Astronomy Data and Computing Services (ADACS): AAL's approach to address astronomy community needs

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ASTRONOMY COMPUTING INFRASTRUCTURE PLAN

The Decadal Plan for Australian Astronomy 2016-2025 identified five top-level science infrastructure priorities, including "world-class high performance computing (HPC) and software capability for large theoretical simulations, and resources to enable processing and delivery of large data sets from these facilities" [1]. To better address these priorities, Astronomy Australia Limited (AAL) commissioned a working group to produce a report [2] in October 2016 that reviewed, in detail, existing computing infrastructure available to astronomers and advised AAL on investments in data and computing infrastructure areas over the next 5 years. In accordance with the recommendations in this report, AAL has invested in the establishment of the Astronomy Data and Computing Services (ADACS) initiative, to provide eResearch support services for the astronomy research community. A two-stage tender process was initiated to identify appropriate eResearch subcontractors, resulting in two service providers engaged to deliver ADACS-related services: (1) Swinburne University of Technology, with four collaborators (1a) eScience Institute, University of Washington, (1b) Institute for Data Intensive Engineering and Science, Johns Hopkins University, (1c) Microsoft Azure, and (1d) NVIDIA; and (2) Curtin University and Pawsey Supercomputing Centre with two collaborators (2a) Cray Inc., and (2b) Cisco.

Astronomy Data and Computing Services (ADACS)

ADACS was officially launched in early 2017, to provide astronomy-focused training, support and expertise to allow astronomers to maximise the scientific return from data and computing infrastructure [3]. In 2017, ADACS is focusing on delivering the following three service components:

1. **Provide astronomy-focused training, using workshops, hackathons, webinars and online documentation, in the following areas**: (1) advanced statistical analysis, informatics and machine learning/artificial intelligence techniques; (2) advanced visualisation of data and simulations; (3) programming and software development (including HPC related programming); (4) use of virtual observatory (VO) tools and data portals; and (5) data management.
2. **Collaborate with relevant astronomy experts to create/enhance astronomy data portals to facilitate the management, sharing and reuse of data.** This includes: (1) managing the All Sky Virtual Observatory (ASVO) project (which comprises a growing network of distributed data hubs that are owned and operated by a range of subcontractors); (2) seeking funding for future VO/data portal integration and better connectivity developments; and (3) coordination with the Australian and International Virtual Observatory (VO) communities and projects.
3. **Collaborate/partner with National eResearch providers to help coordinate and maximise the computing and storage resources available to astronomers.** This includes: (1) coordinating an HPC time allocation process on AAL's behalf; (2) providing expert services which could be allocated to individuals and projects to develop data pipelines, algorithms and other software to deal with big data challenges; (3) setting up a national computing help desk for the astronomy community; and (4) engaging with Amazon and Microsoft to offer commercial data and computing resources to astronomy community.

AAL expects to maintain current funding levels to grow ADACS service capacity in the following areas:

- ADACS will develop a pool of experts that can provide critically required training to Australian-based astronomers, but also actively participate in bidding for SKA Science Data Processor (SDP) contracts. ADACS will provide career progression options that develop into long-term careers for these eResearch experts.
- ADACS will drive research and development in the big data sector. For example, ADACS should have capacity to develop innovative tools and data analysis techniques that enhance existing astronomy projects, and pioneer new methodologies for future-scale projects. Many of these tools will be transferred to other research disciplines.
- ADACS will create opportunities for engagement between the academic and industry research sectors to boost the impact of innovation and enhance alternative career paths for astronomy graduates.

REFERENCES

1. Australian Academy of Science - National committee for astronomy, Australia in the era of global astronomy, the decadal plan for Australian astronomy 2016 -2025, http://astronomyaustralia.org.au/files/publications/astronomy-decadal-plan-2016-2025.pdf (accessed on 26 June 2017).
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ABOUT THE AUTHORS

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Mr Mark McAuley is Chief Executive Officer at Astronomy Australia Ltd and has been the senior executive employee since the company's incorporation in 2007. He has served on a number of national and international astronomy committees, as well as previous roles within CSIRO's Australia Telescope National Facility, which have given him considerable experience in developing strategies and priorities for Australia's national astronomy infrastructure.