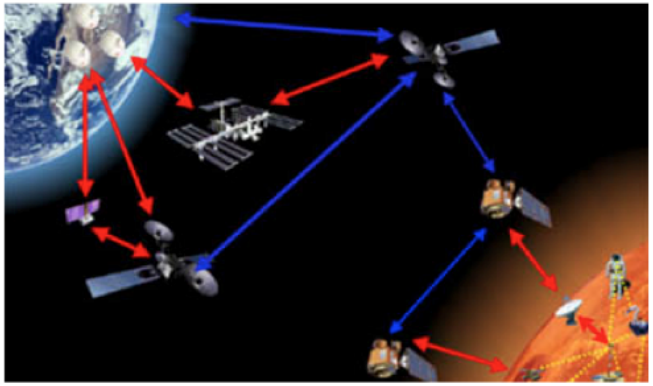
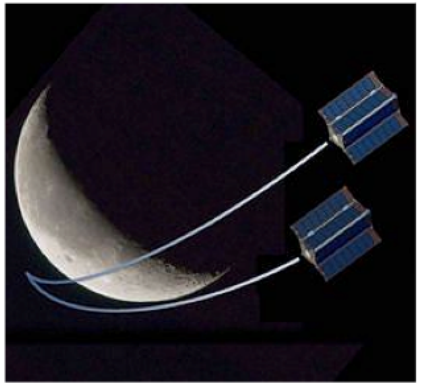
Solar System Visualization (SSV):

Big Data Strategic Initiative Knowledge Driven Automated Movie Production Environment, Alert, Display and Distribution (AMPED)

SSV Goal: Increase resolution, frames, bandwidth; Reduce cost, energy, risk by 10X from 2011-2020.

Eric De Jong Science Division (JPL/Caltech)
Visualization and Image Processing (VIP) Center
CL# 14 - 2385





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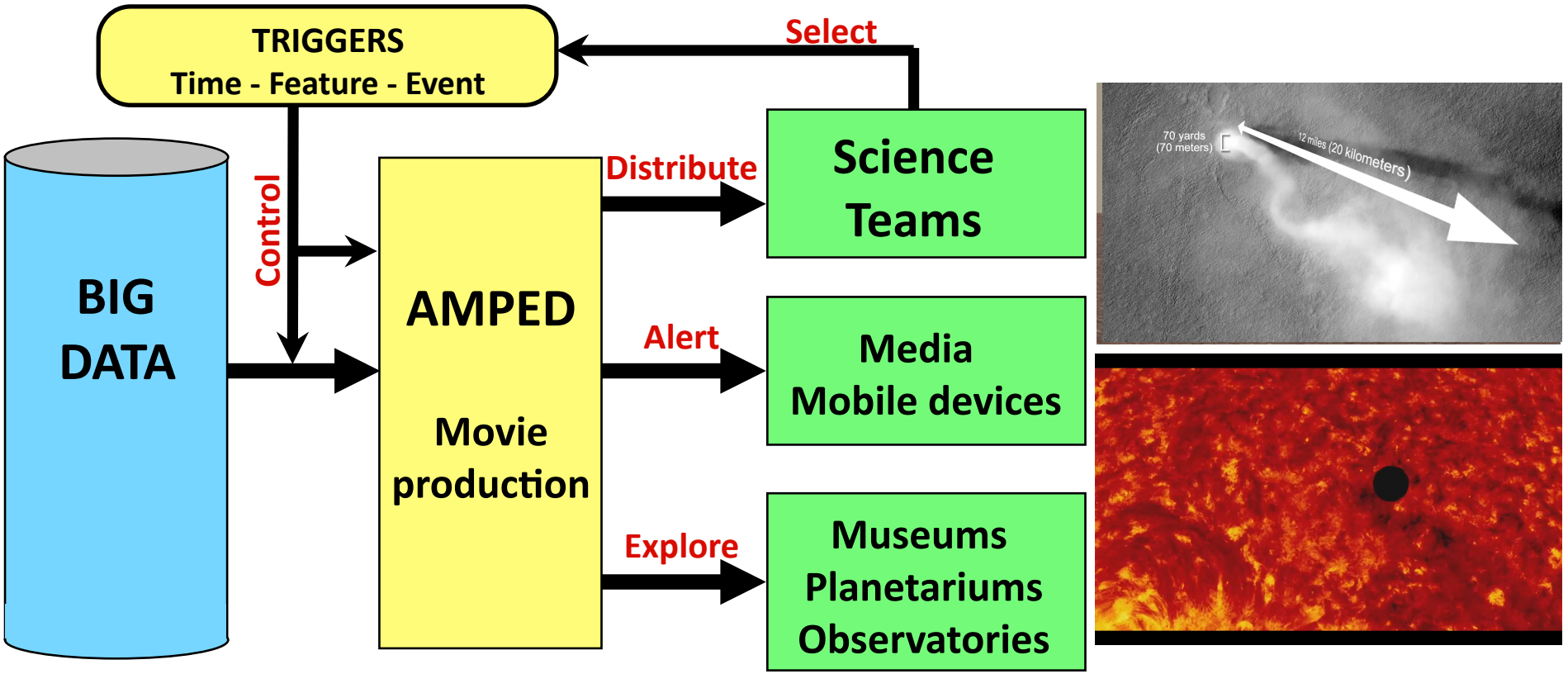
Knowledge driven Automated Movie Production Environment, Display, Alert and Distribution Pipeline.

