TECHNICAL REVIEW REPORT

Grant Agreement number: 606740

Project Acronym: GENIUS

Project title: GAIA European Network for Improved data User Services

Funding Scheme: SPA.2013.2.1-01 Exploitation of space science and exploration data. Call FP7-SPACE-2013-1

Project starting date: 01/10/2013

Project duration: 42 months

Name of the scientific representative of the project's coordinator and organisation: Dr. Xavier LURI, University of Barcelona, xluri@am.ub.es

Project web site: http://genius-euproject.eu/ http://gaiaverse.eu/

Type of technical review:

☑ Periodic regular/foreseen technical review

☐ Unforeseen Technical Review

Period covered by the technical review report, from ……01/10/2013… to … 30/09/2014..

Date and place of review meeting (if applicable): 16/12/2014, REA, Brussels

Name(s) of expert(s):
- Sébastien DERRIERE

Name of expert drafting the report: Sébastien DERRIERE

☑ Individual report

☐ Consolidated report

Name of the Project Officer: Ines MARIN-MORENO

1. OVERALL ASSESSMENT

a. Executive summary

Comments, in particular highlighting the scientific/technical achievements of the project, its contribution to the State of the Art and its impact:

GENIUS is a pan-European project designed to boost the impact of the ESA Gaia astrometric space mission. Gaia aims at producing the most accurate and complete map of the Milky Way to date. The Gaia satellite was successfully launched in December 2013, clearing the greatest risk for GENIUS. However, the commissioning phase of the satellite took longer than expected, and this will slightly impact GENIUS.
While this report only covers the first 12 months of the project, and it is difficult to predict the final impact of GENIUS, the achievements so far are very promising. One can in particular mention:

- A careful study of scientific use cases and user requirements, and comparison to existing archive requirements documents, ensuring that the identified gaps are properly addressed.
- Fruitful collaboration with DPAC CU9, and coordination with the nano Jasmine team in Japan.
- Improvement of the archive data model and the Main Database Dictionary tool, in order to include new metadata, for example Unified Content Descriptors, used in the Virtual Observatory projects for interoperability.
- Adaptation of the TOPCAT tool to provide direct access to the Gaia database, and to interface to the Cross-match service developped at CDS.
- Production of several simulated catalogues, and definition of validation tests.
- Definition of a client-server architecture for multi-dimensional visualisation, and development of a first prototype of linked views using the SAMP protocol.
- And last but not least, a first version of an outreach web portal.

☐ Excellent progress (the project has fully achieved its objectives and technical goals for the period or has even exceeded expectations).

☑ Good progress (the project has achieved most of its objectives and technical goals for the period with relatively minor deviations).

☐ Acceptable progress (the project has achieved some of its objectives; however, corrective action will be required)

☐ Unsatisfactory progress (the project has failed to achieve critical objectives and/or is not at all on schedule).

b. Overall recommendations (e.g. on overall modifications, corrective actions at WP level, or re-tuning the objectives to optimise the impact or keep up with the State of the Art, or for other reasons, like best use of resources, re-focusing…).

There is at this stage no need for overall modifications. The project was well managed in its first year, and no critical risk threatens its progress. Participants are encouraged to keep the same level of commitment during the next phases.
Caution should be taken for Work Packages having many deliverables at the end of the project (month 42): progress has to be regularly checked, following intermediate milestones and the adopted general cyclic development plan.

2. OBJECTIVES and WORKPLAN

a. Progress towards project objectives: Have the objectives for the period been achieved? In particular, has the project as a whole been making satisfactory progress in relation to the Description of Work (Annex I to the grant agreement)?

[X] Yes	[ ] Partially	[ ] No

Comments

Objectives for the period have been achieved. After one year, the project seems well under way to keep with the original schedule and progress plan. Due to the original strategy of cyclic development (akin to DPAC and CU9), most Work Packages have been planned with a duration 1—42 months, but the progress is of course not continuous for all tasks. No major delay has been identified so far.
Some minor changes to the original work plan described in section 3b did not affect the project significantly.
The detailed description of progress is described in the next section.

b. Progress in individual work packages: Has each work package (WP) been making satisfactory progress in relation to the Description of Work (Annex I of the grant agreement)?

[X] Yes	[ ] Partially	[ ] No

Comments

WP1 - Management, is reported in section 4.

WP2 – Tailoring to the end user community
Tasks 2.2, 2.3 and 2.4 have made progress as planned in the DoW. Most of the work in tasks 2.5 (the living archive) and 2.6 (reprocessing of archive data) is still to be done, but this is consistent with the fact that these can only take place once the development of the archive is sufficiently advanced, and there were no related deliverables due in the first year.

