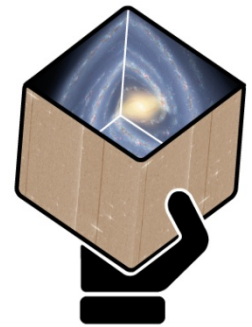


GENIUS Final Report for WP2



gaia



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WP2: Tailoring to the end user community

- Gaia will provide an unprecedented stereoscopic map of our Milky Way and the nearby universe
 - >1 billion stars, 350000 solar system objects, 500000 quasars, 1–10 million galaxies, tens of thousands of exoplanets
 - For nominal 5-year mission catalogue and archive ‘finished’ in ~2022
- Will be key astronomical archive for decades to come
 - Tremendous discovery potential when combined with other archives

WP2: Tailoring to the end user community

- Research and invest effort in:
 - Taking into account user requirements (T2.2)
 - Confronting complex models with a complex catalogue (T2.3)
 - explore the 'bring processing to the data' concept
 - Seamless inter-operation with other data archives, in particular across wavelength domains (T2.4)
 - Can we facilitate future reprocessing? (T2.5)
 - Requirements on preservation of raw data, calibration data, and processing software
 - Explore concept of 'living archive' (T2.6)

GENIUS WP2 contributors

- Leiden: T2.1 (Brown), T2.2/2.5/2.6 (Costigan), T2.3 (Hypki), T2.2 (Massari)
 - I UCAM: T2.2 (Lead: Walton)
 - I KU: T2.2 (Lead: Yamada)
 - I FFCUL: T2.2 (Lead: Moitinho)
 - I INAF: T2.4 (Leads: Smart, Marrese)
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- ◆ Technical coordination was done through the regular coordination mechanisms in CU9
 - ◆ Costigan/Hypki interfaced to astronomical community by participation in conferences/workshops
 - Presentation of GENIUS and its goals
 - Ask Gaia catalogue users about their requirements

T2.2 Requirements Gathering

- UL/UCAM contribution
 - Organized the beta-testing of the archive for Gaia DR1
 - Science alerts requirements analysis
 - Requirement for outreach facilities in archive system
 - Supported GAVIP developments
 - Input received through <http://great.ast.cam.ac.uk/Greatwiki/GaiaDataAccess> used in assessing usage scenarios, ranking these and checking Gaia archive performance against the requirements
- KU contribution
 - Academic outreach for Gaia in Japan
 - Support for the development of the Gaia archive mirror in Japan (<http://jvo.nao.ac.jp/portal/gaia.do>)
- FFCUL contribution
 - Requirements for Gaia DR1 archive visualization services

T2.2 Requirements Gathering: Conclusions

- Requirements analysis and updates uncovered no major missing user requirements
 - Will continue to keep an eye on development of user requirements for future releases, e.g., through interaction with users at the various Gaia data workshops
 - Beta-testing got going a bit late for Gaia DR1, but infrastructure now in place for timely testing of the GaiaDR2 archive and its facilities

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- Consolidated list of user requirements for Gaia archive
- Beta-testing infrastructure in place for future Gaia DRs

T2.3 Confronting complex models with complex catalogues

- UL contribution
 - Proposal for API to interact with Gaia data in sophisticated ways
 - Upload simulations/models to user space
 - Upload code to carry out data analysis or model-catalogue comparison
 - Query archive from within code
 - Save and download results
 - Share data and code with other users
- Implementation proposed to be through thick-server/thin-client approach following REST approach
- Documented in GAIA-C9-TN-LEI-HYP-001/002

T2.3 Confronting complex models with complex catalogues: Conclusions

- This task did not lead to satisfactory results
 - Lack of interaction with other GENIUS WPs, in particular WP3/4
 - Led to vague general requirements from which no real progress can be made
 - Development of concrete prototype would have been a more fruitful approach

Lesson learned

- More effort in WP4 (work on concrete model-catalogue comparison case), followed by derivation of specific requirements on archive would have been better

T2.4 Seamless data retrieval across archives and wavelength domains

- INAF contribution

- Requirements for multi-wavelength cross-match facility
 - Census of catalogues to cross-match against Gaia: radio, sub-mm, infrared, X-ray, γ -ray
 - Developed algorithms for multi-wavelength cross-match
 - Prototyped web interface
- Implementation to be in form of
 - Pre-computed matches to large archives
 - X-match algorithms for x-matching of smaller data sets (millions of objects) from user-provided samples
 - Available through web portal from Gaia-DR3 onward
- Documented in series of tech-notes by Marrese and Fabrizio

T2.4 Seamless data retrieval across archives and wavelength domains: Conclusions

- List of archives to cross-match against Gaia data available
- Clear proposal for the x-match across wavelength domains
- Path to making the service available identified

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- Pre-computed cross-matches with large astronomical catalogues
 - already well-received by community for Gaia DR1
- State-of-the-art cross-match algorithms

T2.5 The living archive

- UL Contribution
 - Investigated ideas and requirements for implementing living archive concept
 - Including survey of existing 'living' archives
 - Documented in GAIA-C9-TN-LEI-GCO-003

T2.5 The living archive: Conclusions

- Critical areas to keep in mind if this idea would be pursued for Gaia archive
 - Restricting scope (no duplication of efforts already existing in other archives)
 - Focus specifically on improving over Gaia-only results
 - Quality control of user-provided data
 - Ease of process to add data

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- Drop this proposal from consideration for Gaia archive functionalities
 - Creating and sharing of user tables is possible
 - VO-space interface also available

T2.6 Re-processing of archived (raw) data

- UL contribution
- All DPAC CU leaders were invited to provide input
 - which data should be preserved as a starting point for re-processing
 - which software (processing and simulation) should be preserved
 - which calibration data should be preserved
- Preservation of documentation also considered

T2.6 Re-processing of archived (raw) data: Conclusions

- Document (GAIA-CU9-TN-LEI-GCO-006) available that summarizes all inputs received
- Will form basis for further work on this topic by DPACE chair and Gaia Mission Manager

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- Good starting point for discussions and implementation of long term Gaia data and software preservation