Challenge: Develop automated science visualization techniques to enable knowledge extraction from enormous volumes of complex data.

AMPED Technology exploits expert knowledge to enable: Automated Multi-dimensional Science Data Stream Visualization, Movie production, Display, Alert and Distribution.



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Knowledge driven Automated Movie Production Environment, Alert, Display + Distribution (AMPED)

State of the Art: Current methods for movie production, distribution and display are labor-intensive and expensive.

State-of-the-Art

- **Highly scripted activities**
- **Large production teams**
- **Hollywood style direction**

AMPED Pipeline Paradigm Shifts

+ Real-time knowledge extraction and display
+ Algorithms and automated procedures
+ Time-Feature-Event triggered Movies + Alerts

AMPED Pipeline Benefits:

- Works with experiment data records, simulation data and archive system data.
- Uses new feature, event and data flow detection code.
- Implements meta-data driven procedures, custom search and pattern recognition.
- Creates 3D stereo movies from Big Data observations, simulations and archives.

Creates Real-Time Science Visualizations for Scientists, Sponsors and the Public.

AMPED Pipeline Enables Real-time, Automated Inexpensive Science Visualization, Movie Production, Alert, Display + Distribution.

PI: *Eric De Jong.* ***Team:*** *Shigeru Suzuki, Richard Zurek, Paulett Liewer, Paul Rosen, Scott Bolton, Ashwin Vasavada, Martin Lo, Edward Rhodes, Roger Griffith, Mike Stetston, Koji Kuramura, Jason Craig, Jeffrey R. Hall, Kris Capraro, Zareh Gorjian, Paul Andres, Steve Levoe, Christopher Cordell, Myche McAuley, Aaron Feldman, Ryan Ollerenshaw.*

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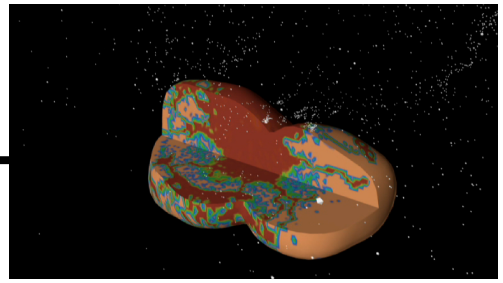
Interplanetary Network Directorate

