Instrument Acquisition Working Group: Status Update
IAWG Members

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IAWG Charge

- Identify instrument acquisition models that promote the scientific success of Gemini. Considerations should include: 1) the instrument decision-making process; 2) delivery of instruments on timescales appropriate for today’s rapidly-changing research environment; 3) matching the community expectations and desires in a timely manner; and 4) providing capabilities that meet the scientific needs of the community. Science requirements should drive instrument acquisition, and therefore they may also influence funding plans. The Working Group should develop a specific strawman model for GSC discussion at the upcoming April meeting, to pass along to the Gemini Board at its May meeting.
Note

- This presentation highlights negatives only
- There are many positives noted in the document regarding previous instrument generations
Highlights: Funding

**Phase II Instrument selection**
*By June 1996*
Overview article by F. Gillett and M. Mountain state: “Gemini will have an ongoing instrument development program as it enters its operations phase”. Project announces

*By December 1996*
USGPO convened a workshop in August to identify the interest and priorities of the US community for future Gemini instrumentation. (Note that in the December NOAO Newsletter is the following: “In the steady-state of Gemini operations, approximately $3.5 million per year will be available for new instruments and facility upgrades”.)

- $3.5M in 1996 is ~$5.3M in 2010 $$ (at 3% inflation per year)
By June 2003
Newsletter states, “Gemini instrumentation program has a vigorous development component that will be used to maintain a steady stream of state-of-the-art instrumentation at both telescopes.” U.S. NGSC holds community workshop in May 2003

- Steady stream of instrumentation envisioned, surely demanding steady **funding** stream

derive is that **good fiscal planning by the funding agencies and the Board is required** if we are to avoid frustrating, if not futile, exercises in instrument planning. The outcome of the Phase I and II instruments was assured due to secured funding, while the **Aspen initiatives** where ultimately short circuited due to lack of funding.

2. Though most funding was secured, total funding was not, which meant **each partner country** had to cover for the shortfall.
By June 1997
The Project announces “international scientific reviews will be held every two to three years, providing an opportunity to reevaluate the content and direction of the instrument program from a scientific and technical perspective”. The first of these International Gemini

Bad:
1. Total funding still an issue.
2. Some instruments still assigned; competitive process circumvented.
3. 'Fill the gap' or 'fast track' instruments lacked sufficient review.
Keck

- White papers regularly solicited
- Seed funding provided by observatory (~$100K per year (TBC)
- Very strong ‘ownership’ in the community
  - Typically UCSC/UCLA provided instruments
  - Instrument concepts percolated up from community
- Yearly review can lead to nimble instrumentation procurement
Subaru

- “Regulation set by SAC or observatory” was effective
- “The SAC plans but has no power to realize” plans
- Strong feeling of telescope ownership
- Can bid for funds on a yearly (TBC) timescale from funding agency
5.6. The instrumentation plan
An STC approved instrumentation plan may be subject to change at any time, either by not launching initially planned studies, by modifying the instrument specs or by being responsive to new ideas.

5.7. Budget
Funds for instrumentation/new facilities included a rolling instrument construction budget line.
Including major rebuilds and upgrades, the average delivery rate has been about one instrument per year, to astronomical accuracy, and instruments range in age up to about 10 years, with an average of 5 years. The first light instruments remain in good working condition.

If each site were to receive a major new instrument every two years, and completed one major instrument upgrade each year, each site could always have two world-beaters and two workhorse instruments, and perhaps a more specialized or visitor instrument for a particular science focus.

Another limit to consider is the rate at which Gemini staff can commission, maintain, and support facility instruments. A reasonable goal is to commission one new instrument and one or two major upgrades per year.

This goal can be accomplished with a budget for new instrumentation of $6-10M per year, depending on trade-offs between performance, price, and schedule. With a budget of $6M per year, Gemini could deliver one instrument every 20 months (assuming an average cost of $10M). This rate is less than optimal, since a rate of one instrument per year would allow a new instrument on each site every other year. Combined with appropriate upgrades, a rate of one world-beating instrument per site per two years would maintain Gemini’s competitiveness.
Highlight Summary

- Long range plan/vision crucial
  - Should be revisited every couple of years for instrument updates

- Absolutely crucial to have steady funding stream for instrumentation

- New instrument per site every two years proposed with a $6-10M annual budget

- Increase funding sources (e.g. NSF, CFI..)

- Seed funding for white papers proven successful for some communities

- Reviews of science, instrument design and costs are crucial
  - Race to lowest-cost bid can demand institutional support, which hurts stakeholders in the long-term
  - Do the ESO/NASA approaches to reviews yield more penetrative reviews?

- The GSC can play a crucial role in setting instrument priorities
  - But guiding, not insisting on a precise path

- Ownership of telescope key to some communities

- Building 8m facility class instruments is tough
  - Perhaps Gemini or Gemini national centers could collaborate/partner with University-based teams?
Previous Model

Every 7 years

• National planning meetings
• International planning meeting
• Instrument selection
• Funding secured
• Build instrument
1/2 Baked Possible New Model for Discussion

- Revised ~2 years
  - Strategic Vision

- Every ~2 years
  - White papers solicited – funded at ~$100K
  - Conceptual studies awarded by Gemini
  - Guided by strategic vision

- Steady stream of funding could be awarded to one of the conceptual studies concepts, or another
  - Awarded by Gemini
  - Guided by strategic vision

- Competitive bid for instrument construction

- Build instrument

Instrument funded from national funding agency; endorsed by Gemini