Subaru Telescope International Partnership

Subaru Users Meeting

11th January 2017

Ikuru Iwata (Subaru Telescope)

Why partners, not just ‘selling’ telescope time?

- The ultimate goal of Subaru Telescope is to produce the best science outcomes from Subaru Telescope.
  - Dividing telescope time into small pieces makes forming large surveys difficult (even if not impossible).
  - Forming single ‘Subaru community’ with partners which share long-term science goals
- Some partners want to commit to long-term planning of the telescope.
- Long-term commitment could help stabilize the budget perspective in long-run.

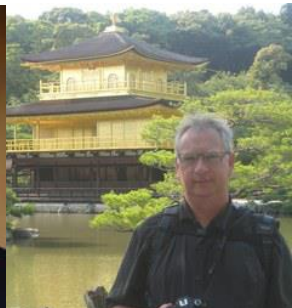
TMT and Maunakea Observatories

- Whether TMT will be built on Maunakea is critically important to Subaru Telescope and all Maunakea observatories.
  - That could affect our strategy of long-range operation plan of Subaru Telescope.
- However, our ultimate goal, ‘to produce the best science outcomes from Subaru Telescope’ will not change.
- MK observatories are more and more working together, in many aspects.
  - We should put long-range vision of Maunakea astronomy into our perspective, while working on strategic planning of Subaru Telescope.

Current Status of Partnership Discussions

Canada

- Collaboration in RAVEN and ULTIMATE-Subaru
- Iwata visited HIA and major universities in 2015-2016
- Arimoto presented Subaru Telescope in CASCA2016
- Discussion with Greg Fahlman (NRC-HIA General Manager) and Dennis Crabtree (director of optical telescopes, NRC)
- Prototype for MSE (Maunakea Spectroscopic Explorer) Spectrograph to Subaru?
- 20% partner of Gemini Observatory, until 2021 (renewal in 2018)
- Shares future vision of ground-based astronomy in TMT



Canada
Long Range Plan Mid-Term Review 2015

- The MTRP (Mid-Term Review Panel) recommends that Canada's participation in Gemini continue to be supported beyond the end of the 2016-21 International Agreement. The nature and level of that participation must be considered within the context of a coordinated plan for funding the operation of our ground-based facilities, together with any opportunities for broader access to the landscape of 8-10m optical/IR telescopes.

Australia

- Discussion started in 2015
- Dec. 2015 Director Arimoto and Iwata visited AAO, ANU, USyd, AAL
- Aug. 2016 Arimoto+ visited ANU and Swinburne.
  - Technical workshop at ANU and AAL board meeting in Swinburne.
- Regular working group meeting
  - Japan: Arimoto, Yoshida, Kodama, Doi, Minowa, Koyama, Iwata
  - Australia: Colless, Couch, McAuley, Greene, Webster, Foran, Fenner, Brierly

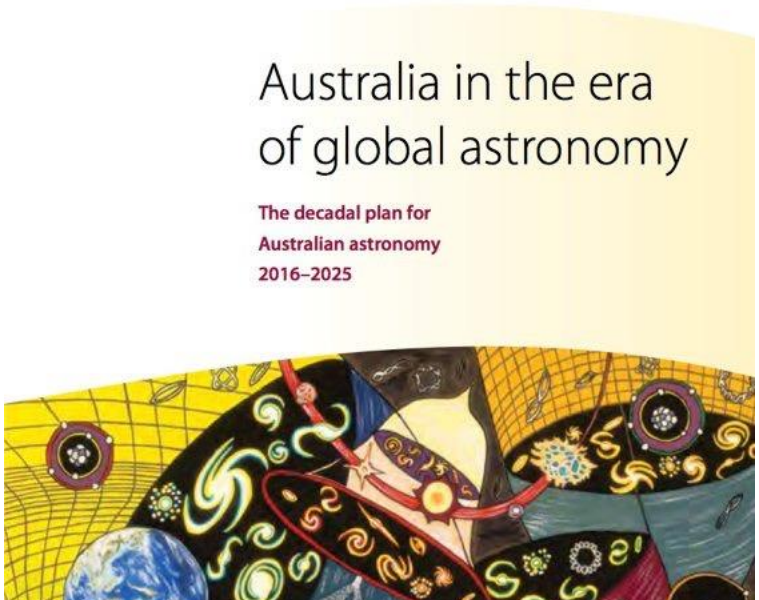
Australia

Announcement, 21st Dec, 2016

The National Astronomical Observatory of Japan and Astronomy Australia Limited announced that they have reached in-principle agreement to collaborate during 2017 and 2018 to benefit both Japanese and Australian astronomers. Australia will provide financial support, technical contributions, and four nights on the Anglo-Australian Telescope in exchange for ten nights on the Subaru Telescope. The telescope access will be available during semesters in 2018 and 2019A. The technical contributions will include a design study associated with enhancements to Subaru Telescope's adaptive optics system. This initial collaboration will benefit astronomers in both countries, and provide a framework for a deeper collaboration in future years.