AMPED Pipeline Enables Scientists to: Observe Visualize Explore



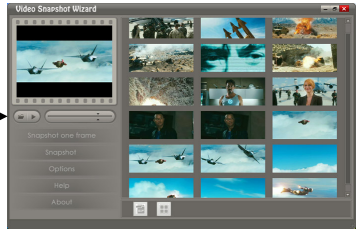
Stereo Image Pairs

Socet Workstation

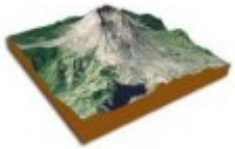
Stereo Image and Range Map Storage

Render Nodes Dual Six Core

Uncompressed 4K Video Server



Real Time 4K Interactive GPU Display



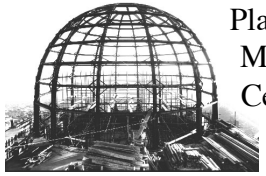
Simulated Flights

Web & Social Networks

Mobile Devices: iPhone / iPads / BluRay / Laptops

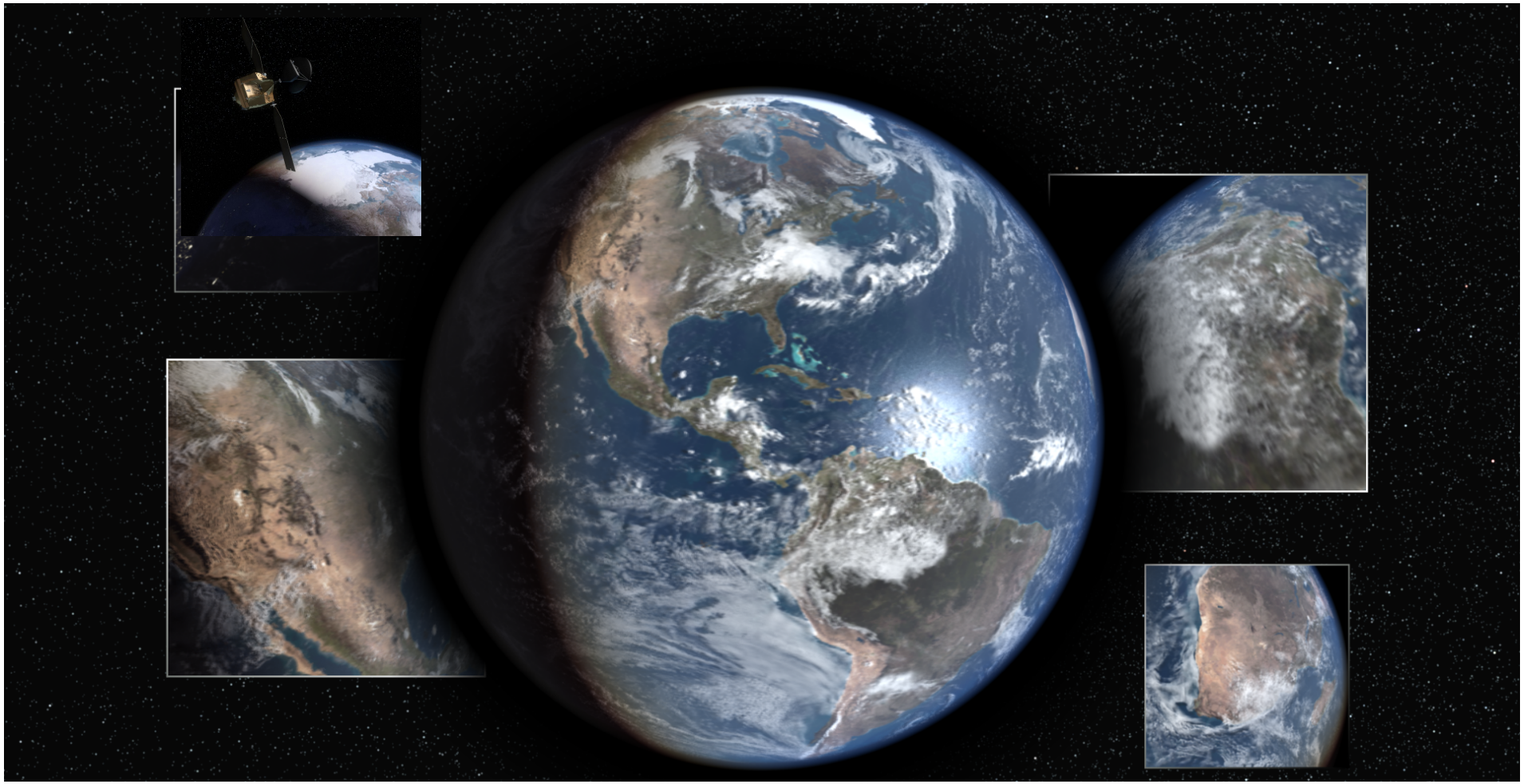
Digital Cinema Projection

HD-2k-4k Stereo



Planetarium Domes, Museums, Science Centers, IMAX 3D

AMPED Pipelines Enable Scientists to Visualize: Mission Operations Observations, Features, Targets, Dynamic Processes, Events.



