EuroVO-AIDA

Euro-VO Astronomical Infrastructure for Data Access

D5.1

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User requirement for the outreach activity

Final Version

DOCUMENT INFORMATION

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1. Introduction

Astronomy is a science attracting a variety of people and it is interesting both for education and as entertainment. In particular, at all educational levels, it offers a laboratory where to teach and experiment with basic physics: gravitation, thermodynamics, electromagnetism, and nuclear physics. As a source of entertainment it offers both beautiful images and the fascination with the marvels, the mysteries and enigmas of the sky.

For these reasons, among others, astronomy is very popular in the internet with many dedicated sites, both of research institutes and of private groups. There is a wide availability of software and images, and even the biggest internet players like Google and Microsoft have entered the field with amazing tools.

Within this crowded field we think that access to the Virtual Observatory (VO) is a fundamental asset that needs to be exploited in the public's interest. Considering the existing software, we think that the best interfaces and tools for the access/exploitation of VO data need to maintain a simple and uncluttered professional look.

In this document we consider the various categories of outreach targets and list a set of general requirements we recommend for the development/adoption of interfaces/tools to the VO. Our document takes into account the newly available draft of the ASTRONET Infrastructure Roadmap (May 2008; http://www.strw.leidenuniv.nl/astronetroadmap/[1]), in particular chapter 7 "Education, recruitment & training, public outreach" and the recommendations therein contained.

2. The targets of EuroVO-AIDA for outreach

Higher Education

The typical target of this group is a university student graduating in science, but not necessarily in astronomy. This public is characterized by easy access to the network and to hardware/software. Documentation, tutorials, examples are important because the use of the interface will be, most likely, self-taught. The transition to a professional version of the interface should be encouraged and made easy. We expect university students to produce presentations based on the data accessed via the outreach interface and we also expect them to require a flexible scripting language.

Teachers of 14-18 years old students

Middle school teachers may have no access to top hardware/network resources and need to produce printed records of their activities for their students. For these reasons teachers need: a) to access only pre-selected slices of a limited number of VO catalogs and images with a basic and light interface, b) a number of printing options relative both to content and to quality/speed trade offs, c) to operate off-line. We also note that diffusion of the access to VO at the middle school level requires both a multi-language interface and an exhaustive documentation with use cases. Finally, teachers certainly need a sky-navigation tool.

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[1] ASTRONET is a consortium of funding agencies that now includes ten participants (four are also partners of EuroVO-AIDA), twelve associates, and four forum members. The goal of ASTRONET is to lay out a comprehensive Science Vision and roadmap for future infrastructures in astronomy in order to consolidate and reinforce the world-leading position of European astronomy at the beginning of this 21st century. ASTRONET is financed by the European Commission FP6 under the initiative « Integrating and Strengthening the European Research Area (ERA) ».

General public

We expect the general public to enjoy the same light version designed for middle school teachers but with an added emphasis on a wide selection of PR images. We also expect demos to be more important for this group of users than for any other.

Amateur astronomers

Depending on their specific activities, amateur astronomers may be considered special cases of our higher education or middle school public. The reason to list them separately is their specific use of (small) telescopes requiring a number of specific options/tools mostly associated with navigation and telescope control in open spaces.

3. Requirements

In this section we collect our basic set of requirements, the "core" of our deliverable **D5.1**. The requirements follow from the analysis of our target public described in the previous section. The list has been compiled thanks to the experience of team members, on consideration of existing projects, and on initial specific but non-systematic interactions with the public.

Our basic requirements are the following:

- compatibility with Virtual Observatory standards
- presence of an adequate sky-navigation tool
- limited number of significant image and catalogue sources
- simplified search options
- selection of objects by class
- careful choice of buttons
- access to PR images of special objects obtained from VO repositories
- high level commands in script language
- easy printing and printer-friendly pages
- (partial) off-line functionality
- use of local images and catalogs
- capability to operate with less then optimal hardware/network resources
- high level documentation: reference guide and user-friendly tutorial
- simplified documentation: primer and use cases
- library of demos

4. EuroVO-AIDA outreach activities

We plan to develop a software interface satisfying our basic requirements by working in close contact with the developers of Aladin (CDS) and Stellarium/Virgo (ESO).

