

**The Astronomy Data Centre of  
the National Astronomical Observatory of Japan**

**Report of the Evaluation Committee**

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The review of the Research and Academic activities of the Astronomy Data Centre of the National Astronomical Observatory of Japan was held on January 24-25, 2008. The review committee had received documents in advance, and heard presentations from NAOJ and ADC staff on January 24<sup>th</sup>. A visit of installations and an additional set of Questions & Answers were organized in the morning on January 25<sup>th</sup>, and the review committee gathered in closed session in the afternoon to discuss its conclusions.

The review committee thanks NAOJ and the ADC staff for the clear presentations of the activities and the very useful answers to the numerous questions, and for their hospitality during the review.

The report will follow the schema proposed by NAOJ:

1. Evaluation of status of Research Activities and User Support and Collaborative Research Activities
2. Evaluation of achievements of the Mid-Term Objectives
3. Future Plans
4. Others

The additional questions asked to the reviewers (dated January 16, 2008) will be answered in the last part of the report.

## 1. Evaluation of Status of Research Activities and User Support and Collaborative Research Activities

### 1.1. On Research Activities

- (a) Is the list of outstanding research outputs such as remarkable papers published, proposed by the ADC, appropriate? Can these papers properly be considered as SS (distinguished) or S (commendable) as proposed in the self-evaluation (format III and IV)? Please comment on each paper listed in the documentation.

The list of outstanding research outputs proposed by the ADC is appropriate.

- *Tanaka et al.: Development of a prototype system of the Japanese Virtual Observatory (JVO), DBSJ Letters Vol. 3, p.81, 2004*

This paper, which describes a research performed in common with a specialist in database research and query language, has received the 2005 Paper Award of the Data Base Society of Japan. This constitutes an important recognition of the astronomical Virtual Observatory by specialists of database research.

The paper is properly evaluated as commendable (S).

- *Miyazaki et al.: Subaru Prime Focus Camera – Suprime-Cam, PASJ, vol. 54, p.833-853*

This paper describes the Subaru Suprime-Cam instrument. It received the PASJ Excellent Paper Award in 2006. Suprime-Cam is an excellent instrument, and it is appropriate to have this paper appear as ADC output because of the involvement of F. Nakata in the quality assessment system, which is specific ADC expertise.

This paper is properly evaluated as commendable (S).

- *M. Ohishi: Leadership of the International Virtual Observatory Alliance*

The International Virtual Observatory Alliance (IVOA) was established in 2002 in particular to co-ordinate the definition of the VO interoperability standards. M. Ohishi has been an Executive Committee member since 2002, deputy-chair in 2004, and chairperson from May 2005 to August 2006. He has also been the chair of the Virtual Observatory Query Language Working Group, and is presently the chair of the Astro-Research Group (Astro-RG), which is in charge of the liaison with the Open Grid Forum. The level of involvement of M. Ohishi in the IVOA is an international recognition of a cutting-edge accomplishment in collaborative research.

We suggest that this output be evaluated as distinguished (SS) rather than commendable (S) as proposed in the self-evaluation.

- *Y. Shirasaki: International Cooperation for Constructing the Virtual Observatory System*

Y. Shirasaki served as a co-chair of the Virtual Observatory Query Language Group (VOQL) of the IVOA, and is now serving as the vice-chair of the working group, and a member of the VOQL Technical Expert Group. This contributes to the international collaboration on the Virtual Observatory development.

This contribution is properly evaluated as commendable (S).

- (b) Are self-evaluated levels of the research outputs and its rationales, the rating scale suggested in the documentation, properly considered? Please comment on these levels.

The self-evaluated levels of the research output are properly evaluated to be commendable, with as explained recognition as outstanding research center by the JSPS since 2004 in a fierce competition and a large number of publications and reports. Also three members succeeded to get permanent positions in universities, a higher-than-average proportion, and a large number of papers have been presented in international meetings in comparison with the size of the team.

- (c) Is quality improvement shown by the ADC appropriate? Please comment on the degree of improvement achieved.

