



EuroVO-AIDA

Euro-VO Astronomical Infrastructure for Data Access

**D5.2**

-

**First release of educational and outreach tools and material**

Final Version

Grant agreement no: 212104

Combination of Collaborative Projects & Coordination and Support Actions



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## LIST OF PRODUCTS

- 1 Aladin Beta Version 5.915
- 2 Stellarium Version 0.10.2
- 3 VirGO Version 1.4.3
- 4 SimPlay
- 5 Use Cases with information on astronomical objects:
  - 5a - The Celestial Sphere
  - 5b - Stars and the Herzprung-Russel diagram
  - 5c - The Pleiades cluster
  - 5d - Stellar proper motions
  - 5e - Confirmation of a candidate supernova
  - 5f - The Hubble sequence of galaxy morphologies
  - 5g - How far is the Andromeda Galaxy? (in German)
- 6 Electronic feed-back form
- 7 Poster: The Sky
- 8 Leaflet: EuroVO-AIDA Outreach
- 9 WP5 TWiki WebPages  
<http://cds.u-strasbg.fr/twikiAIDA/bin/view/EuroVOAIDA/WP5Outreach>

Products 1 to 8 can be downloaded from:

<http://cds.u-strasbg.fr/twikiAIDA/bin/view/EuroVOAIDA/ListOfProducts>

**NOTES ON THE DEVELOPMENTS OF SOFTWARE TOOLS DRIVEN BY WP5**

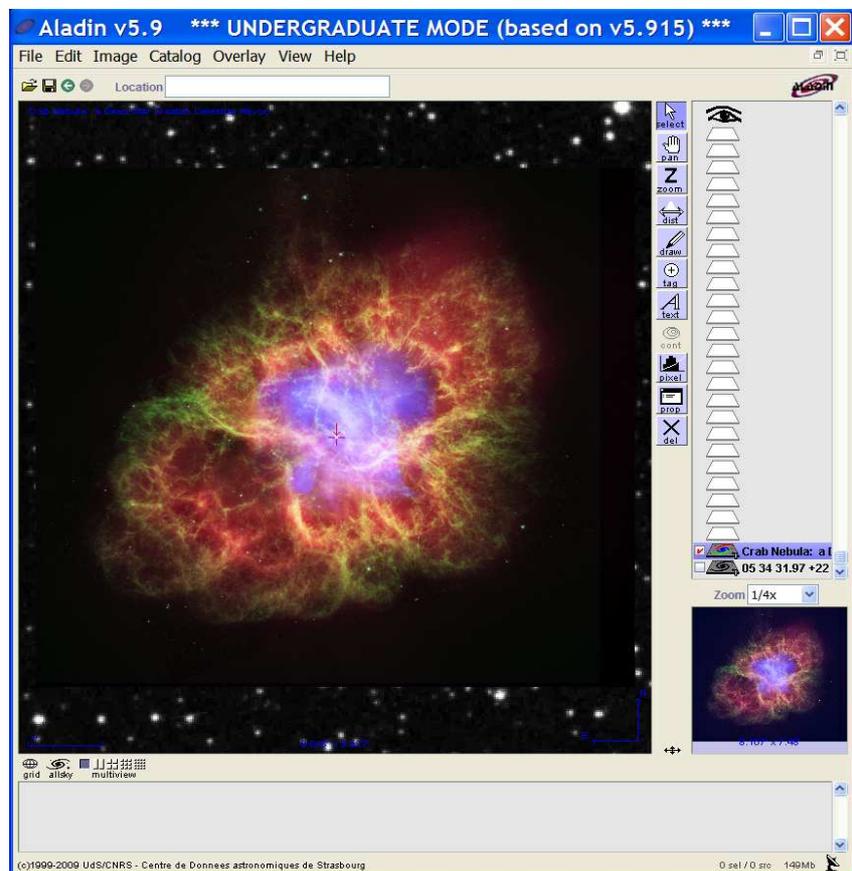
**Aladin**

**Aladin** can now be launched in two special modes added to the original professional mode: undergraduate and preview. In the undergraduate mode, the most important for our project, the choice of images and catalogues has been reduced in order to offer a selection of the most important data without embarrassing the user with too many alternatives or with too sophisticated data. All data are still accessible from the professional version which is offered together with the simplified version. Also the choice of functions activated directly with buttons and switches has been reduced to ease the learning curve required by the software. All these functionalities are still available in undergraduate mode, but they can be selected only via menu.

**Aladin** has been paired with a new Sky Browser that allows navigation of the whole sky, an essential feature for outreach/educational purposes that almost always include the exploration of the sky besides the study of a selected object. It is worth mentioning that the Sky Browser will also be greatly appreciated by professional astronomers.