AMPED Pipeline Inputs : Mission Plans, Spacecraft Commands, Feature Catalogs, Models, Simulations, Observations, Metadata, and Events.

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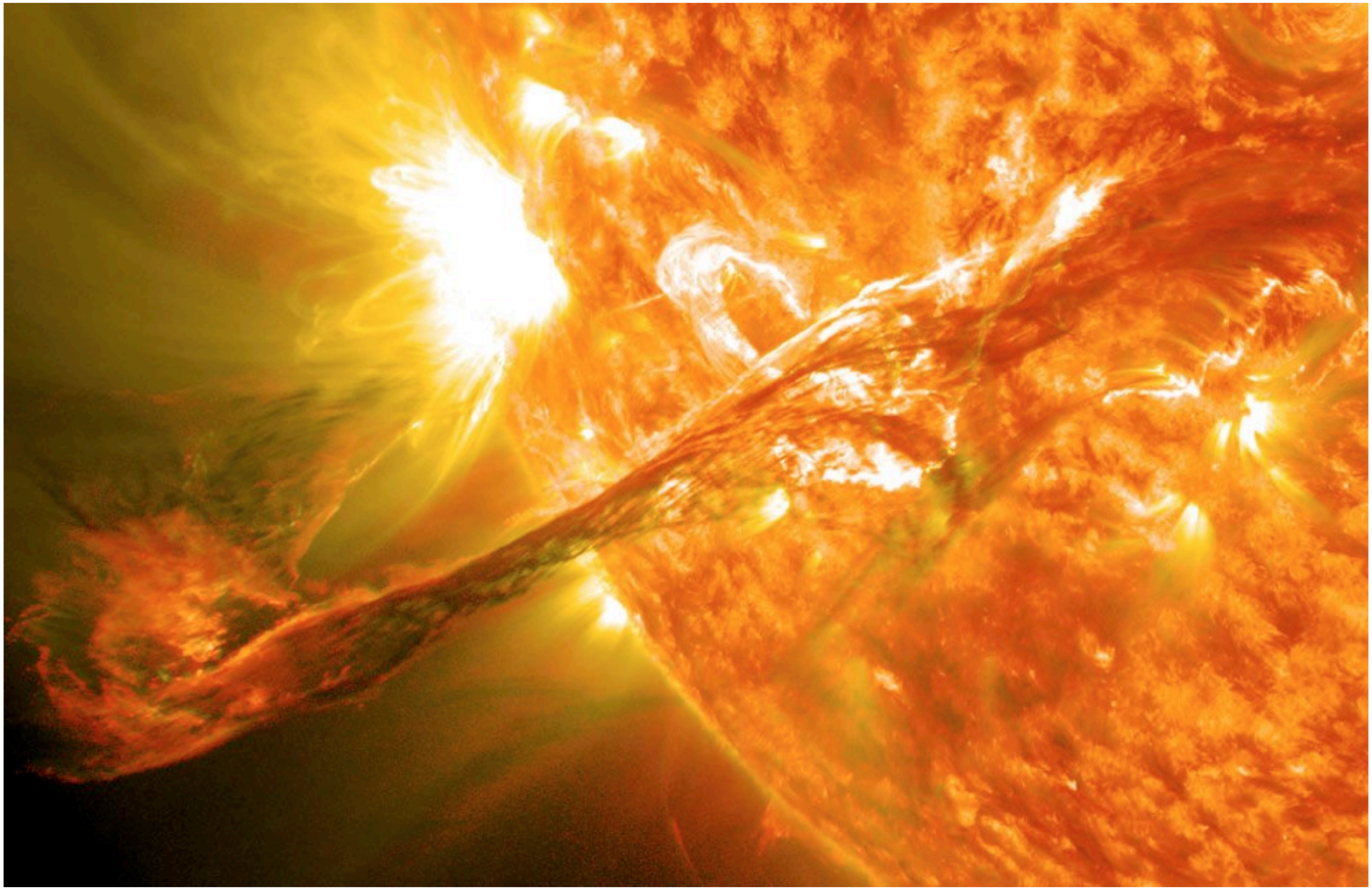
AMPED Pipeline Enables Scientists to Visualize: Dynamic Processes and Events.



