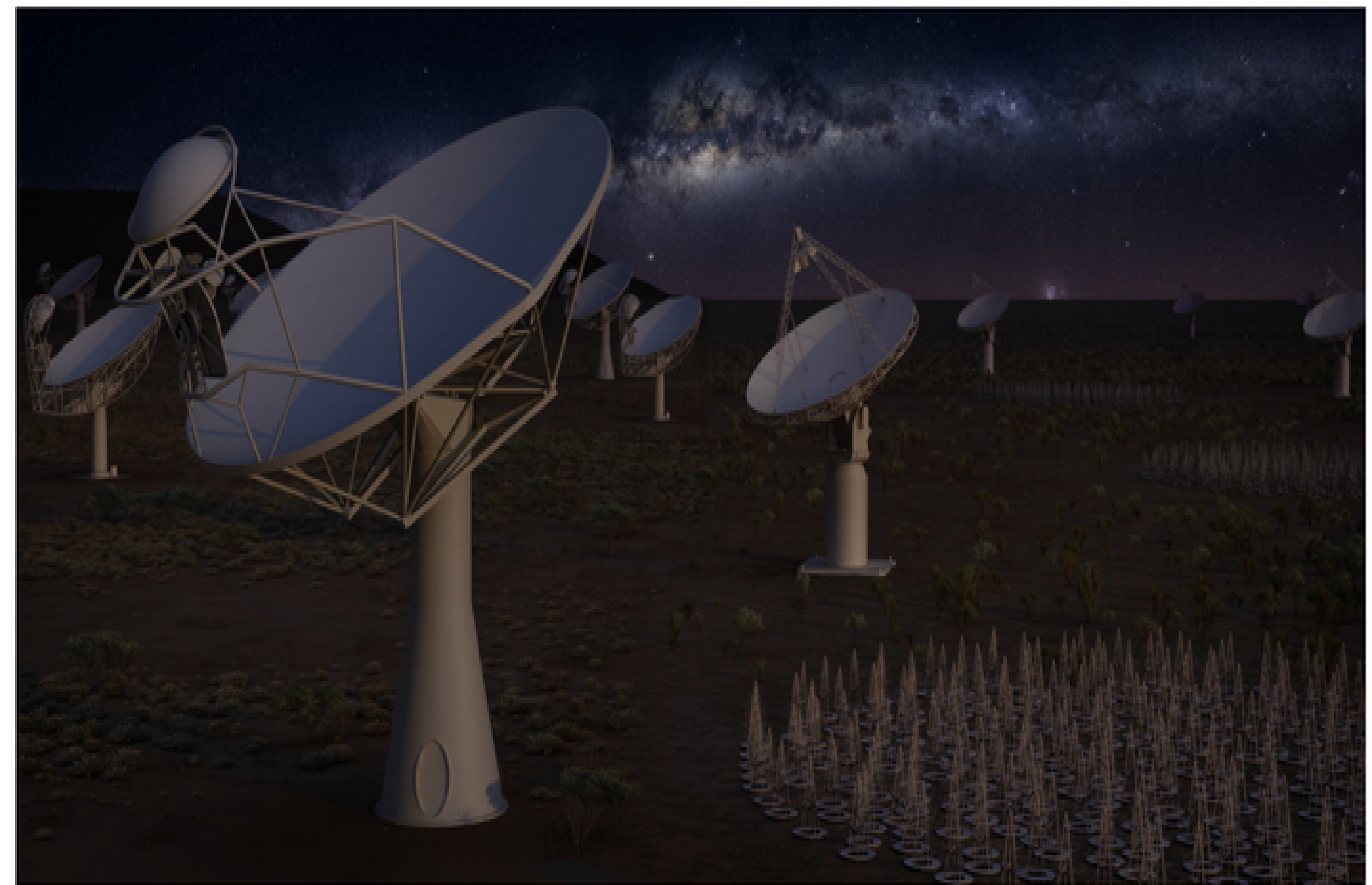


The AENEAS (Advanced European Network of E-infrastructures for Astronomy with the SKA) project has been funded in the Horizon 2020 Work Programme call “Research and Innovation Actions for International Co-operation on high-end e-infrastructure requirements” supporting the Square Kilometre Array (SKA).

The SKA is an ambitious project to construct the world's largest radio telescope and enable transformational science and discoveries impossible with current facilities. Built over two sites in Australia and Africa, it will, when complete, provide over a million square metres of collecting area through many thousands of connected radio antennas.

The SKA is currently foreseen to be constructed in two phases. By adopting a phased rollout, more developed technologies will be utilized early on in the project to secure the first wave of scientific discoveries at the earliest opportunity and then upgraded with new technology currently under development during the second phase. Together with other countries in the world, European member states are leading partners in the construction.

