Observatório Virtual Brasileiro
OVB
(Brazilian Virtual Observatory)

(2009, February 7)

Introduction

The Brazilian Virtual Observatory (OVB; Observatório Virtual Brasileiro[1]) is an initiative which formally started by means of a Declaration of Intentions signed on 2006, August 18, by the legal representatives of six Brazilian research institutes plus the Brazilian Astronomical Society (a facsimile of the declaration is attached to the document). After initial difficulties to create a suitable organizational structure, the OVB is now embedded in the recently founded National Institute for Science and Technology in Astrophysics (INCT-A)[2]. It aggregates efforts of several groups working on Virtual Observatory related issues in various universities and scientific institutes in different parts of Brazil and is meant to provide a common organizational structure for these groups to work in and to ensure basic financing.

The superstructure: INCT-A

Recently, the Brazilian Federal Government initiated a new program entitled "Instituto Nacional de Ciência e Tecnologia (INCT)"[3] in order to establish and consolidate networks of working groups and laboratories on an internationally competitive level, dedicated to long term research in selected fields. These National Institutes are thus "virtual" structures, anchored in an existing major research institute or university, but extending to research teams based in other institutions all over the country.

In the context of this program the INCT-A[4] was created in late 2008. It unites a significant fraction of the Brazilian astronomical community (144 members, more than half of all Brazilian astronomers with PhD.), rooted in 32 different institutes and universities. It is the aim of the INCT-A to plan and to implement a series of actions having in mind the future of Brazilian astronomy. To this end, the INCT-A will formulate and pursue a collective strategy, creating the conditions of Brazil to maintain and consolidate its respectable position gained during the past decades within the international astronomical research community, and providing the next generation of scientists with the necessary conditions to perform frontier research.

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1 There are discussions going on about the final denomination and acronym, the alternative being "BrAVO".

2 See glossary for explication of abbreviations

3 National Institute for Science and Technolgy (http://www.cnpq.br/programas/inct/_apresentacao/index.html)

4 http://www.cnpq.br/programas/inct/_apresentacao/inct_astrofisica.html

The INCT-A is structured in a way such that different lines of activities are pursued in parallel. One of the major items is the consolidation of the Brazilian Virtual Observatory.

The OVB as part of the INCT-A

Virtual Observatory related activities are going on in various places in Brazil for several years. Attempts have been undertaken in the past to create a common platform for the involved research groups to work on. These have met difficulties because of the lack of a suitable superstructure and insecure funding.

With the creation of the INCT-A the superstructure is in place and funding is secured. As part of the INCT-A, the OVB has the explicit charge to (citing from the original INCT-A proposal):

a) coordinate the various proposals and VO projects already in place in the Brazilian research institutions, and

b) coordinate a combined effort within the Brazilian community aiming to develop a VO expertise, and to exchange knowledge and experience by identifying potentially cooperative projects capable of sharing hardware and/or software infrastructure.

Many details of the formal organization of the OVB as part of the INCT-A are still being discussed. However, it is consensus among the members of the participating working groups that the OVB should operate, in the environment of the local VO projects, much the same way as the IVOA does on an international level. That is, the OVB should stimulate and encourage the projects of the different local groups, facilitating the coordination and collaboration necessary for the development and deployment of the tools, systems, and organizational structures. The OVB should organize international workshops and schools aiming at the dissemination of the VO concepts and the qualification of people capable to work on the development of new VO services and tools. The OVB should, moreover, act as partner of the IVOA and intermediate between the IVOA and the various Brazilian working groups.

As part of its governance structure the INCT-A has formed a provisional committee to deal with OVB related issues. It is composed of the following persons:

Albert Bruch (Chair; LNA/MCT)
Laerte Sodré Jr. (IAG/USP)
Reinaldo de Carvalho (INPE/MCT)
Roberto Cid Fernandes (DF/UFSC)
Iranderly Fernandes de Fernandes (LNA/MCT)

The budget of the INCT-A foresees funding of the OVB at a level of about R$ 1,000,000 (currently equivalent to approximately € 330,000) for the next three years, to be used for fellowships, travels, equipment and services. Additional funding is expected (and in part confirmed) to come from the institutions hosting the research groups and the OBV administrative structure.

Administratively, the OVB will be attached to LNA as an institute which does not only host one of the ongoing Brazilian VO projects but which, as a National Laboratory and thus a service institute for the national astronomical community is institutionally committed to the OBV through several corresponding lines of action mentioned in its Master Plan. The LNA Director will (at least initially) serve as point of contact between the IVOA and the OVB.