Australia

- Decadal plan of research infrastructure
- Aiming at 30% access to 8-10m class telescope
- Continuing discussion with ESO, Keck, Magellan
- Limited-term collaborator of Gemini



https://www.education.gov.au/news/2016-roadmap-update-0

East Asian Countries

- Communication with East Asian Observatory (China, Japan, Korea, Taiwan) which currently operates JCMT
- EAO board indicates strong interest in joining Subaru Telescope in long-term
- Subaru director provides in total 6 observing nights in S17A-S17B for EAO time
  - In-kind contribution from EAO is in prep as a return for the EAO time
- Draft MoU for the collaboration between EAO and Subaru Telescope is being prepared.

India

- Possible interest in Subaru Telescope access
- Director Arimoto sent a letter to Dr. Ojha for discussion of possible collaborations.

Some Critical Points on Partnership

Timeline

- 2017
  - S17A and S17B: EAO time from DDT
  - Written agreement with AAL on short-term access
  - Technical contributions from Australia
  - March: 1st Partnership Science WS in Mitaka
  - Outline of long-term collaboration with Australia to be determined for funding process in Australia
- 2018
  - S18A, S18B, (S19A): Australia time from DDT
  - Agreement with Australia?
- 2019
  - S19B?: Long-term partnership starts with Australia?

Critical points to be discussed

- Contributions
  - Cash contributions
  - In-kind contributions
- Telescope time and data access
  - TAC
  - Strategic programs
- Governance
  - The board, STC

Basically NAOJ has a responsibility to formulate and determine the partnership. However, as an open-use institute, NAOJ should listen to community's voices.

Contributions

- Cash contributions
- In-kind contributions
  - Development of new instruments
  - Upgrades of telescope, facilities, instruments
  - Contributions to the operations
    - Human resources
    - Contributions to improvements / cost reduction
- Cash contributions are critical for sustaining Subaru Telescope operation.
  - Minimum contribution for full partnership?
- Q: how we can value in-kind contributions
  - Cf. past new instrument projects – 1st generation instruments, HSC, PFS

Contributions

- Japanese contribution
  - Annual financial contribution for operation
  - Capital contributions by Japan for telescope, facilities, and instruments
  - Technical contributions
- The values of past financial contributions should be included in the Japanese contribution.
  - Their current value needs to be agreed with partners.

Japanese contribution:

$$\frac{\sum(\text{Cash}\ \text{Tech}\ \text{Capital})}{\sum(\underbrace{\text{Cash}\ \text{Tech}\ \text{Capital}}_{\text{JP}}\ \underbrace{\text{Cash}\ \text{Tech}}_{\text{Partner A}}\ \underbrace{\text{Cash}\ \text{Tech}}_{\text{Partner B}})}$$

Telescope Time and Data Access

- Separate regular programs and SSPs.
- Regular programs:
  - Single TAC
    - Including members from partners
  - Allocation basically follows fraction of contributions by a partner
    - Need some flexibility to carry out the best proposals
      - Regulate telescope time so that telescope time gained by a partner is roughly equal to the fraction of its contribution if averaged over the couple of years
      - Secure telescope time for some fraction of the share but leave areas of competition; does not require the equality between telescope time and contribution

Telescope Time and Data Access

- Subaru Strategic Programs (SSPs)
  - HSC SSP: no additional partnership
  - PFS SSP: negotiation and agreement with PFS collaboration necessary
- We need a new definition of large program after PFS SSP
  - No guaranteed access to ‘all Japanese’?
  - Not tied with instrument development groups
- International proposals
  - Currently we accept international proposals for regular open-use with 20% upper limit
  - Should we reduce or stop accepting international proposals?