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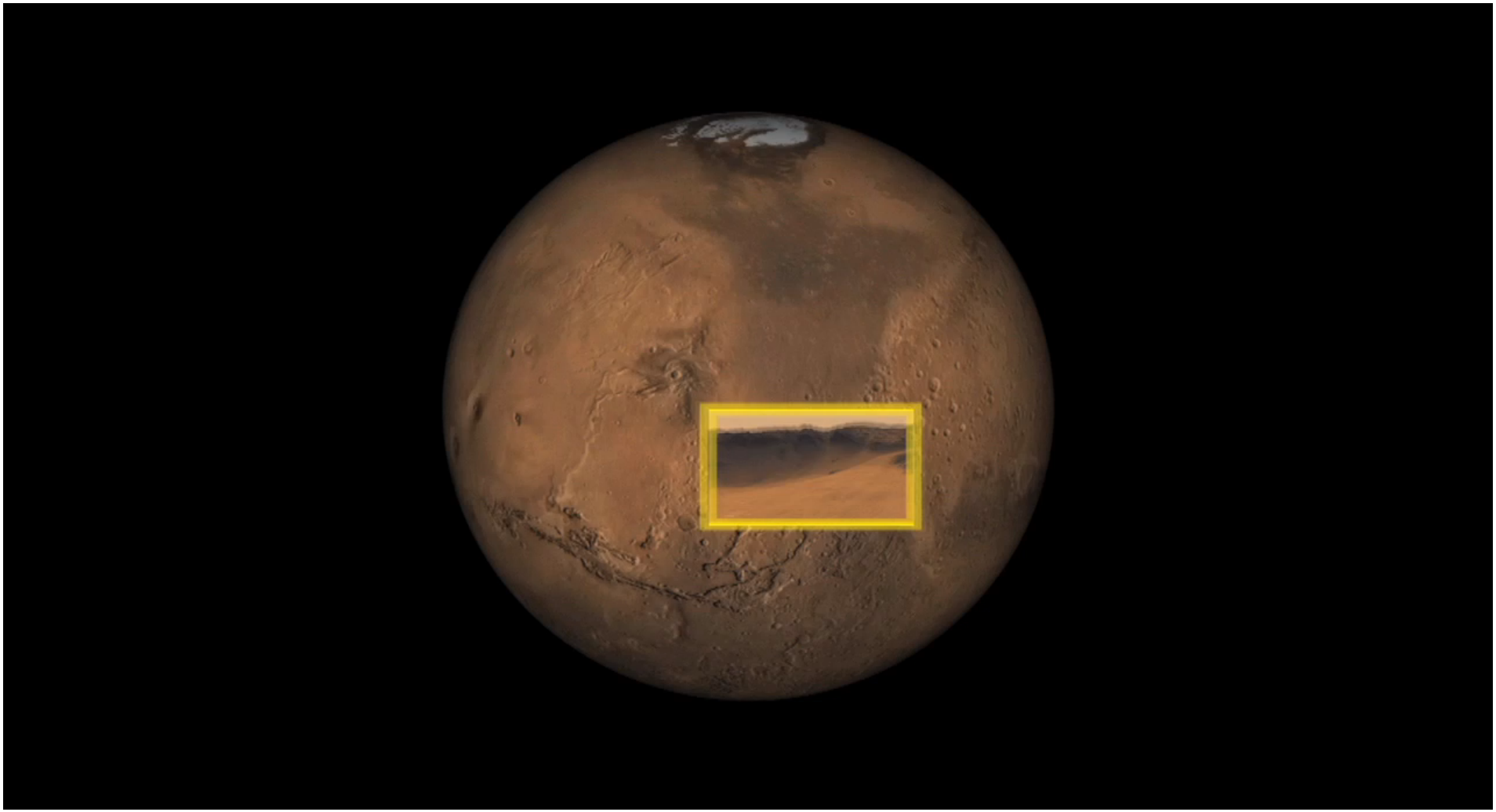
AMPED Pipeline Enables Scientists to Visualize: Features and Targets.



