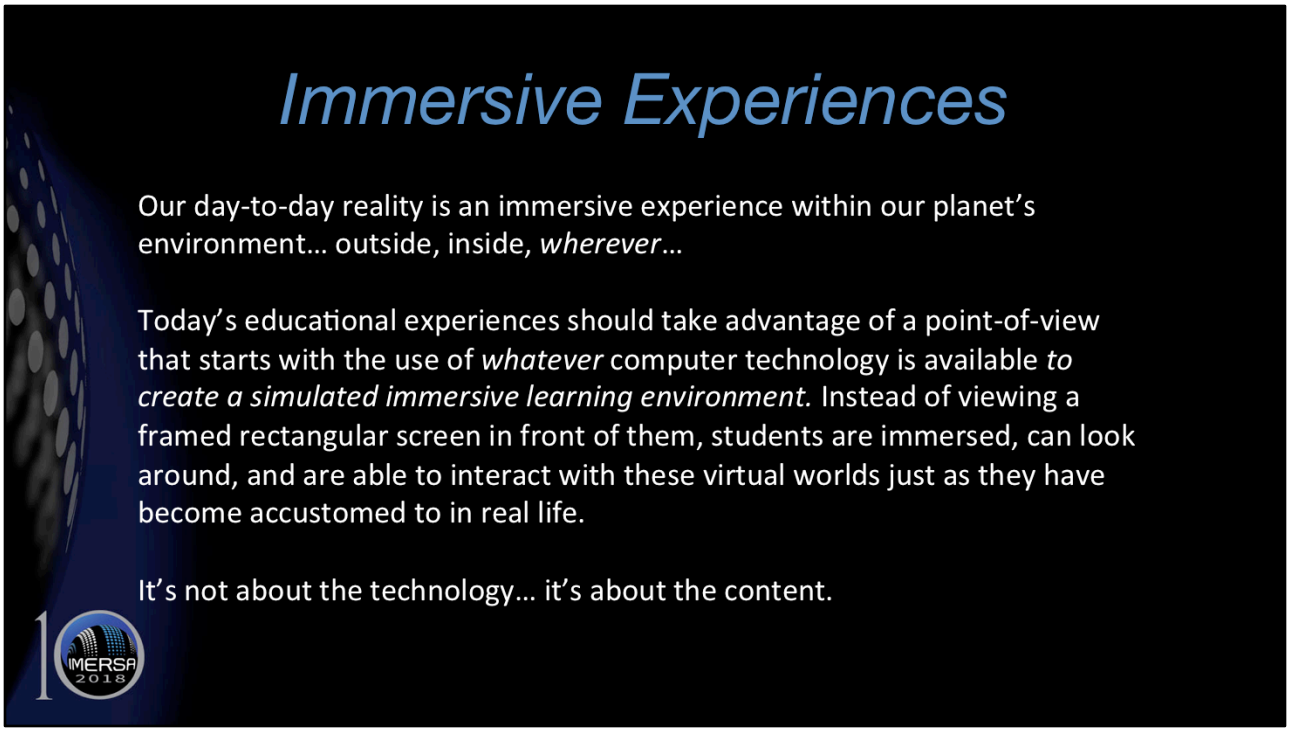
Hi. Jumping right into this, let's first talk about the advantages of using immersive games for education…



Here is a foundational explanation…

Teaching in an Immersive Environment

I remember in elementary school, the great idea of bringing a television into the little three room schoolhouse I attended. A twice weekly science class was aired on the local PBS station. Because of this TV we were also able to see the early NASA space launches, coverage of the Kennedy assassination and even the Pittsburgh Pirates win a world Series. We suddenly became immersed in the larger world around us. No longer locked in a schoolroom setting. Just watching the Mercury space launches made me want to work for NASA.

Immersive Effectiveness

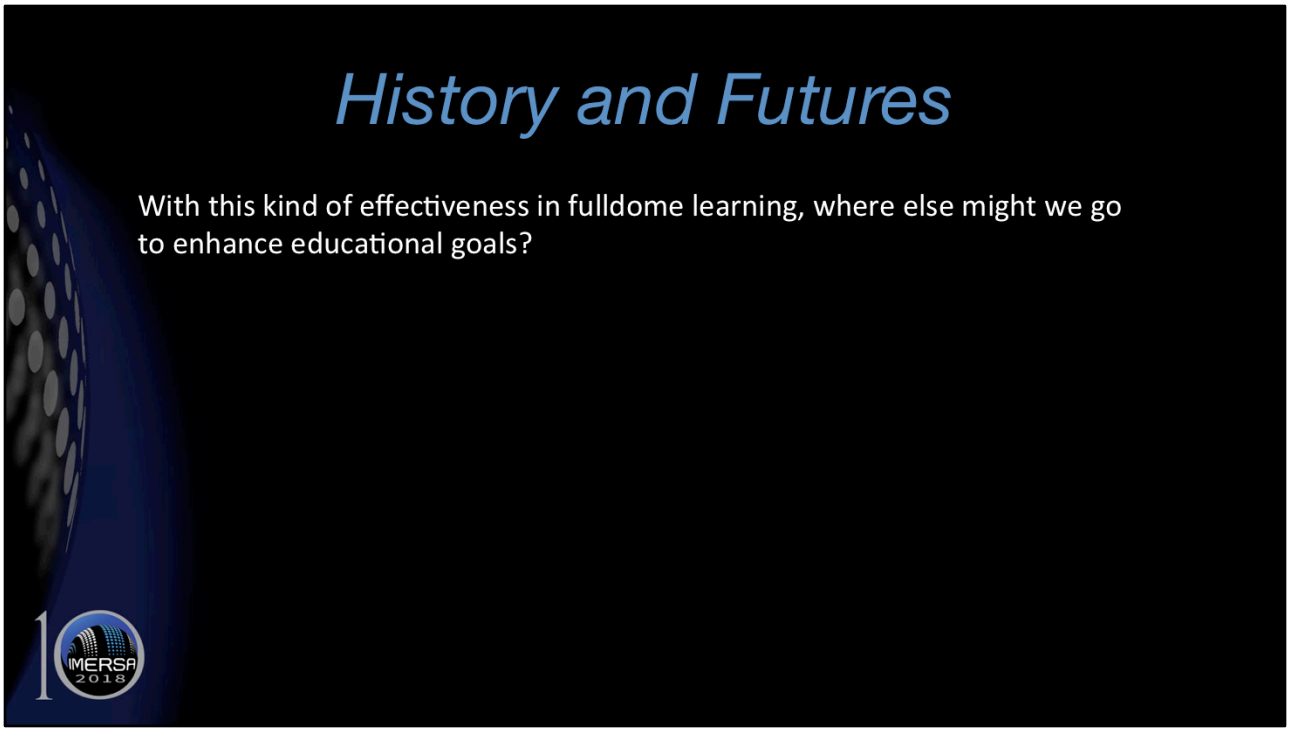
- One way to test the effectiveness of immersive teaching is the retention of what was learned during a program. The Houston Museum of Natural Science undertook a multi year study comparing student retention of concepts in science shows we produced in a fulldome setting verses the typical flat-screen setting.

