

# The sustainability plan of VisIVO

## Description of the work

VisIVO consists of several components: VisIVO Desktop, VisIVO Server and VisIVO Science Gateway. VisIVO supports high-performance, multidimensional visualization of very large-scale astrophysical datasets. Users can obtain meaningful visualizations rapidly while preserving full and intuitive control of the relevant visualization parameters. VisIVO was designed and implemented through subsequent phases. Recent developments of VisIVO took place in the context of EGI and IGI, the Italian NGI, to make VisIVO fully-compliant with distributed e-Infrastructures and capable to visualize data produced by jobs running on DCIs of different nature. The first design and development of VisIVO took place at INAF –Astrophysical Observatory of Catania; here the tool continues to be maintained and further developed so that their capabilities continue to grow. To this end the VisIVO Project Lead group operating at the Catania Observatory established several collaborations over time, in the past with CINECA, the most important supercomputing Centre in Italy and now with EGI and IGI. The kernel of the Project Lead group is constituted by staff personnel, strongly motivated to maintain VisIVO fully efficient and compatible with new emerging technologies. This model, based on a group of permanent staff supported by both external personnel and non-permanent staff hired through new collaborations and well-targeted projects could be the right way to ensure the long term sustainability of tools and services on which e-Infrastructures are based. The tool moreover is maintained on sourceforge, and collaborative co-development is welcome as highlighted in the governance model document of the project currently under preparation. The complete code documentation is given and the C++ class structure easily allow any programmer to write a new class or to add features to an existing class. Some developer notes are provided to allow the programmer to facilitate the code development.

## Wider impact of this work

The long term sustainability of tools and services have a strong impact on research. Tools and service brought into production must be maintained and kept up to date beyond the end of the project that delivered them. The development and maintenance of VisIVO do not depend solely on funds of a specific project but on permanent INAF resources (especially human) and on a well-motivated base of end users that rely on it to achieve their scientific goals. The long term sustainability model put in place for VisIVO could be taken into consideration by other groups and Institutes being in charge of tools and services on which European DCIs depend. The INAF Astrophysical Observatory of Catania (OACT) gives full support to this activity. A project between INAF-OACT and the University of Portsmouth will be signed in the next few months aiming at establishing a long term common development plan for data visualization and exploration which includes the usage of workflows and Science Gateways.

## Printable Summary

VisIVO is an integrated suite of tools and services specifically designed for the Virtual Observatory. This suite constitutes a software framework for an effective visual discovery in currently available (and next-generation) very large-scale astrophysical datasets. One of the components of this suite, namely VisIVO Server, has been recently rewritten to make it fully compliant with the emerging distributed e-Infrastructures. This work is part of the planned activity for task TSA3.5 of the EGI-InSPIRE project. As for any other tool and service developed in the context of a specific project, funded through the EU FP7 channel or through other channels, the problem related to the long-term sustainability, i.e. the ability of the tool or service to survive beyond the end of the funding project is of crucial importance. This talk shows how this issue has been approached and solved for VisIVO so that end users can now use the tool being confident that its long term maintenance is ensured.

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