Space Support Element, A Commander's Situational Awareness Resource

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Agenda

- Commercial Imagery
  - Premobilization Support for Contingency Operations
  - Exercise Support
  - CONUS Defense Support to Civil Authorities, Disaster Response
  - OCONUS Disaster Response and Google Earth
- Space Weather Impacts on Operations
  - OCONUS, 29ID Iraq AT Exercise Example
  - CONUS, Recent Spaceweather
- GPS Precision and Jammer Effects on Operations
- Summary

Commercial Imagery

- Growth of available commercial visible imagery Satellites: Ikonos-2, Quickbird-1, Worldview-1, Worldview-2, and GEOEYE-1.
- Current NGA contracts with Ikonos-2, Quickbird-1, and Worldview-1 and -2.
- Daily Overflights
- Shareable with multinational partners

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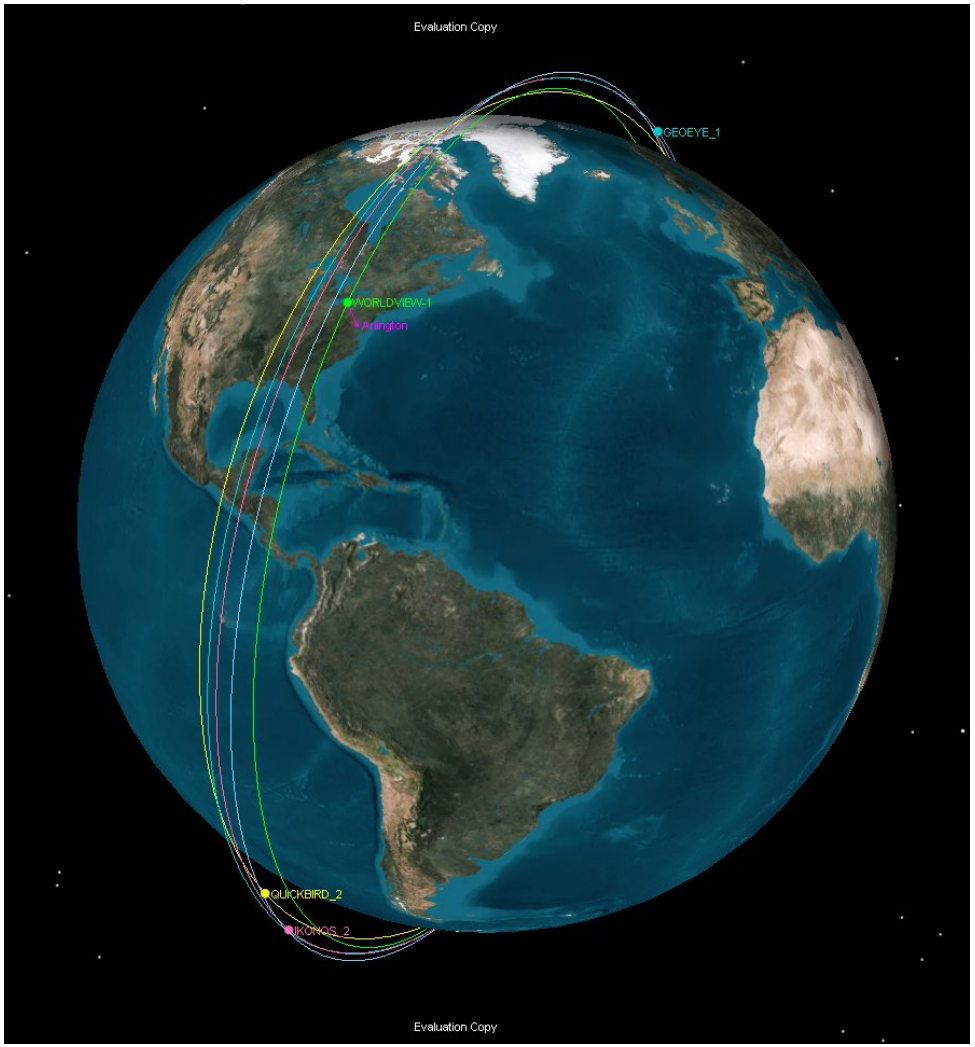
Daily Overflights Commercial Imagery



Calculated Overflight Schedule for Arlington, VA over a two day period, 3-4 OCT 10.

Available Satellites:

3 OCT 10	4 OCT 10
Worldview 1	Worldview 2
Quickbird 2	Worldview 1
Ikonos 2	Ikonos 2
	GeoEye 1

All Overflights in the late morning Weather dependent.

Calculations made with Satellite Toolkit, www.stk.com

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Premobilization Situational Awareness

