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WG 4: Education and Training C. Innovative technologies for education and training

## **Developing an Asset Sharing Repository for Immersive Environments**

There is currently a plethora of websites dedicated to 3D models providing easy access to everything from transportation to industrial equipment, architecture, furniture, and even animals though none is dedicated specifically to nuclear industry or safeguards-related materials. The author's search was unable to locate a website dedicated specifically to nuclear energy, safeguards, and/or nonproliferation subject matter. Models for weapons systems, non-nuclear industrial settings, or other wholly unrelated items dominated searches within sites that do contain nuclear related items.

A dedicated 3D asset sharing website will serve several purposes. By providing a centralized location that developers can search for available assets it will save time and effort, allow for streamlined project planning, and reduce modeling costs by providing ready to use assets that have already been developed by the participating organizations. It will also provide some measure of knowledge management, related to past immersive environment developments, as the assets shared could be tagged with sponsor, developer, and facility type information. Time and cost savings will be realized through the sharing of base components / assets that immersive content developers use to create immersive environments, videos, and other instructional materials. For example, there are currently several immersive environments specific to or potentially applicable to safeguards, safety, and security training needs. While each of these immersive environments was developed for purposes specified by the respective sponsor, if the assets for these environments were shared, each could then provide the building blocks for a variety of potential future projects.

### **Potential Users – Contributors**

The users of, and contributors to, a 3D asset repository should largely overlap. The potential users would include academia, industry, government, non-governmental organizations, and international organizations. While each group will have specific uses for their projects, the assets used to make up each immersive environment have the potential to benefit other developers, each with their own specific end use.

Ideally, as developers of new immersive environments make use of assets provided through asset sharing they will in turn provide any new assets they create for their specific projects. As the number of development projects grows so too should the number of assets available for use.

### **Who, What, Where, When, and How?**

‘Who’ will make use of such a site is not difficult to imagine; developers for the International Atomic Energy Agency, other international organizations, State Authorities, industry, academia, serious games developers, etc. could all benefit from the availability of this information and these assets.

‘What’ will be made available should include 3D models (wireframes, also known as static meshes) textures, sound effects, images, videos, and animations. The final product, the specific program developed, would not need to be shared. This will help insure nondisclosure of sponsor specific training requirements. Guidelines would be provided regarding preferred file types; Filmbox (FBX), Autodesk 3D Max (3DS), or Object (OBJ) files for wireframes, JPEG, GIF, BMP, TIF, PNG, etc. for images, MPEG, AVI, MOV, etc. for video, MP3, AAC, AIF, OGG, etc. for audio, etc. Using industry standard formats would allow for the greatest ease of use of assets across a variety of game engines and immersive training technologies. ARA uses the Unreal Engine for the current PHWR immersive environment while LANL uses the Unity engine for its GCEP and LWR environments, though both game engines use C++ and C# programming languages for training scripting. By sharing their assets in standard formats, ARA and LANL could easily import one another’s models into their preferred game engines to produce new environments and training content.

‘Where, when, and how’ will likely be the most difficult questions to answer. The proposed website will likely be based on a commercial hosting service, and current cloud services are a small fraction of the cost compared to artist asset creation. For an example, cloud servers with effectively unlimited download limits per month (10TB) and Gigabit bandwidth connectivity are available today in Europe for €70 per month or less. The timeline for launch will depend largely upon the time needed for website design and the availability of assets to begin populating the site.

### **Developing Guidelines**

The user community of the asset-sharing site should develop guidelines regarding file types and model fidelity that help inform and standardize shared assets. Providing files in standardized formats will minimize the need for file conversion prior to incorporation into other’s projects. Providing expected minimum and maximum requirements for model detail will ensure that models produced by individual developers provide some uniformity regarding the ‘look and feel’ of the environments. Fidelity standards for the models created by disparate developers will help to ensure environments will run on computers with a wide variety of performance capabilities.

### **Summation**

Asset sharing for immersive environments will present opportunities to shorten development timeframes, reduce costs, and increase availability of immersive environments for a wider audience looking to balance the need for quality training with limited resources. A web based 3D asset repository will facilitate this asset sharing.