VO projects with the OVB

Of all VO related projects currently developed in Brazil we subsequently include here a concise description of those which are currently part of the OVB:

SOAR-VO (project developed jointly by LNA and LAC/INPE): SOAR-VO aims to build a VO service based on archival data from the national observatories in Brazil. During a first phase, public data from the SOAR telescope are being modeled and archived, building up a VO service. In a second phase, the project intends to extend this service to data from the OPD telescopes, by means of a new, portable tool, which is being developed to embody all the basic VO functions, having general applicability to astronomical data.

BRAVO[5] (project developed jointly by the Department of Astronomy – DAS/INPE and LAC/INPE): The primary goal of BRAVO is the generation of investment in information technology, with emphasis on data-mining and statistical analysis. Presently a VO service based on the 2DPhot software is being enabled. This software, developed within the project BRAVO, allows source detection and analysis (classification and photometry of sources) in deep wide-field images and is now being implemented as a VO service. Also being developed is a VO service to make available results from very specialized models of the optical emission of AM Hercules binaries stars, together with tools for comparison with observational data. As is the case for the SOAR-VO, this project also aims at the dissemination of VO concepts among Brazilian astronomers and to qualify them for use of VO tools through the organization of workshops and specialized schools.

Starlight[6] (project developed at the DF/UFSC, with participation of researchers from IAG/USP and from France): Starlight provides a VO service for data derived from the results of modeling of optical spectra of galaxies (population synthesis) using the STARLIGHT code. At the present, a database, accessible by a GUI interface and SQL, has been built. It contains results for more than 500 thousands of SDSS galaxies and its duplication is planned for the next 2 or 3 years. Also planned is the publication of new data based on the results of a new high-resolution evolutionary stellar populations models of great spectral coverage and a variety of abundance patterns.

BRASD (project developed at NAT/UNICSUL): BRASD is a recent initiative that aims at the standardization of both, the creation and archiving of data from numerical simulations. Using an innovative model for data access, it allows the immediate cross matching of observations with simulations, providing a large

[5] http://www.lac.inpe.br/projetos/bravo/bravo.htm; this project will be renamed if the acronym BraVO is adopted for the Brazilian Virtual Observatory (see footnote 1)

[6] http://www.starlight.ufsc.br

database of numerical experiments. Presently, BRASD is hosting about 6Tbytes of data based on results of numerical simulations of HD and M-HD turbulence in the interstellar medium, planetary nebulae, supernovae and AGN jets. A large quantity of software applications for reduction and analysis of these data and for their comparison with observables is also housed. It is planned to increase the storage capacity and the computing power used for this project.

Urania (project developed jointly by IAG/USP and DF/UFSC): Urania is a portal which is still in the phase of implementation. It aims to provide VO services based on data produced by IAG researchers or related to their work. There has been some investments in hardware (e.g. storage servers) in order to house data produced by the IAG photometric redshifts project, as well as to mirror the photometric and spectroscopic data for the thousands of galaxies of the Starlight project (see above). This project also plans to have VO services for producing galactic absorption maps, for grids of synthetical spectra of Be stars, numerical simulation data as well as tools for observational data analysis.

Apart from these, several other VO related projects are currently going on in Brazil, inside as well as outside the INCT-A consortium. The proponents of some of these have already signaled their interest to associate themselves to the OVB and will be welcome if their projects are up to the required standards. Other projects will be invited to join the OVB.

Several federal institutions, not directly related to astronomy and thus not interested in developing VO projects on their own, but with capacities to contribute significantly to the VO infrastructure, have been contacted and all signaled their readiness to collaborate with the OVB. These institutes are:

RNP will be decisive to satisfy the requirements of the OVB for adequate internet connection (capacity, speed) for the transfer of and decentralized access to large amounts of data.

LNCC is willing to contribute with computational capacities, computer storage, access to grid networks.

CTI (formerly: CenPRA) has declared its interest in using their expertize in software engineering to participate in the development of VO application tools, as well as more basic lower level software.

Of these, LNCC and CTI are signatories of the original Declaration of Intention about the OVB.

GLOSSARY

CTI (formerly: CenPRA): Centro de Tecnologia da Informação Renato Archer (Centre for Information Technology Renato Archer); a research institute of MCT which develops tools and applications (hardware and software) for information technology.

DAS: Departamento de Astronomia (Department of Astronomy); part of the internal structure of INPE and responsible for astronomical research within INPE; the largest astronomical research institute in Brazil.

DF/UFSC: Instituto de Física da Universidade Federal de Santa Catarina (Physics Institute of the University of Santa Catarina); hosting the Astronomy Group of UFSC.

