

Evaluation of the NRC's Herzberg Astronomy and Astrophysics Research Centre

NRC-EVALUATION



Budget (2016-17 to 2020-21)

Total Revenues: \$11.1M

Total Expenses: \$242M



Resources (as of March 31, 2021)

Staff (including students): 149

Equity, Diversity and Inclusion (EDI): Good representation of women in all positions, except in middle or senior management.

About the research centre

The Herzberg Astronomy and Astrophysics Research Centre (HAA) operates Canada's national observatories, manages Canada's participation in international ground-based facilities and provides merit-based access to these observatories for Canada's astronomy community. The research centre identifies and addresses next generation astronomical technologies and works with academic partners on cutting-edge science to serve the Canadian astronomy community. HAA designs and deploys new astronomical instruments as well as provides large-scale scientific computing infrastructure and specialized astronomy data management expertise.

About the evaluation

The evaluation of HAA covered the period of 2016-17 to 2020-21. It was conducted by the National Research Council's (NRC) evaluation team and was carried out in accordance with the NRC's approved evaluation plan, Treasury Board's Policy on Results (2016) and the requirements of the Financial Administration Act. The evaluation assessed the research centre's relevance, engagement, capabilities, scientific excellence and expected results. The evaluation drew on a mixed-methods approach including document and data review, a survey of Canadian astronomers and astrophysicists, internal focus groups, internal and external interviews and a peer review with national and international experts.

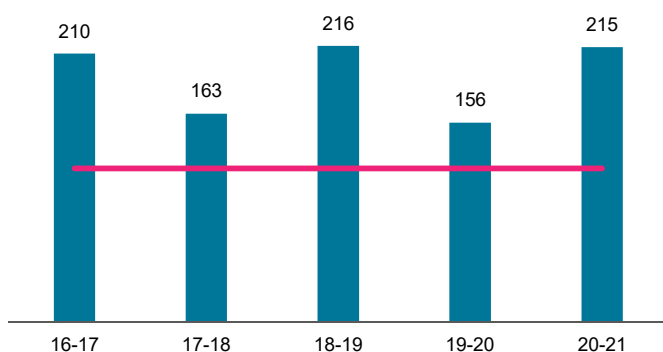
Key findings

Scientific excellence

HAA is a **leader in scientific excellence**. It has contributed to a variety of scientific achievements and technological developments which continue to have positive impacts on the field of astronomy and which have been recognized by national and international science communities.

HAA published **960 peer-reviewed publications**, exceeding its 5-year target of 600. **Citation scores varied between 1.72 and 2.36**, exceeding the annual NRC average citation score of 1.5. Approximately 723 refereed publications used data from the Canadian Astronomy Data Centre.

HAA publications exceeded targets 2016-17 to 2020-21



Relevance

HAA relies on the direction of the Canadian Astronomical Society's Long Range Plan (LRP) for Canadian astronomy. This ensures that the research centre's activities and strategic priorities are closely **aligned with the needs of the Canadian astronomy community**. The research centre provides access to relevant domestic and international telescopes, which are oversubscribed by astronomers.

84% of survey respondents engaged in ground-based observational research reported that the international telescopes supported by Canada are critical to their research needs.

An **HAA Advisory Board** was implemented in response to a recommendation from the 2016 HAA evaluation. However, there is **limited awareness** among external stakeholders of the existence and purpose of the HAA Advisory Board.

The Herzberg Astronomy and Astrophysics Research Centre is **aligned with strategic objectives of the federal government** including advancing fundamental science, fostering the next generation of scientists, and making science collaborative. The research centre is also **aligned with the NRC's mandate and strategic goals**.



Evaluation of the NRC's Herzberg Astronomy and Astrophysics Research Centre

NRC-EVALUATION

Engagement

HAA has **strong collaborations and partnerships** with Canadian and international universities and institutes. To a lesser degree, the research centre has also established national and international industry partnerships, which have led to commercial spin-offs and technological applications within industry.

Over the evaluation period, HAA signed **45 agreements** with Canadian and international partners with a **total revenue of \$8.3M**.



OGDs 10% of total revenue



Academia 52% of total revenue



Industry 38% of total revenue

While HAA is well known within the Canadian astronomy community, within industry, internationally and among the public, there are **opportunities to increase awareness**.

HAA has **established connections with local Indigenous communities** and plays a leadership role in Indigenous dialogue internationally. HAA also ensures environmental sustainability of its sites.

Expected results

HAA is highly capable in managing both national facilities and Canada's participation in international facilities. While significant challenges exist in relation to the Thirty Meter Telescope (TMT) and the Square Kilometer Array (SKA), the factors affecting these projects are beyond the control, but not the influence, of the research centre.

HAA offers significant training and research opportunities for students and Postdoctoral Fellows. HAA demonstrates a strong ability to provide research support that aligns with the needs of the Canadian astronomy community and plays a critical role in contributing to Canada's position as a world leader in astronomy.

Recommendations

- 1. Strategic plan:** HAA's management should update its strategic plan to reflect the 2020 LRP and the recent developments with the TMT and SKA.
- 2. Increase awareness:** HAA should develop a targeted strategy to increase engagement and awareness of its services (e.g., CADC), its outcomes and its successes among: the Canadian astronomy community, international stakeholders, industry, the public and other NRC research centres.
- 3. IT solutions:** The NRC's Knowledge, Information and Technology Services (KITS) should develop concrete options to provide the research centre with responsive, flexible and appropriate services and IT solutions, taking into consideration available resources and government-wide centralization of IT services.
- 4. Increase diversity:** HAA should develop and implement a strategic EDI plan that focusses on research excellence, student engagement, reducing barriers for women to become future leaders, as well as those for minority-group populations, and moving from consultation to empowerment for local Indigenous communities.
- 5. Mentoring:** HAA's management team should develop a mentoring and career development strategy for its early career researchers, students and women in professional and semi-professional positions.

Capabilities

HAA has had the capacities, competencies and facilities needed to achieve its objectives, but many of the **operational challenges highlighted in the 2016 evaluation persist**, including resource constraints, challenges with IT infrastructure/support and lengthy procurement processes.

The number, scope and complexity of astronomy projects are increasing. In response, HAA is working to leverage external funding opportunities from collaborative projects and has recently **implemented a project prioritization/selection process** to balance project demands with current resources.

With the exception of women in administrative, professional, semi-professional and technical positions, HAA's workforce lacks diversity compared to the Canadian labour market availability. In addition, approximately 1/3 of the staff are eligible to retire over the next 5 years.

HAA's **facilities are unique in Canada**, however some are in need of maintenance or upgrading. The value of annual grants and contributions for Canadian access to international observatories have remained static since 2011, which could reduce the amount of time designated to Canadian astronomers in the future.

The full evaluation report, including the management response and action plan, is available on the NRC's website:
<https://nrc.canada.ca/en/corporate/planning-reporting/evaluation>