**Aladin** is now able to read and to write astrometrical calibration information directly inside a JPEG image by using the COMMENT segment of this image format. This new feature leads to the use of the classical JPEG format in outreach mode. Furthermore, Aladin can now understand the new VO emerging standard called AVM used by the outreach astronomical community for describing image context (origin, calibration, etc). Thanks to these developments, Aladin now provides a direct access to the Hubble Press Release images (see Figure 1).

Figure 1  
 HST PR Image of the Crab Nebula displayed with Aladin



**Stellarium/VirGO**

**Stellarium/VirGO**, already satisfying our WP5 basic requirements, gained a new redesigned GUI based on Qt 4.5 for easier use of the software and solve of some bugs. There is now a recoded Digital Sky Survey background display feature that greatly improves speed and that, in the case of VirGO, uses multi-resolution color JPEG images.

**Stellarium/VirGO** now features a display of hour angle for any selected object and of absolute magnitude for bright stars, and allows screenshots in reversed colours (for easier/faster /cheaper printing). In Figure 2 we display a screenshot of Stellarium.

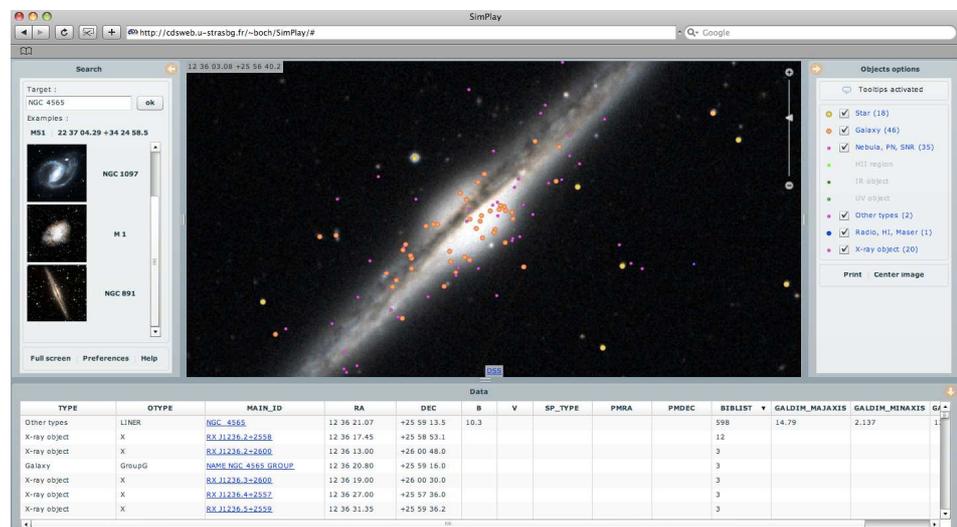


Figure 2  
 A view of the night sky from Stellarium

**SimPlay**

**SimPlay** is a new quick viewer of objects available in the SIMBAD astronomical database (SIMBAD is also an essential database for Aladin). It complements the other software tools since it offers the possibility of a very fast display of images of astronomical objects with superimposed graphic markers at the position of objects of predefined categories (stars, galaxies, X-ray sources, etc.). In Figure 3 we display a screenshot of SimPlay.

Figure 3  
 A screenshot of the quick viewer SimPlay



**All software tools** are documented with new and more extensive guides than in their initial professional versions. The interfaces have been translated, among other languages, in English, French, German, and Italian. The documentation is always in English and often in other languages.

## **THE DEVELOPMENT OF D5.2**

### **Introduction**

We briefly remind the key point of our project plan: we want to provide tools for access to VO data for a non-professional public and, in particular, for students and teachers. The idea is to "adapt" tools already in use among professional astronomers with the following two general requirements: on the one hand to maintain the sense of wonder and the excitement of accessing top-level information that humans have been able to gather by observing the sky, on the other to ease the steep learning curve that the original tools for professional astronomers require.

We also recognize the importance to provide some basic information on the main classes of objects whose data will be searched by our public within the Euro-VO database. We will produce part of such information and we will contact various international projects for the diffusion of astronomy in order to discuss inclusion of (part of) their knowledge base within our outreach interfaces. Finally, we plan to negotiate with various agencies the use of their PR images in order to add appeal to our interfaces also for widest public.