Sharing Timely Information to Deploying Staff

source: Army Geospatial Center Imagery Office

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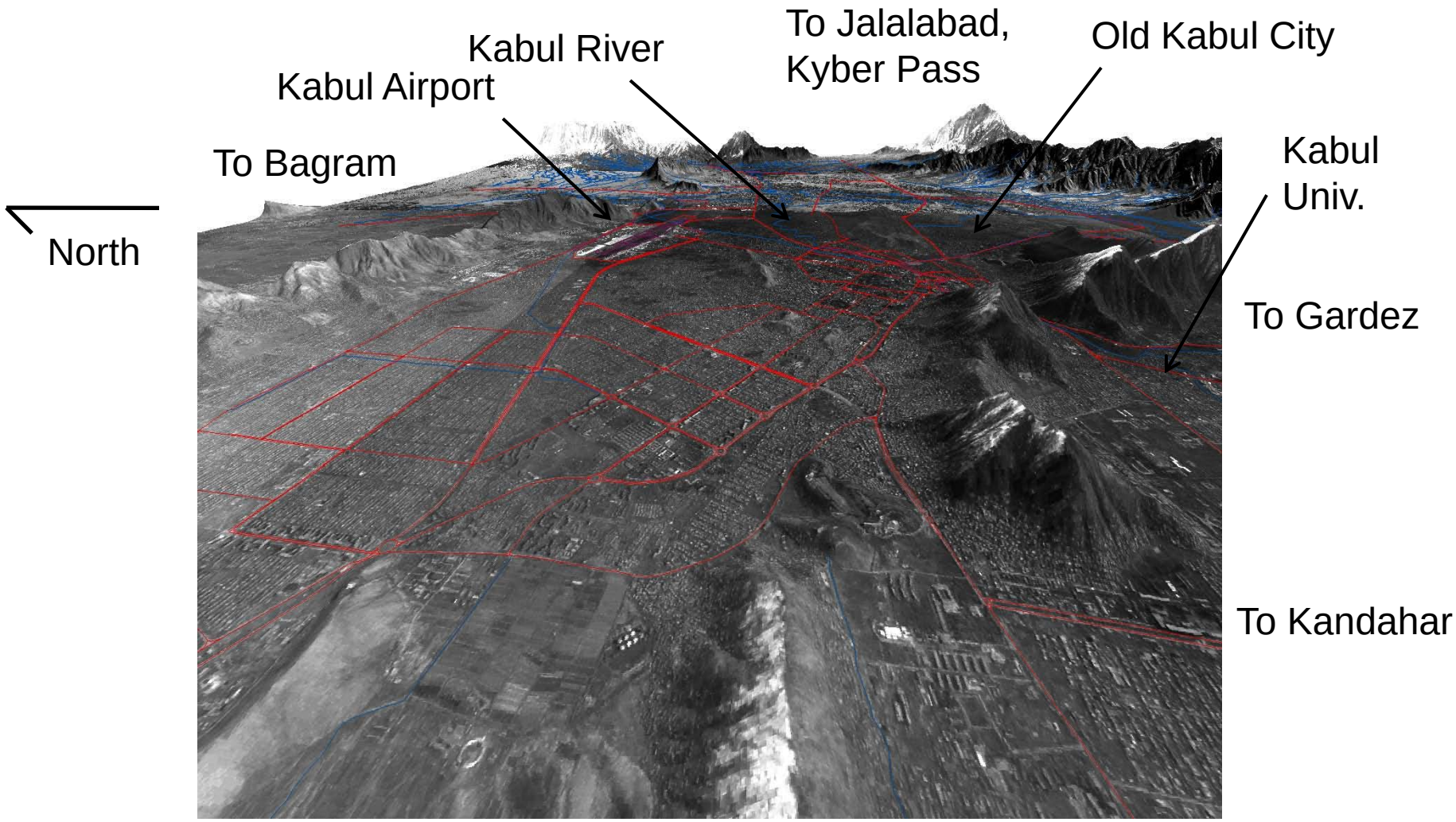
3D Timely Terrain Orientation



Arcscene 3D: CIB5 draped over DTED2

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Kabul, AF from SSW looking NNE

