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# Planetariums without Walls...Adding Distance Learning to Domes

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We all greatly value the presence of live presenters in visitor experiences. Electronic and internet communications have extended the reach of the modern planetarium presenter far beyond the containment of the physical walls. In design work I sometimes refer to this as the modern "planetarium without walls".

One core capability that expands reach is the addition of new reliable, lower cost distance learning systems (DLS). This means you can have guest presenters from anywhere in the world conduct talks in your dome and you can stream your presentations in real time or prerecorded to other sites, schools, and even homes with homeschooling.

Here are couple of examples from GLPA member Mitch Luman (Evansville Museum) "At the Koch Immersive Theater the (DLS) app has been the key to the success of our distance learning system. Our (DLS) has allowed us to have papers presented by individuals that could not attend state planetarium meetings and broadcast live events originating at our planetarium to school assemblies. Anything you can do with your tablet or phone on (DLS) works even better in the dome...We used it with a local school when we called up an astronaut on the ISS using 1 meter short wave last year. Did a program on this at GLPA last year."

For many years DLS for education was only found in well-equipped university lecture halls and class rooms and on occasion in more advanced museums, science centers and zoos. With these early adopters the only choices were proprietary self-contained code/decode technologies that also required annual license fees and service contracts... not to mention a significant amount of technical expertise. And the viewer on the other end often had to have the same system to make it work.

Beginning about five years ago this paradigm took a great shift. Now these streaming capabilities can be added using your existing network with much lower cost, no annual license fees, and super easy user operation via graphic user interfaces. This approach works with any audio system, with any optical or digital projection system and any seating arrangement. The viewers or presenters outside the dome and the participants inside the dome can ask and answer questions and show graphs, diagrams, documents… no limitations. You can use your choice of Skype, Cisco Jabber, Adobe Connect 8, Microsoft Lync, WebEx, Citrix GoToMeeting, LifeSize ClearSea, Polycom M100, Vydyo, Google Plus.

Suffice it to say...there is now a great deal of interest in this capability.

**Getting Started. The Technology in the Dome (Near End)**

Here are the necessary components:

Specialized Low-light Camera. For this type of work you will want a PTZ camera. This stands for **P**an-**T**ilt-**Z**oom. Via Ethernet remote control connection you can have the camera in any location and move and zoom it to capture the presenter, the dome, or audience members. The camera can be mounted to wall, in a cove or on a movable tripod stand. Some sites have two cameras so they keep one on the presenter and one on the dome, as an example.

From distance learning specialist Cy Furst (Visitec Chicago) "A good camera to capture the presenter is a must. The little camera in your laptop is not useful for multiple people or for a stage. Consider a good quality PTZ camera. If the instructor is going to be walking, you will need to look at an operator, control system presets or a tracking camera system. There are 3-Chip cameras and 4K cameras on the market from companies like Sony and Panasonic that tend to do much better in lower light. These will cost you a little bit more, but if you are looking for the best video presentation, you should make the investment. There are also good quality single-chip cameras on the market. They won't break the bank and can be a starting point for those just getting into distance learning."

Camera Controller. This little unit is specific to the camera manufacturer and allows the above mentioned motorized camera control.

Switcher. This allows you to switch between cameras, computers, document cameras and other media and send the selected signal to the streamer and the Presentation Projector.

Splitter. This splits the signal from the Switcher and sends one signal to the outgoing streamer/recorder and one to the Presentation Projector.

Streamer Recorder or Network Bridge. This little interface merges all audio and video sources from the dome to an outgoing network feed and merges audio and video from a network feed into the theater audio and projection systems. You can also select a unit that records your dome presentation to a thumb drive, a thumb drive or to a networked server. These can then be handed out to teachers or students or streamed at a later date. Some of these units also allow you to split the image into 2-3 sections so you can show the PowerPoint on ½ of the screen and the presenter on the other ½. Or a specimen under a document camera on ½ and a PowerPoint on the other.

Presentation Projector. You will not want to use your astronomy projection system for this application. The image will be too large and the resolution will not be as good as using a separate projector. Also using this separate projector will save wear and tear on your astronomy projection system.

Auxiliary PC. Connects the Network Bridge to the actual Internet.

**The Technology at the Far End**

The far end participants might have a system as flexible as yours...or not. All they need is simple typical webcam with mic, computer and monitor or projector...in a dome, classroom, or office. No expensive software is needed. They have their choice of Skype, Cisco Jabber, Adobe Connect 8, Microsoft Lync, WebEx, Citrix GoToMeeting, LifeSize ClearSea, Polycom M100, Vydyo, Google Plus.

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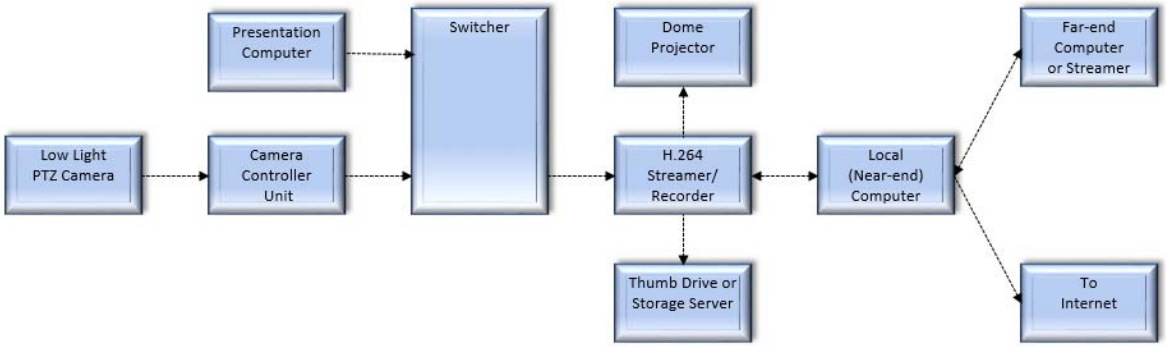
**In Summary**

I see planetarium and exhibit professionals doing amazing things with these new systems. Now that they are low cost and easy to operate they should become standard part of any new or upgrade planetarium project.




**Want More**
Email me directly and I'll send a detailed PowerPoint that drills down deep into this subject.

**Next Issue.**
(JB: To be determined)

About the Author:
Jeff Bowen has worked worldwide as a planetarium and exhibit specialist since 1985 and has been named a Fellow of GLPA and IPS.