Minutes of the fourth GBOG meeting

held in Bologna, Italy on 20-21 October 2008

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approved by:
reference: GAIA-CD-MN-LAB-CS-005
issue: 1
revision: 0
date: 2009-01-14
status: Issued

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Presentations are available on svn (dpacsvn/DPAC/WG/GBOG/meeting/).

1 GBOG news (C. Soubiran)

Summary of actions since previous GBOG meeting in Febuary

ESO LP rejected at P81 was splitted into 2 LPs at P82 : the CU5 one was successful, the CU8 one was rejected. The CU5 one and a shorter version of the CU8 one were submitted at P83.

Coordination : GBOG Proposal Writing Guidelines are published on the Livelink (GAIA-CD-PL-OABO-EP-002)

E. Joliet created the GBOG mailing list gaia-gbog-reps@rssd.esa.int, a svn repository for collaborative editing of documents (dpacsvn/DPAC/WG/GBOG/LivelinkDocuments, /ProposalsArchive, /meeting) and a table of proposal status. The Wiki pages have been improved.

There were 2 actions of communication outside DPAC : a poster presenting the GBOG activities at the annual french meeting in astronomy, and a mention to GBOG in the Prusti's talk at IAUS254.

The GBOG ToR were finally approved bt the DPACE at their seventh meeting (September 2008) after discussions about the limits between calibration and supplementary observations. Two sentences were changed in the Tasks section in order to clearly exclude follow-up observations but giving also a flexible definition of supplementary observations, not to miss opportunities to improve significantly the Gaia final results.

Dissemination of GBOG data

The CU6-CU8 database maintained at AIP by Lionel Veltz is an example of sharing the GBOG data within the DPAC. It already includes $\sim$4300 echelle spectra of $\sim$1900 unique sources and several tables with basic data (identifiers, position, photometry, spectral type,..), observations (telescope, instrument, resolution, date, S/N) and measurements (RV, AP, error, method used, template used..).

The sharing of data within the DPAC implies that these data are described by an Interface Control Document (ICD). Such an ICD is in preparation for the Gaia observed spectral libraries (Thévenin et al, GAIA-C8-SP-OCA-FT-002, in preparation). It defines the various quantities attached to a stellar spectrum, describes the star, the observation and the derived quantities. Another ICD by CU5 is already published in Livelink (Win Evans et al. GAIA-C5-SP-IOA-DWE-009).

New proposals

The VLBI observing program of weak extragalactic radio sources for aligning the ICRF and the future Gaia frame, presented by G. Bourda at the previous GBOG meeting is now part of a CU3 work package (GWP-S-335-15000: Alignment-to-ICRF source list).

A. Jorissen has obtained a run on VLTI(VISA)/AMBER, through the belgian guaranteed time, for the project "Surface brightness asymmetries in Mira variables and supergiants: A threat to accurate Gaia parallaxes?" as a CU4 action related to GWP-M-432: Astrometric Binaries, GWP-M-432-00700: Stellar surface inhomogeneities.

P. Tanga, P. Bendjoya and collaborators have submitted an observing programme (Spectroscopic observations of asteroids as a support to the Gaia space mission) on Dolores@TNG as a CU4 activity. This intrument is also requested by the CU5 group for the BP-RP flux calibration. The 2 groups should coordinate themselves.

C. Allende Prieto, M. Cropper and collaborators have submitted a proposal at IDS@INT related to the flux calibration of RVS spectra (CU6). It was rejected, and finally the applicants will try to use first existing data.

CS was informed about the observing programme "Physical parameters of selected asteroids observed in astrometry, photometry and high angular resolution" submitted on NACO@VLT. Several DPAC members are CoIs and will use the results for their DPAC activity within CU4. However, since the PI is not a DPAC member, and the justification is purely scientific, this proposal cannot be considered as a GBOG one.

ESO

A new category "calibration proposals" appeared in Call for Proposals for P82 (March 2008) but it is restricted to ESO instruments. Up to 3% of all available observing time may be made available for this category.

The ESA-ESO working group presented a report on Galactic Populations, Chemistry and Dynamics. It says in Sect. 7 Recommendations that "*Particular attention has to be paid to the optimisation of synergies between Gaia and ground-based observations, especially with present or potential ESO instruments.*" and then "*(3) ESA-ESO joint initiatives : Calibration of Gaia instruments: ESA and ESO should jointly facilitate observations with ESO telescopes that are required for the calibration of Gaia instruments.*". T. Prusti was at the ESA-ESO meeting in October 2008 where these recommendations were presented. He had the impression that ESO executive (T. de Zeeuw, B. Leibundgut) sees no objection to expand the "calibration category" in order to fulfil the recommendation about Gaia. T. Prusti proposes to send a message to ESO executive and requires an input from the GBOG WG, to be discussed tomorrow. The proposals currently submitted at ESO are : (1) Creating initial calibration fields for GAIA at

the Southern Ecliptic pole - CU3 - M. Altmann - VLT/FLAMES, (2) Establishing the Grid of Spectro-Photometric Standard Stars - CU5 - E. Pancino - NTT/EFOSC2, (3) Spectral energy distributions at low and medium resolution across the HR diagram - CU8 - U. Heiter/Y.Frémat - NTT/EFOSC2, (4) Surface brightness asymmetries in Mira variables and supergiants: A threat to accurate Gaia parallaxes? - CU4 - A. Jorissen - VLTI(VISA)/AMBER (belgian guaranteed time).

