



EuroVO-AIDA

Euro-VO Astronomical Infrastructure for Data Access

D5.3

-

Final release of educational and outreach tools and material

Version 0.4

Grant agreement no: 212104

Combination of Collaborative Projects & Coordination and Support Actions



DOCUMENT INFORMATION**Project**

Project acronym: EuroVO-AIDA
Project full title: Euro-VO Astronomical Infrastructure for Data Access
Grant agreement no.: 212104
Funding scheme: Combination of Collaborative Projects & Coordination and Support Actions
Project start date: 01/02/2008
Project duration: 30 months
Call topic: INFRA-2007-1.2.1 Scientific Digital Repositories
Project web sites: <http://www.euro-vo.org/pub/general/intro.html>
<http://cds.u-strasbg.fr/twikiAIDA/bin/view/EuroVOAIDA/WebHome>

Document

Deliverable number: D5.3
Deliverable title: Final release of educational and outreach tools and material
Due date of deliverable: April 2010
Actual submission date: 25 May 2010
Authors: M. Ramella, G. Iafrate (INAF), T. Boch, F. Bonnarel, C. Capoulun, P. Fernique (CDS), F. Chéreau (ESO), F. Freistetter (GAVO), Enrique Solano Marquez, Carlos Rodrigo Blanco (INTA), Gijs Verdoes Kleijn (Kapteyn Astronomical Institute)
Work Package no.: WP5-SA3
Work Package title: Service Activities for higher education and outreach
Work Package leader: INAF
Lead beneficiary: INAF
Dissemination level: PU
Nature: Other
No of pages (incl. cover): 12

TABLE OF CONTENTS

1. LIST OF PRODUCTS	4
2. NOTES ON THE DEVELOPMENT OF SOFTWARE TOOLS DRIVEN BY WP5 FROM D5.2 TO D5.3	5
2.1. Aladin.....	5
2.2. Stellarium.....	6
2.3. SimPlay	6
3. NOTES ON USE CASES	8
4. NOTES ON THE AIDA WP5 WEBSITE	9
5. THE DEVELOPMENT OF D5.3.....	10
5.1. Introduction.....	10
5.2. From D5.2 to D5.3	10
5.3. Conclusion	11
ACRONYM LIST	12
SOFTWARE TOOLS LIST	12

1. LIST OF PRODUCTS

- 1 - Aladin Version 6.055
- 2 - Stellarium Version 0.10.4
- 3 - SimPlay
- 4 - Use Cases with information on astronomical objects:
 - 4.1 - The sky
 - 4.2 - The stars
 - 4.3 - The shape of galaxies
 - 4.4 - The Pleiades open cluster
 - 4.5 - Proper motion of the Barnard's star
 - 4.6 - Confirmation of an apparent supernova
 - 4.7 - Distance of the Andromeda galaxy
 - 4.8 - Distance of the Crab nebula
 - 4.9 - Asteroids in the Solar System
 - 4.10 - Planetary conjunctions
- 5 - Electronic feed-back form
- 6 - Poster: The Sky
- 7 - Leaflet: EuroVO-AIDA Outreach
- 8 - WP5 TWiki WebPages:
<http://cds.u-strasbg.fr/twikiAIDA/bin/view/EuroVOAIDA/WP5Outreach>
- 9 - Website (AIDA WP5) dedicated to the distribution of our products to the public:
<http://wwwas.oats.inaf.it/aidawp5/>

Products 1-7 can be downloaded from <http://cds.u-strasbg.fr/twikiAIDA/bin/view/EuroVOAIDA/FinalProducts>.

The dedicated Website (product 9), distributes products 1, 2, 3, 4 and contains a link to the TWiki WebPages for interested visitors.

2. NOTES ON THE DEVELOPMENT OF SOFTWARE TOOLS DRIVEN BY WP5 FROM D5.2 TO D5.3

All software tools are documented with new and more extensive guides than in their initial professional versions.

The interfaces have been translated into the languages of partners. The documentation is always available in English and often in other languages.

2.1. Aladin

Aladin, in our delivered version, allows the user to search for objects of a selected class: galaxies, stars, nebulae, etc. All available objects of the selected class(es) appear as marks on the Sky Browser (Figure 1). One or more of the displayed objects can be selected and used as entries of Aladin servers for the retrieval of VO data and catalogs. The menu of the selection by class also offers a direct link to images and to information of representative objects in each class. This is a major development of Aladin and the answer to a very common request among our test users.

Aladin also includes a color version of the sky that can be used both in the standard window and in the Sky Browser. The choice of the colored sky is between the infrared IRAS-IRIS and the optical DSS. The colored sky meets general expectations of the outreach users of Aladin.