- Aladin (http://aladin.u-strasbg.fr/)
- Stellarium (http://www.stellarium.org/)
- Virgo (http://archive.eso.org/cms/tools-documentation/visual-archive-browser)

These software tools have been selected because they are developed by partners of EuroVO-AIDA, because they can be offered free of charge to the public, and because they are already well known among professional astronomers (Aladin) and among professionals of outreach activities (Stellarium). The fact that the software already exists "in house" guarantees that we will be in the best position for testing and delivering a final product for the public. We also note that the full versions of Aladin and Stellarium/Virgo are characterized by different and complementary strong points (Aladin excels for data and catalogue handling, Stellarium/Virgo offers a very sophisticated sky-navigation tool and has an active support community). The short-circuit between developers of these tools via EuroVO-AIDA should therefore be very fruitful.

We have surveyed other available and popular tools besides Aladin and Stellarium/Virgo. Our aim is to compare Aladin and Stellarium/Virgo against these tools and, possibly, to encourage developers to satisfy our requirements.

Among the software tools we surveyed, we consider the following particularly interesting and join the list to our requirements as part of our first deliverable **D5.1**:

- Astroart (Commercial): http://www.msb-astroart.com/
- Cartes du Ciel (free): http://www.astrosurf.com/astropc/cartes/index.html
- Celestia (free): http://www.shatters.net/celestia/
- Google Sky (free): http://earth.google.com/sky/skyedu.html
- Iris (free): http://www.astrosurf.com/buil/us/iris/iris.htm
- JSky (ESO/Gemini Observing Tool, free): http://archive.eso.org/JSky/
- MaxIm DL (Commercial): http://www.cyanogen.com/products/maxim_main.htm
- Redshift (Commercial): http://www.redshift.de/us/_main/index.htm
- SkyCat (ESO, free): http://archive.eso.org/skycat/
- Skychart (Sky & Telescope, free): http://skychart.skytonight.com/observing/skychart/
- sky-map (SDSS, free): http://sky-map.org/
- SkyServer SDSS DR6 (SDSS, free): http://cas.sdss.org/dr6/en/tools/
- StarryNight (Commercial): http://www.starrynightstore.com/stniso.html
- TheSky (Commercial): http://www.bisque.com/Products/TheSky6/
- Xephem (free): http://www.clearskyinstitute.com/xephem/
- World Wide Telescope (Microsoft, free): http://www.worldwidetelescope.org/

Another important part of the EuroVO-AIDA outreach activity is the inclusion of basic information on selected (classes of) astronomical objects and instrumental techniques (see our list of requirements). We will provide some of the basic information but additional manpower would be needed to carry out this task in full.

An intermediate step is to capitalize on existing resources of other outreach projects/organizations. We list here some of the most important among these projects/organizations, a list that again is part of our **D5.1**. In some cases we plan to contact directly the management in order to develop useful interactions and exchanges of expertises.

- US NATIONAL VIRTUAL OBSERVATORY (NVO): http://www.virtualobservatory.org
- HANDS ON UNIVERSE (HOU): http://www.handsonuniverse.org

- ESO & EUROPEAN ASSOCIATION FOR ASTRONOMY EDUCATION (EAAE): http://www.eaae-astro.org and http://www.astroex.org

- EUROPEAN SPACE AGENCY (ESA): http://www.esa.int

- NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA): http://www.nasa.gov

5. Next steps

Our immediate and more urgent tasks are: Multilanguage upgrades, design of use cases with proper documentation (different cases for different groups of public), and test of prototype interfaces with sample public.

Other activities we will pursue in parallel are:

a)   Selection of best data to be accessed by the outreach interface,

b)   Assessment of the usage of KML[2]/outreach vocabulary (also with IVOA Registry WG and Semantics WG),

c)   Contact Hands on Universe.

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[2] Keyhole Markup Language (KML) is an XML-based language schema for expressing geographic annotation and visualization on existing or future Web-based, two-dimensional maps and three-dimensional Earth browsers. KML was developed for use with Google Earth, which was originally named Keyhole Earth Viewer. It was created by Keyhole, Inc, which was acquired by Google in 2004.

ACRONYM LIST

AIDA	Astronomical Infrastructure for Data Access
CDS	Centre de Données astronomiques de Strasbourg
D#	Deliverable number
DR	Data Release
EAAE	ESO & European Association for Astronomy Education
ERA	European Research Area
ESA	European Space Agency
ESO	European Organisation for Astronomical Research in the Southern Hemisphere
Euro-VO	European Virtual Observatory
EuroVO-AIDA	European Virtual Observatory - Astronomical Infrastructure for Data Access
HOU	Hands-On Universe
INAF	Instituto Nazionale di Astrofisica
IVOA	International Virtual Observatory Alliance
KML	Keyhole Markup Language
NASA	National Aeronautics and Space Administration
NVO	National Virtual Observatory
PU	Public
PR	Public Relations
SDSS	Sloan Digital Sky Survey
VObs or VO	Virtual Observatory
WG	Working Group