Aims of the meeting

The aims of the meeting are to

1. Have a clear overview of all GB observations on-going or planned within the DPAC : title, PI, instrument, WP, status, volume, term, eventual difficulties (manpower, rejected proposal,..), priority,..;
2. Check overlaps between proposals and decide whether coordination is necessary;
3. Give an input to T. Prusti for a message to ESO in the ESA-ESO bilateral frame, related to the calibration proposals;
4. Decide whether other actions towards observatories/authorities would be useful (OPTICON ?);
5. Find solutions to improve the GBOG communication inside and outside DPAC;
6. Define a policy for the use and dissemination of GBOG data;

2 DPAC/DPACE updates (F. Mignard)

Project update

Phase C/D officially began with the signing of the contract between Astrium and ESA in August. Activities and concerns : (1) Radiation test campaigns, (2) Basic angle stability not yet demonstrated, (3) RVS, grating/prism manufacturing slower than desirable, introducing several alternatives but no demonstration of performance, (4) Keeping sub-contracts on track to deliver on time, (5) Production/brazing of the 17 elements of the torus, (6) Spacecraft mass and launch safety constraints in Kourou, (7) Schedule evolution, CDR delayed to mid-2010, but launch unchanged at end 2011.

Progress for CCD delivery satisfactory although production on hold due to bond lifting issue. Mirror manufacturing : Blanks done, CVD broke M3 (one FM; spare to be used), problem now understood, M2-M4 polished. The torus is currently determining the critical path in the schedule; 17 segments to be brazed together in a 3.5 m diameter structure. RP filter meets the specs, BP has problem of sensitivity at blue end of spectrum.

DPAC news

As of 15 Sep 2008, DPAC has ∼390 members corresponding to ∼170 FTE, a difference of 16 members since February (26 in and 10 out). 15 countries are represented (map of geographical distribution on the presentation). Counting the participants to the various CUs, there are 527 participants with a multiple factor of 1.35. There are 275 persons with one membership to CU only, 89 persons with 2 CU memberships, 16 persons with 3 CU memberships, 3 persons with 4 CU membership.

The second meeting of the Steering Committee was held 26 June at ESTEC (PO positions funding, hiring procedures). DPACE had meetings 06 and 07, and 3 telecons on PC and I/F engineer, PO Positions, ITN. The selection of 3 PO positions and contract in progress.

Major releases and achievements up to Sept 2008 : GaiaTools 4.3, MDB Dictionary Tool 4.0, ParamDB 5.1 with Gaia-3, Development H/W has arrived at Cambridge (first major test in IDT/Phot with 1 million stars), AGIS 4.0, Source matching in IDT with 99.996% efficiency, Test of IDT over one day with a sample of 1-billion stars (7h process with 140 GFLOP/s computer), Dec 07: release of Gaia-Simu 3.0 (Universe and Instrument models), Jan 08: GIBIS 3.3 web service deployed at CNES (452 simulations run at CNES from January to April), Feb 08: GOG 2.0 web service deployed at CNES (229 simulations run at CNES from January to April), March 08: Simulation requirement for cycle 5 released, Solar System module in the Gaia simulator, Java Workshop 7 & 8 held (∼20 participants each), Cycle 4 simulated data being produced: 4 TB, May 2008: start of cycle 5.

Significant advances with auxiliary data: SS ephemeris operational in the Java ToolBox, asteroids search tool, QSO initial catalogue delivered (ver. 1.0), IGSL (Initial star list) version 1.0 with 10^9 sources, more reference frame QSOs being observed in VLBI, on-going observation programs on calibration stars. GBOG Terms of Reference approved. DPAC webpages in preparation.

Major Documents Issued : DPAC Risk Management Plan, DPAC Risk Register, DPAC Project Development Plan, Software Engineering Guidelines for DPAC, Radiation Task Force (RTF) TOR, Radiation Recovery Plan, Ground Based Observation for Gaia (GBOG) TOR. For Each CU (or DU) : SDP (S/W development plan), SRS (S/W requirement specs.). In advanced stage of preparation: ICD (Interface Control Document) with the Project. 38 DPAC meetings in 2008.

PO Positions

Basically the PO has been defined in the PIP with five people (1 FTE each) : (1) Project Coordinator head of the PO, (2) System engineer (Develop the overall system architecture for DPAC), (3) Interface engineer (establish and maintain any ICD defining deliveries between DPAC and Gaia Project), (4) Project Scheduler (establish and maintain an overall DPAC schedule and monitor its implementation), (5) Product assurance engineer (maintain the Product Assurance

Plan)

The selection procedure is on-going.

GREAT

GREAT is a joint action between GST and DPAC to help prepare the scientific exploitation of Gaia and maximise the science return. It will bring together the community within or outside Gaia and promote early scientific exchanges (science meetings, grants, publications, databases). GREAT is run by a Steering Committee which is the GST + DPACE (except U. Bastian). Funding (from ESF and EU FP7) is granted by the SC upon evaluation of projects submitted after an open call.

