

Project summary

Many research groups and institutes within the European Research Area (ERA) are playing a central role in the production of a vast range of atomic and molecular (AM) data, data that is of critical importance across a wide range of applications such as astrophysics, atmospheric physics, fusion, environmental sciences, combustion chemistry and in industrial applications from plasmas to lighting. Currently these vital and fundamental A&M resources are highly fragmented, available through a variety of often poorly documented interfaces, thus limiting the full exploitation of their scientific worth. This in turn impacts negatively on research programmes across a wide range of topics from space exploration (the search for extra solar planets, understanding the chemistry of our local solar system, of the wider Universe), the study of the earths atmosphere and the atomic and chemical processes involved their, climate change, fusion programme for energy, and so forth.

Through the auspices of this infrastructure the Virtual Atomic and Molecular Data Centre (VAMDC) aims to build a secure, documented, flexible and interoperable e-science environment-based interface to the existing AM data. The VAMDC will be built upon the expertise of existing AM databases, data producers and service providers with the specific aim of creating an infrastructure that is easily tuned to the requirements of a wide variety of users in academic, governmental, industrial or public communities both within and outside the ERA. The project will cover the building of the core consortium, the development and deployment of the infrastructure and the development of interfaces to the existing AM databases as well as providing a forum for training potential users and dissemination of expertise across the ERA. It is expected that VAMDC becomes a European legal entity during the course of the project.

VAMDC, the Virtual Atomic and Molecular Data Centre, will thus provide the wide community of both European and global users with access to a comprehensive federated set of Atomic and Molecular (A&M) data and application resources. This will be enabled by the utilisation of the excellent grid and Virtual Observatory data and application infrastructure that has been created across Europe by initiatives such as the Euro-VO and EGEE. VAMDC will have an enduring and transformational impact on the European research area – greatly enhancing opportunities by offering much improved access to a wider and better assured range of fundamental A&M data and their supporting applications.

VAMDC brings together a wide range of partners with expertise in both the provision and use of A&M data and in the technical development and use of the key e-infrastructures (e.g. the Euro-VO). VAMDC is organised following inclusive and open principles. It will interact widely with the external community to ensure that the priorities for deployment of A&M services are well founded, that training programmes are widely available, and that the benefits of access to this information infrastructure is fully accessible to the community across Europe. Internally VAMDC will effectively deliver this ambitious scientific data infrastructure, by means of service activities focused on the deployment and then continued provision to the data resources and research activities aimed at designing the necessary technical extensions to the baseline infrastructure necessary to meet the demands of community of A&M users. VAMDC will interact with the wider development of the underlying infrastructures – thus EGEE and the Euro-VO – and also participate in relevant standardisation activities such as the International Virtual Observatory Alliance, to ensure continued interoperability of VAMDC resources with related e-Infrastructures.