WP3 – Aspects of archive system design
Tasks 3.2 and 3.4, as well as UEDIN contribution to task 3.3 have progressed as described in the DoW. CNRS and CSIC contributions to T3.3, as well as task 3.5 will be activated later, again in compliance with the project plan and not delaying any deliverable.

WP4 – Tools for data exploitation
Task 4.2 on visualization has progressed as planned. Several data mining techniques have been tested (T4.3). And the UBR contribution to customize the TOPCAT tool for Gaia was done (in T4.4). The CSIC contribution start was delayed due to administrative issues which have now been solved, with minor impact on the initial planning to occur in the second year of the project.

WP5 – Tools for data validation and analysis
The definition of validation scenarios and tools (T5.2) is the one that progressed most. The IGSL catalogue is being used in T5.3, to compare with the GUMS catalogue generated by the Besançon model. Preparatory work has been done in T5.4 and 5.5. Work on 5.6 just started because special objects will not be part of the first Gaia releases.

WP6 – Support activities
Several simulated Gaia catalogues have been generated in T6.2 using CSUC computers and the Mare Nostrum supercomputer. Only the initial requirements analysis was done in T6.3, and the bulk of the work will take place in the next two years.

WP7 – Dissemination
Two websites were released: one dedicated to the project description, and a community portal based on Wordpress for dissemination (T7.2 and 7.3).

c. Milestones and deliverables: Have planned milestones and deliverables been achieved for the reporting period?

[X]	[ ]	[ ]
Yes	Partially	No

Comments

The milestones of the first 12 months have been achieved, namely: the plenary kick-off meeting (MS1), the testbed agreement with ESAC and CU9 (MS2), hiring of developers (MS3), the GENIUS portal (MS4 and MS7) and the requirements documents (MS5 and MS6).
Deliverables have also been achieved, but for those documents in common with DPAC, care should be exercised to mention GENIUS in the document (see D3.1 and D6.1).
D5.1 was delayed by 2 months due to the unexpected departure and replacement of a GENIUS Post-Doc in WP5.2.
D4.2 seems sketchy, but as described in the DoW, we understand that the deliverable is the prototype (TOPCAT/STILTS in this case), not the accompanying text.
Deliverables are described in the following table.

DELIVERABLES LIST STATUS			
No.	**Title**	**Suggested Actions (To be Approved/Rejected)**	**Remarks**
1.1	Kick-off meeting (plenary)	approve	
1.2	Semestral report 1	approve	
1.3	Semestral report 2	approve	
2.1	Requirements specification for catalogue and data archive	approve	
2.2	Requirements specification for outreach facilities built into the archive system	approve	In same document as 2.1
3.1	GENIUS/ESAC–SAT Co-ordination and Interface Control document	approve	No mention of GENIUS
4.1	Requirement specification document for the exploitation tools	approve	
4.2	Delivery of first prototype of exploitation tools	approve	sketchy
5.1	Delivery of prototype of internal checking tools (WP 520)	approve	
6.1	Delivery of first simulated catalogue data	approve	No mention of GENIUS
6.2	Deployment of first public science alerts prototype	approve	
7.1	Basic setup for the community portal internally available for working	approve	
7.2	First public version of the community portal	approve	

d. Relevance of the objectives in the coming periods: Are the objectives for the coming period(s) i) still relevant and ii) still achievable within the time and resources available to the project?

i

[X]	[ ]	[ ]
Yes	Partially	No

ii

X		
Yes	Partially	No

Comments

The objectives of the project are more relevant than ever. Gaia is now sending data, which is processed by DPAC, and catalogues will be produced on a regular basis (even if the planning was revised due to the extended commissioning period), starting now at launch+31 months for the first release (June 2016, 9 month later than previously planned).
GENIUS objectives should improve usability of Gaia catalogue data.
Even with the delay in the catalogue release (properly assessed in the risk management of the DoW), objectives can still be achieved within the time and resources devoted to the project.

3. RESOURCES

a. Assessment of the use of resources : To the best of your estimate, have resources used, i.e. personnel resources and other major cost items, been (i) utilised for achieving the progress, (ii) in a manner consistent with the principle of economy, efficiency and effectiveness[1]. Note that both aspects (i) and (ii) have to be covered in the answer.

i

X		
Yes	Partially	No

ii

X		
Yes	Partially	No

Comments

As far as can be seen from the reports, deliverables and presentations at the review meeting, the various GENIUS beneficiaries made good use of the resources : sufficient support was provided in terms of contributed staff, and the hired staff was effectively working as planned for the project where needed, and as announced in the DoW.
Care was exercised in the recruitment process to select quality candidates.
The resources spent seem fair, efficient and effective. No undue expense was identified.

b. Deviations: If applicable, please comment on large deviations with respect to the planned resources.

