

The “Aspen Process”

The path to Gemini’s next generation of instruments actually led through the small town of Aspen, Colorado during June 2003. This was the sight of the Aspen Instrumentation Workshop attended by over 90 members of the Gemini astronomical community. A basic element of the strategic planning process within Gemini’s instrument program is community involvement and it was through this workshop that community involvement in defining future research directions at Gemini culminated. It is clear that the Observatory acts as a conduit for instrument teams within the Partnership to provide capabilities that enable science for its worldwide constituency of astronomers. In effect, the customers for Gemini’s instrument program are the astronomers that use the observatory for their research. It is therefore crucial that

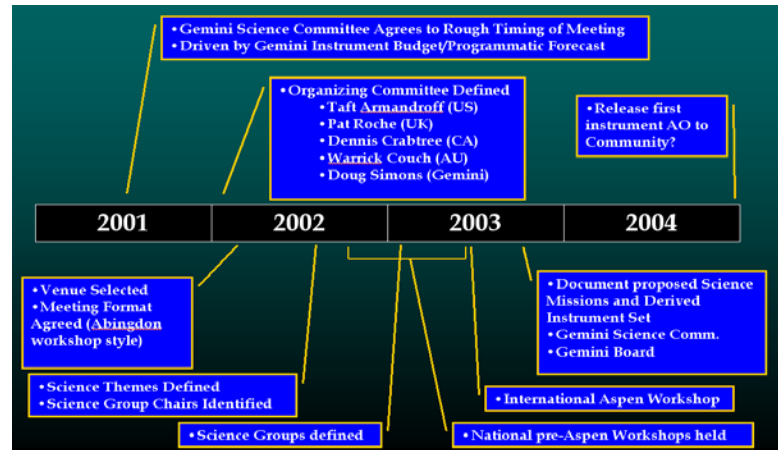


Figure 1 - A timeline depicting Aspen Process milestones over the last two years is shown.

the definition of future instrumentation stems from Gemini’s customers and their vision of future astronomical research. This periodic external scientific infusion into Gemini’s development program is the heart of what has come to be known as the “Aspen Process”.

The Aspen Process actually started in July 2001 with a Gemini Science Committee recommendation to launch the next round of instruments through a science conference in 2003. Figure 1 illustrates the various steps taken between that GSC meeting in July 2001 and the Aspen meeting in June 2003. The Observatory was asked to organize this science conference and, in turn, recruited lead scientists within several partner countries to act as the organizing committee. After selecting a venue for the meeting, four science themes were defined, which together broadly defined a comprehensive set of astronomical research topics. The intent of defining these themes was to structure the workshop and its participants into four groups that could each focus on a set of research topics, ranging from planetary science to high-*z* cosmology. The science themes and corresponding group chairs participating in the Aspen Workshop included:

- Stars, the Solar System and Extrasolar Planets (Chris Tinney)
- Star Formation Processes and the Interstellar Medium (Michael Meyer and Bob Blum)
- Structure and Evolution of the Milky Way and Nearby Galaxies (Rosie Wyse)
- Formation and Evolution of Distant Galaxies and the High Redshift Universe (Bob Abraham)

In parallel with this activity, the organizing committee also held national pre-Aspen meetings within their respective countries in order to develop coherent science perspectives leading into the international workshop. These pre-Aspen workshops were generally structured along the same science themes as the Aspen meeting, and acted as a channel for *many*

astronomers to inject their perspectives about Gemini's scientific future. The Aspen attendees participated in these preliminary national workshops, thereby providing continuity between all of the various science meetings. The makeup of each science group was proportioned to partner shares in the Gemini Observatory, to ensure that each group had broad international representation and received input from each of the pre-Aspen national workshops. In addition, Gemini science staff members were present in each science group in Aspen.

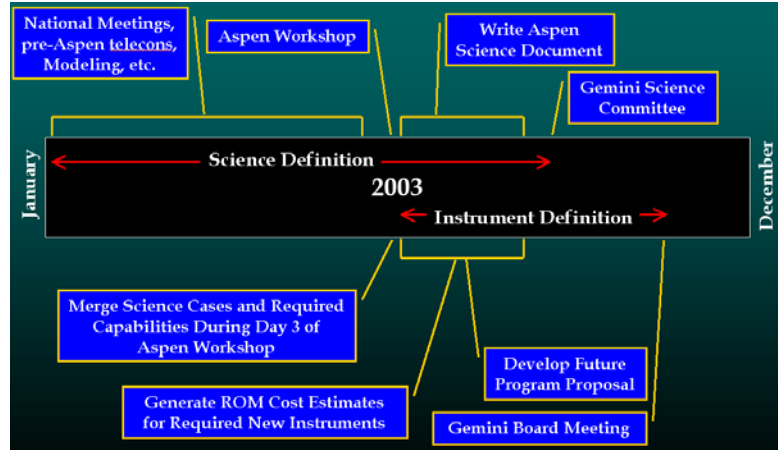


Figure 2 - A more detailed timeline of 2003 milestones in the Aspen Process is shown.

Figure 2 shows a 2-track process used to develop the science case and corresponding new instrument requirements from Aspen. The science definition phase of the Aspen Process ends with a recommendation from the GSC to the Gemini Board about which new capabilities should be developed. A second parallel track of activity, the instrument definition phase, began soon after the Aspen Workshop. This track primarily consisted of generating cost estimates for the potential new instruments and facilities required to support the science mission identified at Aspen. Ten organizations participated in generating rough order of magnitude (ROM) level cost estimates for potential new instruments. This effort, combined with the workshop science report, which was principally authored by the Aspen science group chairs, links the science ambitions of the Gemini community to a set of potential future instruments, defined by top-level design requirements and a set of cost estimates. All of this information was provided to the GSC for its October 2003 meeting, which was asked to make a recommendation to the Gemini Board about which instruments should be further pursued among those identified in Aspen. Finally, during its November 2003 meeting, the Board endorsed taking the first steps in developing key instrumentation identified through the Aspen process. These steps include –

- Starting design studies for 2 new instruments, including a high performance coronagraph and high resolution near-infrared spectrometer
- Starting a feasibility study for a wide-field fiber fed optical multi-object spectrometer
- Starting a feasibility study for a Ground Layer Adaptive Optics (GLAO) system
- Examining innovative ways to support key science goals identified during the Aspen Workshop by either modifying instruments already under development for Gemini or by using unique visitor instruments

The product of this activity will be much better cost and performance estimates than are currently available for the proposed new instruments, in about 1 year. This information will be fed into future decisions for funding such instruments as part of the 2006-2010 budget cycle for Gemini.

Finally, it is important to recognize a key difference between the 1997 Abingdon Instrumentation Workshop and what occurred in Aspen in 2003. In the former, funding already existed to build the next-generation instruments for Gemini hence the Abingdon Workshop included a blend of technical and science discussions. At that point, since funding for new instrumentation had already been defined the core question at Abingdon was how to spend it wisely. In contrast, at the time of the Aspen Workshop, no funds existed to build new instruments for Gemini, as the current five-year fiscal cycle ends in 2005. As a result the Aspen Workshop tended to focus much more on “big questions” in astronomy that can be addressed through new capabilities at Gemini. The product from the Aspen Workshop is a comprehensive and compelling science case which the Gemini funding agencies can in turn use to support future fund raising activities.