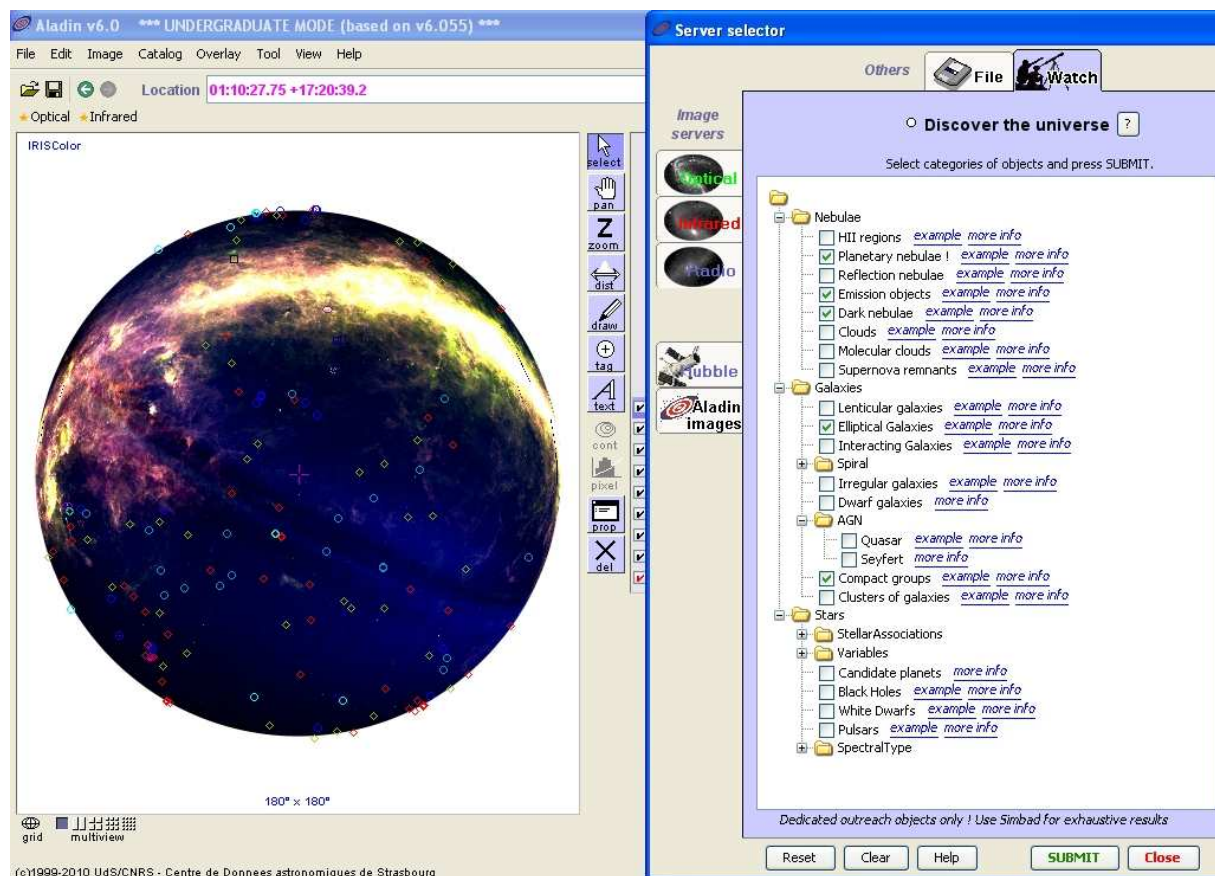


Figure 1: The Sky Browser of Aladin and the new window for the selection of objects by class

2.2. Stellarium

Stellarium, in our delivered version, has a fast optimized core and a new script engine. Perhaps the major new feature compared to the D5.2 version is the implementation of plugins allowing for a variety of new functionalities. Examples of these functionalities are: the angle measurement on screen, the display of extended compass marks, and the telescope ocular simulation. A real success with our test users is the possibility to display and track artificial satellites (Figure 2).