Encouraging staff members, including younger staff, to participate in international conferences and present their own results, in spite of the high volume of functional duties, is a good policy and helps to maintain the data centre at the leading edge.

### *1.2. On User Support and Collaborative Research Activities*

- (a) Is the list of outstanding research outputs such as remarkable activities, proposed by the ADC, appropriate?

The activities listed have a high Social/Economic/Cultural impact although they are not central to ADC mandate. Other activities more central to the data centre mandate and objectives, cited in the self-evaluation report or found in the publications of the data centre members, might have appeared as commendable (S).

- *M. Ohishi: The Achievement Award of the International Telecommunication Union Association of Japan, Inc., in 2006*

M. Ohishi has had a long-term role in the Radiocommunication Sector of the ITU, in particular as the chairperson of the WP7D (radio-astronomy, see below). He also established a radio astronomy protection group in the Asia-Pacific region to unify the radio astronomers' voice. This has important Social and Economic aspects, and the regional role in the Asia-Pacific region is also commendable. The Achievement Award recognizes this impact.

This contribution is properly evaluated as commendable (S).

- *M. Ohishi: Chairman of WPD7 (radio astronomy), study group 7, the Radiocommunication Sector of the International Telecommunication Union*

M. Ohishi has been elected as chairperson of the WP7D (radioastronomy) of the ITU in 2000. This committee has the important role to protect radio-astronomical observations against man-made interference. This has important Social and Economics aspects and a large community impact.

This contribution is properly evaluated as commendable (S).

- (b) Are self-evaluated overall level of the user support and collaborative research activities appropriate? Are the rating scale suggested in the documentation properly considered? Please comment on this level.

The activities in support of supercomputing (which are no longer under ADC responsibility but have been during most of the period under review) have performed well, with successful AOs, and high and effective usage, in particular for important simulations which are also very useful for public outreach.

- (c) Is quality improvement shown by the ADC appropriate? Please comment on the degree of improvement achieved.

The review committee appreciates the reorganization of the former Astronomical Data and Analysis Center into two different entities, the Astronomy Data Center and the Center for Computational Astrophysics. This gives more visibility and manageability to two different important service activities which have different aims and require different types of expertise.

The review committee supports ADC decision to drop general purpose computing, which should allow the team to focus more on their core mandate.

### *1.3. Overall Evaluation*

The overall evaluation of activities is given in 2.5 below.

## **2. Evaluation of Achievements of the Mid-Term Objectives**

Is the self-evaluation of the progress achieved on the following items of the activities, proposed by the ADC, appropriate?

### *2.1. On Research Activities*

The review committee agrees with the self-evaluation of the progress achieved (A): steady development of the JVO system, success in getting external funding, excellent level of international collaboration, together with the promotion of individual research activities for which two young researchers won Excellent Paper Awards.

### *2.2. On the User Support and Collaborative Research Activities*

The review committee agrees with the self-evaluation of the progress achieved (B): the user support has been robust, for the supercomputer system with open announcement of opportunities; with the improvements of the SMOKA system; with user training and Summer School programs. As explained above, the review committee approves the reorganization of the ADEC and the creation of the Astronomical Data Center.

The proposed overall evaluation is B and not A however, because of the problems experienced by the network in spite of the high dedication of the relevant team. The manpower problem in that domain is one of the points on which very urgent action is needed

(see below). The global results of the team are however excellent in view of the very high constraints.

### *2.3. On the Graduate School Education*

The proposed self-evaluation is B. The review committee proposes to upgrade this evaluation to A, since there has been a dedicated policy to encourage and help young staff to publish their work and participate in international conferences, and the ratio of recruitment on permanent positions is higher than average, even if not all the candidates succeeded in obtaining a permanent position. This is particularly remarkable in a team with a high volume of functional duties.

### *2.4. On the Collaborations with General Public and the International Exchange*

The proposed self-evaluation is A. The review committee agrees with this evaluation. The social and international impacts of the activities are excellent and clearly exceed the standards expected. A lot of the activities rely on the national and international impact of M. Ohishi, and it is important to see also other team members taking responsibilities.

### *2.5. Overall Evaluation of the Achievements of the Mid-Term Objectives*

Excellent achievements of the overall objectives have been made, as seen in Sections 2.1-2.4 above.