There are studies showing the advantage of using immersive technologies for education…

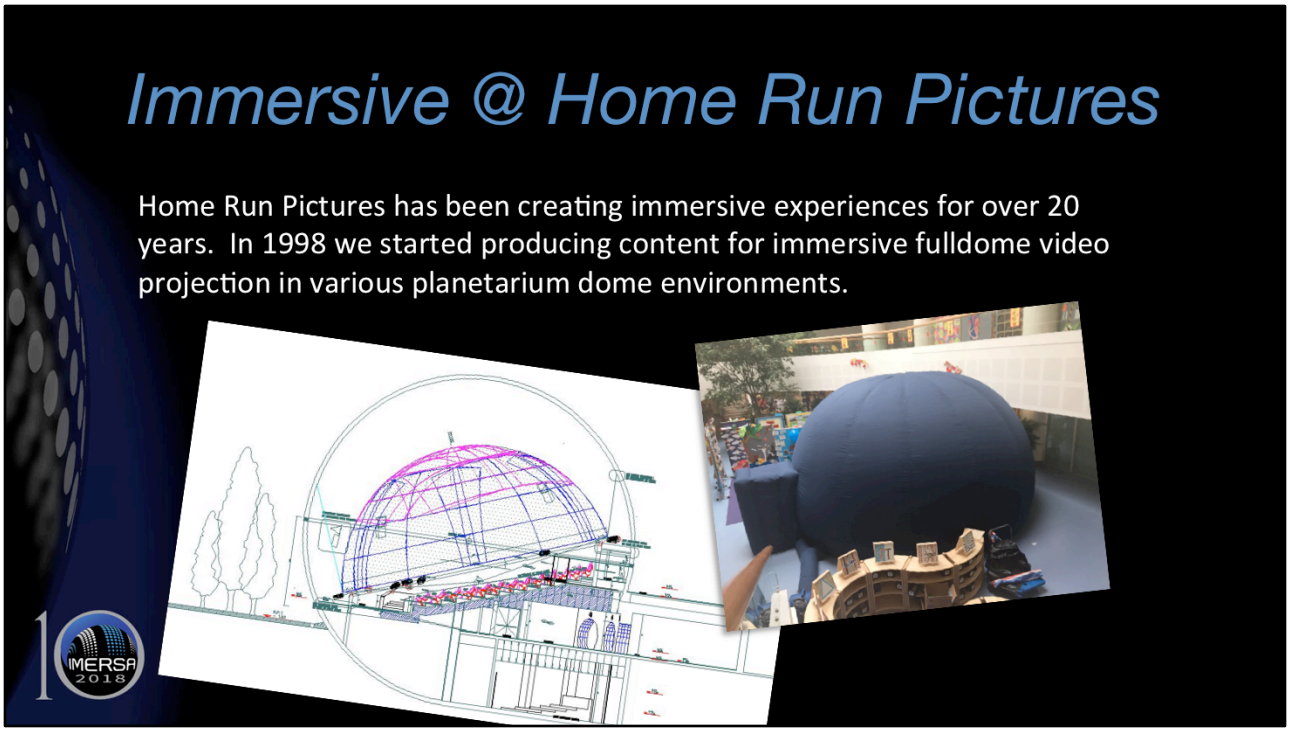
Immersive Effectiveness

- One way to test the effectiveness of immersive teaching is the retention of what was learned during a program. The Houston Museum of Natural Science undertook a multi year study comparing student retention of concepts in science shows we produced in a fulldome setting verses the typical flat-screen setting.
- Retested after a six week time period, the students learning in a flat-screen setting only remembered 30% compared to the students learning in an immersive fulldome setting remembering a surprising 100%.
- *Immersive experiences are very effective…* you might say immersive experiences connect directly to our minds… you might also say even directly to our hearts.