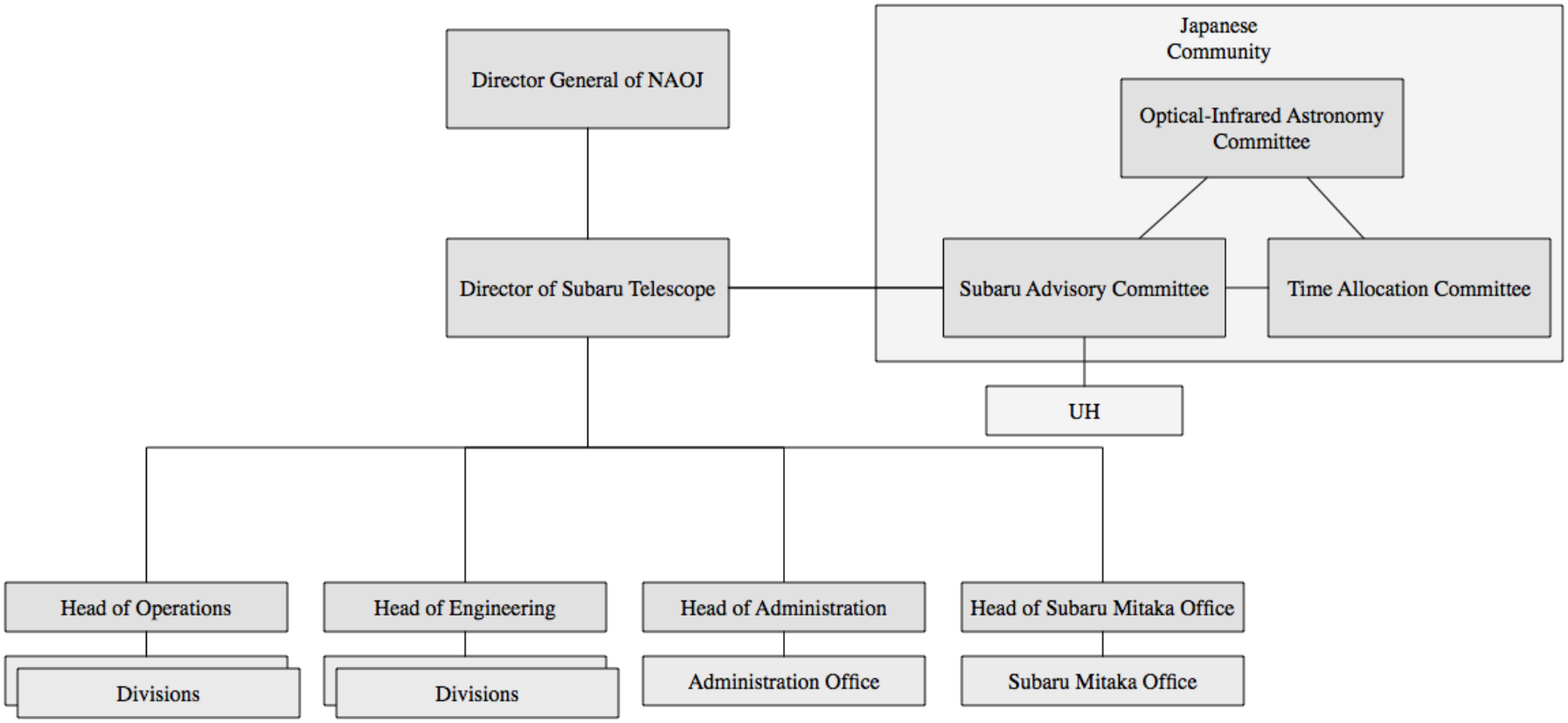
Governance / Organization

- The board
  - NAOJ director general and Japanese representatives
  - Partner representatives
  - Make high-level decisions on budget, strategic plan, and organization
- NAOJ director general
  - Has superior power over the board in some areas, such as appointment of Subaru Telescope director (who is NAOJ professor) and the existence of the project
- Roles of the board and NAOJ DG should be clearly defined.

Governance / Organization

- Science and Technology Committee
  - Supersedes the roles of current SAC
  - Representatives of partner institutes / communities
  - The observatory consults STC on operation matters
- Finance
  - Each institute has responsibility of its contributions
  - Overall management: TBD
  - Fiscal year starts in April
- For the first 1-2 years Australia will join existing SAC until the board and other organizations are formed.

Current Subaru Organization



Organization with partners (Draft)