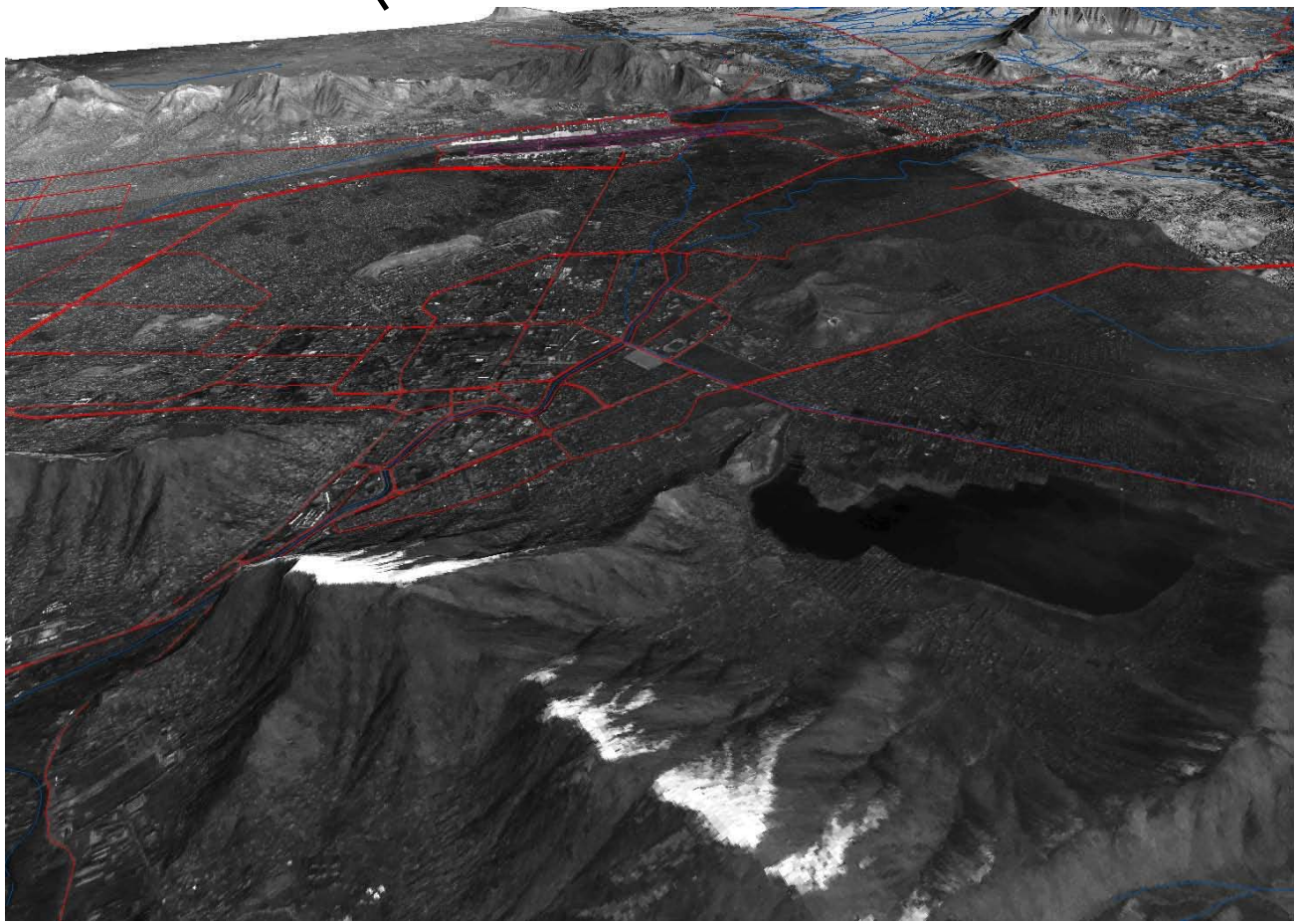
N

To Bagram

To Jalabad, Kyber Pass

To Kandahar

To Gardez



Arcscene 3D: CIB5 draped over DTED2

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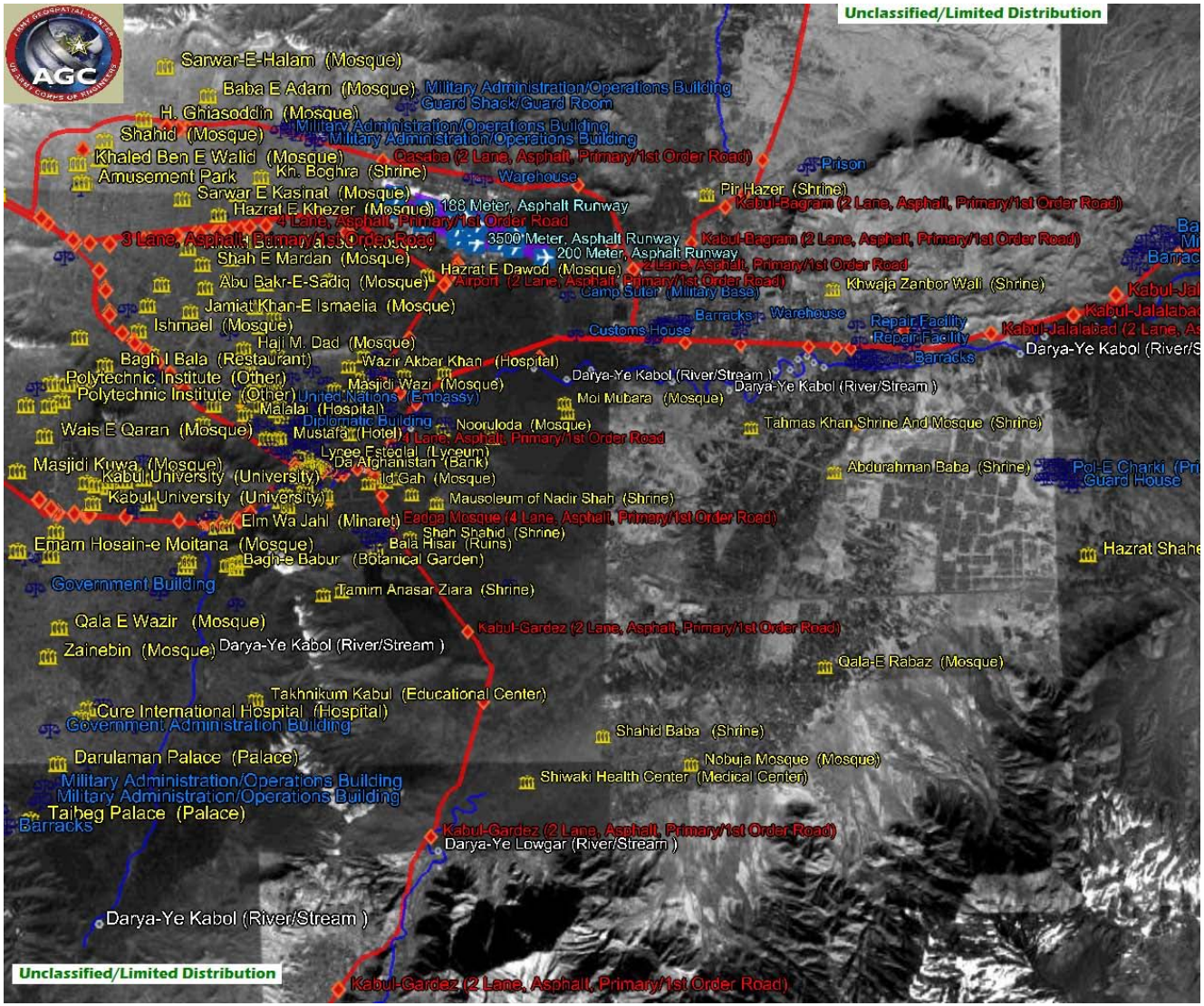
ArcGlobe, KMLs a desktop COP

Kabul, AF

KMLs:
Roads
Sites
River
Airport
Govt



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Archival Commercial Imagery For Exercise Support

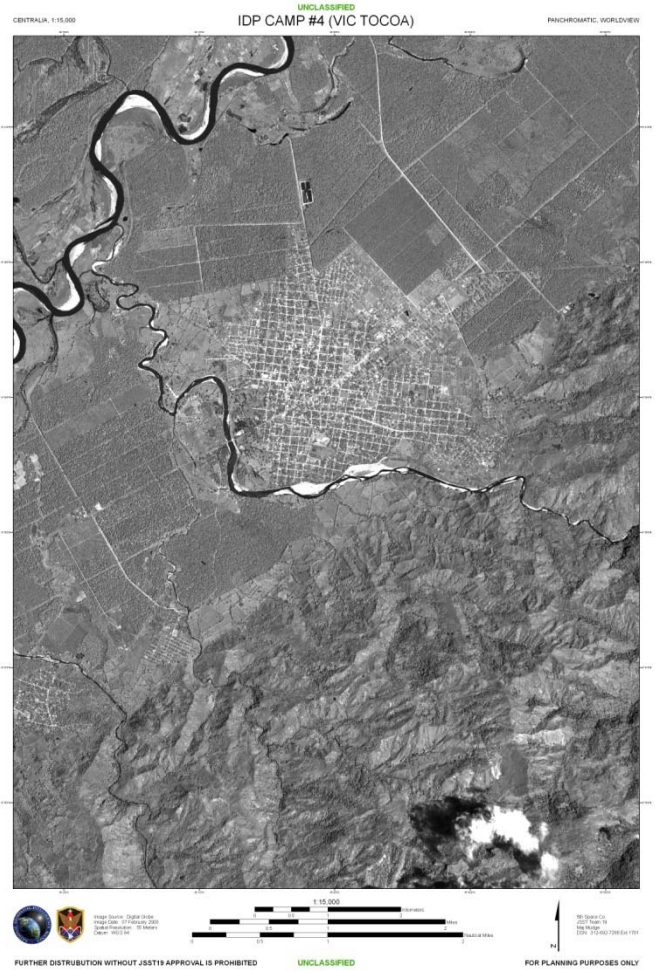
Panamax, 29ID CFLCC Space Support Element with 1st Space BDE Army Space Support Team, production capability

