DoD BIM Contract Requirements
BEST PRACTICES

Leo Fernandez, Assoc. AIA
Aerospace & Defense
Production Technology Leader
Hurricane Harvey
Hurricane Irma

Winds: 185 mph
Category: 5
Moving: W at 15 mph
Hurricane Maria

LAT: 17.9°N    LON: 65.6°W
15 MI SSW OF VIEQUES

WINDS: 155 MPH
PRESSURE: 917 mb
MOVING: NW at 10 MPH
- Thousands Without Homes
- Combined Damage: Over $200 Billion
As Architects and Engineers...

- We strive to improve Safety and Wellness on every one of our building designs
- But we cannot control nature
- If disaster strikes, what information will you produce to restore your losses to pre-disaster condition?
Leonel Fernandez, better known as Leo, is a design and strategic management professional with 15+ years of experience in the Architecture, Engineering, Planning and Technology industries; specializing in Building Information Modeling (BIM) management, design, indoctrination and implementation within the AECOO industry.

Leo joined RS&H as an Aerospace & Defense Production Technology Leader. Leo studied Architecture at the Polytechnic University of Puerto Rico and for over 11 years has been using Building Information Modeling technology to complete a wide range of Architectural Projects; ranging from schools and office buildings to large military facilities for DoD (USACE, NAVFAC, Air Force, Air National Guard & NASA), amongst other government agencies.

Leo is responsible for the implementation of BIM technology, BIM Standards, BIM Execution Strategies, BIM Quality Control Protocols, Training manuals and courseware. Since 2015, he has been teaching Building Information Modeling to future design professionals at a Florida college institution. He has lectured on the use of BIM in AECOO Conferences, and national events both in the United States as well as in the Caribbean. He is also an Industry member of the U.S. Army Corps of Engineer's Industry BIM Consortium.
Presentation Topics

- DoD BIM Goals & Objectives
- Common DoD Contract BIM Requirements
- Best Practices
- Q&A
DoD BIM Goals & Objectives: Air Force

1. Integrate BIM data with Air Force Facility Management and Geospatial tools
2. Eliminate conflicts via Clash Detection
3. Geolocation (create Control Points for Assembly Layout)
4. Accurate 3D Record Model for FM Team
DoD BIM Goals & Objectives: USACE

1. Use Spatial Program Validation to ensure the facility meets all program requirements
2. Design: Manage Design QC through Interference Management and Model Element confirmation
3. Construction: Interference Management and 3D Coordination
4. Site Utilization Planning (use BIM models to coordinate construction site logistics prior to and during construction)
DoD BIM Goals & Objectives: NAVFAC

1. Standardize data processes and data format for facility life-cycle sustainment
2. Design: Produce 3D Parametric Design Models
3. Construction: Produce Record Models
4. Data entered once, used repeatedly, used consistently, and maintained current
Common BIM Contract Requirements

1. BIM Project Execution (PXP) Plan
   a. BIM Requirements Kickoff & Demonstration Meetings
   b. Include BIM Execution Strategy
   c. Include Process Maps (Level One and Two)

2. Minimum Modeling Requirements (M3 or eOMSI)

3. Mandatory BIM Uses (During Design):
   a. Design Authoring
      ▪ Using agency-specific Revit Templates
   b. Design Reviews
   c. 3D Coordination (Interference Management)
   d. 3D Control and Planning (Geolocation)
   e. Facility Management Data (COBie & eOMSI)
      a. UniFormat and/or OmniClass
Common BIM Contract Requirements

4. Mandatory BIM Uses (During Construction):
   a. 3D Coordination (Interference Management)
   b. 3D Control and Planning (Geolocation)
   c. Record Modeling
   d. Facility Management Data (COBie & eOMSI)
      a. UniFormat and/or OmniClass

5. Quality Control Checks
   a. Visual Check
   b. Interference Check
   c. Standards Check
   d. Model Integrity Check
   e. Version Updating Check
   f. Revision Authority Check
Common BIM Contract Requirements

5. Deliverables:
   a. BIM Files
   b. CAD Files
   c. COBie Data Extraction (Excel format)
   d. Interactive Review 3D Format (NWC, 3D PDF, Bentley Navigator, etc.)
   e. Revit Compare Tool Report
   f. QAQC Reports (Model Checks)
   g. QAQC Reports (CAD Standards Checks)
   h. QAQC Reports (Model Integrity Validation)
   i. QA/QC Reports - Visual Check Report
   j. QA/QC Reports - Interference Management Checks
   k. IFC Coordination View
   l. List of all submitted files (Excel spreadsheet preferred)
Best Practices: Contract Language

1. Read!
2. Read!!
3. Read!!!
Best Practices: Contract Language

1. Do not agree to anything until...
   a. Proposed Contractual Requirements are discussed during BIM Requirements Kickoff Conference

2. Understand that there are separate contractual responsibilities for:
   a. Designer of Record
   b. Contractor
   c. Government
Best Practices: PM’s & Negotiating Officers

1. Before you bid on DoD projects, familiarize yourself with your organization’s:
   a. BIM Skills
   b. Experience
   c. Ability to comply with BIM Requirements
   d. Do not lie on Proposals

2. Assess the need to improve your organization’s capabilities
   a. Hiring someone with DoD experience
   b. Staff Training
Best Practices: PM’s & Negotiating Officers

3. Familiarize yourself with Design Authoring Requirements
   a. Availability & Staff Experience with Required Software
   b. Licensing Cost

4. Familiarize yourself with frequency of:
   a. Processes (QC checks)
   b. Deliverables

5. Understand how all of the above will affect Financial Budget

6. Put together a winning team
   a. Familiarize yourself with Production Team’s skills
   b. Technical Skills Assessments
   c. BIM Managers (DOR & KTR)

7. Negotiate final Terms of BIM Requirements
Best Practices: Minimum Modeling Requirements

1. Familiarize yourself with Levels of Development (LOD’s)
   a. DoD only recognizes LOD 100, 200, 300, 400, 500

2. Familiarize yourself with Grade & Format Definitions
   a. Grade: Granularity (LOD)
   b. Format: 3D/2D, with/without Facility Data
What are Levels of Development (LOD)?