3 EPC updates + 1st year of GBOT (M. Altmann)

3.1 The Ecliptic Pole Catalogues

It is recalled that the motivation of the EP-Catalogues is to have test fields for testing and evaluation of spacecraft and its functions immediately after launch. They will be used to analyse the system efficiency at the faint end (object detection, windowing, incompletness,..). EPs are ideal for a polar (orange slice type) scan law. The SEP includes fields of the outer LMC, a higher star density and several LMC clusters. The NEP includes PN NGC 6543 and galaxy NGC 6552.

Status of SEPC : Successful MPIA 2.2m+WFI proposals (9+9 hrs) for BVRI imaging (PI: Klaus Meisenheimer), observations in Nov. 2007 semi-successful (60% done), observations in Jan. 2009 pending, data reduction for 1st data set essentially complete, photometry requires calibrating with new data. U imaging considered, not WFI but MOSAIC2 (deadline for proposals March 2009). 2nd epoch planned for about winter 2010/11 (WFI, OmegaCam etc.). Reduced R and I data (long & short (10 s) exposures) of ca. 80% of the field (SW corner missing): 450 000 stars with a S/N>4.7 found. Seeing $\sim$1" in all exposures. Currently not calibrated due to lack of calibration data, will be acquired in Jan. 2009! Prominent LMC population visible, RGB, RC, Gal. MS. LMC RC mostly fainter than spectroscopic limit of 17.0 mag.

Status of NEPC : Successful CFHT proposal (4 out of 5 hours). Observations completed, data detrended, further reduction pending. UBVRI observations 1 square degrees field. Additional field offset by 30' to test astrometry (GBOT). 1st epoch already available (2004 by Korean group (Hwang et al.). 3rd epoch in 2010.

High resolution spectroscopy of SEP: Goal is to get HR-Spectroscopy for RV and abundance determination of stars with V$\leq$17 mag for testing the procedures in Gaia initial phase (GIP).

1700 MW stars down to V=17 mag, with LMC contribution 2-4 times higher (see GAIA-C3-SP-ARI-BV-001). ESO Paranal-UT2-FLAMES-GIRAFFE-UVES requested. Gives moderate - high resolution multi object wide field spectrograph, up to 130 objects per shot, 30' diameter circular field, HR and LR grisms, intervals spanning most of the optical range up to 6 objects can be fed into UVES, with higher resolution an a larger spectral range. 1st proposal accepted with priority C in service mode. Observations pending, will be available 04/09. 2nd spectroscopy proposal for the next ESO-deadline (March 2009) aiming at FLAMES/GIRAFFE+UVES with same 2 grism setups (HR21 +LR02). Reductions pending, help required! In the north, no equivalent instrument is available. Other observations? LoResSp, HiResSp of single stars?

3.2 1st Year of GBOT

GBOT=Ground Based Optical Tracking

The highly ambitious aims of the Gaia mission requires very precise knowledge of the satellite's whereabouts! Gravitational deflection of light by planets and especially relativistic refraction. Parallaxes of solar system bodies very sensitive to baseline. Single available tracking station does not suffice! Second tracking station too expensive. Task at hand: Evaluating and organising possible world wide observing campaign of Gaia.

GBOT-Timeline: - 2008: Kickoff, evaluation of methods and feasibility - 2009: testing, contacts to observatories, defining requirements, other preparations, software - 2010: conclusion of tests, selection of participating observing stations, other preps, software - 2011: conclusion of all preparatory activities, test run, launch - 2012-20: operational phase.

Requirement : 10 mas/day. Before 1st AGIS, data will only be precise to 50-100 mas (due to precision limits of available reference catalogues), afterwards calibration to Gaia coordinates. Expected brightness of Gaia remains uncertain and still is under significant debate. WMAP expected to have similar brightness. 1st successful observations of WMAP by Andrei et al. @2.2m La Silla+WFI and by F. Colas, F. Taris, S. Bouquillon et al. @1.06 PdM telescope. Test Observations will continue in 2009 and 2010 to test methods, precision (under different circumstances), etc.

Telescope specifications: Minimal diameter $\sim$1 m, focal length ideally 14+ m, pixel scale 0.2/pix (debatable for some sites! PSF FWHM should be between 3 and 6 pix.). Time stamp precision 0.1 sec. Observatory needs to be able to supply data on a regular base. Ideally robotic or remote controlled telescope or with long term observational program. Telescopes on both hemispheres required. Aim is to get about 3-6 regular contributors and some backups. Recruitment of observatory partners starts 2009.

Open issues : Gaia's brightness, pixel scale, reduction procedures and software, NIR observations? VLBI observations? Full moon observations (L2 is near full moon) ?

4 IGSL description / matching (R. Smart)

The Initial Gaia Source List is a snapshot of the best astrometric information on all celestial objects before Gaia launches. Nominally to a magnitude limit of G=20, however CTE requires a fainter limit of r=24. IGSL includes photometry in two or more all-sky bandpasses and a rudimentary classification.

IGSL 1.0 (Tycho/UCAC/SDSS/QSO/GSC) delivered to ESTEC on 12/2007. 2008 : IGSL cross match tool produced, 11/2008 : Xmatch and IGSL 1.0 Assessment, 05/2009 : Attitude Star Catalog 1.0 to ESTEC, 11/2009 : IGSL 2.0 to ESTEC, 05/2010 Definitive IGSL + ASC subset.