Examples:
Great Swan Island G5's planning for amphib. assault

IDP Camp #4, G4 logistical planning

30 commercial imagery maps shared amongst staffs from G1-G9

MDMP Resource, shareable with multinational partners



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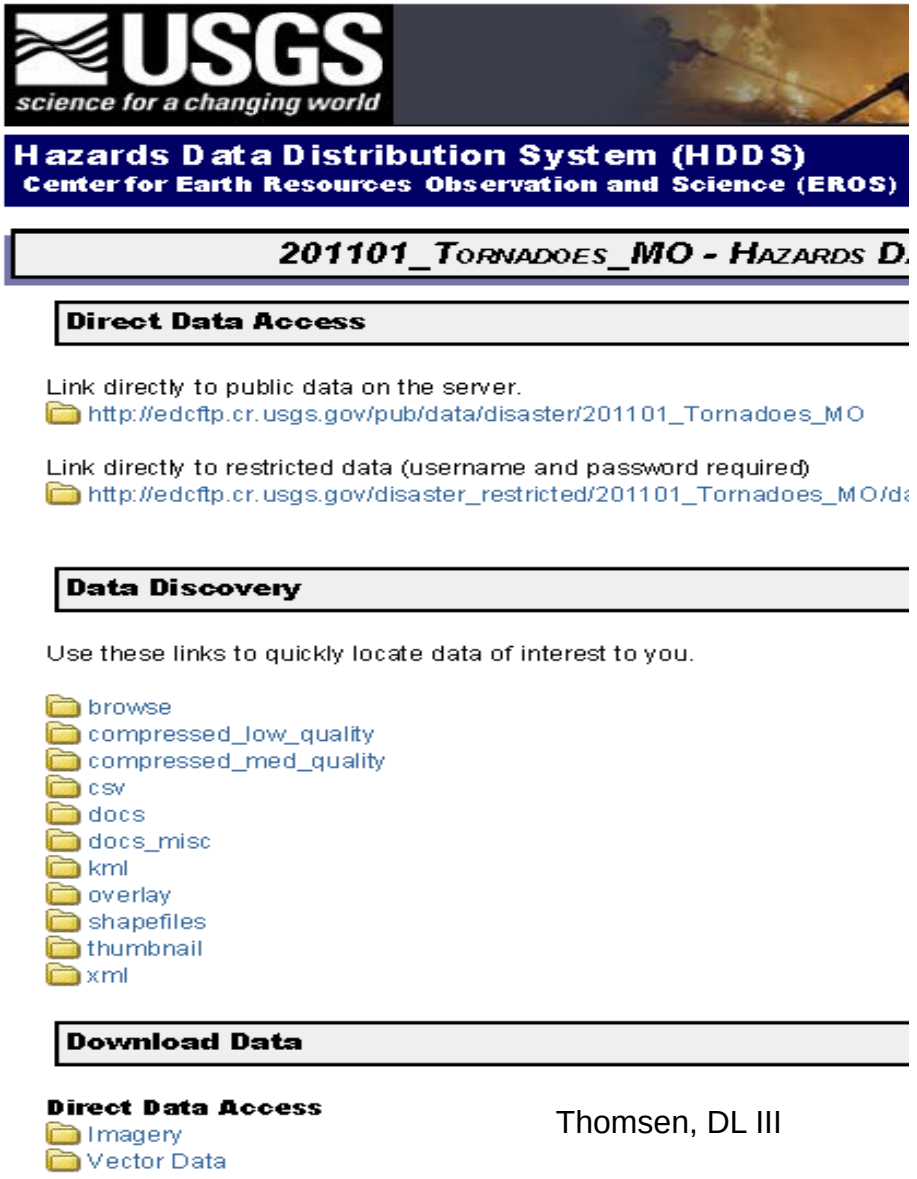
CONUS Disaster Response

- USGS obtains commercial imagery:
- supporting recent disasters:
  - Dissemination by NIPR site (http://hdds.usgs.gov)
  - WIDS Brite/ IBS dissemination

Point of Contact, Ms. Brenda Jones, 24/7

Hazards Data Distribution System (HDDS)



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OCONUS Disaster Response

Emergency Operations

USGS science for a changing world

USGS Home
Contact USGS
Search USGS

Emergency Operations Portal

- **Quick Downloads of U.S. and International Imagery**
  Access disaster response imagery in predefined tiled downloads (HDDS).
- **Interactive GIS Map Viewer**
  Use the interactive map to specify your area of interest and choose data layers.
- **GIS Resources**
  Find Web map services.
- **Digital Library**
  Locate related Web sites, resources, maps, products, presentations, meeting notes, and much more.

Emergency Operations

Explore critical pre- and post-disaster images and datasets online for immediate viewing and downloading. The U.S. Geological Survey (USGS) Emergency Operations, in support of the Department of Homeland Security, provides these images for use in disaster preparations, rescue and relief operations, damage assessments, and reconstruction efforts. We supply satellite and aerial images for analysis of disaster areas before, during, and after a disaster.

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URL: http://eoportal.cr.usgs.gov//EO/index.php
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TAKE PRIDE IN AMERICA

Hazards Data Distribution System (HDDS)

USGS science for a changing world

Hazards Data Distribution System (HDDS)
Center for Earth Resources Observation and Science (EROS)

201103_EARTHQUAKE_TSUNAMI_JAPAN - HAZAR

Direct Data Access

Link directly to public data on the server.
http://edcftp.cr.usgs.gov/pub/data/disaster/201103_Earthquake_Tsunam

Link directly to restricted data (username and password required)
http://edcftp.cr.usgs.gov/disaster_restricted/201103_Earthquake_Tsunar

Data Discovery

Use these links to quickly locate data of interest to you.