Three Dimensional (3D) 25 centimeter/pixel model of Mojave Crater created from a MRO/HiRISE stereo pair. MRO orbits 300 km above the surface of Mars.

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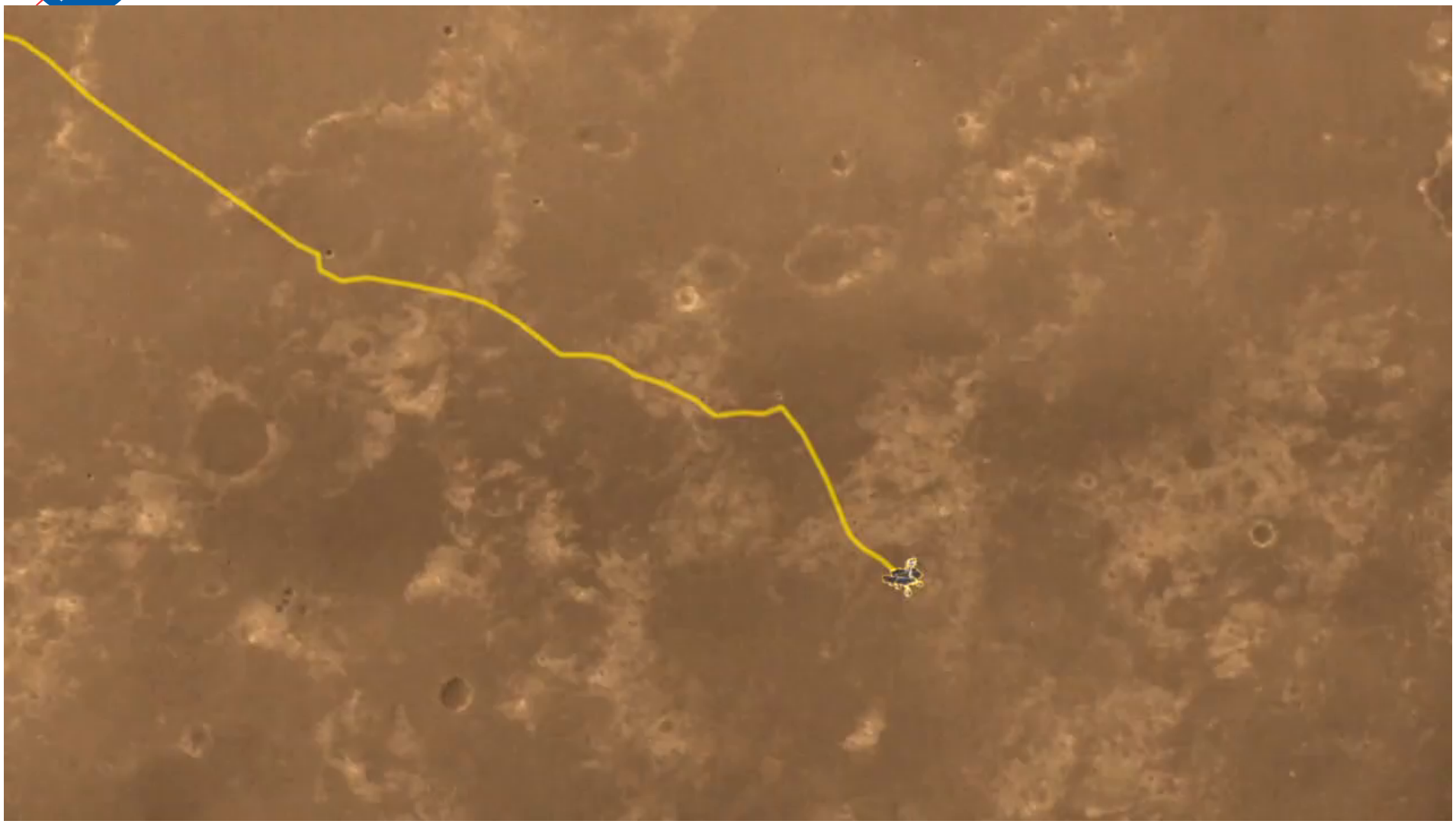
AMPED supports Opportunity 10th Anniversary