Objectives of IGSL have evolved since 2006. The pre-matching of the numerous auxiliary catalogs will clean and homogenize the auxiliary data and allow us to minimize and investigate mismatches before launch. It will simplify the software development and act as a sanity check during the mission especially First Look. It will provide cross reference material for GAIA uses such as multi band magnitudes and data mining. It will allow transit predictions for the purpose of charge-transfer history tracking, especially early in the mission. Finally a subset of the IGSL will form the Attitude Star Catalog for the IDT.

The problem of cross-matching is mainly related to the typical PSF of the GB instruments the catalogs are based on compared the Gaia PSF. The catalogs have different resolution, epochs (proper motions, variability), passbands. Gaia may resolve two sources (ex in the case of a spectroscopic binary) where IGSL has only one entry.

5 IGSL cross matching (E. Joliet)

A tool for IGSL Cross Matching (IGSL-XM) is developed at ESAC. It is necessary since 10-50 auxiliary catalogs will need to be matched to the IGSL, including 100 to 1000 objects each. IDT uses cross match as well as the Gaia community. For each source, its source id is a combination of healpix id, running number id and component id. For the object numbering scheme see GAIA-C1-MN-IOA-FDA-002-3. IGSL-XM is deployed in new Gaia machine with public access (http://gaia.esac.esa.int/igslxm/igsl/). A Tomcat server delivers Jsp pages. A Submit form is used to set user defined angle units, radius search and reference frame. Nearest source is the search criterion for xm : the algorithm finds the minimum angular distance from IGSL neighbors to the user input source. Output shows sorted results in a table downloadable as a csv or ascii file. Users can get a plot with the distribution of the input sources and view the matched source in Google Sky map and skymap.org. There is still a problem to deal with the fact that there is no magnitude or color checks, no use of proper motion / epoch and coordinate errors.

The tool is in Mantis for bug/request issue tracking. Feedback from users is important. Improvements are planned : XML output as VOTABLE, cross match from the user code directly

using SOAP request, speeding up the user request.

6 Status report of CU4 GB observations (W. Thuillot)

Follow-up network organized in DU 459 is not considered here. There are currently 3 observing programmes related to CU4 activities. It is recalled that CU4 Object processing is made of 3 DUs : NNS Non Single Stars, EO Extended objects and SSO Solar System Objects.

The programme ”Surface brightness assymetries in Mira variables and supergiants: A threat to accurate Gaia parallaxes ?” is submitted by A. Jorissen (Université libre de Bruxelles, Belgium), E. Pasquato (PhD), P. Cruzalbes, S. Sacuto (postdoc) on VLTI-AMBER at P83. 3 nights are requested on the Belgian guaranteed time. The project will continue several years. It is part of WP 700 (stellar surface inhomegeneities, A. Jorissen) in DU 432 (astrometric binaries, J.-L. Halbwachs). The plan is to monitor sample of Long Period Variables and supergiants stars (5 targets) to measure the photocentre shift and time varying luminosity in order to model the effects on astrometry (Pasquatos thesis) and to ensure the accuracy of the Gaia parallaxes.

The programme ”Large survey of the Physical properties of Main-Belt asteroids” is submitted by B. Carry, C. Dumas, S. Lacour, S. Mouret, M. Kasalainen, D. Hestroffer, J. Berthier, P. Tutthil, M. Kppers, T. Fusco on VLT- NACO at P83 as a Large Programme. 17 nights are requested and then N nights in 2 years. 3 members of the DPAC (S. Mouret, D. Hestroffer, J. Berthier) will use the results of this programme in DU 457 Global effects on dynamics, WP 100 Mass determination for a subset of asteroids from gravitational perturbation during close encounters (S. Mouret, D. Hestroffer, F. Mignard) and in DU 458 Physical parameters (A. Cellino) WP 700 (size and shape determination). They will observe a sample of 57 Main Belt asteroids with adaptive optics to determine their physical properties (size, shape, pole orient., mass,..) and the relationship of taxonomic class with density. Modeling of systematic effects (photocentre offset) will contribute to the calibration of Gaia algorithms (size, shape, mass) and will put constraints on initial mass in the code for the determination of masses.

The programme ”Spectroscopic observations of asteroids as a support to the Gaia mission” has been submitted by P. Tanga, Ph. Bendjoya, A. Cellino, M. Delbo on TNG - DOLORES. 5 nights have been obtained (first results in october). It is part of DU 458 (A. Cellino), WP 800 (Proc. RP-BP signal calibration , M. Delbo), WP 900 (Asteroid taxonomy, Ph. Bendjoya who moved from CU8). The need of these observations corresponds to a risk identification: ”GB observation of the blue part of the asteroid spectrum not available or not sufficient” presented at the CU4 meeting in Liege in May 2008. The programme starts with 16 targets (MBA) over a total of 120 asteroids representing 5 to 10 targets by main class. Spectrophotometry from the near UV to the near IR will be obtained in Gaia’s geometric conditions (not at opposition but near quadrature) to build a database of raw spectra in order to test Gaia algorithms for reduction and taxonomy classification.

