

## THE GEMINI OBSERVATORY VIRTUAL TOUR

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### ABSTRACT

Because of their remoteness and the resultant difficulty of visiting the Gemini telescopes on Mauna Kea and Cerro Pachon, a virtual tour of the Gemini Observatory was instigated. This has been developed over the years and has received wide acclaim. This talk illustrates where we are now with the Virtual Tour and gives some examples of topics that have worked well and some idea of the costs involved in such an enterprise.

### INTRODUCTION

During the past five years, the Gemini Observatory Virtual Tour (GOVT) has gone from a prototype project of limited scope to a broad initiative that has impacted a number of existing and new education and outreach programs at the Observatory.

Initially the GOVT was developed to address the problem of limited access to the summit area of Mauna Kea, and health, safety and staffing issues related to providing tours at Gemini North. Especially problematic is the fact that students under 16 years of age are not allowed on organized summit tours due to potentially severe health issues.

*Figure 1. The Gemini Observatory Virtual Tour "package"*



The GOVT was initially produced as a simple CD-ROM-based walking tour of the interior of the Gemini North facility, with interactive elements that allowed users to learn more about specific locations within the facility and to understand better how the observatory worked. With the initial success of this prototype, the GOVT has continually expanded to meet new needs, expanded rationales and educational objectives.

Beyond providing a simple virtual experience to those wishing to visit the summit facilities, the GOVT has evolved to serve as a general informational package for anyone wanting to learn more about Gemini, its technology and scientific results. The content of the tour has also expanded dramatically and now contains dozens of modules covering most major aspects of Gemini's mission.

To meet the objectives set for the tour, it must be:

- Educational;
- Highly Interactive;
- Fun and Challenging;
- Bi/Multi-lingual;
- Current (updateable);
- Low-Cost (Distribution);
- Bullet-Proof for Kids and Kiosks;
- Accessible – MAC/Windows.

While most of these objectives have largely been met, some are still being developed, such as the bi/multi-lingual features. The next version (3.0) will contain Spanish translations, and additional languages are planned, incorporating all of the Gemini partnership languages within three years.

Making the tour current is an ongoing effort, but the ability to update it easily has been incorporated into the tour by developing an internet update feature into a "News" module. This module features current press releases and images in a lively newspaper-style format with updateable headlines, lead stories and an expanding archive.

To meet the objectives of the GOVT, it was deemed that the most appropriate technology to use was a CD-ROM, due to low duplication costs and the almost universal accessibility of such drives in computers. Furthermore, with the relative ease of producing interactive content with multimedia elements and the relatively large data capacity of CD-ROMs it was determined that this combination would be the most ap-

## GOVT RATIONALES AND OBJECTIVES

## PRODUCTION TECHNOLOGIES AND FEATURES

## CONTENT ELEMENTS AND FEATURES

appropriate for the tour. The final factor in choosing the CD-ROM format were our plans to “port” the tour to internet delivery eventually. Limiting the size to about 700 MB assured that eventual internet delivery would not be prohibitive.

The following key elements guided the selection of production technologies and features:

- CD-ROM/Hard Drive Delivery
- Interactive Media (QuickTime VR)
- Assembled with Macromedia “Director” for flexibility and interactivity
- Internet Enabled
- Mouse-driven Kiosk Mode
- Internal User Tracking (kiosk mode only - for evaluation)

The GOVT contains dozens of specific modules and elements. Many of these are part of larger themes that together make up an experience that allows users to delve as deeply or superficially as they desire. The following are some of the key elements that can be explored in Version 3.0 of the tour (see Figure 2):

- Simulated Observations (using real data)
- Gemini Images Screen Saver Maker
- Walking Tour
- Electromagnetic Radiation Explorer
- Adaptive Optics Game
- Active Optics Game
- Mauna Kea Explorer
- “Cosmic Times” News Updates
- Meet Gemini Staff
- Mirror Technologies

These and many subelements combine to provide an average of approximately five minutes of dwell time for visitors who use the tour at kiosks. For extremely interested users it is not uncommon for an experience to continue for 15 minutes or longer if “Simulated Observations” are completed.



Figure 2. Various “screen shots” from the Gemini Observatory Virtual Tour showing several activities available on the CD-ROM

While future expansion is possible, Version 3.0 nearly fills one high-capacity CD-ROM, so if new modules are added it will be at the expense of existing content. Note: capacity has been allocated for future language translations and news release updates.