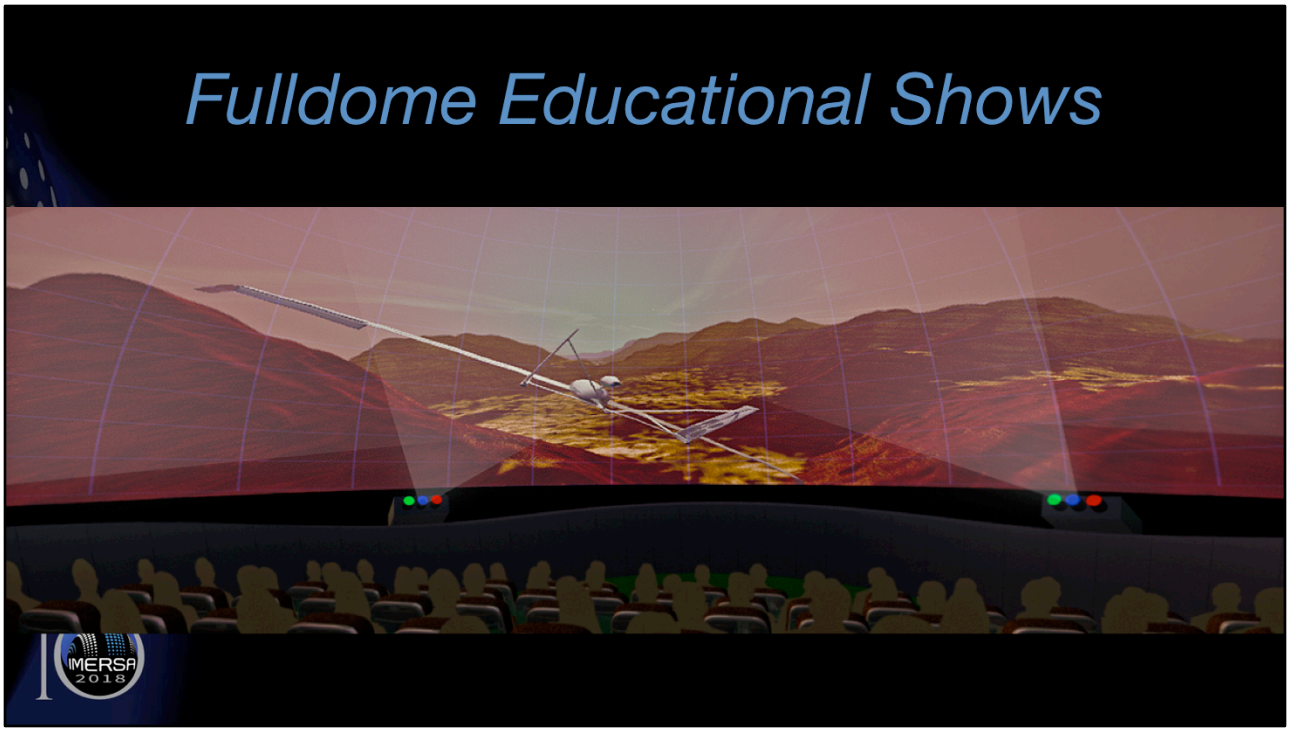
..



So how can we use this elsewhere for educational goals…

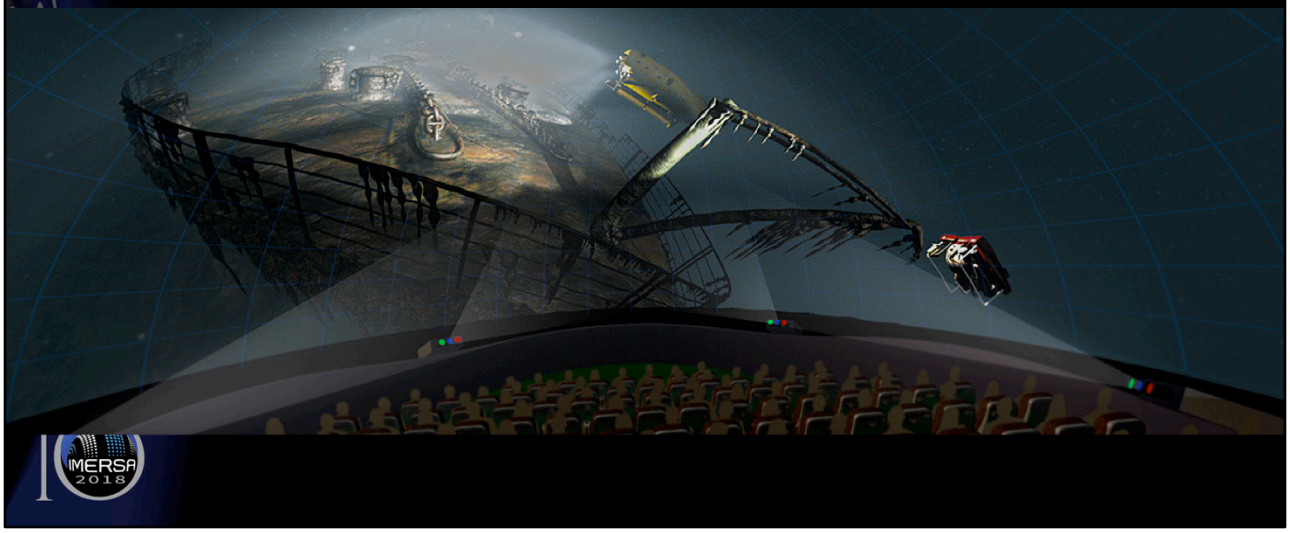


As most of you know, Home Run Pictures has been doing fulldome since the beginning… The content needs of big domes offered the budgets needed for producing shows, but the smaller portables opened up other potential uses… allowing the dome and its immersive experience to be anywhere…



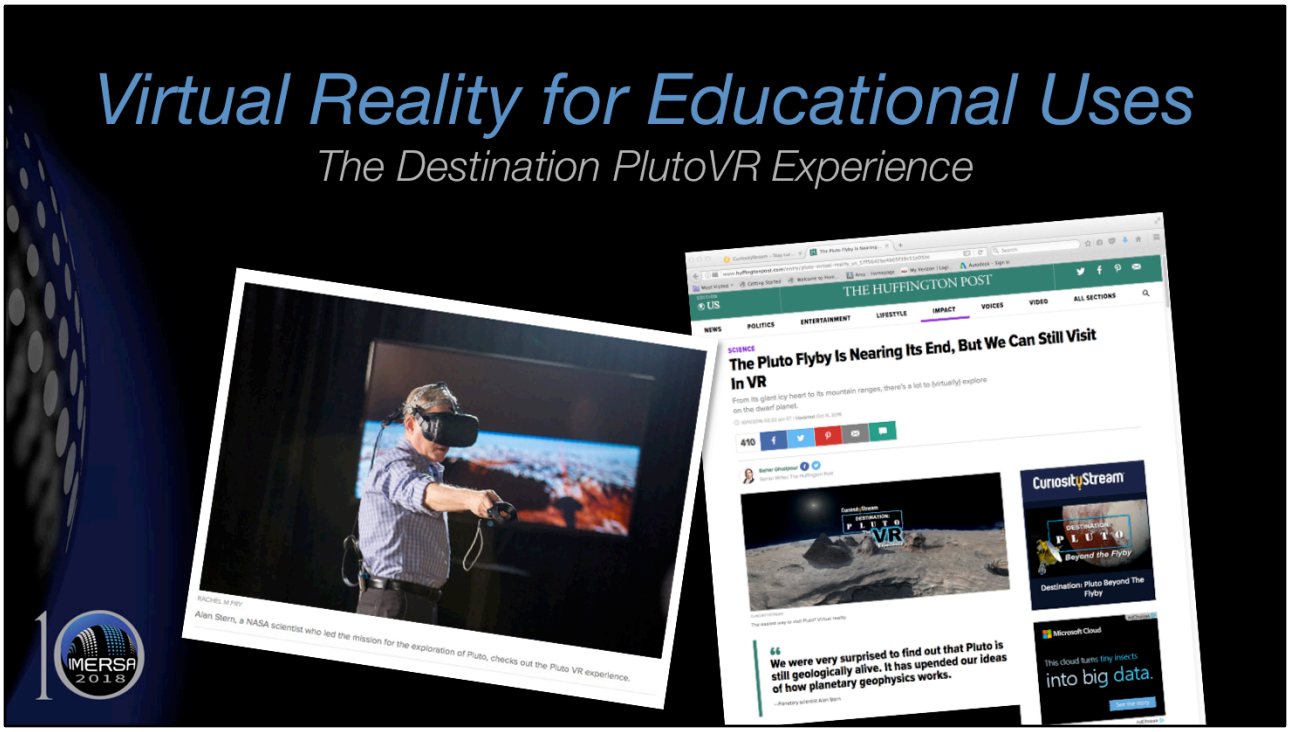
Here's one fulldome show we produced… the "Travelers Guide to Mars" show for Buhl Planetarium… it contained a scene where a Mars Plane flies over the the big canyon on Mars…

