES	VLT	ESO	P82, 16 of 31 h	Heiter
3 M dwarf benchmark star candidates of 17 requested				
– follow-up proposal submitted for P84 to complete sample				
SARG	TNG	La Palma	summer 2009, 23 h	Heiter
FGK-type benchmark star candidates				
Scheduled				
EFOSC2	NTT	ESO	2-6 Aug 2009	Frémat
calibration stars for ESP				
Submitted or foreseen				
NARVAL	TBL	Pic du Midi	2009-2010	Soubiran
ESP calibration stars and benchmark star candidates				
AFOSC@NOT or EFOSC2@NTT or Dolores@TNG				Heiter
AP reference stars				

TABLE 1: Status of CU8 observing programmes since GBOG-M04.

In CU8, an "Interface Control Document for Gaia observed spectral libraries" has been written, see UH-002. It defines the content of observed spectral libraries produced and validated by CU8, thus concerning only science data (astronomical objects), presumably reduced. Four parameter tables are currently defined using the MDB dictionary tool: StarObserved, GalObserved (point source galaxies), QSOObserved, AsteroidObserved.

4 General discussion

4.1 Data sources for AP reference stars (Mon 10–12)

4.1.1 Private data

Martin A. has collaborated on FEROS data for 2-3 open clusters (IC2391, IC2602, NGC 2451, ...), see Platais et al. (2007, A&A 461, 509). Carlos A. has data for Hyades and Pleiades.

4.1.2 Public data

The question was: how do we make most efficient use of archive data? How do we find appropriate data? One suggestion is to explore VO tools, e.g. VOSpec (`http://www.sciops.esa.int/index.php?project=ESAVO&page=vospec`). They develop rapidly and might be useful by now. Other possible tools/databases:

1. VirGO – the next generation Visual Browser for the ESO Science Archive Facility (`http://archive.eso.org/cms/tools-documentation/visual-archive-browser`). It is a plug-in for the popular open source software Stellarium.
2. GIRAFFE archive – a database of reduced FLAMES spectra (in total 1763 fields) – `http://giraffe-archive.obspm.fr/`
3. MILES database (`http://www.ucm.es/info/Astrof/miles/miles.html`) – check parameter distribution (possible contact: Scott Trager)

(The ASTROVIRTEL project was mentioned, but this has ended in 2003.)

4.2 Data reduction protocols (Mon 10–12)

Protocols of data reduction and analysis performed on all observations should be written by every reducer, in order to be able to reproduce the reduction/analysis steps at a later time if needed and to apply a similar reduction procedure to data from the same instrument. CU5 has started to do this for imaging and spectroscopic data, mainly as a collection of notes on their internal wiki pages (`http://yoda.bo.astro.it/wiki/index.php/Reports_on_Data_Reduction_and_Storage`), and in one TN draft (`http://yoda.bo.astro.it/wiki/images/Tngredu.pdf`). CU3 has imaging data and documenting the reduction process is planned. CU6 and CU8 have mainly spectroscopic data and no reduction protocols yet. Experience from CU5 shows that, although data from most instruments can be reduced according to a standard pipeline, there are always a few exceptional issues for which specific procedures have to be applied (e.g. telluric line correction in case of spectroscopy). These specific issues should be pointed out in the reduction protocol. In the end, this could lead to a publication, i.e. an instrumental (technical) paper.

4.3 On Science alert follow-up

For background cf. talk by G. Gilmore and slide on DU17 activities in CU5 presentation. The GBOG WG will keep an eye on the developments, specifically Elena will try to keep informed about them and give news at the next meeting (Action EP). Caroline will ask in the GST about

publication of science alerts: when will publication start and what about the DPAC policy on follow-up observations (needed for algorithm validation) (Action CS).

4.4 On small- and medium-size telescopes

Restructuring and availability of 2-4m telescopes (cf. talk by G. Gilmore): Action GBOG: Prepare a coordinated input for the review panel at `http://www.strw.leidenuniv.nl/2to4mtelescopes/`

Strategy for 1-2m telescopes is also needed: put pressure on national funding agencies (stress that these telescopes are important for Gaia and give specific reasons). Action: Check which proposals rely heavily on 1-2m tel. (e.g. GBOT, SPSS, ...) and prepare a statement to be sent to national agencies or committees.

This will be based on a Livelink document describing the long-term GBOG plan and reviewing the types of telescopes needed (also during the mission), with input from all CU reps. 2 different sections: 1) our needs, 2) which facilities are available and who is responsible, what is needed to operate them (e.g. funding). Timeline: first draft in June. Action CS and EP to create a document structure and put it on svn ASAP. Action all: fill in this document by end of June.

Opportunities related to the GREAT network were discussed. Next GREAT meeting 19-20 Nov 2009 in Nice.

4.5 GBOG Routine actions

GBOG Routine actions were reviewed (Minutes of M04 and `http://www.rssd.esa.int/wikiSI/index.php?title=GBOG:_Routine_actions`). Update of wiki pages to be done, in particular update of Proposals and Projects tables. Deadline: July 15

Emmanuel will insert the information from the “GBOG observing programmes” section into the table in the “Projects” section and remove the former section.

4.6 Status of ESO proposals

CU5 runs within large programme with EFOSC2 ongoing (see CU5 presentation). CU8 run scheduled for August 2009, plan is to reduce the data from that run as fast as possible and then apply for more time.

4.7 GBOG future documents

1. Document of telescope needs (1-2m + 2-4m)
2. ICD documents - every CU prepares a draft for next meeting (see e.g. CU8 ICD)

4.8 Data policy

4.8.1 Raw data

All raw data should be included in MDB, to be used by DPAC members for any Gaia calibration work.

Policy: Before scientific use of GBOG data, within DPAC, the prospective user must contact the observer and/or PI of the data, which can be found in the respective keywords in the header section of the data file.

This implies that the ICDs for GBOG data must include the parameters “observer” and “PI”, as is the case e.g. in the CU8 ICD.

4.8.2 Reduced data

Data sharing with the community at large will be decided on a case by case basis by the teams that do the work.

Publication in a public data base (probably by CU9) will be discussed on a wiki page and in a final discussion at one of the next meetings.

4.9 Raw data archive

Data storage needs – current status:

CU3	>1 TB
CU4	?
CU5	0.5 TB
CU6	?
CU7	?
CU8	>0.5 TB

Every CU representative has to contribute an estimate (with justification) on the wiki page `http://www.rssd.esa.int/wikiSI/index.php?title=GBOG:Storage`. Emmanuel will remind them.

4.10 Manpower for observations and reductions

Working for Gaia is a problem for non-permanent people (scientists) because the scientific return is low. GBOG data can be used for scientific publications which can be part of, e.g. a PhD thesis. Suggestion: Have a mini-workshop on data reduction at next GBOG meeting, for similar kind of data, to share experience and increase efficiency.

4.11 Content and scope of GBOG meetings

In general, a GBOG meeting is a closed meeting, only GBOG members participate. In addition, persons can be invited who can contribute important information for the discussions.

Agenda, 3 half-days: 1) CU reports, 2) open discussions, 3) closed discussions.

When the GBOG meeting is close to another meeting, 1) and 2) are open for other people who want to listen. They are also always open for other DPAC members (listening) who are located at the meeting place.

4.12 Miscellaneous

We will need a CU9 representative.

4.13 Next meeting

Location: Nice (LOC: Philippe Bendjoya). Date: 17-18 Nov 2009 (in combination with GREAT meeting)

Suggestion to discuss at next meeting: 1 physical GBOG meeting per year + 1 electronic meeting.