- browse
- compressed_low_quality
- compressed_med_quality
- csv
- docs
- docs_misc
- kml
- overlay
- shapefiles
- thumbnail
- xml

Download Data

Direct Data Access
- Imagery
- Vector Data

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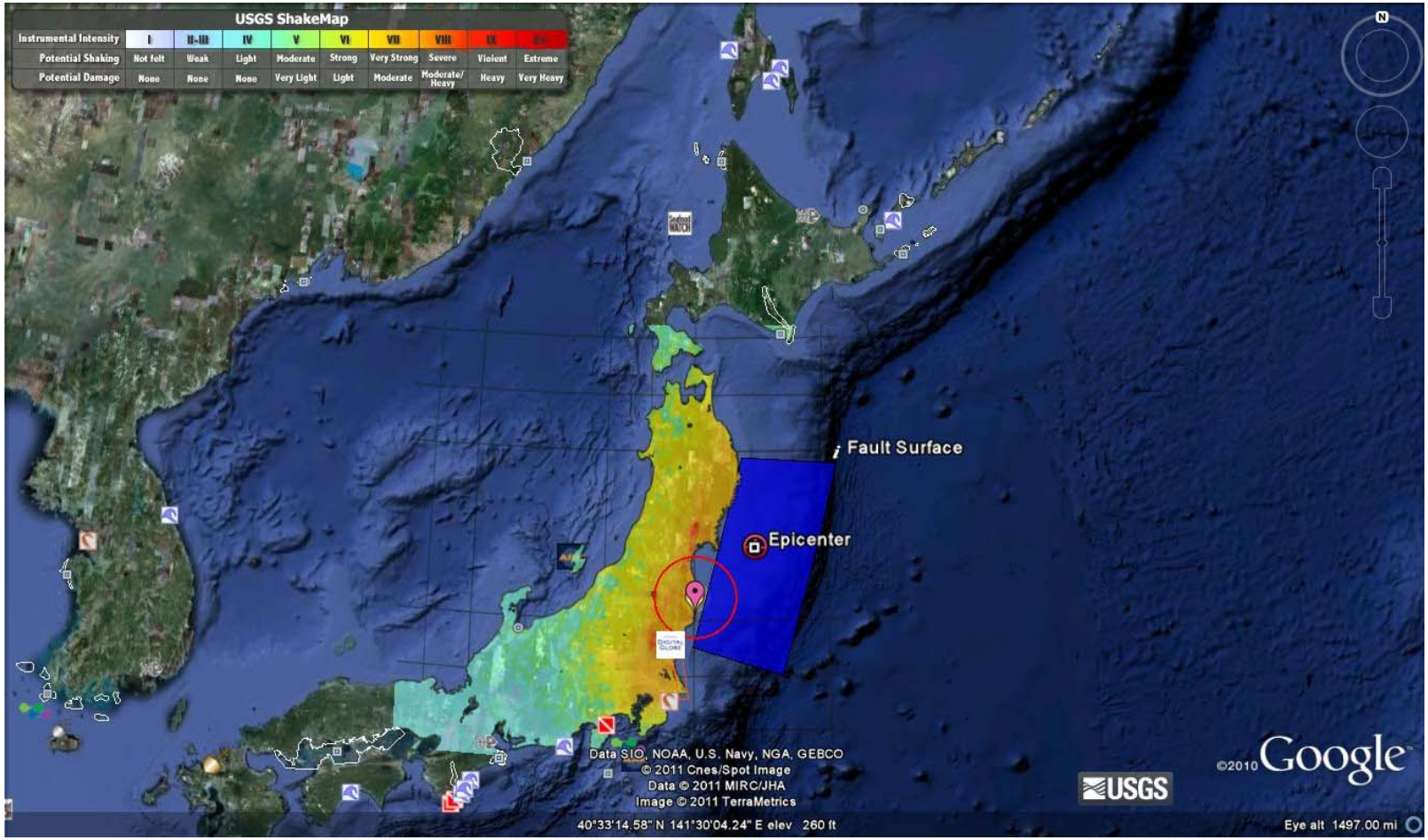
Google Earth showing USGS Products