**LOD 100**
- 3'0" x 7'-0" Door

**LOD 200**
- 08 11 00 Metal Doors and Frames
- 6" 08 11 13 B1 1 3/4" Metal Door (Louvered)

**LOD 300**
- 3' - 4"
- 4'7 5/8" 101
What are Levels of Development (LOD)?

- **LOD 100**
  - AHU
  - 2' - 0"

- **LOD 200**
  - D3040 - DISTRIBUTION SYSTEMS
  - 2' - 6"

- **LOD 300**
  - D3040100 - AIR DISTRIBUTION SYSTEMS
  - 2' - 9"
Best Practices: Minimum Modeling Requirements

3. Familiarize yourself with responsibilities between DOR and KTR
   a. Minimum Modeling Matrix M3
   b. eOMSI Facility Data Workbook

4. Understand Seriousness of Compliance
Best Practices: Minimum Modeling Requirements
Best Practices: Minimum Modeling Requirements
## Best Practices: Minimum Modeling Requirements

### Minimum Modeling Matrix (M3)

**Version: 1.3 (SEPT-19-2014)**

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<tr>
<th>Level</th>
<th>Element ID</th>
<th>OmniClass ID</th>
<th>UniFormat ID</th>
<th>MasterFormat ID</th>
<th>Included in Facility or Site?</th>
<th>LOD</th>
<th>GRADE (CD)</th>
<th>GRADE (AB)</th>
<th>Primary Discipline</th>
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<td>200</td>
<td>B</td>
<td>B+</td>
<td>Electrical</td>
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</tbody>
</table>
Best Practices: Record Models

1. Record Model requirement is to be fulfilled during Construction Stage

2. Familiarize yourself with Contractor’s BIM skills
   a. Contractual Requirement during Construction
   b. DOR’s: negotiate additional service to aid requirement fulfillment

3. Record Model to include:
   a. Alterations between Design Development stage and what was Built/Installed
   b. Final Resolved Interference Management
   c. Final Facility Data
3D Coordination Requirement

- Clash Detection
  - Navisworks or BIM 360 Glue
  - The goal of clash detection is to eliminate the major system conflicts prior to installation.
  - The information model is then used to create detailed control points to aid in assembly layout.
Best Practices: 3D Coordination

1. Familiarize yourself with 3D Coordination Software
   a. Availability, Licensing Cost, Training, Means & Methods

2. BIM Manager & QC Manager to work together

3. Define 3D Coordination Strategy & How it Affects Project
   a. Frequency
   b. Validation
   c. Reaction Time

4. Fight to maintain a unified check process
   a. Avoid separate 3D Coordination checks between consultants

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Best Practices: Facility Management (COBie)

1. COBie: Construction Operations Building Information Exchange
2. Goal: Integrate BIM data with DoD Facility Management and Geospatial tools
   - Record Model attributes and COBie spreadsheets are populated to provide information to the Facilities Management system.
   - Potential value:
     • Store operations, maintenance owner user manuals, and equipment specifications for faster access.
     • Maintain up-to-date facility and equipment data including but not limited to maintenance schedules, warranties, cost data, upgrades, replacements, damages/deterioration, maintenance records, manufacturer’s data, and equipment functionality.
Best Practices: Facility Management (COBie & eOMSI)

1. Familiarize yourself with the COBie process:
   a. The Process begins during DD phase
   b. Follow “The COBie Guide” instructions
      ▪ Download & install COBie Revit Plugin
   c. The DOR’s populate COBie data:
      ▪ UniFormat II
      ▪ OmniClass
   c. Government extracts data in XML format to populate:
      ▪ Tririga, BUILDER & Maximo software
   d. The Process ends during Construction phase
      ▪ Record Model with final attributes

2. Familiarize yourself with the Assets Required for FM

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Best Practices: Facility Management (eOMSI)

1. The eOMSI Facility Data Workbook (FDW) is an excel spreadsheet that documents the Mastersystems, Systems, and Subsystems installed in the facility during construction by the Contractor.

2. For each Subsystem installed in the facility, the Construction Contractor populates up to 17 required standardized facility asset data fields. Upon construction completion the Construction Contractor submits the final eOMSI for upload to MAXIMO.

<table>
<thead>
<tr>
<th>REQUIRED ASSET FIELDS</th>
<th>DOR/KRT/GVT</th>
<th>Explanation</th>
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<td>Name</td>
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</table>
Summary

Upon successful fulfillment of these BIM Requirements you get:

a. Accurate Design & As-Built Geometry and Floor Plans
b. Facility Asset Data:
   a. Specs
   b. Quantities
   c. Cost
d. Manufacturer Data
e. Warranty Data
f. Location
c. Geolocation Coordinates:
   a. GIS Location, Orientation & True North
   b. Ability to do automated assembly layouts with control points
d. And so much more!

Advise: Host Data on the Cloud
Conclusion

- We have seen the benefits of completing BIM Requirements such as Facility Management data input & extraction
- Why isn’t this a Standard Operating Procedure?
  - Human Nature: won’t fix until broken
  - Sometimes challenging to meet these requirements due to budget constraints
- Let’s not wait for another catastrophe to strike
- Let’s meet halfway and work together to make the future a brighter one for all generations to come
QUESTIONS?

THANK YOU!

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