In the CU4 meeting in Bordeaux, 20-21 november 2008, WT will present the GBOG information to the participants, check the status of the CU4 GB observing programmes and see whether results have been obtained or other programmes are planned. He will insist on the need of coordination for the next proposals and check with the leaders whether there are strong priorities within the observing programmes.

7 Status report of CU5 GB observations (E. Pancino)

WP-513 is still short of 1.5 FTE. A post-doc position has been opened and went void, it will soon be re-opened to start in Jan-Feb 2009. Funds situation is ok, the first ASI-INAF funds are over and new ASI funds for Gaia are arriving as planned.

The Instrument Familiarization Plan has been finalized: almost all the data on CCD lineary, shutter characterization, bad pixel masks, fringing masks, 2nd order contamination have been gathered for all telescopes and instruments, and are under processing.

The observing protocols are being finalized right now, the first one for the Instrument Familiarization Tests is already in Livelink, the second one on photometry and variability is in preparation, and the third one on spectrophotometry is foreseen for 1st quarter 2009.

A summary of the observation status (plots are on the presentation), as of September 2008, has been presented:

- Bad weather wasted 1/3 of the observing time granted up to now;
- Acceptable data have been obtained only on 50% of the granted time;
- Total nights granted up to now: 95 (approx 19 per period);
- An estimate of the completed SPSS is of approximately 15%;
- Relative photometry and absolute photometry are quite advanced ($>$20%);
- Spectroscopy is a bit late, with $<$15% of the SPSS observed;
- Total SPSS (Primary and Secondary): approx 250.

These numbers, based on the first 2 years of observations, are necessarily going to get better with time. ESO observations will start in November this year and only in 2009 we will be observing at full regime with all the foreseen instruments and telescopes.

Data Reduction has started, the reduction protocols are at various stages of completion, with the photometry ones in a more advanced stage than the spectroscopy ones, and the pre-reduction

ones in a more advanced stage than the analysis ones. Semi-automatic pipelines made of IRAF (and other software) scripts are in preparation, some already stored in the Wiki-Bo. The short term variability searches data – for WD near the instability strip – are now being reduced in routine mode.

The Archive and the Database are also progressing. The raw data archive is ready and data are being routinely ingested, while the reduced data archive is under construction.

All the documentation, the archives, the summaries of observation and the internal reports can be found in our Wiki-Bo internal pages at `http://yoda.bo.astro.it/wiki/`. Credentials to access the pages can be obtained from Elena Pancino.

8 Status report of CU6 GB observations (C. Soubiran)

There is only one observing programme in CU6 about the calibration of the radial velocity zero point, the one about the flux calibration of RVS spectra proposed by Allende Prieto et al. being postponed as mentioned above. The aim of the proposal is to define a set of 1000 bright FGK stars ($6 < V < 10$), stable in radial velocity at the 300 m/s level during the mission to set the RV zero-point and to validate a method of RV calibration with asteroids. The preselection of 1500 star candidates has been done from existing catalogues : Famaey et al. (2005), Nidever et al. (2002); Nordstr$\acute{}$om et al. (2004) with rigorous criteria. Asteroids are observed to check the (O-C) radial velocities versus their physical parameters. The observing programme started in 2006 on ELODIE at OHP and continues with 8 nights per semester on SOPHIE at OHP, NARVAL at Pic du Midi, CORALIE at La Silla (Swiss telescope). It gets support from French PNPS and PNG (status of key-programme) + Geneva Observatory and french AS Gaia. Observations should continue until 2010, then a follow-up of the stars will have to be organized during the mission. Observations with NARVAL are organized in coordination with CU8 to define the AP reference stars for GSP and ESP algorithms and build a library of empirical spectra in the RVS range. The observed spectra and related measurements are put in a CU6-CU8 dedicated database maintained by Lionel Veltz at AIP (Germany). At the end (2010) we will have a new catalogue of RV standards and a new method of RV calibration with asteroids, very valuable for other projects. Publications are forseen. Concerning the manpower, there are 6 runs per year and 4 volonteers for observations. The reduction pipeline for NARVAL has been done by G. Jasniewicz, while there is an on-line reduction for the other instruments. We have already $\sim$1000 RV measurements and spectra plus as much useful data retrieved from the on-line ELODIE archive. Preliminary results are shown about variable stars to be disqualified as RV standards and asteroids on which (O-C) are larger than expected but still comply with the requirements.

9 Supplementary observations for CU7 (G. Clementini)

Summary of manpower for CU7-WP732 : Gisella Clementini, Vincenzo Ripepi, Laurent Eyer+1 or 2 PhDs, Thomas Lebzelter, Rene Hudec, Katrien Kolenberg, Szabados Laslo+1or 2 PhDs, Mansur Ibrahimov, Pavel Koubsky for a total of 3.50 FTE.

Needs of the CU7 variability studies : (1) time series photometric/spectroscopic observations, (2) proper time sampling and accuracy (depending on the type of variability: short/long period variability; high/small amplitude variability), (3) dedicated observations properly scheduled in time and coordinate.