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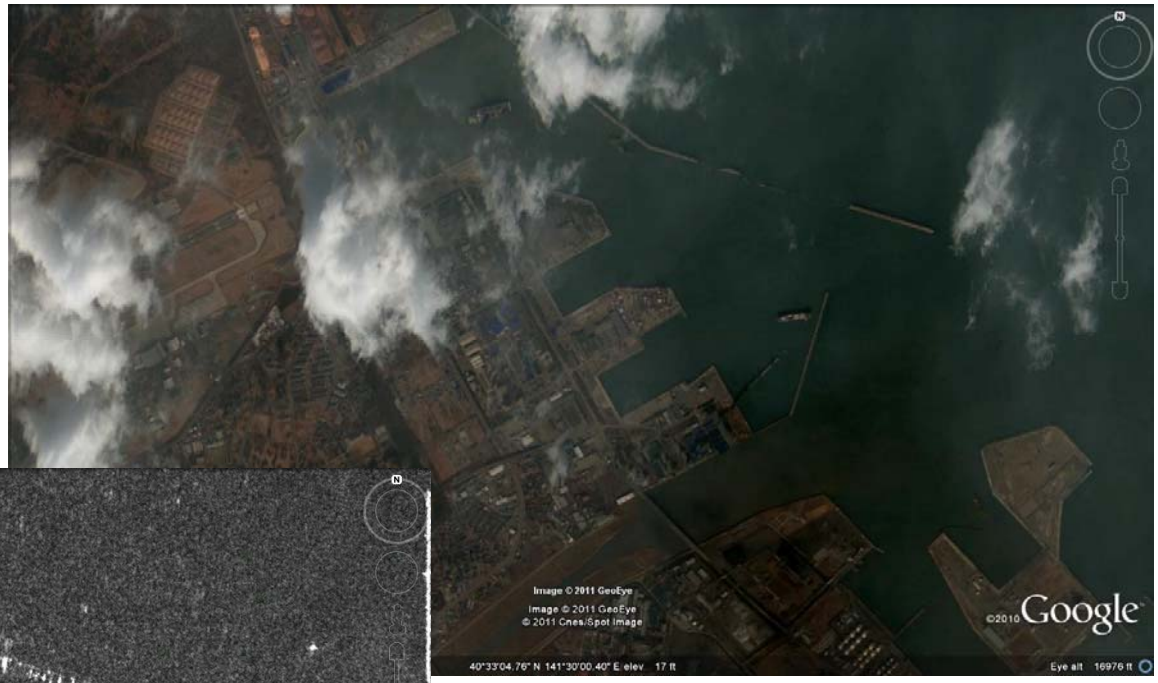
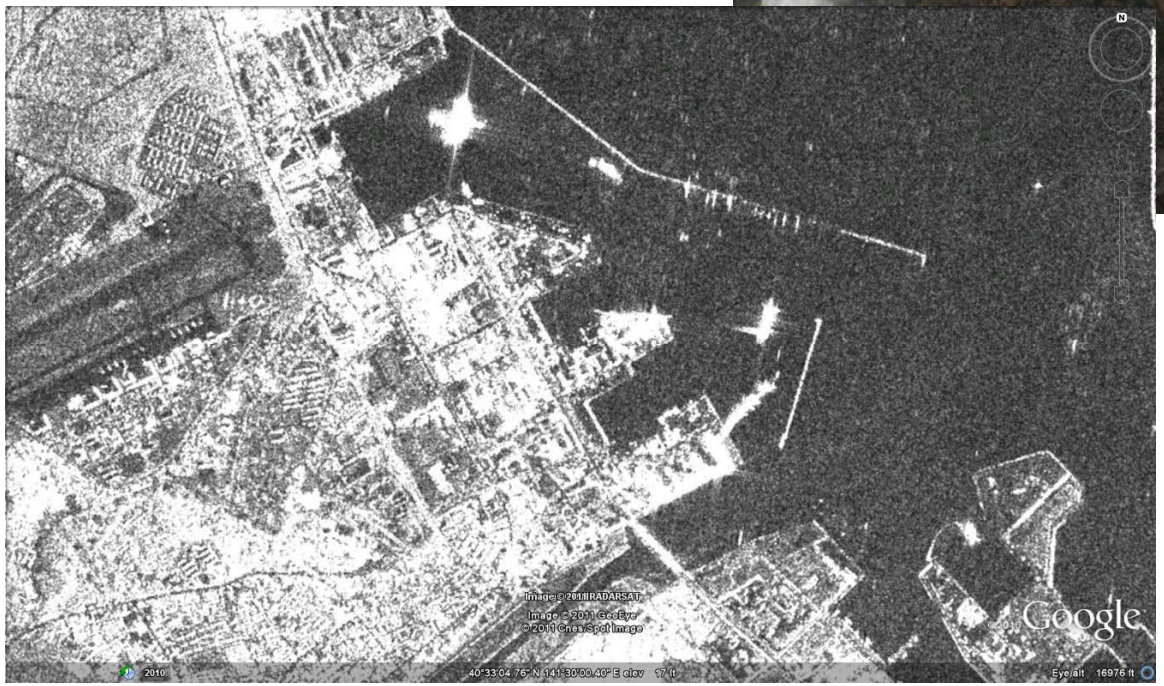
Radarsat-2 on Google Earth

Hachinone Port, NE Japan
After Tsunami, MAR 11

GeoEye-1





Radarsat-2

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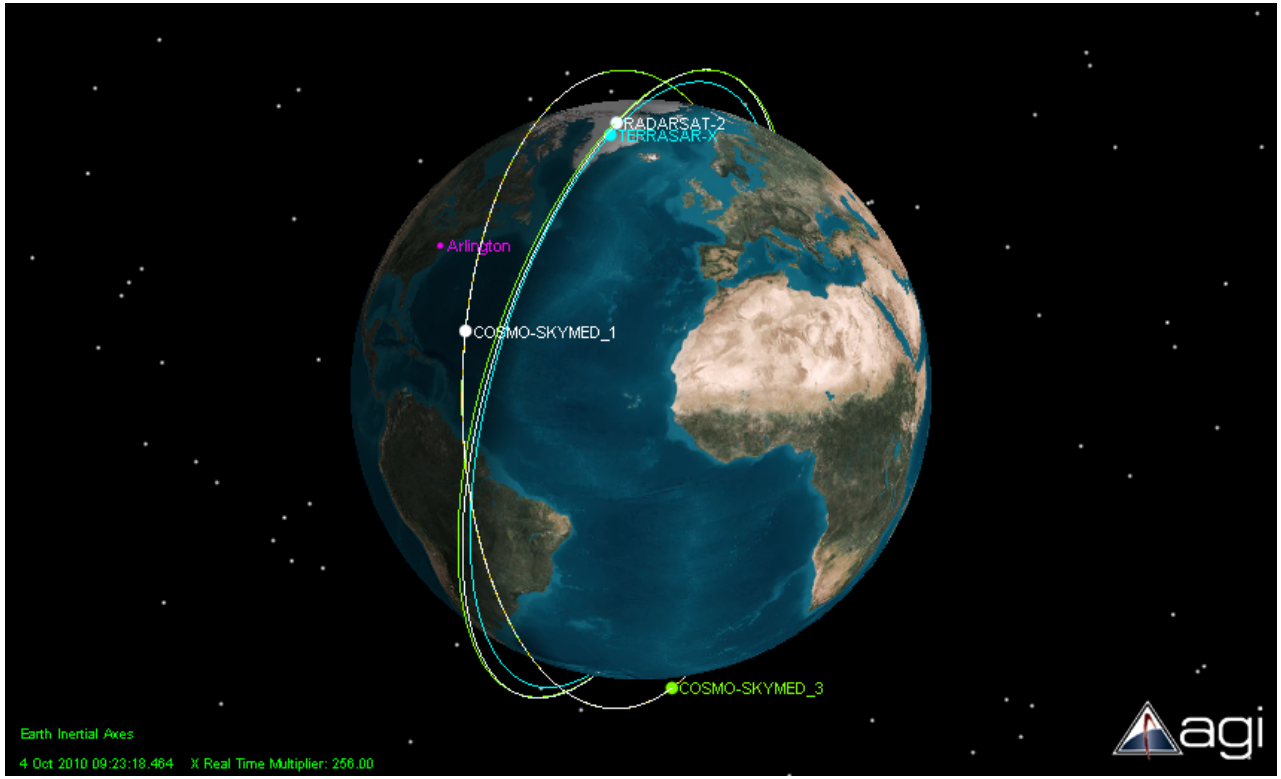
Commercial Radarsat: Up and Coming

- RADARSAT-1 and 2
TERRASAR-X
COSMO-SKYMED-1, 2, and 3

- Day/night

- Twice Daily Overflights(dawn/dusk)

