NASA LaRC's

Spatial Data Management and Decision support Environment



Brad Ball Nov. 2016

Agenda

- LaRC Overview
- Areas of work and philosophy
- Facility Management Portal
 - Explanation
 - Examples
 - Evolving Capabilities
- Building Information Modeling
- Laser Scanning
- Task/Change/Configuration Management



Overview



NASA Langley Research Center

Major Areas of Spatial Data Work

• Plant/Campus Data (ESRI):

• Base Map, Utilities, Aerial/LiDAR, Network Analysis

Building Interior Data (ESRI):

• Gross/Net, ~20 layers such as elect. panel, fire

Relational Database (Oracle):

SDE, SU, RP, FRS, Move Tool

Measurement Technologies (Trimble):

• GPS, OTS, Laser Scan, Leveling, Geodetic Control

• Other:

• BIM, mobile/virtual, Optimization,





 $Subsidence \ level \ loop$





NGS level training



Integrated survey

Facilities Management Portal



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Impervious Surface Analysis



Environmental Spill Plan

- Surface gradient for potential ground surface flow
- Storm inlets, pipes, ditches displayed with flow direction for spill interception





- Outfall drainage boundaries describe final point of containment before dispersing into environment
- Petroleum tanks labeled by volume and oil type
- Tanks symbolized by container type

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Locator









Safety and Fire Department Support

- Card Readers
- Fire Extinguishers
- Pull Stations
- Smoke Detectors
- Sprinklers
- Fire Alarms
- Confined Spaces
- Etc.



Space Management Tools

Footprint Management



Space Management Tools

Organizations And Personnel



Technical Space Management: Master Facilities List (MFL)

Building 1200 Laboratory Complex



Space Optimization

- Visualize assets
- Model organizational synergy, operational costs
- Plan complex move constraints
- Optimize solutions to save money and improve effectiveness



Parking Optimization

New Data Center will be placed in triangle space near LaRC HQ

Impact:

Forces many employees to traverse Langley Blvd (Center's busiest street)

Solution:

Add additional parking spaces near B1230

Tool will also identify opportunities to turn unused parking lots into green space



sUAS Operations for Updating Aerial Photography





Next Generation Flood Impact Analysis Tool



Various tidal datums

Building Details With Sandbag calculations

Storm Predictions Link

3D Models



City Engine with UAS imagery



3D Storm Drain System – Basemap features with parking lot manholes and





Three Dimensional Multi-modal Transportation Routing Network



Multimodal (walking, biking, driving)

Handicap accessible

Traveling salesman routing

Integrate with GIS locators (building, room, personnel, equipment)

Basic BIM Models from Scans





3D LASER SCAN NTF WIND TUNNEL



NTF TEST SECTION







3D LASER SCAN BLDG 1247E

COMPLETE 3D POINT CLOUD 1247E AND BOTTLE FIELD

GIS Task Management



GIS Configuration Management



Backup

Flood Elevation Graphic







Building Information Model (BIM)



Pipes colliding with Ventilation duct

Review BIM Model for Contract requirements including:

- Object geometry representation completeness (LOD Level of Development).
- Object information for asset Maintenance to be exported to Maximo (LOI Level Of Information).
- Absence of object collisions/clashes.





1247E COMPRESSOR STATION 3D POINT CLOUD