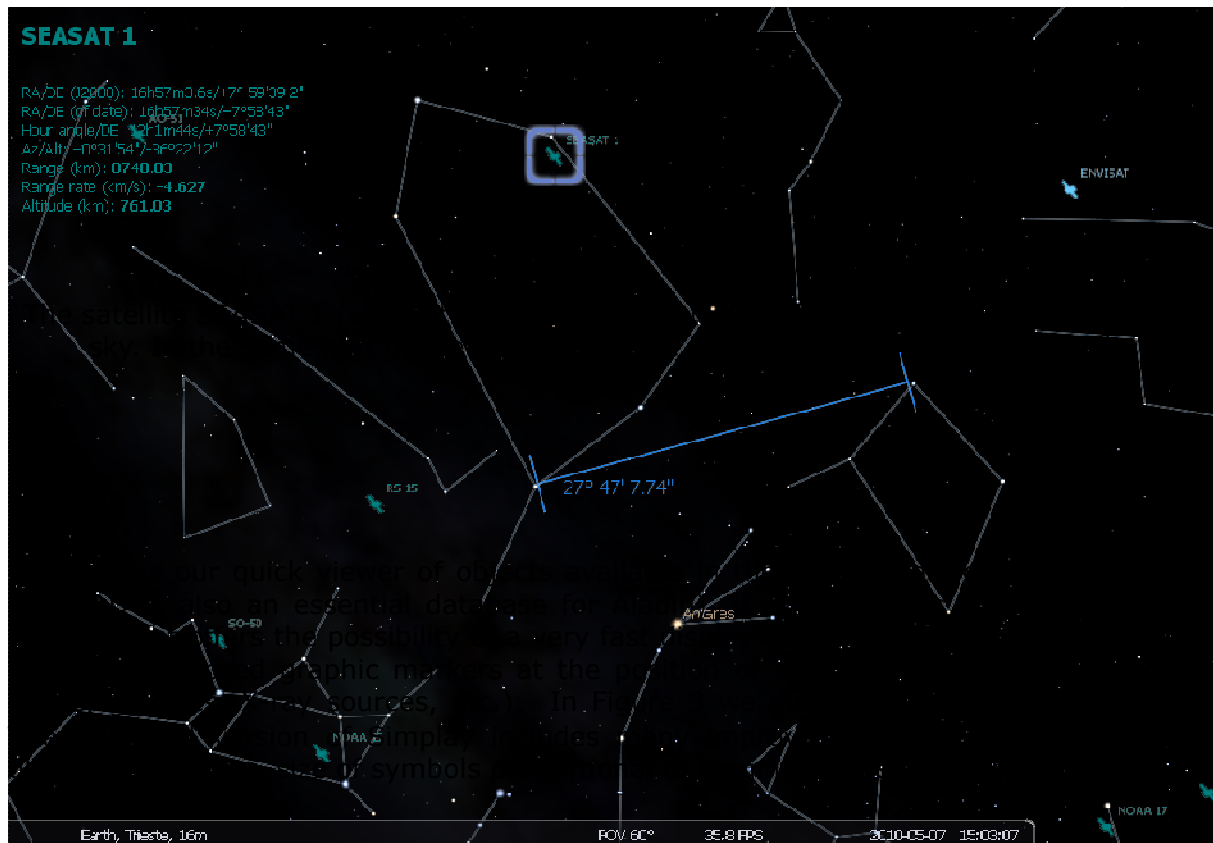


Figure 2: The satellite SEASAT 1 (within the highlighted square) transiting through the Stellarium sky. In the same part of the sky a light blue segment measures a large angle.

2.3. SimPlay

SimPlay is our 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.

The delivered version of SimPlay includes many improvements like column selection, object highlighting, size of symbols proportional to magnitude, user configurability.

The screenshot displays the SimPlay quick viewer interface. The central panel shows a star field with a central galaxy. A tooltip for a radio source is visible over a green dot, displaying the following information:

[BF52005] J024612.75-301705.3
Radio G
02 46 12.75 -30 17 05.3

The interface includes a search panel on the left with a target field containing 'NGC 1097' and an 'ok' button. Below the search panel are examples of objects: Coma Cluster, M 83, and NGC 1097. The right panel, titled 'Objects options', shows a list of object types with checkboxes: Galaxy (4), Star, Nebula, PN, SNR, HII region (402), IR object, UV object, Other types (3), Radio, HI, Maser (1), and X-ray object (16). The 'HII region' and 'Radio, HI, Maser' options are checked. The bottom panel, titled 'Data', displays a table of object information.

TYPE	OTYPE	MAIN_ID	RA	DEC	B	V	R	J	K	SP_TY
Other types	SN	SN 1999EU	02 46 20.79	-30 19 06.1		17.3				SN.IIPec
Other types	SN	SN 1992bd	02 46 18.98	-30 16 28.9		15		11.526	10.382	SN.II
Other types	SN	SN 2003B	02 46 13.78	-30 13 45.1		15				SN.II
HII region	HII	[EKS96] NGC 1097 59	02 46 07.78	-30 17 48.0						
HII region	HII	[EKS96] NGC 1097 65	02 46 08.51	-30 17 55.1						
HII region	HII	[EKS96] NGC 1097 74	02 46 09.25	-30 17 50.9						
HII region	HII	[EKS96] NGC 1097 75	02 46 09.39	-30 17 44.8						

Figure 3: A screenshot of the quick viewer SimPlay

3. NOTES ON USE CASES

Use cases are the second leg of WP5, the first being software tools. The importance of use cases in the final deliverable D5.3 is greatly increased with respect to D5.2. The delivered versions of the use cases are fully consistent with the delivered software tools and have the following structure:

- a) a brief overview of the use case,
- b) an introduction to the astrophysical problem addressed,
- c) an introduction to our software and to Virtual Observatory tools,
- d) a detailed step by step guide to the use of our tools to solve the problem.