IAG: Instituto de Astronomia, Geofísica e Ciências Atmosféricas (Institute of Astronomy, Geophysics and Atmospheric Sciences); a research institute of USP.

INCT: Instituto Nacional de Ciênca e Tecnologia (National Institute for Science and Technology); a program installed in 2008 by the Brazilian Federal Government to establish and consolidate networks of research groups and laboratories.

INCT-A: Instituto Nacional de Ciência e Tecnologia de Astrofísica (National Institute for Science and Technology for Astrophysics); an institute of the INCT program, aimed to prepare Brazilian astronomy for the future.

INPE: Instituto Nacional de Pesquisas Espaciais (National Institute for Space Research); an institute of MCT; Brazilian counterpart of ESA in Europe and NASA in the USA.

IVOA: International Virtual Observatory Alliance.

LAC: Laboratório Associado de Computação e Matemática Aplicada (Associated Laboratory of Computation and Applied Mathematics); part of the internal structure of INPE.

LNA: Laboratório Nacional de Astrofísica (National Astrophysical Observatory); a research institute of MCT with the mission to provide and operate the observational infrastructure for astronomy in Brazil.

LNCC: Laboratório Nacional de Computação Científica (National Laboratory for Scientific Computation); a research institute of MCT with the mission to create and apply mathematical and computational methods for the solution of scientific and technological problems.

MCT: Ministério de Ciência e Tecnologia (Ministry of Science and Technology); organ of the Federal Government of Brazil.

NAT: Núcleo de Astrofísica Teórica (Nucleus of Theoretical Physics); part of the Centre for Exact Sciences and Technologies of UNICSUL.

OPD: Observatório do Pico dos Dias (Pico dos Dias Observatory); one of the observatories operated by LNA.

OVB: Observatório Virtual Brasileiro (Brazilian Virtual Observatory).

RNP: Rede Nacional de Pesquisa (National Research Network); a service institution of MCT, responsible, on a national level, to provide internet connexion for research and educational institutions and to promote the innovative use of advanced networks in Brazil.

SOAR: Southern Astrophysical Research Telescope; a telescope located at Cerro Pachon, Chile; jointly operated by LNA/MCT, National Optical Astronomy Observatory (USA), University of South Carolina (USA) and Michigan State University (USA).

UFSC: Universidade Federal de Santa Catarina (Federal University of Santa Catarina); the most important university of Santa Catarina State.

UNICSUL: Universidade Cruzeiro do Sul (Southern Cross University); a private University located in São Paulo.

USP: Universidade de São Paulo (University of São Paulo); the largest Brazilian University.

VO: Virtual Observatory.

Declaração de Intenções

Os signatários deste instrumento,

(a) convictos da grande importância e potencial que os arquivos de dados astronômicos têm para a pesquisa nessa área do conhecimento;
(b) convictos da necessidade de se desenvolver ferramentas inteligentes para o uso integrado de múltiplos bancos de dados, a fim de permitir explorar plenamente o conteúdo científico da enorme quantidade de dados já disponíveis e a serem obtidos por projetos futuros da astronomia observacional nacional e internacional;
(c) cientes dos esforços desenvolvidos para essa finalidade em diversos outros países, conhecidos de forma genérica com Observatório Virtual ("Virtual Observatory") e agregados de forma preliminar numa organização denominada "International Virtual Observatory Alliance" – IVOA (www.ivoa.net);

criam, através deste, o Observatório Virtual Brasileiro – OVB, como um projeto nacional no âmbito da "International Virtual Observatory Alliance" – IVOA.

Baseados nestes preceitos, o OVB, através da criação conjunta de estruturas para o uso eficiente e eficaz de dados arquivados, declara sua intenção de colaborar para estabelecer estruturas de fomento, nas diversas instituições de pesquisa, de projetos científicos e tecnológicos relacionados ao Observatório Virtual.

A fim de detalhar a forma da colaboração entre as instituições representadas pelos signatários, será criada uma Comissão Técnica com membros de todas as instituições signatárias, a serem nomeados pelos seus Dirigentes, com a atribuição de apresentar até o dia 30 de novembro de 2006, minuta de um documento especificando a estrutura e os procedimentos do Observatório Virtual Brasileiro. O Laboratório Nacional de Astrofísica coordenará os trabalhos da comissão.

Os signatários aguardarão uma recomendação da Comissão Técnica antes de solicitar a associação do Observatório Virtual Brasileiro à IVOA.

Itajubá, 18 de agosto de 2006

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