Fulldome Educational Shows



Another show, “Night of the Titanic” for the Houston Museum of Natural Science… featured a “you are there” experience where you are a present-day scientist in a submersible 2-1/2 miles down exploring the wreck site…

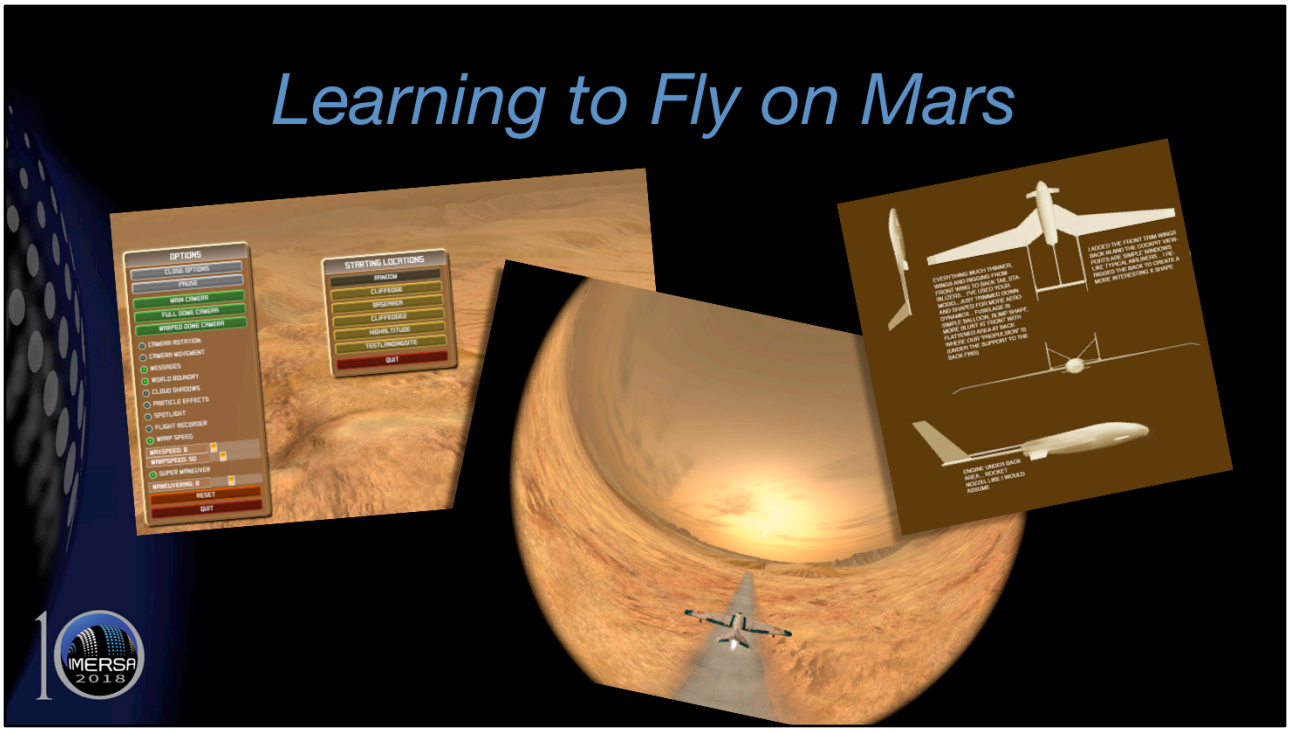
And in a NASA/Rice University fulldome show we explored a coral reef…



