

# Asiago astronomical archive: status and features

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## Abstract

We present the new archiving system that is under installation at Asiago Astrophysical Observatory. Its main features comprise fast and reliable distribution capabilities, easy monitoring and access to the archive through a new web-interface.

## Introduction

Geographically distributed archives present challenges when ingesting and delivering large amounts of astronomical data. The main issues are related to remote control and configuration, monitoring and logging anomalous conditions, fault tolerance and error handling. The New Archiving Distributed Infrastructure (**NADIR**) developed and implemented within the Italian Astronomical Archive (**IA2**) project, has shown to be able to overcome successfully these issues. It is currently installed and working at the Large Binocular Telescope Observatory (LBTO) and at Telescopio Nazionale Galileo (TNG). In this work we describe the features of the new archiving system based on NADIR that has been installed at **Asiago Astrophysical Observatory**.

## The IA2 project

IA2 (Italian Astronomical Archive) is a research infrastructure project that aims at co-coordinating different Italian national initiatives to improve the quality of astrophysical data services. The project is supported by INAF.

IA2's main goals are:

- ▶ archiving systems and safety;
- ▶ data curation and preservation;
- ▶ distribution over several sites;
- ▶ data publication in the VO;
- ▶ providing services and tools (TWiki, OwnCloud).



Data to be archived come from:

- ▶ telescopes (LBT, TNG, Asiago);
- ▶ surveys: raw and/or calibrated;
- ▶ simulations: ITVO;
- ▶ EU projects (INDIGO-DataCloud, GENIUS, VIALACTEA, etc.)

## Asiago Astrophysical Observatory

It was founded in 1942 and it is operated jointly by INAF-OAPd and DFA Uni. Pd. It hosts the largest optical telescope in Italy. The data rate is of about 300 GB/year.



Figure: Asiago main station. From Wikipedia.



Figure: Asiago cima Ekar. Courtesy: Lino Contri.

It is spread over two locations:

1. main station (1050 m);
  - ▶ Galilean telescope (122 cm, DFA Uni. Pd)
2. cima Ekar (1366 m);
  - ▶ Copernicus telescope (182 cm, INAF OAPd)
  - ▶ Schmidt telescope (67/92, INAF OAPd)

Used for research and educational purposes.

## NADIR

The New Archiving Distributed Infrastructure (NADIR) is an **archiving software** developed at IA2 in order to overcome issues connected to:

- ▶ data evolution (changes in format, publication policy, metadata content...);
- ▶ software deployment and reusability;
- ▶ software flexibility and configurability;
- ▶ scalability requirements.

NADIR is based on **TANGO** from which it inherits the following points of strength:

- ▶ a TANGO device is an archiving software (metadata and data importer and exporter);
- ▶ device properties are modifiable at any time;
- ▶ reusability of a device for different archiving purposes;
- ▶ configuration database;
- ▶ multi language environment (C++, Java, Python);
- ▶ multi threading environment;
- ▶ high scalability, modularity, robustness;
- ▶ easy error tracking and reliable monitoring tools;
- ▶ hidden complexity of communication between remote servers.



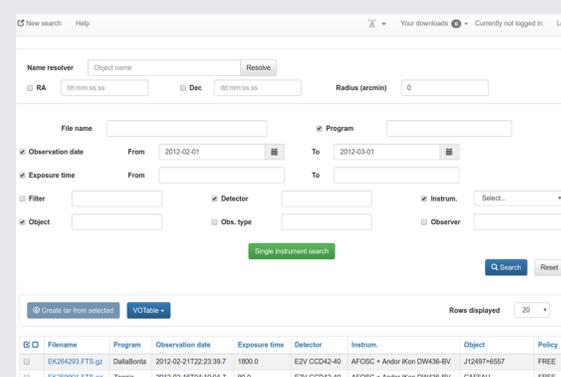
## TANGO Controls

TANGO Controls (<http://www.tango-controls.org>) is a free, open source, device-oriented controls toolkit for managing remotely any kind of hardware or software. Its main features are:

- ▶ distributed control system;
- ▶ object oriented and highly scalable;
- ▶ fundamental brick: the **device**
- ▶ supports bindings to the major languages;
- ▶ customarily used to control physics experiments;
- ▶ communication managed by two network protocols: omniORB (synchronous and asynchronous) and Zeromq (event-driven).



## Web-interface



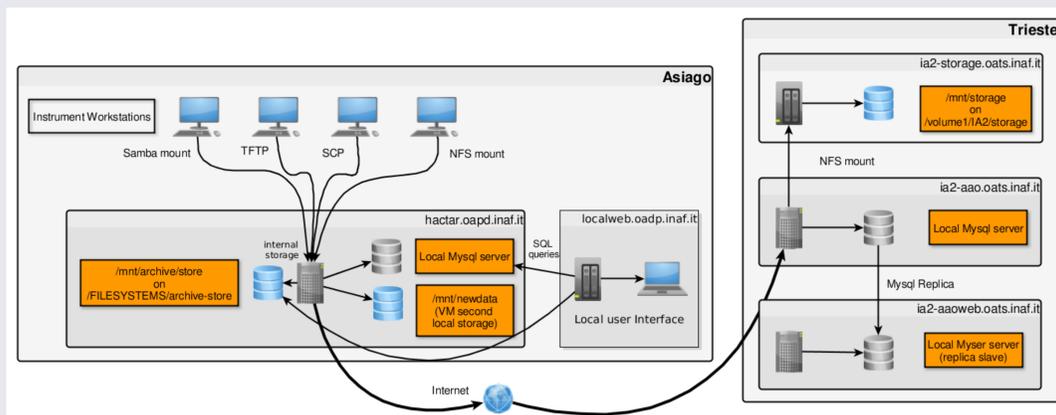
created by APOGEO web-interface generator (see **poster P8.29**);  
▶ access to resources via traditional queries on main instrumental and observing parameters;

- ▶ query result exportable via SAMP protocol to the Virtual Observatory compliant clients (Aladin, Topcat);
- ▶ future user authentication performed by using EduGain (currently managed by the IDEM federation).

## System configuration

In order to speed-up the distribution process, the archiving system planned for Asiago Astrophysical Observatory will consist of:

1. a **temporary archive** (data < three months old) available only from within observatory's LAN → reduce latency issues in case of data retrieval;
2. a **web interface** to access the archive locally in Asiago and publicly in Trieste (compliant with publication policy);
3. a **main archive**, public and hosted in Trieste.



## Conclusions

The archiving system detailed here has been installed and tested at Asiago Astrophysical Observatory. Besides the advantages introduced by the NADIR archiving software in terms of flexibility towards data evolution and easy monitoring of the archiving procedure, the deployment provides also a completely new web interface for accessing the data. While the main public archive will be hosted in Trieste, a temporary archive accessible only from within observatory's LAN will reduce latency issues in case of data retrieval.