Fast & Easy Interface to MESSENGER Mission Data

Erick Malaret @ Applied Coherent Technology Corp.
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*Easy Browser Access via the web:
from standard browsers or mobile devices
ACT-REACT QuickMap provides an easy-to-use yet powerful web interface for map related products.

Designed with the end-user in mind, QuickMap offers rapid access to data without the tedium of handling file format details and data archive structures.

For NASA satellite missions, and when used in conjunction with PIPE / MSHELL, it provides MISSION PROGRESS MONITORING in the form of:

- Global and regional mosaics as the result of specific data collection campaigns
- Digital Elevation Models
- Instrument coverage views (where observations have taken place)
- Location overlays, e.g. latitude and longitude grid, recent featured images, sites of interest, ...
- Special products, e.g. master target collection status and master target mosaics
- Satellite position (based on JPL/NAIF/SPICE kernels), and automatic tracking of present position
- Ability to validate products and fuse data both within a mission and across servers.
ACT-REACT QuickMap has similarities with other web based mapping applications such as Google Maps. But it differs by offering:

- Rapid data updates supporting mission progress
- On-the-fly product generation. Pre-caching of all possible products is not required.
- Product Search & Access tools
- Leverages on PIPE architecture, for capabilities of data ingestion, publishing and analysis (which has been proven over many NASA/NOAA/DoD Missions).
The following slides show the main features and usage of ACT-REACT QuickMap, along with some of the layers and data products from the NASA MESSENGER mission to Mercury, which are exposed via the QuickMap interface.

- Global imaging campaigns (MDIS instrument)
- Multispectral imaging (MASCS instrument)
- Satellite tracking
- Digital terrain elevation models (MLA, MDIS, …)
- Data access and query capabilities (link to NASA PDS)
QuickMap: Navigate around

Map Navigation mode

Zoom

- **Double-click** to zoom in
- **Shift + Drag** to zoom to the selected area
- **Zoom bar**: click on [+]/[-] to change zoom level and on the globe icon to display the whole map
- **Change map scale** by selecting the desired resolution from the drop-down menu
- **Keyboard**: use the [+]/[-] keys to zoom in and out

Pan

- **Click and drag** the map
- **Keyboard**: use the arrow keys to pan around
- **Enter Latitude / Longitude**
QuickMap: Navigate around

Map Navigation mode

Context Map
- Display and hide the context map by clicking on the [+]/[-] button near the lower right corner
- Drag around the red area to jump to a different location
QuickMap: Navigate around

Change Map projection:

Polar views cover from +-65 degrees latitude to pole
Choose between available layers by using the left panel:

- MDIS Color 750 nm
- MDIS Color (750,550,480) nm
- MDIS Color (1000,750,430) nm

... and combine them:

Example of a composite view showing semi-transparent terrain elevation map, morphologic base map, named features and outlines of regions targeted for further high-resolution imaging.
QuickMap: Navigate around

Zoom from whole globe to extreme detail

Degas
MDIS global monochrome mosaic

The following mosaic has been generated by calibrating, projecting, filtering and assembling about 35,000 images collected so far by the MDIS Wide and Narrow angle cameras.

Each 'patch' is an individual image making up the global mosaic:
MDIS global mosaics campaigns

Additional global mosaics are being built to address specific scientific needs; their progress can be monitored via ACT-REACT QuickMap:

- **Stereo basemap (photogrammetry)**
- **Eight colors (multispectral imaging)**
- **Albedo map** (minimized shadows)
- **High solar incidence map** (with shadows)
- **Three colors High resolution map**

Coming soon
MASCS/VIRS global mosaic

The following mosaic has been generated by calibrating, projecting, filtering and assembling about \textbf{2 millions observations} collected so far by the MASCS/VIRS instrument.

The \textit{interpolated version} is easier to compare with MDIS global mosaics:
Location Overlays

Overlay layers help identify and search locations of interest:

- Latitude/Longitude grid
- Mercury and MESSENGER charts
- Mercury named features and images highlighted by the MESSENGER team members

Search features
Location Overlays

It is always possible to get a real time update of where the spacecraft is and see the portion of the planet which is illuminated by the sun.

Global sinusoidal view, depicting the trajectory and the position of the MESSENGER spacecraft while it is leaving the dark side and entering the illuminated area of mercury.
Product Search & Access tools

Switch from *map navigation* to *path* mode

Draw a path on the map (single click to add a vertex, double click when done)

*This example shows how to extract elevation profiles over a selected path*
Product Search & Access tools

Switch from map navigation to search mode and select the desired item.

Drag a rectangle over an area of interest to request additional information.

In this example, the result box provides the ID of the selected MESSENGER Tile.
Example: search for images covering the provided region of interest and download them from PDS (valid for already published products).
Product Search & Access tools

Example showing how access MASCS/VIRS spectrometer observations

In this example, the result box provides information and links for further inspection about the selected MASCS/VIRS multi-spectral measurements.
Product Search & Access tools

It is possible to inspect the spectrum of each single MASCS/VIRS spectrometer observation, and compare it on-the-fly with the MDIS spectrum measured on the same spot:

MASCS/VIRS

MDIS

Coming soon
Example: using terrain elevation data and a morphologic basemap to create 3D ground views.
Permalink

While navigating the map, it is always possible to access a link that can be bookmarked for future inspection and/or shared with other people.
Live Demo...

Questions?

Suggestions?

Ideas?