AMPED enables Scientific Visualization of Observations and Operations

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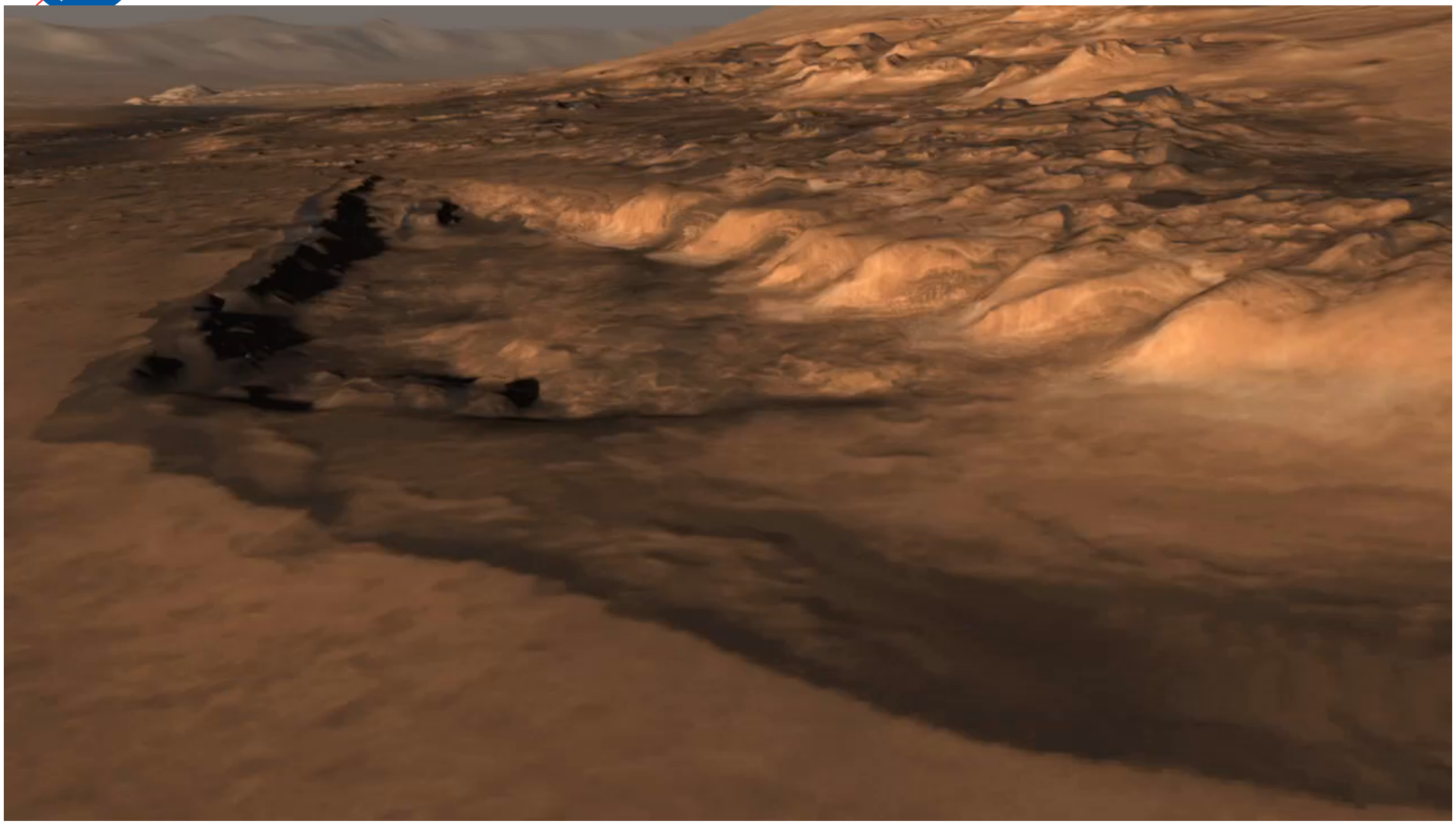
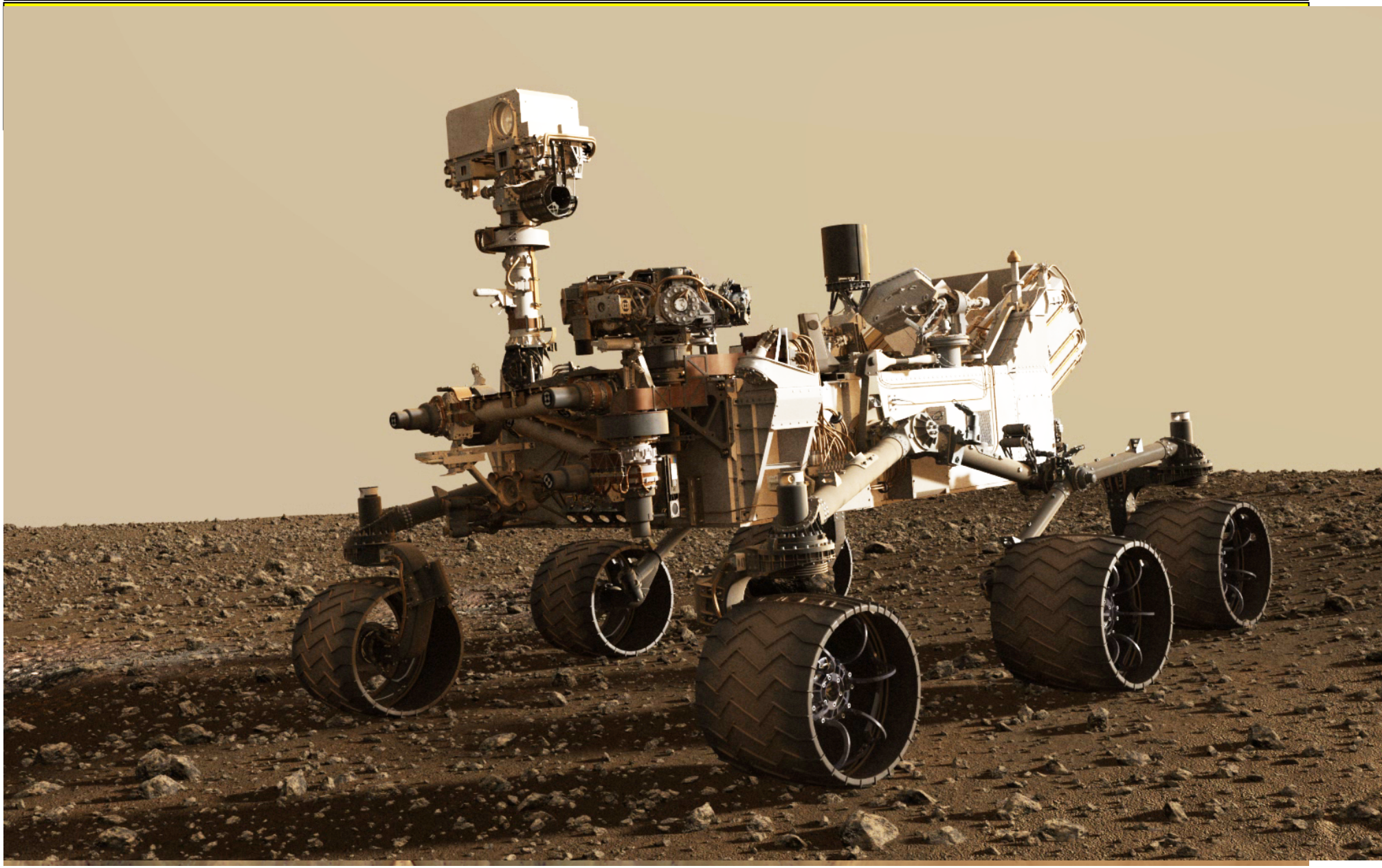
AMPED Enables Scientists to Visualize: Mission Operations and Observations



Rover model created from photographs and computer aided design data. Computer graphic rover image composited onto terrain derived from observations.

Thank You. Questions?