

MEMORANDUM OF UNDERSTANDING

BETWEEN

THE INTERNATIONAL VIRTUAL OBSERVATORY ALLIANCE (IVOA)

AND

THE OFFICE OF ASTRONOMY FOR DEVELOPMENT (OAD)

1. Background

1.1 The International Virtual Observatory Alliance (IVOA)

The International Virtual Observatory Alliance (IVOA) was formed in June 2002 with a mission to "facilitate the international coordination and collaboration necessary for the development and deployment of the tools, systems and organizational structures necessary to enable the international utilization of astronomical archives as an integrated and interoperating virtual observatory." The IVOA now comprises 20 VO programs from Argentina, Armenia, Australia, Brazil, Canada, Chile, China, Europe, France, Germany, Hungary, India, Italy, Japan, Russia, South Africa, Spain, Ukraine, the United Kingdom, and the United States and an inter-governmental organization (ESA).

The Virtual Observatory (VO) is the vision that astronomical datasets and other resources should work as a seamless whole. Many projects and data centres worldwide are working towards this goal. The International Virtual Observatory Alliance (IVOA) is an organization that debates and agrees the technical standards that are needed to make the VO possible. It also acts as a focus for VO aspirations, a framework for discussing and sharing VO ideas and technology, and body for promoting and publicizing the VO. The need to cooperate with astronomy communities, and the need for astronomical education and public outreach has necessitated the establishment of an education interest group by the IVOA.

1.2 The Office of Astronomy for Development (OAD)

The OAD was established in 2011 by the International Astronomical Union (IAU), in partnership with the South African National Research Foundation. The OAD is a key part of the IAU's strategy to use astronomy for sustainable development.

The mission of the OAD is to help further the use of astronomy, including its practitioners, skills and infrastructures, as a tool for development in every country by mobilizing the human and financial resources necessary in order to realize the field's scientific, technological and cultural benefits to society. This is primarily implemented through funding and coordinating projects that use Astronomy as a tool to address issues related to sustainable development.

Both the OAD and IVOA have ongoing projects of astronomical education and public outreach and realize that astronomical data and technology have the potential to be applied in various fields to

benefit society. IVOA could provide the latest technology, standards and expertise to support workshops organized by OAD.

2. Purpose of the collaboration

Both the OAD and IVOA are motivated to use astronomical data for education, development and public outreach. The purpose of this collaboration is to bring together the complementary resources and expertise of IVOA and of the OAD to advance the application of astronomical data and technology use in different areas of society.

Initial pilot activities will be for both parties to jointly support

- 1) The development of a blended-learning Masters course in Astrophysics for universities based in Southern Africa. This pilot initiative could later be expanded to other regions.
- 2) Astronomy for development and education activities, for example the Shristi Astronomy Project¹, run virtually from India, which trains students on using archival astronomy data for discoveries.
- 3) Data driven citizen science projects, for example Worldwide Telescope (WWT) guided tour contest.

3. Role of IVOA

IVOA will organize experts and provide active support in the workshops and activities organized or funded by OAD related to astronomical data and technology. IVOA information and tools can also be provided to support learning outcomes, and help promote social development through application of astronomical technology. For the initial activity of the blended-learning Masters course, the IVOA will link the OAD, and the curriculum designers of the Masters course, with experts across the Virtual Observatory network.

4. Role of the OAD

The OAD will provide links between relevant implementation stakeholders at universities (and other applicable institutions) and the IVOA. This will form a platform for the promotion of Virtual Observatory tools and astronomical technology for education and development. The OAD will also link the IVOA with OAD funded projects and networks globally that may be able to utilize the Virtual Observatory tools as part of their activities.

5. Expected outcomes

- a. Both IVOA and OAD recognize each other as their partners. Logos and Links of each other will be added on the websites.
- b. A wiki page listing existing Virtual Observatory tutorials at both graduate and education/outreach levels, publicized widely through OAD networks
- c. One or more new graduate level Virtual Observatory tutorials
- d. Broader uptake of the Virtual Observatory tools in tertiary education in astronomy, hence encouraging adoption of the IVOA technologies and standards across countries where astronomy is developing.
- e. Application of IVOA technologies and standards, which are already widely used in the field of astronomy research, to other areas of societal development, wherever possible.

¹ <https://shristiastro.com/>

- f. An adaptable curriculum available for use at universities, based on the IVOA resources and technologies relating to astronomical scientific data. With regard to the initial activity, at least one Masters programme in Southern Africa in which Virtual Observatory tutorials form an integrated part of the learning process.
- g. New global data-driven citizen science projects and events with the concept of STEAM education.

6. Conditions of the collaboration

- a. The Parties shall secure adequate funding from various sources to cover any costs of activities conducted by each party pursuant to the MOU. However, the activities associated with the MOU shall be contingent upon the availability of the required financial resources.
- b. Any disputes arising with respect to this MOU shall be settled by good faith negotiations between the Parties.

7. Duration and Amendments

- a. This MoU will come into force on the date of signing and remain in force for a period of three years, unless terminated sooner by mutual consent of the parties.
- b. This MOU establishes the basic guidelines for the initial OAD/IVOA collaboration, but both parties remain open to further collaborations which may be outside of this MOU.
- c. Changes and amendments to this MOU are possible if mutually agreed upon, should be fixed in writing and signed by all parties, and should explicitly reference this MOU.

Approved and agreed:

International Virtual Observatory Alliance



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Chenzhou Cui
Exec Chair

Date: March 03, 2021

Office of Astronomy for Development



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Kevin Govender
Director

Date: March 03, 2021
