**The Planetarium**

**Stephen F. Austin State University**

**Mission Statement**

* To provide high quality, thought provoking educational programs in astronomy, the sciences, arts and humanities utilizing advanced presentation technologies.
* To present science that is entertaining, interactive, first hand, accessible, relevant, and understandable.
* To help develop the science literacy and participation in science and technology of our students and the residents of East Texas.
* To support the astronomy lecture and laboratory courses by providing an excellent simulation of the night sky and for multimedia presentations on a variety of astronomical topics.
* To assist area schools as an educational resource enhancing their astronomy and space related teaching activities.
* To serve as a community resource for astronomy and space education for community and civic organizations, the general public, and the media.

**Brief History**

The SFA Planetarium first opened in the fall of 1983 in the new Math-Nursing building. It was equipped with a Spitz 512 star projector, a 9 meter dome, and seating for 50. At that time, its single purpose was to support the introductory astronomy course which had an enrollment of 214 students. Shortly after opening the Physics Department was swamped with requests from local schools and the public for access to our new facility. The planetarium was quickly upgraded with the necessary hardware for running multimedia programs. Later that fall, we opened to the public with the shows “Cosmos” (narrated by Carl Sagan) and the “The Christmas Star.” We have been providing service and outreach to local school districts and the public ever since. Our total number of visitors is now over 200,000, about 7,000 annually.

**Planetarium Usage Data 1983-2011**

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| --- | --- | --- |
|  | **Number of Programs** | **Number of Visitors** |
| **Astronomy 105** | 1,150 | 38,000 |
| **Outreach (School and Public)** | 4,400 | 168,000 |
| **Totals** | 5,600 | 206,000 |

**Future Needs**

In order to maintain its viability as a space science education facility, the SFA Planetarium requires a major hardware upgrade. This is primarily the result of advances in projection technology and the fact that all aspects of audio and visual production are now done with computers (everything has gone digital). This new technology combined with the rapid pace of scientific discoveries and the new skills of science visualizers has forced the planetarium field in a new direction. Most planetariums built in the last 10 years now use a new “full-dome” video projection system. It is important to understand that the full-dome planetarium is not “the direction the planetarium field is heading,” it’s where we are already. Every major planetarium manufacturer has digital theater products. Planetariums have clearly evolved from the incandescent technology of the last century.

The current SFA Planetarium presents multimedia star shows using the old incandescent technology. Our facility is often referred to as a “classic” planetarium and is equipped with the following hardware:

* Opto-Mechanical Star Projector (28 years old)
* 30 slide projectors (these are no longer manufactured)
* Several special effect projectors
* CRT Video projector (no longer manufactured)
* Video players (laser, DVD)
* Audio - HD playback
* Computer Control System - Pentium II computer with DOS operating system

For new programming, we typically purchase 2 or 3 new show packages each year that are produced specifically for our “classic” configuration. This year, there will only be one new program offered. New program material has become increasingly difficult to find since many show production companies now cater to the new full-dome planetariums. With slide projectors no longer being manufactured, support for our hardware — service, parts, supplies and classic show packages — is naturally waning. This leaves our Planetarium in a very precarious position. For example, if the company that transfers our images to slide film goes out of business or Kodak stops making slide film then it will become impossible for us to produce new programming. We would then have to rely on our current library of programs to continue operating (many of which already contain dated material). By nursing along the old hardware and if no catastrophic failure occurs, we can probably continue to operate for a few more years. Nothing last forever, so at some point, our analog planetarium equipment is going to reach the end of its useful life— full-dome video projection technology is the only logical choice to replace our aging hardware.

As indicated above our planetarium’s technology depends on a 28 year old opto-mechanical star projector, 30 individually placed slide projectors and a single video projector. The new technology would replace all that equipment with a single all-dome digital projection system using high-end graphics computers and a laser or DLP projector. In a new technology planetarium, all the sights and sounds are created digitally, and the audience is immersed both in breathtaking imagery and sound. In such an immersive environment, the audience can move freely through a 3D universe viewing endless astronomical phenomenon and utilizing advance teaching aids.

Astronomy is one of the most visual of all the sciences in both the way the data is collected and analyzed. In the last few years huge astronomical datasets have become available for use in the planetarium and new data pours in so fast it is hard to keep up. Astronomical data visualization allows us to examine that data and show the real size and scale relationships of the universe. This powerful three-dimensional exploration, demonstration and descriptions of the measured universe across all scales have become a spectacular reality in the new immersive full-dome planetarium.