- Used for Japan Earthquake Response, picked up edge of Tsunami damage



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Unclassified Geospatial Information Resources

- Commercial Imagery Archive: NGA uWarp
- Supporting map data: NGA Geospatial Data Navigator, GIS information layers
- Army Geospatial Center: archival commercial imagery, maps, geopdfs, and shapefiles, including DAGR maps.
- USGS archive of domestic commercial imagery and maps.
- OCONUS: Commercial Imagery Team, CENTCOM J2-Collection Manager

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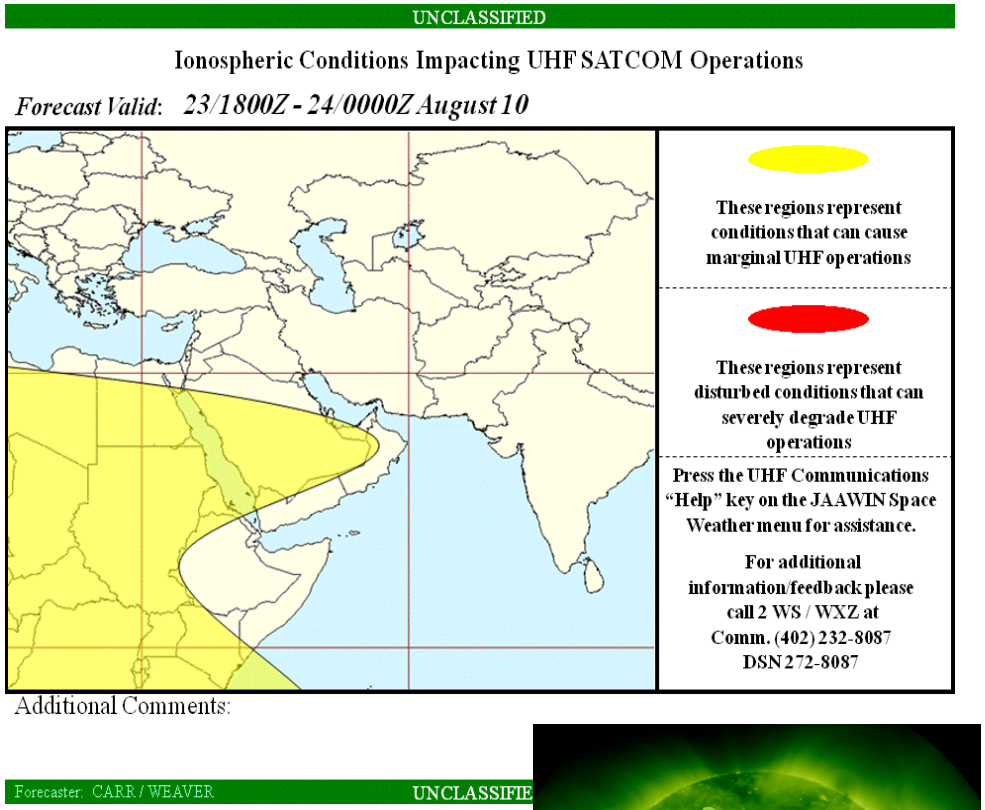
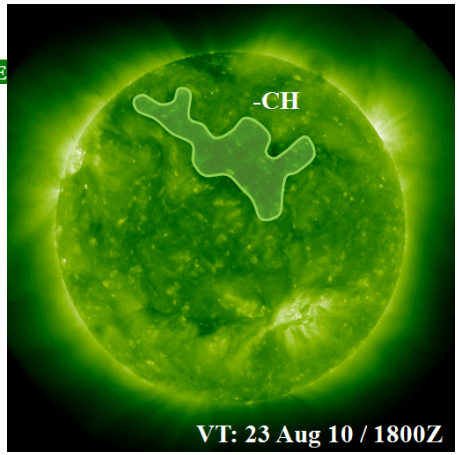
Increasing Solar Activity: Operational Impacts

- UHF SATCOM Forecast 22-24AUG10 for SW Asia
- 29ID TACSAT will have temporarily degraded or total loss of UHF radio communications forecasted from 23AUG10-26AUG10 during night time hours due to moderate scintillation.
- *Other bands that will be affected are L-Band which are used for GPS, SATPhone (Iridium, Thuraya, and INMARSAT), and FFT. S-Band (satellite uplinks) will also be affected.*





Prediction capabilities increasing from 3 days towards 4-5 days. Example: Proactive vs. reactive for planning primary and alternate communications important for C2