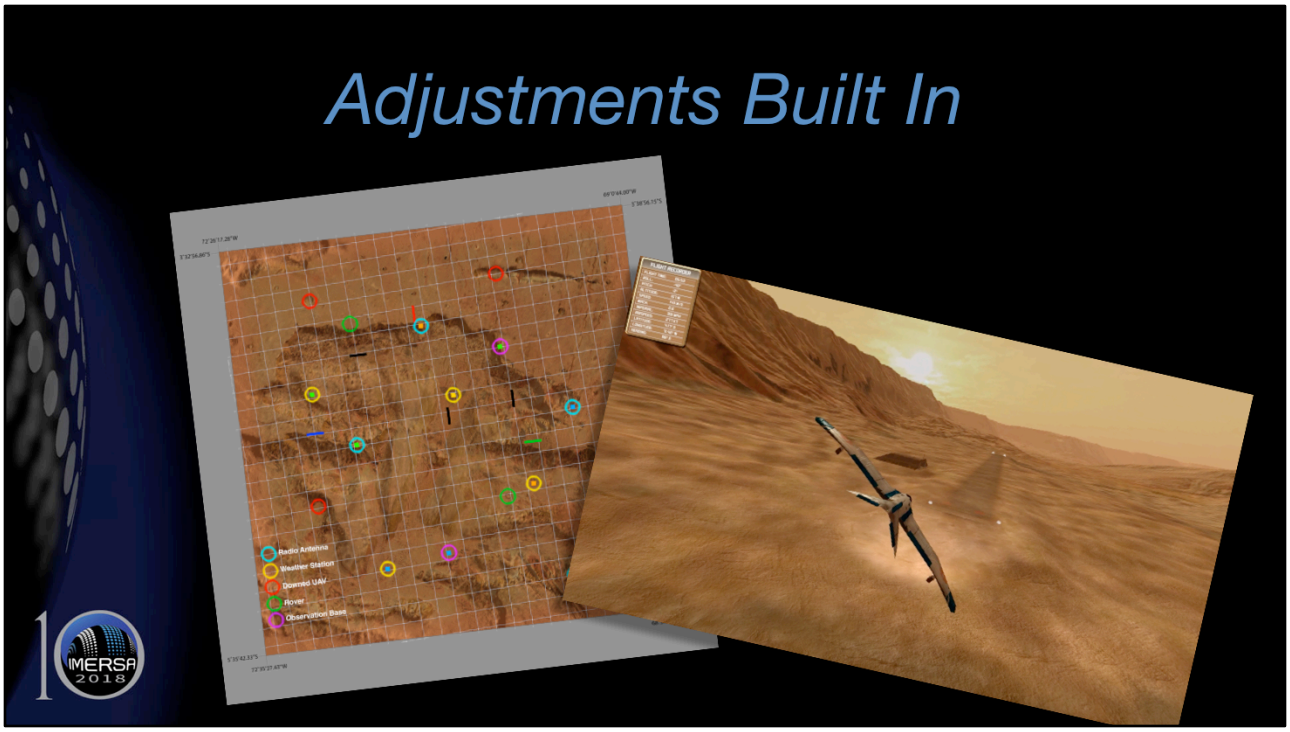
Last year I gave a talk here about using VR as a educational tool, a side bar from a documentary for Curiosity Stream we worked on. The VR simulation was a huge success with lots of positive response… Assets created for the documentary animations were expanded upon for the VIVE VR version…

The Houston Museum of Natural Science's Expedition Center sets up a real life immersive experience just like a NASA mission control… flatscreen simulation games are created from past fulldome show themes using models and props from the productions…

Why not also take assets from those fulldome shows and using portable planetariums, create immersive games by just adding 360 fisheye or mirror cameras to a Unity game build……

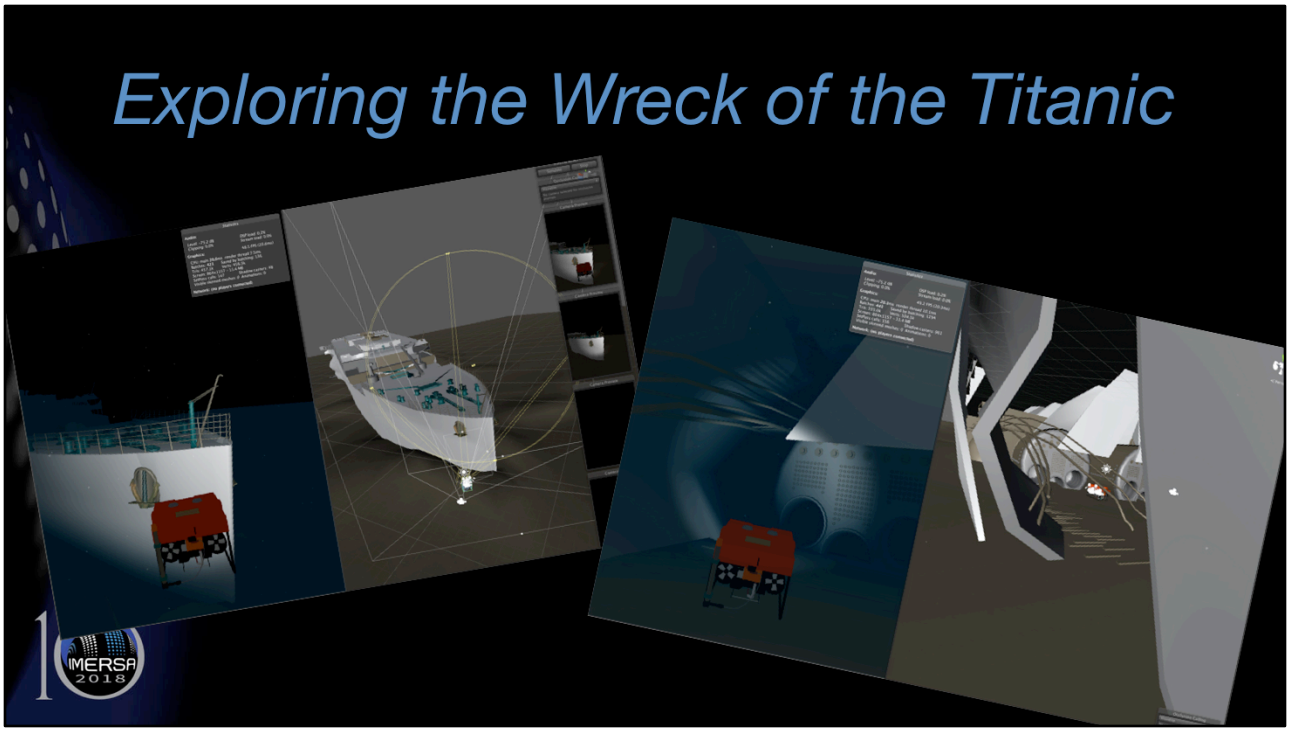


We first tried this back in 2012 initially creating a Unity game for use in the Houston's Expedition Center using NASA MOLA data for the terrain and a similar NASA Mars plane concept we had used in the Buhl fulldome show… The goal, a simulation designed to teach the physical concepts of flight… on Mars that is, where the thin atmosphere and lower gravity make flight more difficult than on Earth…