1

The principles of economy, efficiency and effectiveness: refers to the standard of "good housekeeping" in spending public money effectively. Economy can be understood as minimising the costs of resources used for an activity (input), having regard to the appropriate quality and can be linked to efficiency, which is the relationship between the outputs and the resources used to produce them. Effectiveness is concerned with measuring the extent to which the objectives have been achieved and the relationship between the intended impact and the actual impact of an activity. Cost effectiveness means the relationship between project costs and outcomes, expressed as costs per unit of outcome achieved. Guide to Financial Issues, Version 30/06/2010p.37.

Comments

No large deviation with respect to planned resources was identified.
Minor changes have been well handled:

- Internal administrative problems in one of the partners, CSIS caused a delay in the availability of funds, therefore delaying the hiring of staff. The planning for this partner has been revised accordingly.
- The database used for the main archive at ESAC has changed from proprietary software to free open source (PostgreSQL). As a consequence, the budget planned for buying the software licence and formation will be re-allocated to improve the hardware used for data mining activities.

4. IMPLEMENTATION OF THE PROJECT

a. Management: Has the project management been performed as required?

[X] Yes	[ ] Partially	[ ] No

Comments

The project management was performed very satisfactorily in the first year. The fact that most of the management is performed by a single partner (U. Barcelona) proved efficient, and hiring a part-time project manager (Lola Balaguer) allowed to complete activities as planned.
The first six months of the project were devoted to advertising positions, coordinating with Gaia DPAC/CU9, organising the kick-off meeting and hiring personnel.
The kick-off meeting saw participation of all 13 nodes.
A Twiki was developed for internal information management, and is used accordingly.
The rules for managing the different nodes, as well as the integration of GENIUS activities with the overall Gaia/DPAC effort have been defined. The fact that X. Luri, project coordinator for GENIUS is also manager of the CU9 facilitates this integration.
A reporting is done every three months to the Project Officer, and project reports are done every six months.
An External Advisory Board was also recently formed, but its work will begin in early 2015 only.

b. Collaboration between beneficiaries: Has the collaboration between the beneficiaries been effective?

[X] Yes	[ ] Partially	[ ] No

Comments

The collaboration between the beneficiaries was effective. A good infrastructure has been setup, with a project Twiki where all activities can be published and edited by the project partners, and access to the Subversion code revision management system for sharing code and documents with versionning.
There were two important meetings : the kick-off meeting (2013 December 4-5), and a joint CU9-GENIUS meeting in Vienna (7-8 July 2014). In addition, monthly telecons are organized.
In order to improve collaboration, a Webex licence for teleconferences and conference microphones have been purchased. They allow enhanced communication between the beneficiaries, with about 15 teleconferences organized so far. This and the policy of favouring many shorter trips rather than few long trips also impact positively the work-life balance, and the gender issue.

c. Beneficiaries' roles: Do you identify evidence of underperforming beneficiaries, lack of commitment or change of interest of any beneficiaries?

[ ]	[ ]	[X]
Yes	Partially	No

Comments

There were no underperforming beneficiaries in this period. The actual effort of some beneficiaries (CSIC, UNIGE, FFCUL) in the first year is low compared to their expected total effort over the full length of the project, but this is consistent with the project schedule with activities to take place later.

5. USE AND DISSEMINATION OF FOREGROUND

a. Impact: Is there evidence that the project has/will produce significant scientific, technical, commercial, social, or environmental impacts (where applicable)?

[X]	[ ]	[ ]	[ ]
Yes	Partially	No	Not applicable

Comments

The project will definitively produce a significant scientific impact. The main risk was a failure at launch of the Gaia satellite, which fortunately did not happen.
Gaia will produce an extremely precise catalogue, over a billion objects, with unprecedented positional accuracy on positions and motion, spectroscopy, etc. But GENIUS will develop exploration and visualization tools that will allow the full scientific exploitation of this catalogue.
In addition, the GENIUS project will reinforce the strength of european research through improved scientific collaboration between all the beneficiaries.
The social impact of GENIUS will be first through outreach, giving the public access to an unprecedented view in six dimensions of our stellar neighbourhood, our Galaxy and beyond. But the alerts system being developed should also detect Solar System objects, including potential hazardous Near-Earth objects.

a.1. Is there an impact on participating Small and Medium Enterprises (SMEs)?