Many ground based/satellite observations exist in the form of photometric catalogues (Hipparcos, OGLE, MACHO, EROS, SDSS,..) and spectroscopic catalogues (RAVE, SDSS3, ?Archival data: CORAVEL, CORALIE, ELODIE..). Some of them are already included in the CU7 database. Possibility is under study to include digitized astronomic plates archives covering typically about 50 years.

New observations of groups of variable objects are needed to prepare or complement our knowledge of the Gaia sources, and also for the quality control and calibration of specific algorithms being developed in CU7. A network of small/medium (1-2 m) size telescopes is being put in place. It involves about 12 people, 9/10 sites, 15 telescopes from 8 to 200 cm in size (details in the presentation). Coordination with other CUs is possible.

New observations that may be needed for CU7 include (1) photometry of selected Cepheids/RR Lyrae stars to determine current photometric ephemeris, follow period changes, predict ephemeris valid for the time interval of Gaia measurements, (2) photometry of the regions at the ecliptic poles (VISTA-IR + VST visual observations of SEP already planned starting in 2009, planning of NEP observations in progress), (3) photometric monitoring close to the starting date of Gaia and during mission for checking the data analysis, (4) spectra of LPVs (Miras, Ir variables) in the spectral range of RVS at a resolution around 10000, (5) training data to check the data model, and classification algorithms.

Next CU7 review Meeting will be held in Prague, 12/14 November, with specific discussions on the aspects related to the planning of the data and what subjects can be analysed with limited amount of data, like with the 1.5 year data, on which Supplementary Observations should be engaged for quality checks. It is expected to make in this Meeting a definite planning of the start of CU7 Supplementary Observations.

10 Status report of CU8 GB observations (U. Heiter)

CU8 "Astrophysical Parameters" objectives are (1) classify all Gaia sources assign probabilities for being a single star, binary, galaxy, quasar, asteroid, etc. (2) determine astrophysical parameters (APs) for all sources; for stars these are : Teff, log g, [Fe/H], [α/Fe], interstellar extinction also used by CU6 for RVS data processing.

The purpose of GB observations for CU8 is the calibration and testing of General Stellar Parametrizers (normal stars), GSP-phot and GSP-spec, and of Extended Stellar Parametrizer (emission line stars, abundance anomalous stars, chromospherically active stars,). GB observations consist of high- and low-resolution spectroscopy of stars covering whole parameter space and probing Gaia magnitude range from which AP determination of calibration stars will be performed as well as testing and improving synthetic spectra used as training data for AP algorithms.

There are CU8-GBOG dedicated work packages : GWP-S-811-20500 : Ground-based observations for GSP lead by Ulrike Heiter with input from people within WPs Training data and GSP-spec and GWP-M-835-01000 : Ground Based Observations for ESP lead by Yves Frémat with input from people within WP ESP.

For the WP GB observations for GSP, current activities deal with the denition of calibration data needs and selection of candidate AP reference stars. A technical note Calibration of the GSP algorithms using ground-based observations is on Livelink (U. Heiter, C. Soubiran & A. Korn, GAIA-C8-TN-UAO-UH-001), presenting a list and description of source catalogues for AP reference stars (FGK stars), either from high-resolution spectroscopic studies (bright stars) or open and globular clusters studies (faint stars) or large catalogues of calibrated spectrophotometric studies.

Since GBOG-M03, 2 runs of 4 nights have been done on NARVAL (high-resolution optical spectroscopy) in July and October. It was essentially dedicated to emission line, abundance anomalous and active stars. U. Heiter's programme on benchmark stars obtained 11 hours on HARPS at ESO from Oct 2007 to Mar 2008. There is an ongoing programme of high-resolution IR spectroscopy on CRIRES on VLT for 31 hours at P82 for M dwarfs as benchmark star candidates. A programme of low-resolution optical spectroscopy on EFOSC2@NTT at ESO is submitted for 5 nights at P83 by Y. Frémat on peculiar stars. High- and low-resolution optical spectroscopy is planned by U. Heiter at SARG@TNG on benchmark stars and on AFOSC@NOT for AP reference stars. Continuation of the NARVAL programme on peculiar stars and AP reference stars is submitted.

Interface Control Document for the Gaia observed spectral libraries (GAIA-C8-SP-OCA-FT-00? by F. Thévenin et al.) is to appear on Livelink. It defines format and content of observed spectral libraries produced and validated by CU8 (might be extended to other CUs). Three parameter tables are currently defined using the dictionary tool: StarObserved, GalObserved

(point source galaxies), AsteroidObserved.

Still to be done : define final target lists for AP calibration (field stars, clusters, ecliptic-poles fields + cross-correlate with target lists of CU3, CU5, CU6), search archives for existing data , continue high-res spectroscopy, submit new proposals, e.g. low-res spectroscopy, organize data reduction and analysis, implement calibration in algorithms and simulations.

11 General discussion

11.1 The new proposals

CU4 proposals at NACO and DoLoRes

These proposals – dedicated to parameters determination of asteroids – concern fundamental topics for CU4, but more than anything, those data will be needed to test and train the algorithms that extract the asteroid parameters from Gaia data. However, the PI is not a member of DPAC, even if some COIs are DPAC members. Discussion follows on how to consider these ”hybrid” proposals.