Production of the GOVT has been distributed over a period of about five years and many of the content elements have been produced for multiple purposes so determining exact costs is difficult. However, if the tour were to be produced as a stand-alone product the budget would be of the order of \$200,000. Of this, the single most expensive elements are animations and programming. The following list provides rough estimates of expenses (all expenses in US dollars):

- Programming: \$50K
- Animations: \$100K
- Graphic Design: \$25K
- Photography (Staff): ~\$20K (estimated)
- Disc Duplication: ~\$0.85/each (with packaging)

Annual duplication expenses for modest distribution rates of 10K/year are \$8,500 excluding shipping and handling costs.

## EXPENSES AND RESOURCES

## WHAT WORKED... WHAT DIDN'T:

Starting out as a modest "experiment" to provide a safe alternative to visiting the Gemini facility on Mauna Kea appropriate for all ages, the GOVT has been a tremendous success. This success is reflected in the fact that development of the tour has continued and expanded well beyond the initial scope of the project and it is now a fully developed interactive experience that has been tested and evaluated using multiple criteria and metrics.

Essential to the development process has been the use of internal counters and "dwell-time" monitors. These have provided essential data (not traceable to individuals) on where users of the kiosk version of the tour went and how long they spent on various activities (dwell-time). In addition, an opportunity for users to provide comments and suggestions has proved to be invaluable in modifying existing content and the development of new modules and content areas of interest to users.

Beta testing at public kiosks has also been extremely successful for identifying stability issues with the program and as mentioned previously for tracking usage patterns and navigation issues. Currently there are a total of 12 GOVT kiosks in Hawaii, Chile, Tucson and Canada.

Because this program has been under development for several years, the evolution of content and overall structure of the tour has never had a "front-to-back" review. This is a weakness of this approach and a plan is being developed to address the issue and possibly restructure the tour and re-work the navigation and story line of the tour to better match user interactions and educational objectives. This is discussed further in the "Future" section that follows.

Another element that remains to be addressed is the assessment of usage or "insertion rate" by end-users who receive the CD-ROM package. This is currently being addressed by including a "Customizable Screen Saver" module that will allow users to make a screen saver with the tour to encourage "insertion." In addition, several of the activities now allow users to email us a mailing address on successful completion of selected activities to obtain a Gemini Legacy Image set. This is designed to allow us to monitor increases in "insertion" rates as a metric of the GOVT's impact.

Annual distribution of the GOVT is currently at a level of about 10K/year which has been sustained over the past 3 years as the tour has been tested and developed. Future plans involve more aggressive distribution now that all stability issues have been addressed and an appropriate level of content has been achieved.

With version 3.0 of the Virtual Tour completed, plans are underway to address several issues for version 4.0. These issues relate to summative assessment strategies, educational implementation, distribution expansion, navigation assessment/modelling, integration into other education/outreach programming and additional language translations.

- **Summative Assessment Strategies:** a formal summative assessment strategy is being developed to assess the success of educational goals of the tour, “insertion rates,” user interaction tendencies and the identification of improvements that can be made in future versions of the tour.
- **Educational Implementation:** adapting the tour for formal educational use will be pursued by assembling teacher focus groups to identify how the GOVT can be used effectively in the classroom to support national science standards and curriculum throughout the Gemini partnership. A redesign of the tour’s navigation and emphasis will be considered to accomplish this objective.
- **Distribution Expansion:** expanding distribution of the tour to new audiences that include educators is a key objective. A sample of the tour will be made available on the web that will allow the public to sample the tour and upon successful completion of an activity they will be given the opportunity to receive a full CD-ROM copy. Outreach throughout the Gemini partnership will also be expanded as new language/translations become available.
- **Navigation Assessment Modelling:** as part of the summative assessment, user interactions will be studied for possible modifications to the navigation model currently used for the tour.
- **Integration Into Other Education/Outreach Programming:** the GOVT will be integrated into new and ongoing Gemini education/outreach programming like teacher workshops, a new prototype program call “Live from Gemini” and classroom visit preparation activities.
- **Additional Language Translations:** all of the Gemini partnership languages will be included in future versions of the GOVT. These will include English, Spanish, French, Portuguese and Hawaiian.

## THE FUTURE

## SUMMARY

The Gemini Observatory Virtual Tour project is a long term initiative that has been successful on many levels. All major elements in the programme are now complete, and a process of review, assessment and adaptation is now underway that is intended to broaden distribution to the public and educational users.

We encourage you to request the current version of the tour by sending an email with your mailing address to: [geminivt@gemini.edu](mailto:geminivt@gemini.edu)

Comments and suggestions for future versions of the tour are also welcome.