Conceptron Associates

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AV PROJECT PROFILE

Project: **H.R. MacMillan Planetarium, Vancouver, Canada**

Project Type: Planetarium

Dates: November 1995 to November 1997

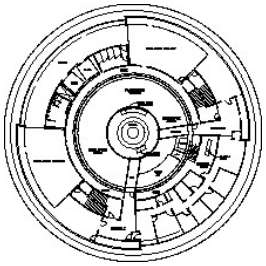
Summary: Analysis of available show control automation systems vs. the planetarium's needs.

Design, specification, budgeting, scheduling, tendering, and bid evaluation of automation, sound, and video systems for planetarium. Specification and tendering of new Laser system. Design of electrical distribution and automated routing system – provided as input to the electrical specification process. Installation review and acceptance testing of automation, audio, and video systems for planetarium.

October, 1997 marked the 30th anniversary of the **H.R. MacMillan Planetarium** (located in Vancouver, BC). Starting in the Fall of 1995, we started on the design of a significant upgrade for this facility. Our mandate was to replace the existing show control system, laser projector, and slide projectors. We were also to upgrade the front-end of the sound system, and to design a video distribution and projection system. This was divided into two Phases that would be installed during two shut-down periods in the Fall of '96 and the Fall of '97.

The AV budget was about $550,000 CDN.

Video



Video in a planetarium environment has some unique challenges. Unlike any other projection venue, the screen is often totally black. This is a requirement to contribute to the illusion of infinite vastness. Any images projected on this surface must not show their projection boundaries, but must, rather, appear to float in the black void. Ideally, the client wants a huge (greater than 12m/40 ft wide), bright image that will project an inky black background – a clear impossibility with video projection.

After some research and in situ testing, we came up with a compromise solution. One or more CRT-based video projectors would be used to provide smaller images with a background black enough to vanish. For added flexibility, these projectors are mounted on motorised X-Y platforms. This allows the video image to be positioned at a variety of locations on the dome, and even to move (slew) while projecting.

For impact, a high-powered, large-venue projector was also chosen. This would give a very large, bright image at a fixed location – compromise: the background would be visible as a grey on the blackness of the dome. Using light requirements based on in situ demonstrations, we determined how much light output would be required. The trick was to avoid overkill by going for "more power," with no regard to how much is actually needed. If the projector has too high a light output, the background grey will be too objectionable. To help hide the background, we added a dowser to cut off light when no image was being projected, and a series of motorised masks that can be moved in front of the lens. When used judiciously (e.g.: projected when other projectors are spilling light onto the dome, masking the image, using material that has a natural frame, etc.), this large image adds great impact to the shows.

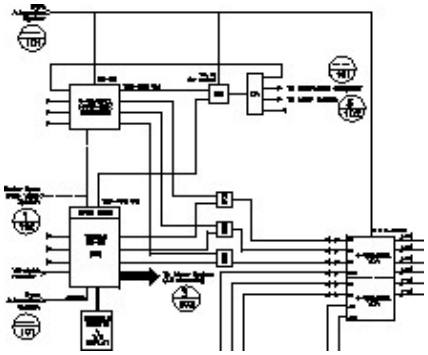
A very flexible matrix switching arrangement allows assignment of a variety of video sources (e.g.: laser disk, Betacam, S-VHS), video processors (e.g.: faders and mixers), and graphics sources (e.g.: a graphics server, line doublers, stage-mounted computer input) to be assigned to any combination of projectors and console preview monitors. All of this is dynamically controlled by the show controller.

Show Control

Planetarium automation systems are specialised, and differ widely in capabilities. We sent a detailed questionnaire to eight vendors to determine the capabilities of their systems, and to determine a budget price. Based on the client's needs and budget, we decided on three vendors from whom we would solicit bids.

The "traditional" approach for a planetarium is to ask for proposals from each vendor. This approach, unfortunately, has a number of drawbacks. Typically, if you request proposals from three vendors, you will receive three radically different proposals with pricing varying considerably. This is analogous to requesting proposals from three car dealers, and receiving one on a compact car, another on a luxury auto, and a third on an all-terrain vehicle – while they are all cars, and have many elements in common, a comparison is almost meaningless. There is also no guarantee that any one of them truly meets the client's needs.
We solved this problem by carefully designing and specifying a system that would fit the capabilities of all the vendors (albeit with varying degrees of customisation). Each bidder received the same bid package, complete with detailed specifications and drawings. The specifications covered the function and capabilities of the system in great detail (no vague or grey areas), as well as the quality of workmanship required. This approach ensured the client that they were getting quotes that were all based on precisely the same system – a system that exactly met their needs.

Audio



The planetarium already had a multi-channel sound system with 13 speakers arranged in concentric rings going up the dome. This system allowed them to both patch any source channel to any speaker or combination of speakers, and to "pan" a source across a number of speakers. This system was about 15 years old, and the automation that used to control it was no longer operational – it was tape-based, and the special tape decks had finally worn out. Since our principal had been involved in the original system design, we were able to design an interface that allowed the new show control system to interface to the old sound control electronics and restore automation control of audio levels and sound positioning.

The signal processors, the power amplifiers, and the speakers were still operating satisfactorily, and we decided that there was no need to replace them. We did, however, specify new equipment for the front-end: a 16-track digital tape transport for the primary show sound-track and Laser control data; a 4-track HD recorder for random-access audio; and a console mixer to accommodate microphones for the newly added stage.

Misc.

The Laser projector was upgraded (the existing lasers were re-used) to provide some novel and sophisticated features. A Laser programming package (including a monitor) was included. We again wrote a specification (with invaluable input from LaserHouse Productions), and put out a bid package to three major Laser suppliers.

As design progressed on the show control system, it became obvious that the electrical system also required upgrading. We decided to re-use the existing effects dimmer system because it still functioned, had had few maintenance issues, and would save precious budget funds. We used this opportunity to design a unique electronic "patch-bay" into this existing effects dimming system to greatly increase the client's effects capacity and flexibility. We provided the necessary input to the electrical engineers, and helped them review the electrical contractor's installation of this highly unique system.

The ageing slide projectors were replaced with Kodak Ektapro's. These are a new generation of slide projector that features rapid random access capabilities as well as RS-232 serial control.