A first conclusion is that at the moment the NACO proposal should be considered as a non-DPAC proposal. To become a DPAC, and thus GBOG, proposal, its main goal should be Gaia processing and probably the PI should be a DPAC member. Still we would like to be informed about this programme to make circulation of information and coordination easier.

François points out that there will be more and more proposals with the Gaia name somewhere. Some of them will have nothing to do with DPAC, but we should be prepared to classify DPAC and non-DPAC proposals promptly.

A second conclusion is that the DoLoRes proposal was clearly presented as a DPAC proposal, even if GBOG was not explicitely mentioned. The team that presented it should be made more aware of GBOG: future proposals should conform to the guidelines and be coordinated through the GBOG. The applicants should contact CU5 (E. Pancino & A. Bragaglia) to check for possible overlaps with the CU5 DoLoRes proposal and coordinate the observations if necessary.

CU4-CU7 Mirae & supergiants proposal

Proposal about surface brightness asimmetries that make parallaxes wrong for Miras and supergiants (PI Jorissen), on VLTI/AMBER Belgium GTO.

Comment by Gisella: if something deals with variables, it should fall under CU7, not CU4. This falls under work package WP 700 within the CU4 package DU 432. It also falls somehow

within CU7 (Thomas Lebzelter) long period variables WP (number 720-0400).

Action => William, as CU4 representative, should warn this team about the CU7 WP dealing with long period variables, and both the observations and the actual tasks of these two WP should be coordinated. In principle (?) they should be coordinated through the respective CU managers.

Conclusion => This proposal is clearly a DPAC proposal, future proposals should conform to the proposal writing guidelines. This is especially true if it becomes an ESO proposal (it is currently on belgian guaranteed time).

Comment: GBOG should watchful with the ESO situation. We should have a census of all the ESO proposals, and a plan of the future proposals, to avoid a ”saturation/oversubscription” of Gaia proposals at ESO. If there is this risk, we should decide priorities.

CU3 proposals on Quasars

- Variability of QSOs (WFI@2.2m);
- Optical to radio QSO centroid quantification (WFI@2.2m);
- Host galaxy signature and effects on centroid determination (CFHT DDT).

These are all scientific proposals by Alexander Andrei. He is also the manager of the WP *”Auxiliary data: intitial QSO catalogue”* number 335-13000. It is not clear whether the ground-based observations are part of the WP. The proposals are already accepted and ongoing, they do not mention Gaia processing explicitly, but they mention Gaia somehow. They are important to Gaia processing, of course, but not fundamental (Gaia goes on also without those). It is worth mentioning that there is a QSO WP in CU2 (spectral library) and in CU8 (classifier).

Conclusion => the main goal of these proposals is science, so they are non-DPAC. However, they can also be useful for Gaia processing. Therefore, if future proposals become necessary for the Gaia processing, they will be considered DPAC proposals, and they should conform to the guidelines. We would like to have information on these project anyway, to facilitate exchange of information within GBOG/DPAC.

11.2 GBOG role

Note 1 => GBOG should be informed of all proposals that involve DPAC members, whether they are strictly related to Gaia processing, or Gaia science related or hybrid. Coordinating means first to be informed. This should happen through the CU representatives. We should write a message to the DPAC.

Note 2 => CU representatives (based on discussions with CU managers and proposers) decide if CU proposals should be considered DPAC or non-DPAC. If they are DPAC, they should conform to the guidelines and the PI should be a DPAC member. Exceptions are possible. Non-DPAC proposals will be put on a special list.

Action => Caroline will prepare a mail containing the above concepts and send it to the DPAC (Done).

See Section 11.7 for a checklist of the tasks of the CU representatives.

11.3 Ground based data policy

Raw data

The guidelines already contain a reccommendation about proprietary period (renounced or made as short as possible). Most observatories have raw data archives and even prereduced data archives, we should link our proposals to those archives.

For observatory that do not have archives, we should maintain our own internal archives (CU3, CU5 already have such archives). CDs and DVDs deteriorate fast. We should not dedicate too much effort in a public raw data archive, but still, we need Terabytes of disk space.

Action1 => Emmanuel will enquire about the CU1 and main databases to see if there is any possibility or plan to store the raw data as well.

Action2 => CU representatives should make a census of the data that come from observatories without an archive system and provide amount of data estimates.

François: do we need to develop a server with an interface? Probably not. Probably storage and access to ftp will be enough.

Caroline: we should also consider the risk management side of it. If we discover in the future that we have to reprocess everything, we do not want to get crazy in the public archives to retrieve the data. Maybe we want to keep the raw data (and maybe some intermediate steps, see below) to avoid loosing too much time.

Reduced data, use within DPAC and for Gaia

Existiting databases:

- CU3: the need for a DB&A has been mentioned, but at the moment the data are available by asking Martin;

- CU4: not yet. The first data were obtained this month;
- CU5: DB of reduced data under construction (password protected) will contain intermediate data products, and final flux tables;
- CU6-CU8: DB contains reduced spectra, wavecal, catalogues of astrophysical parameters (password protected);
- CU7: contains photometric catalogues available in the literature; in the future will contain also data (probably there will be a password).

All agree on the fact that it should be possible to circulate data; DPAC members should be informed and coordinate with the team that took the data, they should be free to download and use the data for Gaia processing purposes.

