

Indians are pushing the frontiers of man's scientific knowledge.

Astrophysics

Now access astronomy data, running into four terabytes, from absolutely anywhere in the world, courtesy India's first virtual observatory.

What does it take to hold the keys to heaven? Just a computer and an Internet connection! Pune-based Inter University Centre for Astronomy and Astrophysics (IUCAA) has developed India's first and only virtual observatory, which will allow scientists to explore the sky, without using telescopes or visiting an observatory.

To put it simply, the scientists have created a virtual sky inside the high-end computers of the facility, which astronomers can access from anywhere in the world. The virtual sky has copious astronomical data, running into four terabytes (4,000,000,000,000 bytes) generated through decades of studies from observatories based on the ground or planted in space platforms like the Hubble and the Chandra. To get an idea of the data generated by telescopes, try this: the area covered by a thirtieth of a degree in the sky has at least 30,000 astronomical sources.

Christened Virtual Observatory-India (VO-I), the project took three years to complete with active cooperation from Pune-based IT company Persistent Systems, which provided six software engineers for VO-I. All over the world, 14 similar laboratories are coming up, which will be part of the International Virtual Observatory Alliance (IVOA). The IUCAA-Persistent Systems partnership to develop virtual observatories is the first of its kind in the world.

In reality, VO-I is an amalgamation of astronomical science and

information technology. The vast amounts of astronomical data from all over the world has to be managed in the form of storage systems as well as writing codes for retrieval mechanisms. "This is an empowering tool for astronomers," says Ajay Kembhаве, dean of Visitor Academy Programme, IUCAA.

VOI took roots in a conference in the US nearly three years ago and to further the cause, Kembhаве took the help of Anand Deshpande, Persistent's



CEO. "The field of astronomy is extremely data-intensive and requires in-depth domain knowledge. Persistent specialises in building and implementing top-class infrastructure - software. Using this expertise to solve large data problems in astronomy gives Persistent exposure to a new domain of databases," says Deshpande.

Any astronomer, aspiring to study celestial objects only needs to log on to the IUCAA site and click on the VO-I link. The site has many tools developed by prominent astronomy institutes from other parts of the world that help in carrying out studies and retrieving data. VO Plot, a tool developed by IUCAA that is widely used

by astronomers all over the world, also features on the web page.

The astronomer only has to submit his data query on the site and use the tools to carry out calculations and plot results in graphs. Powerful computers at the IUCAA as well as other prominent institutes like Fermi Lab or Johns Hopkins University carry out the calculations and give the results to the astronomers through the site. Without this facility, one would have to gather the data through telescopes and observatories, where it is extremely difficult to get a time slot for observation.

With VO-I ready for use, the IUCAA has initiated plans for VO-I TNG (The Next Generation). "The objective is to create a virtual map of the sky where one can take a tour and retrieve data," says Kembhаве. The IUCAA will also link up VO-I with a grid computing facility developed by the Centre for Development of Advanced Computing (CDAC) for faster computation of complex astronomical problems.

—Rituparna Bhuyan