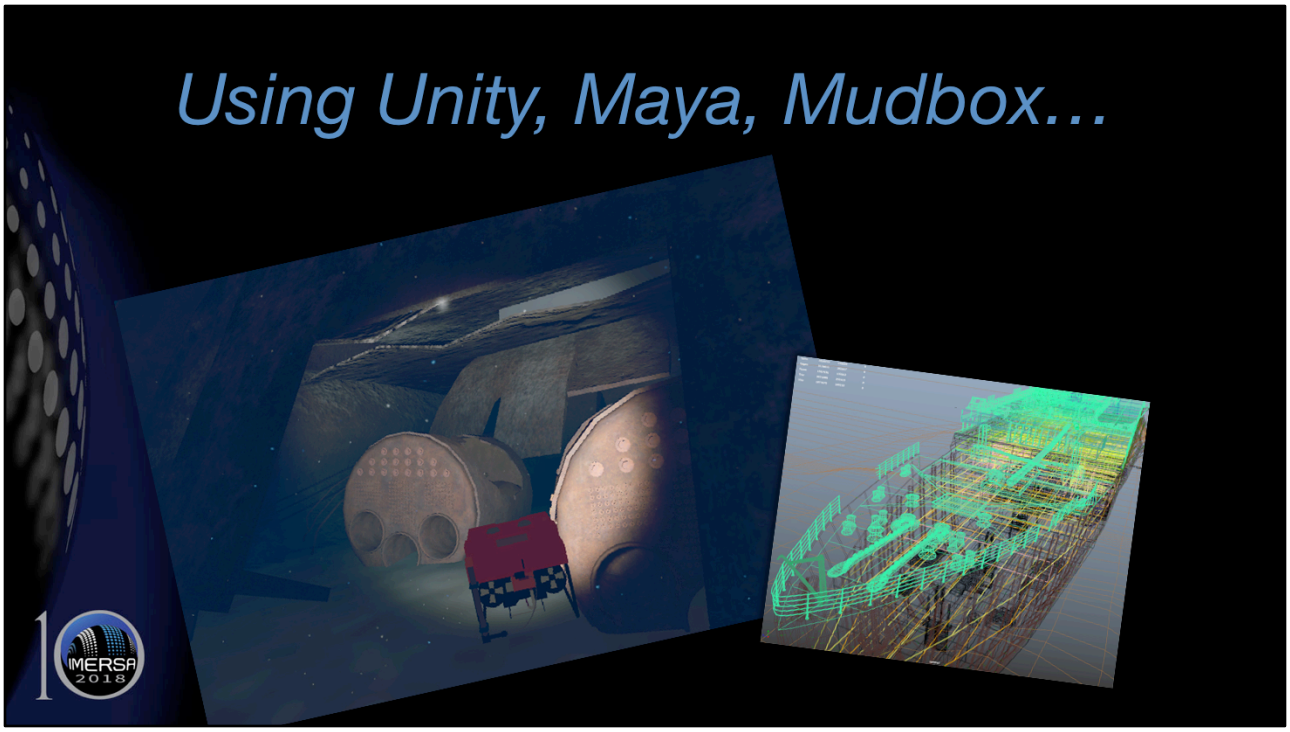


Variable settings programmed into the simulation game allow the “teacher” to adjust the physics and give the students flying a better understanding of the various principles, for example how changing gravity and air density effects lift… and then replaying so students can see the effects…

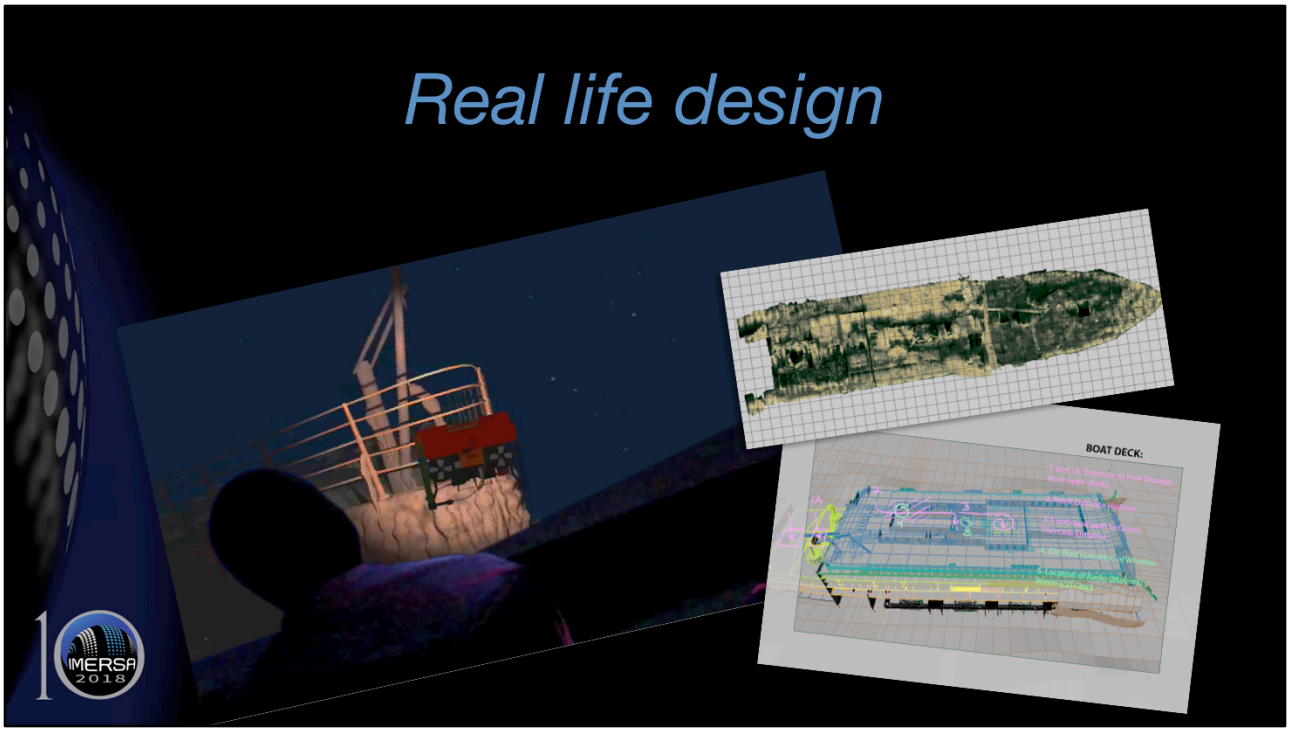
A fulldome version was also created… one designed goal is to get the plane to one of the landing strips before a sand storm hits and learning how hard being quick can be on Mars… alternative goals are to find various points-of-interest, Mars spacecraft landing sites, old rovers, etc…you can play this in the dome at the Expo today…