Ricky comments that there is no need to discuss publication of Gaia-related issues in scientific journals at this stage, but Ulrike brings the Gaia paper on the filter system as a counter example. Anyway, we all agree that GBOG should facilitate the data circulation and sharing within the DPAC.

Data policy for scientific use of Gaia data, within DPAC

- CU3: everybody involved in the published product should be a co-author, including software scientists. DPAC should be mentioned in the acknowledgement (Angie: we should prepare a standard sentence). Not all data can produce interesting catalogues for scientific journals, data should then be published to the Gaia community (LL document, or similar);
- CU5: Elena: authors of software that is used for a publication, should also be authors of the paper; data used for Gaia, either for science or calibration, should be published to be useful for the community at large. Angie: but we should not wait to publish the data and catalogue before making some scientific work on them;
- CU6: we have to consider that we will produce papers thanks to GBOG data, albeit DPAC members who prepare softwares will not have the same advantage of promoting their Gaia work, and this is not fair; this is a good reason to encourage the sharing of GBOG data within the DPAC.
- CU7: studies for variability are very close to science and should be considered on a case by case basis. We have many young scientists and post-docs that need to published a lot. We should be allowed to publish as soon as possible;
- CU8: Yves: There are two possibilities at my opinion. One possibility would be to follow the rules that CU1 imposed for the software development which are under GNU Lesser General Public License. Another possibility is to use the same policy

than the one adopted by CU2 for the simulations which stipulates that the use of the data in a context other than the one originally specified has to be notified and approved by the team that requested the simulations (in our case, it could be the GBOG team); Andreas Korn: the team that invest efforts on the data should have the right to use them; Carlos: the data should be accessible for everyone in DPAC for Gaia related work. GBOG should be consulted on a case by case for any other use.

Conclusion => majority thinks that GBOG should not be concerned with the data sharing with the community at large. This should be decided on a case by case basis by the teams that do the work. No restriction should be put on the data publication in public journals. Elena only partially agrees, she thinks that the ground based data as well – not only Gaia data – are an enormous resource and that they should be published to the community in a form that can be subsequently used for doing additional science.

11.4 IGSL and ICD

Emmanuel gives more information on what we should do with our auxiliary catalogues. Basically, an ICD should be written.

After some discussion, and after checking the CU5 ICD (already in Livelink GAIA-C5-SP-IOA-DWE-009) and the CU8 ICD (in preparation, GAIA-C8-SP-OCA-FT-002), we conclude that all the auxiliary catalogues that will be somehow used by one of the pipelines will go into the MDB after an ICD is prepared and appropriate DataTypes are created.

Conclusion 1 Each ICD has to include a field called ”source identifier”, which is left blank in the beginning and is later filled by the cross-matching algorithms (CU1). An additional source ID field is needed if one CU needs to use their own cross-match tool instead of the ”official one”. This is especially true when you put your catalogue in the MDB and other CUs need to use your catalogue.

Conclusion 2 There is no need for a GBOG ICD document. Anyway, it would be useful to make a census of the existing ICDs and to link them to the GBOG Wiki.

Action => Emmanuel will create a section/table in the GBOG Wiki to summarize the ICD documents of the various CUs.

11.5 Wiki pages improvement

Description of projects. *Action* => Emmanuel will create the structure of the Wiki table, CU representatives will fill in the missing info. Should contain: CU - WP - responsible person - main project short description - sub-projects short description/title - period start - period end -

instruments (with links to the archives) - link to the description page - link to the proposals table - expected outcome (rv standards, flux tables, catalogues of magnitudes ...)

Proposals table. *Action* => Emmanuel will change the proposals table. All fields will be sortable (telescope and instrument should be into two separate columns). We will use it and report any further needs. Kind of observations would be nice (spectro, photo etc.).

Introduction. (1) The content could be updated; (2) the full text should go to another page, the main page should only list links to the various sections; (3) the main page should still contain a concise description, with ”more” pointing to the separate page.

GBOG members. (1) The actual members stay there; (2) the other contributors go on a separate page, with a link.

Links section. Should be split in the following sections: (1) data (with archives, databases, libraries, etc.); (2) useful links (at the end, containing the GBOG svn links).

Documents. This section should: (1) start with GBOG documents (link to LL); (2) have section on official livelink minutes (LL link) and to related meeting pages; (3) section on posters, publications, outreach = external documents; (4) section on other WG documents, DPACE docs of relevance etc.

11.6 Next meeting

Majority votes for Uppsala, probably at the end of April 2009. Other discarded options were Torino (close to CU2+CU3 joint meeting) in April 2009 and Heidelberg (maybe close to CU8 meeting).

11.7 Actions for CU representatives

The CU representatives should:

- Make brief presentations at their respective plenary meetings: Remind and describe the GBOG role; Remind about the need to inform GBOG and follow guidelines; Decide with CU managers which proposals are DPAC and which not.
- Gather every 6 months approx – mid Feb and mid Aug – all the info on ongoing and planned observing programs and note it on the GBOG Wiki;
- Fill in/update proposal description and proposal tables; at least they should be fully updated one month before every GBOG meeting.
- Decide with CU managers which proposals are DPAC and which are not.