**Why Build a Planetarium**

*International Planetarium Society, “So You Want to Build a Planetarium”*

*“There are many reasons to build a planetarium but the most important one is that it provides a place on our campus and in our community where people can enjoy a guided journey of exploration through the vast cosmos to which we all belong. Never before have humans known as much about the universe as we do today. Never before have we acquired new information about the universe as quickly as we do now. Yet, at the same time, never has the general public been so ignorant about even the basic facts of astronomy. Hence the need for planetariums as front line artillery in the battle for science literacy has never been greater. The educational role of the planetarium is enhanced by the ability of the stimulating planetarium environment to inspire enthusiasm for science, awe at the marvels of the universe, and new perspectives on our world and civilizations. In this sense a planetarium is of no less a cultural importance than a library or museum.”*

**A Bigger SFA Planetarium?**

Our astronomy program has grown considerably since 1983. Our Astronomy 105 enrollments for 2010-2011 exceeded 800 students. With 3-4 astronomy sections each semester averaging 100-120 students, it is obvious why our 50 seat planetarium is rarely used by faculty for lectures. In addition, the limited seating capacity of our 9 meter dome limits our public and school attendance. Other Texas University based planetariums in similar sized communities have much larger attendance numbers (see table below). With a larger SFA Planetarium we could most likely double or triple annual attendance.

The table below also shows a recent building boom in new university based planetariums in our state. These new planetariums have generally been a component of a new science building and most incorporate the new full-dome technology. Planetariums are a huge attraction for elementary, middle and high school kids on college campuses. They serve not only as an important space science educational resource but could also help with attracting new students to our universities.

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| **Texas Planetariums** | **Dome Size** | **Seating** | **Type** | **Opened** | **Annual Attendance** |
| Stephen F. Austin State Univ. | 9.1 m | 50 | Star Machine | 1983 | 7600 |
| Navarro College | 18.3 m | 203 | Full-dome | 1997 | 24,000 |
| Tarleton State University | 12.2 m | 85 | Full-dome | 2001 | 12,000 |
| Central Texas College | 18.3 m | 180 | Full-dome | 2003 | n/a |
| Sam Houston State University | 7.3 m | 60 | Full-dome | 2004 | n/a |
| UTA Roundhouse | 9.1 m | 62 | Full-dome | 2004 | n/a |
| Texas A&M Commerce | 12.2 m | 83 | Full-dome | 2005 | n/a |
| Texas A&M International | 12.2 m | 85 | Full-dome | 2005 | n/a |
| Sul Ross State University | 9.1 m | 60 | Full-dome | 2006 | n/a |
| San Antonio College | 9.1 m | 95 | Full-dome | 2008 | n/a |
| University of North Texas | 12.2 m | 101 | Full-dome | 2008 | n/a |
| Univ. of Texas – Pan American | 7.0 m | 60 | Full-dome | 2008 | 34,000 |
| University of Texas at Arlington | 18.3 m | 165 | Full-dome | 2009 | n/a |
| Midwestern State University | 7.9 m | 60 | Full-dome | 2009 | n/a |
| Angelo State University | 15.2 m | 114 | Full-dome | 2010 | 20,000 |
| North Central Texas College | 9.1 m | 63 | Full-dome | 2010 | n/a |
| Tyler Junior College | 12.2 m | 88 | Full-dome | 2011 | 30,000 |

In additional to the normal uses of astronomy and space science, a planetarium equipped with an all-dome digital projections system can also be used for:

* programs in the other sciences
* cultural and artistic presentations (concerts/theater)
* entertainment (movies, laser light shows)
* first class multimedia for important guest lecture presentations

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|  | **Options for Upgrading the SFA Planetarium** | | **Cost** |
| 1 | Renovate existing Planetarium - 9.1 meter dome, 60 seats  Full-dome Digistar 4 SP2HD  *(Remove existing star machine)* | | 418 K |
| 2 | New Planetarium - 15 meter dome (50’), 115 seats  Full-Dome Projection  *(Digistar 4 )* | 800 K – 1.8 M | |

**Cost Estimates for Upgrading or Building a New Planetarium**

**Renovation of Current 9 meter Planetarium – 50 to 60 seats**

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| **Item** | **Cost** | **Notes** |
| New Seating | 20 K | 60 seats ($325 each) |
| Second Entry Door/Carpet | 10 K | Required by fire code (estimate-Mike Rustad) |
| RGB LED Cove Lighting | 24 K | power savings (ECCS) |
| Surround Sound System | 25 K | 5.1 surround system |
|  | | |
| **Projection Systems** |  |  |
| Full Dome Digital System | 200 K | Digistar 4 SP2HD |
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| **Dome Resurfacing** |  |  |
| Replace dome skin | 99 K | Seamless overlaps |
| **New Shows** |  |  |
| Base Library of Programs | 40 K |  |
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**New 15 meter Planetarium - 115 seats**

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| **Item** | **Cost** | **Notes** |
| New Seating | 38 K | 115 seats |
| RBGW LED Cove Lighting | 56 K | power savings (ECCS) |
| 15 meter dome | 166 K | Perforated Aluminum - Astrotech |
| Surround Sound System | 40 K | 5.1 surround system |
|  | | |
| **Projection System** |  |  |
| Full Dome Digital System | 1.4 M | Digistar 4 (1.3 M + 75 K for producer) |
| Full Dome Digital System | 465 K | Minolta Super Media Globe (single projector) |
| **New Shows** |  |  |
| Base Library of Programs | 40 K |  |