Observatory metrics for use in the Senior Review

We realize that our facilities operate in very different modes that make direct comparison on a completely uniform set of metrics a challenge. We also recognize that the observatories are at different stages of development and maturity. We have tried to cast metrics in such a way as to allow normalization for these factors when possible, and to provide a range of metrics that encompass the wide variety of activities and operations seen in the observatories. We also understand that each facility may have particular features that are not captured in these quantitative measures, and we expect that each will present information on those in addition to the metrics listed below. Some measures, such as cost-effectiveness and characterization of future projects and plans, we leave to the discretion of the observatory to define and provide.

In spite of these caveats, we suggest a common set of metrics below that allow us to compare the various components of the facilities and their capabilities.

Telescope subscription rates

(These should be normalized for comparison, say by 6-month semesters. Should be presented for the last 6 to 10 years. Should be broken out by telescope within a facility.)

- Number of proposals received,
  - separated by staff and non-staff PIs
  - domestic and foreign (for Gemini US and partners)
- Amount of time (by night or hours) requested
  - separated by staff and non-staff PIs
  - domestic and foreign (for Gemini US and partners)
- Total time requested/total time available for science

Users/programs supported

(These should be normalized for comparison, say by 6-month semesters. Should be presented for the last 6 to 10 years. Should be broken out by telescope within a facility.)

- # programs allocated time
  - number of programs with non-staff PI's
  - number of programs with observatory staff as PI's
  - number of thesis programs
  - number with U.S. PI's
  - number with foreign PI's
  - information on geographic distribution - # states, # institutions, characterization of institution (R1, PUI, etc), if information known
- # PI's and PI's + co-PI's (sum on proposals and by individual)
- # students - graduate, PhD, undergraduate
- Collaborative programs, e.g. coordinated with other observatories or space-based
- Fraction of community served (e.g. #users/#AAS members associated with discipline)

Publications/citations

(Normalized by available science time with consideration that some facilities were not under full science operations during this period.)

- Number of publications in peer-reviewed journals (if numbers for conferences provided, should be given separately)
  - by observatory, and by telescope
  - both staff and non-staff - led publications
  - (Need to describe how papers that acknowledge more than one telescope used are counted)
- Citations of papers using observatory data
  - by observatory and by telescope
  - both staff and non-staff - led publications
- Other publications or citations

Data archive and access

- Description of digital library and archival products and services provided to the community
- Amount of data ingested to archive
- Amount of data retrieved from archive
  - If possible, characterize downloads by site
- Number of papers based on archival data, if not included in publications above

Nature of facility

- Are telescopes, instruments, or capability provided unique?
- Does the facility offer capabilities that are otherwise unavailable to US astronomical community?

Partnerships and service to the community

- Software provided, and characterizations of its distribution or use
- Partnerships with universities, instrument design or fabrication
- Added value infrastructure provides to the community (e.g. tenant support)

Education and Outreach

- Number of visitors, participants in sponsored programs, tours, etc
- Programs sponsored, e.g. teacher enhancement, community engagement, curriculum development
- Press releases, media events, media products or resources provided
- Other publications, web presence and use
- REU program – number and demographics of student participants
- RET program - number and demographics of teacher participants

Other possible metrics, if available and at the discretion of the observatory:

- Cost effectiveness – normalized to operating costs, staff FTE, observing time, etc
- Scientific highlights
- Development of future projects and instruments