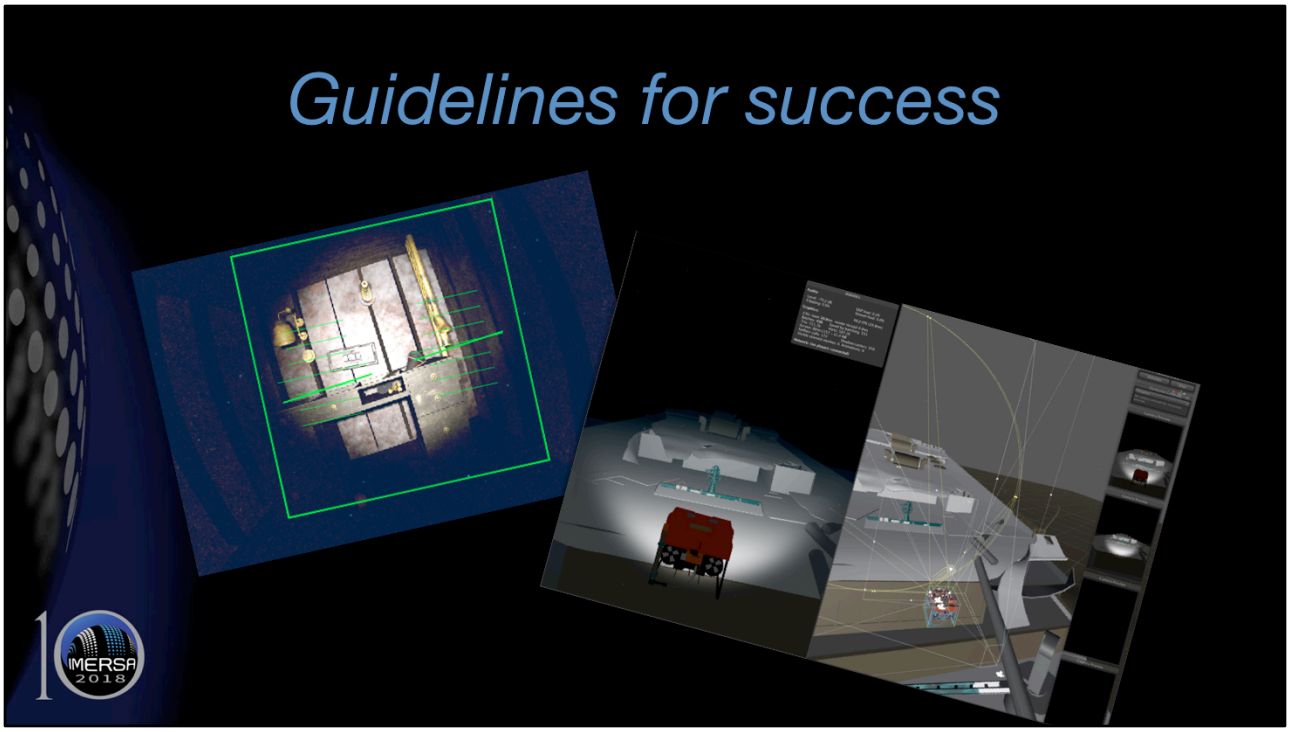
We originally did six Titanic documentaries for the Discovery Channel, followed up with two fulldome shows about the Titanic… we've now created a game version… the Houston museum will first be using this in their "mission control" experiences… players get to explore the wreck of the Titanic using a remotely operated vehicle [ROV]… once again a theme easily ported to play in an immersive style game…



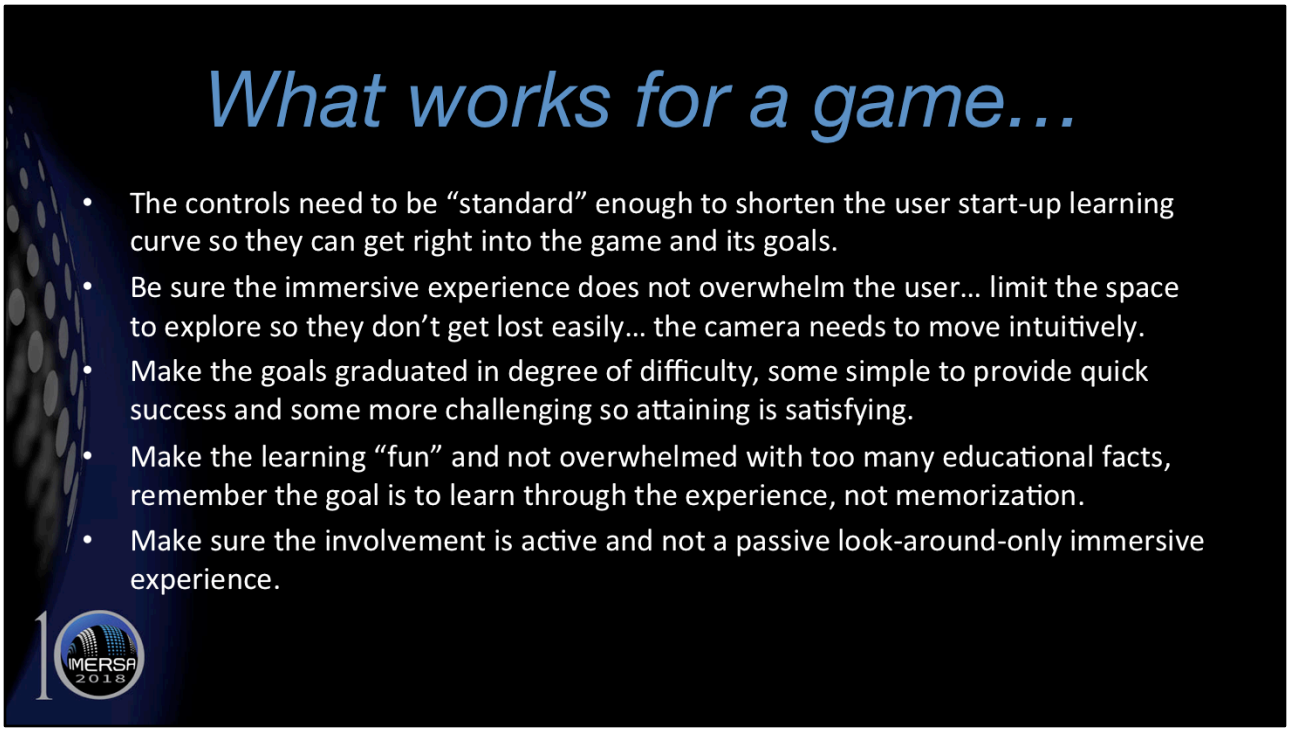
We are using the same production pipeline as for fulldome content… Maya for modeling and any animation, Mudbox, 3D Coat, and Substance for texturing and polygon optimization, etc… and Unity obviously as the game engine…



