

Additive Manufacturing, Virtual Collaboration, and the Digital Thread at EXWC

Cody M. Reese, PE
Expeditionary Engineering Director - NAVFAC EXWC
cody.reese@navy.mil

- **Past Efforts**

- Remote Collaborative 3D Printing - Process Investigation

- **Ongoing Efforts**

- Unmanned Inspection for Facilities Applications
- 3D Model Translation workflow analysis
- Additive Manufacturing for Facilities Applications

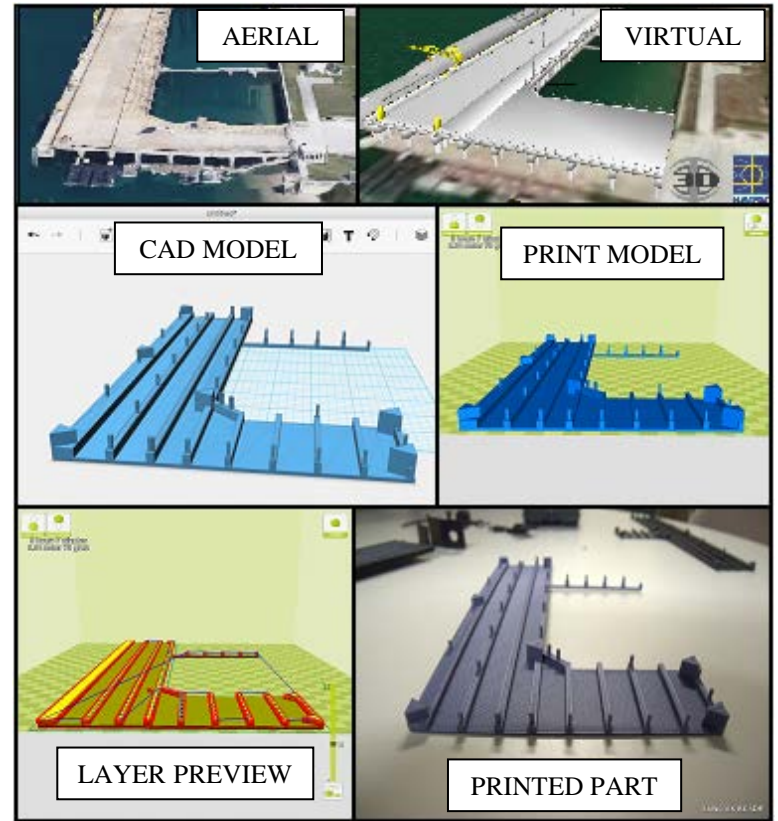
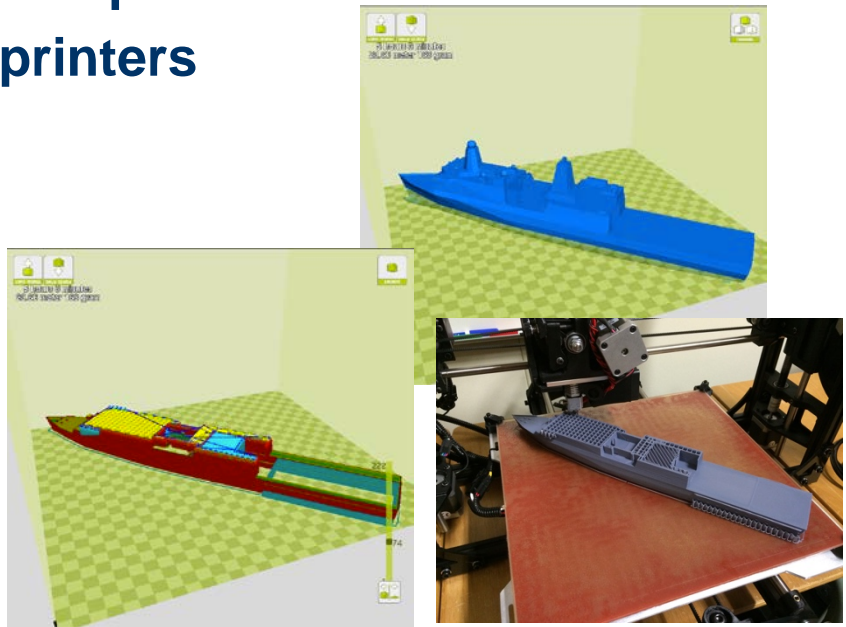
- **Efforts of interest**

- Additive Manufacturing of Facilities
- Facilities Requirements for Additive Manufacturing systems
- Expeditionary Additive Manufacturing

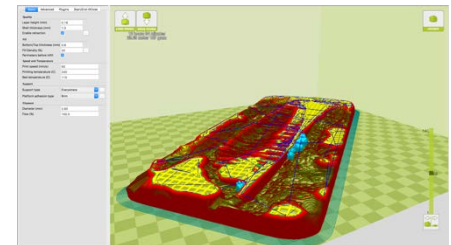
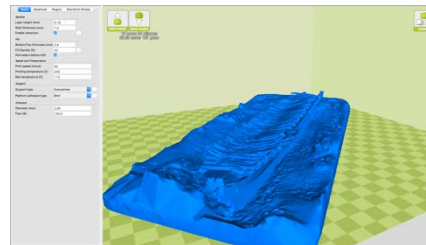
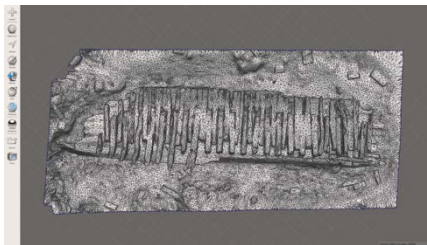
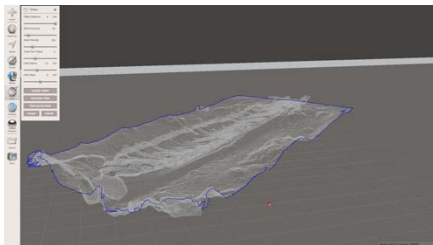
RC3DP – Remote Collaborative 3D Printing



- Preliminary evaluation of the 3D printing digital thread
- Send/receive files in various formats, process/translate, print
- 30+ models
- 10+ file formats
- 13 software packages
- 5 computers
- 2 printers



- **Unmanned Inspection for Facilities Applications**
 - Determine the primary applications, feasibility, utility, and capability gaps of small, unmanned systems to augment facilities inspection and design reconstruction operations
- **Additive Manufacturing for Facilities Applications**
 - Determine primary candidates for additive manufacturing
 - Test and Evaluation of select parts
 - Business case analysis and AM system distribution model
- **Model Translation**
 - Evaluate typical model translation needs, workflows, and costs
 - 3D models are ubiquitous in the modern technical environment
 - Core to CAD/CAM, GIS, Virtual Planning, Simulation, etc.
 - Specialized software, expertise, and workflows are required to translate



- **Additive Manufacturing of Facilities**

- Maintain awareness of ongoing Army and USMC efforts in additive manufacturing of expeditionary facilities
- Large gantry or boom-mounted concrete extruders, capable of printing structures in place

- **Facilities Requirements for Additive Manufacturing systems**

- Evaluate/codify facilities requirements for advanced AM systems
- **Advanced (metal) AM systems require**
 - Specialized raw-material storage and handling (metal powders)
 - Appropriate environmental conditioning and HVAC
 - Appropriate power and grounding systems
 - Appropriate floor stability
 - Supporting machine shop capabilities

- **Expeditionary Additive Manufacturing**

- Everything discussed above – in the Expeditionary context