The ADC has performed excellent overall work. The staff is highly dedicated, working effectively within the constraints. We commend them to remain engaged in research and in a variety of community support activities. They bring significant contributions and expertise on national priorities such as Subaru and they make major technical contributions to the international Virtual Observatory initiative.

The high level expertise on data quality assessment is extremely important to encourage easier use and broader reuse of data, in particular of the very valuable Subaru data. We commend ADC's interest in improving data usability and accessibility for Japan's national research facilities. This activity is critical for improving the visibility and international impact of Japan's investment in world class astronomical telescopes and instrumentation.

However, we have identified several challenges and opportunities which require action to fully exploit the remarkable capabilities of Subaru and ALMA in the near future. They will be detailed in Section 3.

## **3. Future Plans**

The ADC's future plans are thoughtful and well-considered. ADC aims will allow a significant enhancement of service to the community with more focus on core tasks and better synergies with national data producers.

In particular, the creation of Science Centers for each important Japanese resource, with participation of dedicated staff both from the ADC and from the instrument teams, should help to improve service to users and to a broader cross-section of the astronomical community. It is important in a context of limited resources to prioritize the goals. Improving Subaru data

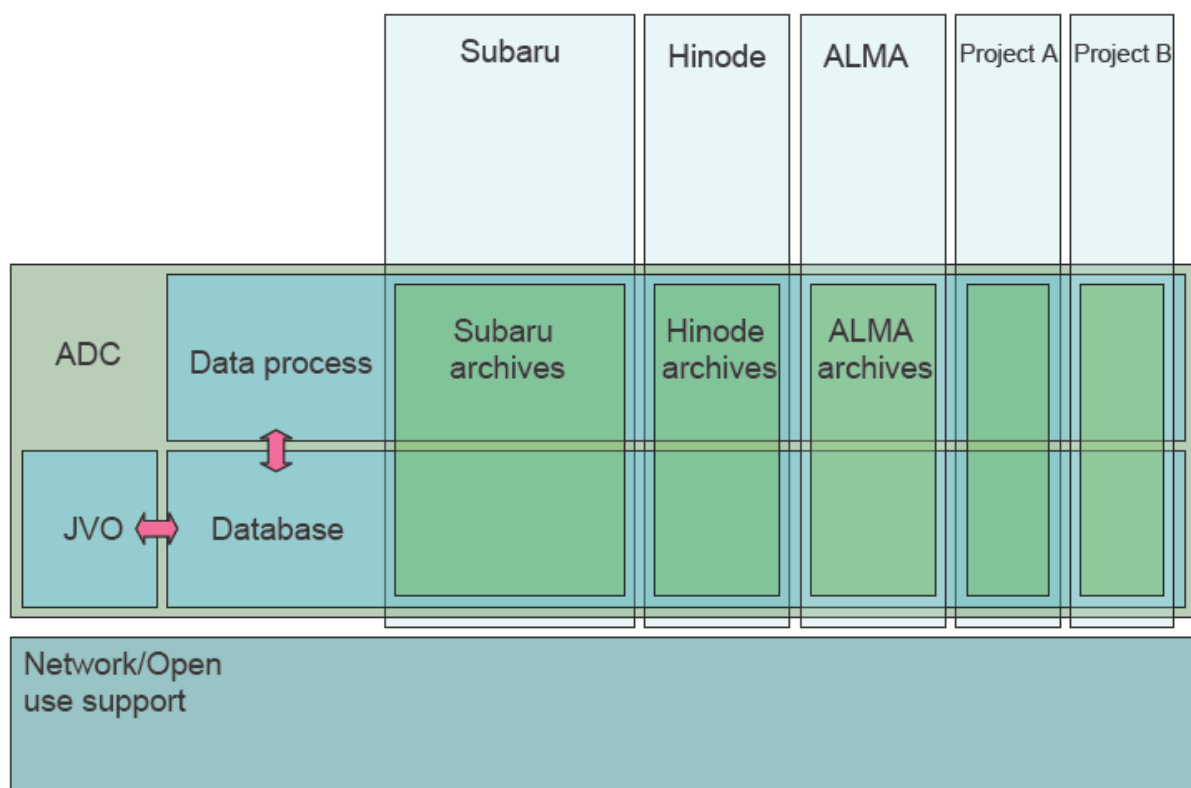
products and availability is obviously a priority target. The Subaru Science Center should allow ADC data quality assessment expertise, data, and tools to be included at an earlier stage in the Subaru data pipeline. The distribution of Subaru data to observers should be rationalized, and the importance of the Subaru pipeline analysis should be recognized, and its versions strictly controlled. On the other hand if there are duplications between SMOKA and VO developments they should be merged.