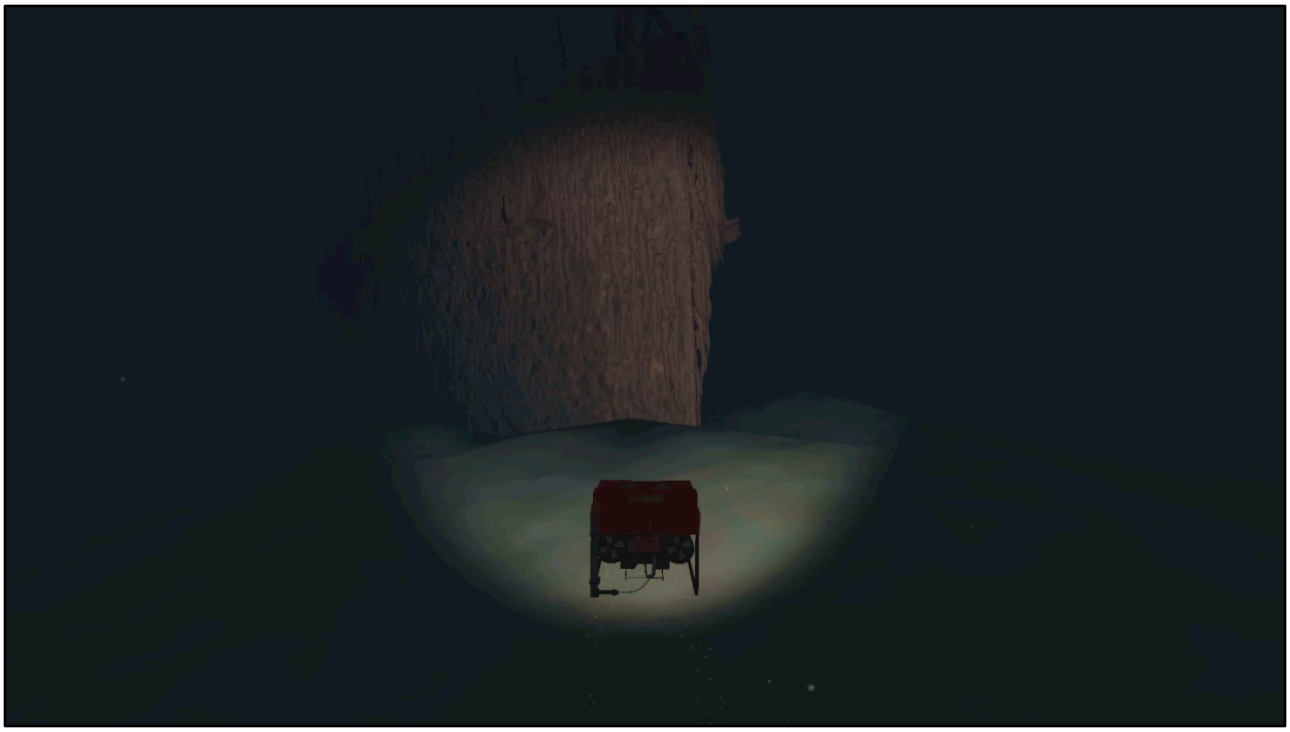
Titanic is designed following several of the real Discovery Channel expeditions to the wreck site we worked on… the player is controlling Robin, a real life Remotely Operated Vehicle [ROV]… the game controller is set up with appropriate abilities to move similar to the real ROV… you are in the blackness of being 2-1/2 miles below the surface with only blueprint-like diagrams used by your navigation partner to guide you…



To be successful in an educational game that will potentially be used only briefly you need to allow for the user to be quickly successful… otherwise frustration inhibits the learning process before it begins…



OK… here’s some things we have learned… the controls need to be standard enough so the start-up curve is quick… limit the game space so the user does not get lost… mix simple goals in with harder ones…not too much information… and an active not passive involvement…



In this game there are destination points as your goals… the bow, what remains of the bridge, the hole where the Grand Staircase was leading to the First Class Dining Room and other decks… the boiler rooms… and also the radio room, the swimming pool, various cabins, and cargo holds… there are various items to locate, like dishes, shoes, eye glasses, suitcases, a pocket watch, etc… this is also available to play in the dome in the Expo…

Reusing the assets from the fulldome show about the coral reef…In this game you get to explore a coral reef in a scavenger-hunt-like game… set up similar to the Titanic exploration we reused the little ROV except this time you are in a brightly lit environment…again in the Expo dome…

The goal is to find various species of coral, fish, a sea turtle and a shark… there also are some treasure items from an old Spanish wreck… the obvious lessons learned here are the different species of coral and marine life… plus some fun by being a treasure hunter…

So there's a quick 10 minute explanation of what we've learned about immersive games… you can try out these games, if you have not already done so, in the portable dome at the expo that Gary Young from Go-Dome is showing… Also there is some further information at my studio's VR site… Questions…