A New Architecture for Visualization: Open Mission Control Technologies

Jay Trimble, NASA Ames Research Center

ESAW 2017
A New Platform

- Why a new platform?
- Capabilities
  - All of your data in one place - no more application switching
  - View your data the way you want to see it
  - Compose your data without programming
  - Web based, desktop and mobile
  - Data source integration
  - Plug in architecture for customization
  - Open Source

http://nasa.github.io/openmct/
Open Source

- Learn about it
  - http://nasa.github.io/openmct/
- Try it
  - https://openmct-demo.herokuapp.com
- Get the code
  - https://github.com/nasa/openmct
Open Source

- Enables Collaboration
- Reduces/Eliminates ownership issues
- Provides immediate access without restriction

http://nasa.github.io/openmct/
Missions

- JPL
  - Mars 2020
  - Mars Science Lab (Beta Test)
  - Earth Science (evaluating)
- Ames Research Center
  - Resource Prospector Lunar Rover
All Your Data in One Place
View as you want it

http://nasa.github.io/openmct/
Composition - Create

CREATE
AMMOS Users

- Folder
- Display Layout
- Web Page
- Historical Telemetry Table
- Real-time Telemetry Table
- Overlay Plot
- Stacked Plot
- Data Set
- LAD Table
- LAD Table Set
- Data Table

Create

- Web Page
- Example Imagery
- Event Message Generator
- Sine Wave Generator
- Clock
- Timer
- Folder
- Display Layout
- Telemetry Panel
- Timeline
- Activity
- Activity Mode
Compose in Layouts

http://nasa.github.io/openmct/
Mars Science Lab
Composition (JPL)
Resource Prospector Composition (ARC)
On the Desktop

@JPL

@ARC
Mobile

iPad

Phone
Architecture

- JavaScript
- HTML and CSS
- Domain Objects
  - Identifier, Model, Dynamic Behavior
- Views

http://nasa.github.io/openmct/
Persistence

- User created objects stored as JSON documents on mission control web services (MCWS) at JPL

http://nasa.github.io/openmct/
Mission Adapters JPL

- Open MCT integrates with mission data sources via adapter plug-ins.
- Adapters handle requests for real-time subscriptions and/or historical queries.
- Views initiate requests for the data they will display, Open MCT Mediates.
- Plug in mechanism avoided coupling to specific server side data.

http://nasa.github.io/openmct/
VISTA Objects

- VISTA is Open MCT customized by plugins
- Customized for the JPL Mission Domain
- More objects on the way

http://nasa.github.io/openmct/
WARP Objects

• WARP is Open MCT, customized by plug ins

• Deployed at ARC

http://nasa.github.io/openmct/
Compare

Open

WARP

VISTA
WARP Objects

http://nasa.github.io/openmct/
Mobile WARP for Rover Ops