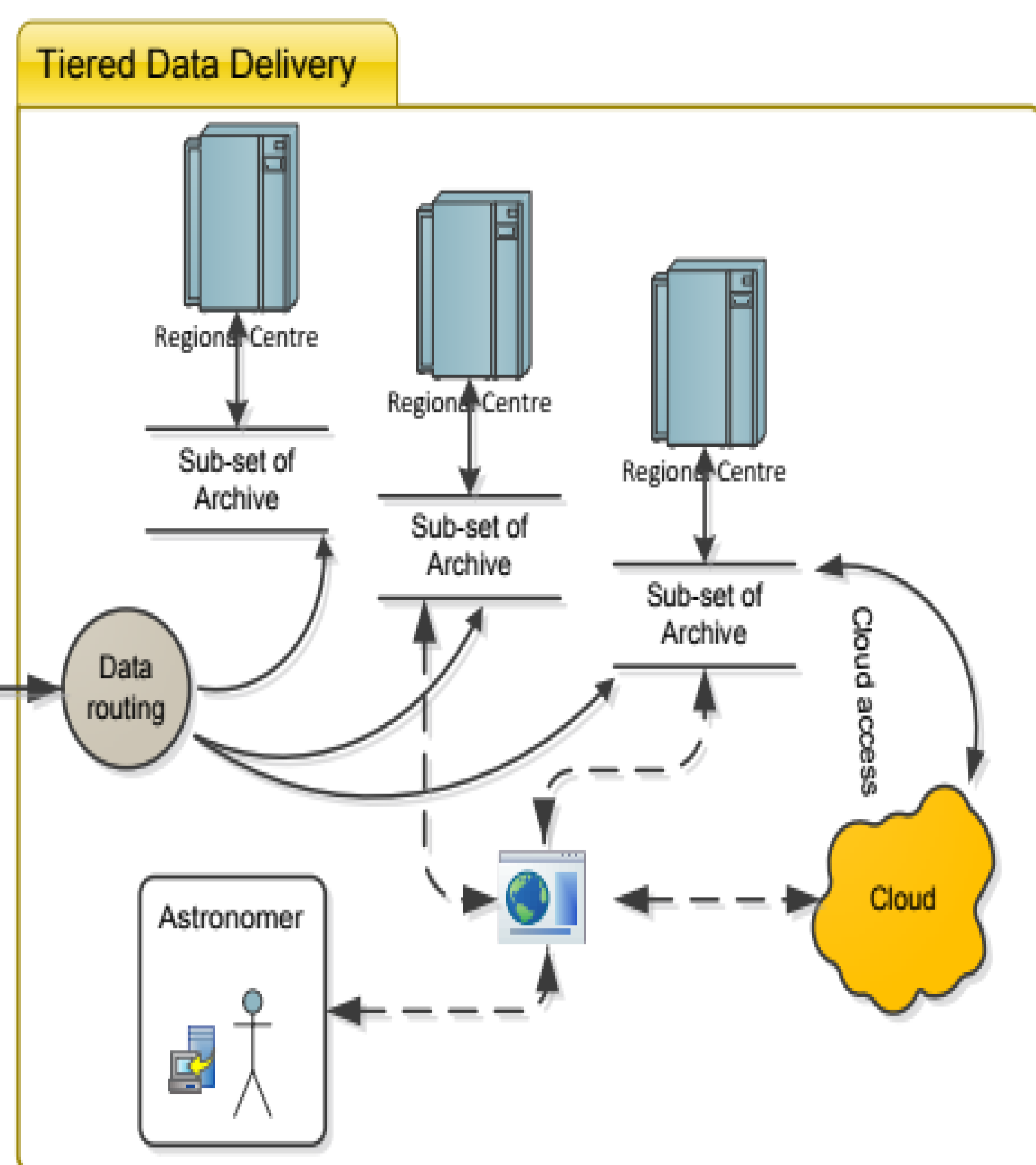
The scientific potential of the forthcoming SKA radio telescope is simply unprecedented and represents one of the highest priorities for the international scientific community in the coming decade. By the same token, the large scale, rate, and complexity of data the SKA will generate present challenges in data management, computing, and networking that are similarly world-leading. Like the SKA itself, a coordinated, global effort will be required to solve these challenges and fully realize the ground-breaking scientific potential of the project.



The next few years will be crucial in preparing to support this first SKA science. Based on current projections, it is expected to produce an archive of standard data products with a growth rate on the order of 50–300 petabytes per year. Although the challenges associated with populating and maintaining the SKA science archive are already impressive, these data products actually represent only the first part of the full science extraction chain. Further processing and subsequent science extraction by the community will require a significant research infrastructure providing capacity in networking, storage, computing, and expertise.

The AENEAS project represents an opportunity to pursue the design, deployment, and operation of the necessary research infrastructure for SKA science at a European level and in close coordination with the SKA project, the host countries, and other international partners. Ultimately, our ambition is to ensure the astronomy community has the resources it will need to achieve the truly transformational science potential of the SKA.

The SKA has been widely identified as one of the major “Big Data” challenges for the next decade. The technical challenges in computing, storage, networking, and analytics required to deploy a research infrastructure capable of supporting European SKA science are also attractive to the IT community, and have much wider applicability both within an academic but also commercial context. A distributed and federated European SRC, therefore, can provide a platform for a European and nationally focused partnership with industry for the continued development of these core technologies and hence a clear route to delivering impact and return.



The ultimate objective of the AENEAS project is to develop a concept and design for a distributed, federated European Science Data Centre (ESDC) to support the astronomical community in achieving the scientific goals of the SKA.

This design must include the functionality required by the scientific community to enable the extraction of SKA science and integrate the necessary underlying infrastructure not currently provided as part of the SKA Observatory to support that extraction. Taken all together, the European contribution to the SKA design and construction phase represents a large fraction of the total project, and the European radio astronomy community is both large and actively involved in the full breadth of the SKA science case. Actively engaging with that community to define the required capabilities of the envisioned ESDC network will be one of the central activities of the 3 year AENEAS project.

The AENEAS activity will leverage existing products, technologies, services, best practices and standards offered by European e-Infrastructures and integrated e-Infrastructures worldwide. The SKA requirements gathered in the project will further advance the state of the art through co-design and accelerate the current level of e-Infrastructure interoperability.