In some cases we add exercises and solutions.

We specify here the main topics addressed by each use case:

- 1 - **The sky:** apparent motion of the celestial sphere, celestial coordinates, constellations, light pollution
- 2 - **The stars:** color and luminosity, the Hertzsprung-Russell diagram
- 3 - **The shape of galaxies:** the Hubble morphological sequence
- 4 - **The Pleiades open cluster:** distance, parallax, stellar evolution, the Hertzsprung-Russell diagram
- 5 - **Proper motion of the Barnard's star**
- 6 - **Confirmation of an apparent supernova:** astrometry, end-point of stellar evolution
- 7 - **Distance of the Andromeda galaxy:** distance indicators, Cepheid variable stars
- 8 - **Distance of the Crab Nebula:** linear and angular sizes of extended objects, expansion of the supernova remnant
- 9 - **Asteroids in the Solar System:** distribution of asteroids, orbital elements, resonances
- 10 - **Planetary conjunctions:** conjunctions, the Star of Bethlehem, the (supposed) end of the world in 2012

All use cases are available in English and Italian, many are also available in other languages of the partners.

4. NOTES ON THE AIDA WP5 WEBSITE

The EuroVO-AIDA WP5 Website (<http://wwwas.oats.inaf.it/aidawp5/>) is one of main products since it contains all other products and also serves as our main interface toward our public.

Because the site plays a very important role, we have used great care in designing it. The site is fast and clear and obeys the main rules of effective web design focusing on usability and utility. From the visual point of view, its colors are those characterizing the whole EuroVO-AIDA project. The graphics of the home page introduces both astronomy and the virtual world.

5. THE DEVELOPMENT OF D5.3

5.1. 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 of providing some basic information on the main classes of objects whose data will be searched by our public within the Euro-VO database. We have produced part of such information and have contacted various international projects for the diffusion of astronomy in order to discuss inclusion of (part of) their knowledge base within our outreach interfaces. We are glad to be able to use of NASA's 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", delivered on 7 July 2008. 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

Our second release has been D5.2, "First release of educational and outreach tools and material", delivered on 3 May 2009.

5.2. From D5.2 to D5.3

With the release of D5.2 we already had our main products available in a preliminary form. We remind here that a very important characteristic of our D5.2 products is that we developed them on the basis of extensive feed-back from teachers and students we had recruited as testers in north-eastern Italy. In all cases our test program has been officially adopted as part of the regular school activities, and it 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 PCs.

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. 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 release of D5.3 follows another year of tests within selected schools in Italy and, more recently, France. Since basic tests had been performed in order to release D5.2, for our final release we focused on the self-sufficiency of teachers willing to use our products in class. For this series of tests we offered, in most cases, only support on demand. In this way we reached many more students and teachers: we estimate our products have been used/tested by about 100 teachers and at least 1000 students.

The software tools and the use cases that constitute our D5.3 product are the result of the testing process we just described.

5.3. 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 and French schools and by groups of amateur's astronomers. The tools we release implement the feedback from 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 and understanding of the sky.

ACRONYM LIST

AIDA	Astronomical Infrastructure for Data Access
CDS	Centre de Données astronomiques de Strasbourg
D#	Deliverable number
DSS	Digital Sky Survey
ESO	European Southern Observatory
Euro-VO	European Virtual Observatory
EuroVO-AIDA	European Virtual Observatory - Astronomical Infrastructure for Data Access
GAVO	German Astrophysical Virtual Observatory
INAF	Istituto Nazionale di Astrofisica
INTA	Instituto Nacional de Técnica Aeroespacial
IRAS	Infra Red Astronomical Satellite
IRIS	Improved Reprocessing of the IRAS Survey
NASA	National Aeronautics and Space Administration (USA)
PC	Personal Computer
PR	Public Relations
PU	Public
SA	Service Activity
SEASAT	Sea satellite
USA	Unites States of America
VObs or VO	Virtual Observatory
WP	Work Package

SOFTWARE TOOLS LIST

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