Our first release has been D5.1 "User requirement for the outreach activity". The most important products in our first deliverable are:

- a) the list of "a priori" requisites that software accessing VO data in outreach/educational mode should satisfy
- b) our choice of the interfaces on which to base our program: Aladin, and Stellarium/VirGO

### **From the first simplified software to the latest version of our software tools**

Following the release of D5.1 we implemented the a-priori requirements in at least one of the two main software tools Aladin and Stellarium/VirGO (see the section "Next Steps" for the requirements still to be implemented).

Then we created an initial set of 7 use cases focusing on subjects that are known to be included in school textbooks and that allow us to illustrate the most important aspects of our tools. The topics of the use cases are listed at the beginning of this document. Each use case consists of a guide with an introduction to the astronomical subject, the step-by-step procedures required to obtain the result from the software tools and, in several cases, of a choice of tests that teachers may perform to verify the level of engagement of students in the use case activity.

In order to obtain a feed-back on both the software and the astronomical/astrophysical subjects of our use cases, we recruited as testers teachers and students of 7 middle school classes (13 year old students) and of 4 high school classes (18 year old students) in north-eastern Italy. In all cases our test program has been officially adopted as part of the regular school activities and has involved more than 200 students. We invited the students to use the software also on their home PC and offering our support.

Each teacher selected 3-4 use cases. We devoted four hours of activity in class to each use case: one hour of support to the teacher's lecture on the astronomical background of the use case, one hour of a slightly more technical presentation of EuroVO-AIDA and the software tools, and at least two hours of support to students using Aladin and Stellarium on the PC's. The hours spent supporting students at the PC's proved extremely useful to record their reactions (negative and positive) to the interfaces. These reactions led to significant improvements of the software tools, including the elimination of a number of hidden bugs.

At the end of the testing activities students and teachers provided us with more than 150 written feedback forms. Students and teachers found EuroVO-AIDA WP5 very useful for learning/teaching astronomy. Most of the students used the software also at home. They tried all options and functionalities and found the simplified version of the software quite easy to use (as expected, Aladin was found more complex than Stellarium). Feed-back forms contain many suggestions on how to improve the software and on possible new use cases. All teachers appreciated our program and would be very interested into repeating it during the next school year.

Groups of amateur astronomers asked for an evaluation found EuroVO-AIDA WP5 useful for their activities. They already knew Aladin but have never used it because of the English language. In most instances the availability of a translation in mother language has been an essential feature to trigger the use of our tools.

The software tools that constitute our D5.2 product are the result of the testing process we just described.

## **Conclusion**

In agreement with our project plan, we release simplified versions of professional tools to access Euro-VO data. These tools have been tested in selected Italian schools and by groups of amateur's astronomers. The tools we release implement the feed-back by these users. We have also developed astronomical problems that can be solved with our tools and that should help outreach/educational users to get acquainted with the software and also, more importantly, should be the starting point for further exploration of the sky.

## **TO BE DONE**

A short list of the most important steps on which we are already working on, or that will be part of our path to the final delivery D5.3 includes:

- selection of astronomical objects by categories
- communications between our tools and Google Sky/WWT
- develop initial contacts with organizations like HOU and ESO
- increase the library of use cases with emphasis on the simplest problems
- extend our test scheme to a few schools in other countries
- continue translation efforts
- diffuse our products to the public via advertisement in conferences and via dedicated Web Site (under construction).

From a technical point of view the greatest effort will be to provide the option to select objects by class. In fact, besides programming, this task will require both a hierarchy of objects and a set of rules to select at least one object per class but also not more than a few hundreds or thousand at most. We will also have to make sure that the objects that will be retrieved will be relevant for our public. We have already agreed on how to proceed and count on having this option ready to test it in schools during the next school year.

## ACRONYM LIST

AIDA	Astronomical Infrastructure for Data Access
AVM	Astronomy Visualization Metadata
CDS	Centre de Données astronomiques de Strasbourg
D#	Deliverable number
ESO	European Southern Observatory
Euro-VO	European Virtual Observatory
EuroVO-AIDA	European Virtual Observatory - Astronomical Infrastructure for Data Access
GUI	Graphical User Interface
HOU	Hands-On Universe
INAF	Istituto Nazionale di Astrofisica
JPEG	Joint Photographic Experts Group
PC	Personal Computer
PR	Public Relations
PU	Public
Qt	Quasar Technologies (better known as Trolltech)
SA	Service Activity
VObs or VO	Virtual Observatory
WP	Work Package
WWT	World Wide Telescope

## SOFTWARE TOOLS

Aladin	CDS Interactive sky atlas
SIMBAD	Set of Identification, Measurements and Bibliography for Astronomical Data - Astronomical objects database
SimPlay	Interactive viewer of SIMBAD objects
Stellarium	Virtual planetarium
VirGO	ESO Visual archive browser