In particular, in order to improve the usability of the Subaru data, implementing the efforts so far made by ADC, we recommend the following:

- 1) Astrometric correction of the Suprime-Cam data (Yoshino et al. 2007, Kokuritsu-Tenmon-Daihou, 10, 19-37) should be implemented in the Subaru pipeline, so that Subaru users can receive the astrometric-corrected data.
- 2) Subaru data access via JVO (<http://jvo.nao.ac.jp/portal/subaru.do>), including the Suprime-Cam mosaic tool, should be merged with SMOKA.
- 3) All the information available in SMOKA should be promptly available to Subaru observers. For instance, time sequence of weather information (e.g., <http://smoka.nao.ac.jp/weather2.jsp?subaruT2003-05-03T12:00:00>) should be made immediately available to guest observers or to the public.

The Subaru data centre is also required as a prototype for proper management of ALMA: the nature and volume of ALMA data necessitates such an integrated approach.

A desirable schema of ADC organization and of its interaction with projects is shown below:



Another top priority is increasing the technical support for the network. So long as ADC retains responsibility for this task, the current staffing situation presents an exceedingly high risk for NAOJ as a whole, and a totally unfair burden on the two persons in charge. Most

major research organizations manage their IT support in a different way, with a department dedicated to technical support and planning for hardware, software, security and network. We urge NAOJ to consider such an approach. In a new configuration where network routine activities would be carried out by a separate division, ADC may well continue research in informatics in domains relevant to its activities (e.g., efficient data transmission).

On the other hand, we suggest that ADC actively seeks user feedback on their activities (user surveys, interviews, user committee, visit to major organizations in the frame of the inter-university center activities, newsletter, etc.).

#### **4. Others**

No other remarks.

## Additional questions

1. *The ADC plans to continue to operate the SMOKA system for the Subaru data archive and to utilize the distributed observed data and related resources through the Japanese VO, where both systems are closely related to each other. How do you evaluate this future plan of the Astronomy Data Center in the context of the related situation in the world?*

The future plan of the Astronomy Data Center is in the mainstream of current astronomical projects in other countries, in particular with *production of science-ready data* through pipeline processing. The necessity to put a larger fraction of resources in data pipelining and distribution is more and more widely recognized. In order to develop such pipeline systems, it is necessary for the data center to closely collaborate with individual telescope projects. In this context, the future Astronomy Data Center should have much closer ties with the telescope projects such as Subaru and ALMA (see the diagram above).

2. *What do you think would be the appropriate number of permanent and non-permanent staff in the Astronomy Data Centre to achieve its objectives?*

An increase in staff is needed to meet all the goals. The priorities on Subaru, network, and ALMA requires in particular additional staff.

For which concerns the support to network, it is necessary to hire at least one high level specialized engineer (not a scientist). See also the above recommendation on the establishment of a specific IT support center.

3. *How do you evaluate the ratio between the budget and the number of staff, when compared with other data centers in the world, to achieve its mission?*

This question is very difficult to answer because the structure of the budget is very different from what it is in other places. It is in particular unusual to include network costs, and the very high cost for renting and supporting computers is also noticeable. We urge NAOJ to assess the cost/benefit of different possible solutions, which include purchasing more cost-effective computers and/or hiring in-house or out-sourced support engineers. At least, the general network cost (including the budget for support staff) and the cost of running the genuine astronomical data center should be separated, so that cost-effectiveness of the ADC is properly evaluated.