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The pilot project for the TNG Long-Term Archive

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Abstract. The pilot project aiming at the definition of a long-term archive for the national Galileo telescope (TNG) is described. The scope of the project, its development plan and the current status are reported, with particular reference to the requirements for interoperability with other archives, aimed at the inclusion of the TNG long-term archive in the phase-B of the European Astronomical Virtual Observatory (AVO) project.

Key words. astronomical data bases: miscellaneous

1. Scope

A detailed pilot project is underway, aiming at demonstrating the feasibility of technical solutions for the Long-Term Archive (LTA) of the Telescopio Nazionale Galileo (TNG), within the framework of general electronic archives of astrophysical data, both existing and to be implemented in the future.

The TNG LTA will be implemented separately and at a later stage. To demonstrate its feasibility, the work plan of this pilot project includes the construction of a prototype LTA, and the study and prototype implementation of methods allowing: (1) the long-term storage of scientific and technical data from the TNG; (2) testing practically the feasibility of deriving value-added information from the stored data; (3) guaranteeing access by the CGG staff and by the scientific community to original and derived data; (4) providing tools to support the life cycle of observing proposals; (5) providing interoperability with a number of existing international data enters and archives.

Furthermore, a number of recommendations will be made to guarantee harmonization of the TNG Long-Term Archive with other projects related to archiving of data of astrophysical interest, with particular reference to projects specific to the Italian astronomical community, and to the national and international coordination ef-

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forts towards a multi-wavelength Virtual Astronomical Observatory. A close interaction is ensured with a number of existing national and international projects on advanced data mining tools.

2. Development: plan and status

The development plan of the project and a product tree have been prepared, mapped to the already-described scope. The key points in the development are: (1) the definition of a structure for the prototype LTA, with the identification and selection of a data model, and of a proper hardware/software environment to support it; (2) definition and prototype implementation of tools allowing to populate the LTA and to retrieve data from it; (3) testing of the efficiency over the network, and bandwidth requirements; (4) implementation of additional services (quick-look tools, on-the-fly calibration of science frames, data mining, etc.); (5) implementation of a name resolver and basic interoperability tools.

The current status of the project is reported in the following (see also Smareglia et al. 2000; Pasian et al. 2001).

The data model of the TNG and therefore the data items needed to populate the archive, the data interface between the archives at the telescope (AaT) and the LTA, and the data ingestion tools have been defined and implemented. The database structure has been designed on top of an object-relational database management system (Oracle), and the speedup achievable with an SMP parallel system with shared memory (using the parallel query feature available in Oracle) has been tested.

A user interface (UIF) including visualization and a module for the servicing of user requests (retrieval of telemetry and FITS files) have been designed and are being completed. File retrieval efficiency and network speed are being benchmarked.

Finally, a data mining activity is being carried out on the Technical database with the purpose of finding relations/correlations among housekeeping parameters, through the unsupervised use of neural networks, and performing statistical analysis of the housekeeping parameters giving guiding error on the 3 axes.

As for interoperability with other national and international projects, the use of internationally-defined standards (FITS, ASU, Astrores, VOTable) has been studied and is being pursued; a name resolver using the SIMBAD facility is being installed; CDS tools are being tested on the TNG catalog of observations.

The link with international projects is actively pursued by participation of the TNG LTA group to the Science WG of the AVO (a project, funded by the EU to provide a prototype multi-wavelength virtual astronomical observatory for the scientific community) and to the Interoperability WG of the OPTICON project. This international activity is felt to be particularly important, in view of the possible creation of a national astro-grid for computation and data access, and of the eventual participation of the Italian astrophysical community in the phase-B of the AVO project.

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