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Exercise

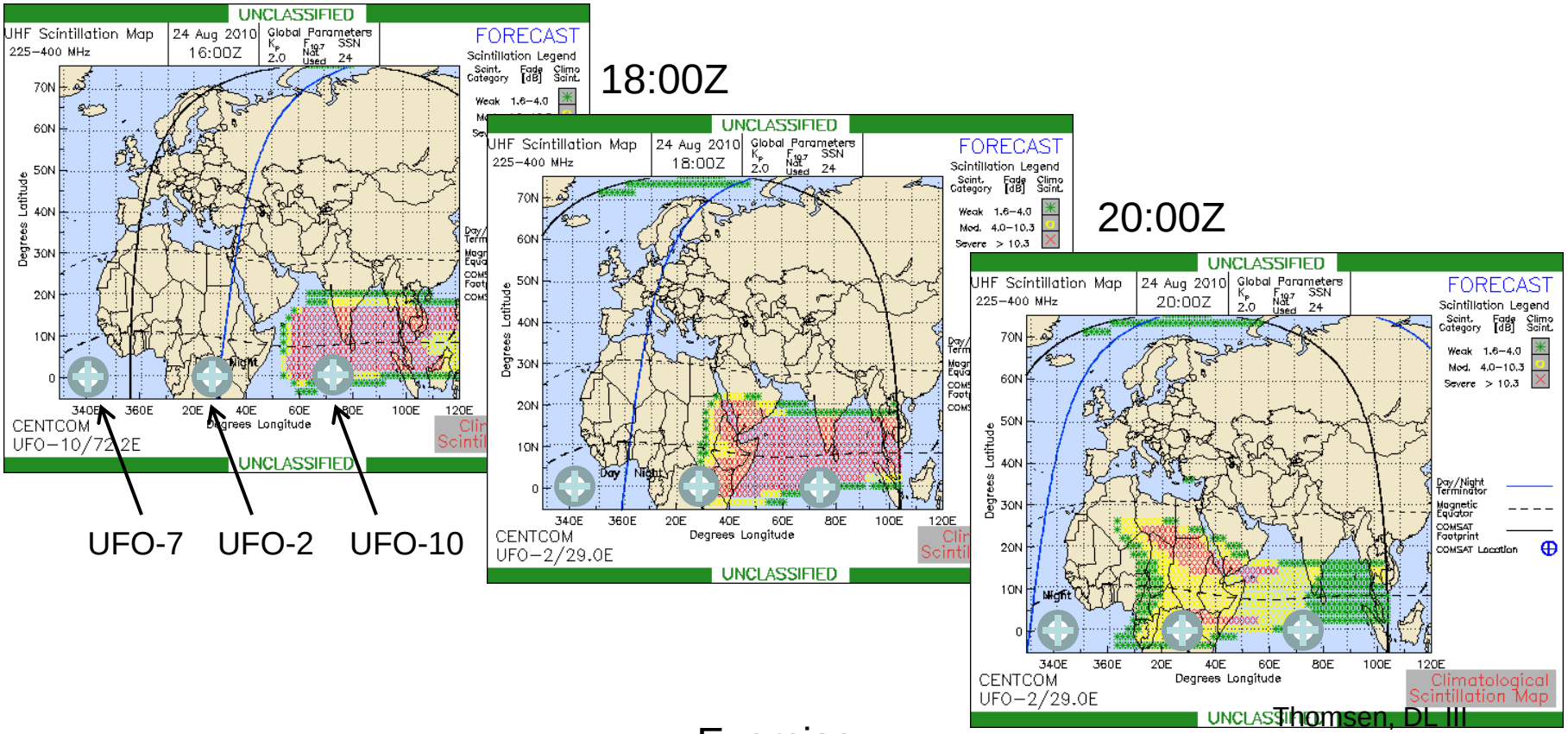
Spaceweather and UHF Communication

Temporarily Degraded or Total Loss of UHF in CENTCOM region: UFO-7, UFO-2, and UFO-10

16:00Z

18:00Z

20:00Z



Exercise

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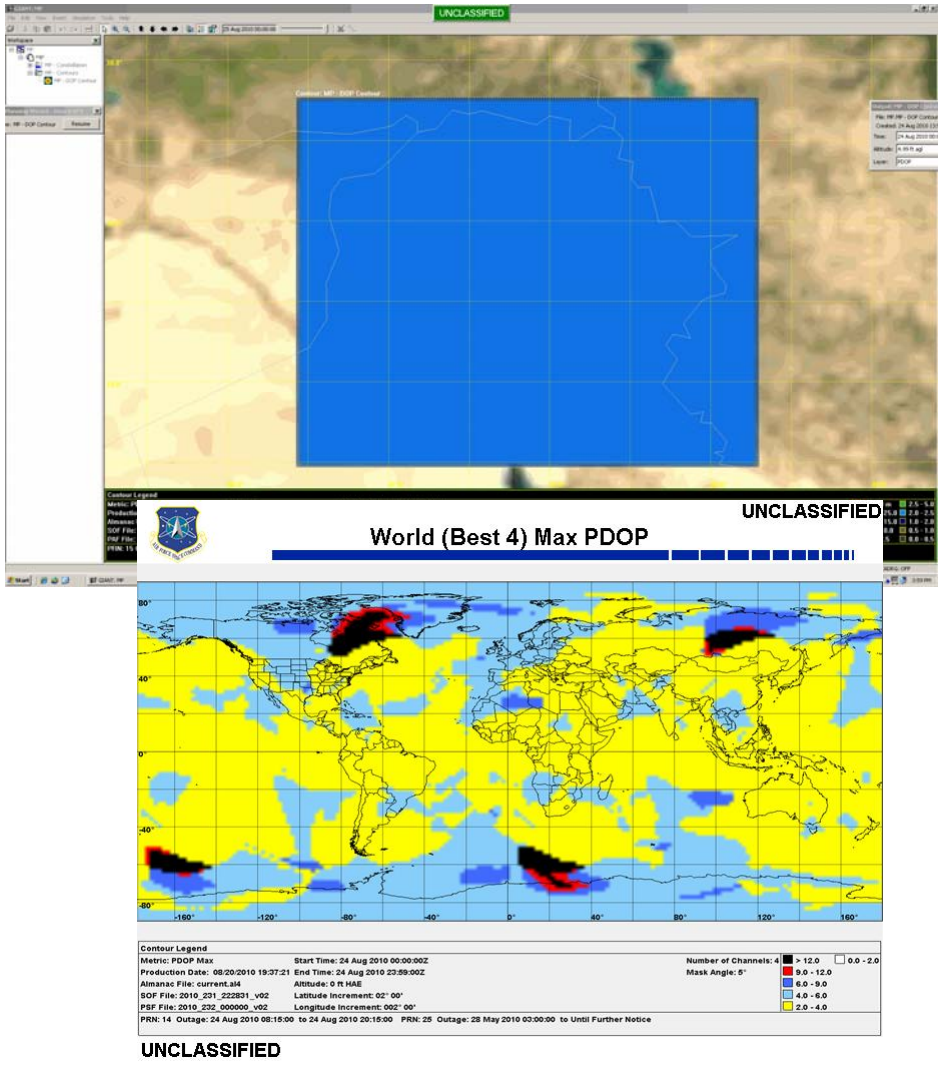
GPS Performance and Jammer Predictions

- GPS performance prediction 4 Best PDOP for 29ID AO from 24 AUG 10 0000Z – 25 AUG10 0000Z is 2.0-2.5, using GIANT, GPS Interference and Navigation Tool, source: 29ID Space Support Element. Forecasted PDOP shows minimal dilution of precision for the AO, figure 1.

- *GIANT can also predict GPS performance with terrain masking and interference/jammer effects. It can predict GPS performance over an area, along a route, or at a point. It is an excellent planning tool for missions that depend on GPS.*



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Exercise

Summary

- Space support adds to situational awareness
- Commercial imagery: increasing availability and shareable.
- Spacweather forecasts supports predictability of SATCOM performance
- GPS analysis tools forecasts precision and jammer effects