[ ]	[ ]	[ ]	[X]
Yes	Partially	No	Not applicable

Comments

a.2. Is there an exploitation potential for the participating SMEs?

[ ]	[ ]	[ ]	[X]
Yes	Partially	No	Not applicable

Comments

b. Use of results: Is the plan for the use of foreground, including any update, appropriate? Namely, please comment on the plan for the exploitation and use of foreground for the consortium as a whole, or for individual beneficiary or groups of beneficiaries and its progress to date.

[X]	[ ]	[ ]
Yes	Partially	No

Comments

Results produced by GENIUS will benefit the European astronomical community, and beyond. The tools and method developed will enable optimal use of the Gaia catalogue, enabling many scientific discoveries and publications, and feedback to the public through outreach.
The improved version of TOPCAT, with extended TAP support and access to the CDS Xmatch service, is already widely used in the community, and facilitates the interaction with other VO tools.
Other developments made in GENIUS will benefit other large astronomical missions, and possibly other disciplines where management of large and complex datasets is needed, for example applications of :

- virtual machines
- advanced statistics and model/data comparison
- multi-dimensional visualization
- improvement of VO protocols

c. Dissemination: Have the beneficiaries disseminated project results and information adequately (publications, conferences…)?

☐	☒	☐
Yes	Partially	No

Comments

So far, the project has considered dissemination mainly through web pages and the development of a public portal, in coordination with other Gaia-related websites.
GENIUS members should consider including publications acknowledging GENIUS in their future reports as part of the dissemination effort.
Also, contributions to several conferences or specialized reviews could be considered for publishing GENIUS-related results (ADASS, Astroinformatics, Astronomy & Computing, …).

d. Please identify potential information that should be disseminated to:

- Policy makers

None

- The scientific community

Advertising new prototypes developed in the project (data mining, visualization, tools, portals...) as they become available. This would allow to have testers outside the project and get early feedback from the community.

- The general public

Without replicating Gaia-related information available elsewhere in the public portal, GENIUS results should be shared as they become publicly available (images or animations with relevant caption for example).

- A specific group of end users

Teachers can be a dedicated target for outreach, as they are often eager to find practical exercises or applications that can be shown or experimented in the classroom. The European AIDA project developed some tutorials in its WP5, and many teachers use them.

e. Involvement of potential users and stakeholders: Are potential users and other stakeholders (outside the consortium) suitably involved (if applicable)?

☐	☐	☐	☒
Yes	Partially	No	Not applicable

Comments

Most aspects have been covered in previous items.

f. Links with other projects and/or programmes: Is the consortium interacting in a satisfactory manner with other related Framework Programme projects and/or other R&D national/international programmes, standardisation bodies (if relevant), existing relevant networks?

☐	☒	☐
Yes	Partially	No

Comments

GENIUS is interacting very efficiently with DPAC and CU9, with partners involved in VO projects, and with Japan for the nano Jasmine project, which is very good. A few additional interactions could be relevant : • For T2.4, which deals with cross-matching, contacting the ARCHES FP7 project could be relevant, as they developed a multi-catalogue probabilistic cross-match system. • For T2.5, about living archives, contacting existing centres like CADC which is providing on-line access to the growing HST archive could allow sharing expertise.

6. OTHER ISSUES

If applicable comment on whether other relevant issues (e.g ethical, policy-related/regulatory, safety and gender issues) have been handled appropriately.

Yes	Partially	No
X		

Comments

There are no real issues related to ethics or safety in the GENIUS project.
On gender issues, one can note that this aspect was carefully studied, both when hiring participants, and in the project management, trying to avoid excessive travels, and favouring teleconferences and short trips for collaborating, therefore preserving a good work-life balance. Parity was not achieved, with a 28% female staff in the newly hired personnel, but this is still a significant progress over the 16% female staff reported by IAU for computer-science projects.

7. FLAG THE PROJECT

- ☐ Highlight as a success/case story
- ☒ High visibility/media attractive project
- ☐ Substantial R&D breakthrough character
- ☒ Project linked to R&D national/international programmes
- ☐ Project with an impact on EU policies (click on which EU policy: http://ec.europa.eu/policies/index_fr.htm)
- ☐ Project with an impact on promoting Joint Programming (especially for ERA-NET)
- ☐ Outstanding Use/Exploitation of results
- ☐ Significant R&D participation from outside EU
- ☐ Involvement of non-RTD actors in the field (economic, policy makers, civil society, end-users, standardisation bodies…)
- ☒ Good innovation potential
- ☐ No Flag
- ☐ Other

Comments

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Date: 14/01/2015
Signature(s):