

OSCC.RC/11/10
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U.S. Delegation to the OSCC

Please see the attached presentation for the Second Open Skies Review Conference, 7-9 June 2010

**Working Session 2, Agenda Item (vi):
“Potential Non-Treaty Applications for Open Skies Assets”**


Presented by Mike Betts and Don Spence, United States Department of Defense

OPEN SKIES REVCON 2010


Potential Non-Treaty Applications for Open Skies Assets



Don Spence
Michael Betts
US Government



Briefing Content



- **Introduction**
 - Airborne Advantages
 - Sensors
- **Protection of Critical Infrastructure**
 - US Program
 - OSCE Program?
- **Disaster Relief Support**
- **Environmental/Climate Change Monitoring**



Airborne Imaging Advantages



- **Versatility**
 - Aircraft can fly when and where needed
 - Day-night, all-weather
 - Broad area/same-day coverage
 - Tailored imaging strategies/sensor options
- **Resolution**
 - Can exceed commercial imaging satellites
- **Accessible**
 - Source is country/customer controlled



Sensors



- **Open Skies - Today**
 - Panchromatic (Black & White)
 - Hardcopy Film
- **Open Skies - Digital Era**
 - 4-Band (B&W, Color and Near-Infrared)
 - Mid-wave & Long-wave Infrared
 - Synthetic Aperture Radar
 - Multi-sensor operations
- **Potential Non-Treaty Sensors**
 - LIDAR (Laser Light Detection and Ranging)
 - Hyper-spectral Imagery
 - Other



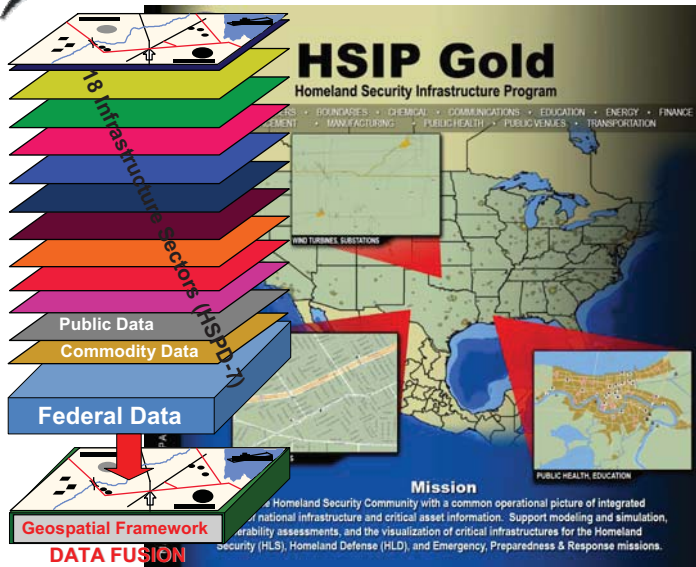
U.S. Homeland Security Infrastructure Program



- Provides a **common operational picture**
 - Reduce response time for a natural or terrorist-caused disaster
- **Data sets from government, public and commercial sources for critical infrastructure**
 - Energy, Public Health, Industries, Transportation (roads, ports, airfields)
- **Commercial satellite and airborne imagery as framework**
 - 1 meter resolution nationwide
 - <30 cm for urban areas (airborne)
- **Data accessible via web-based services**
 - Can be shared at all user levels, national to local
- Potential for **digital Open Skies imagery**



HSIP Data Bases

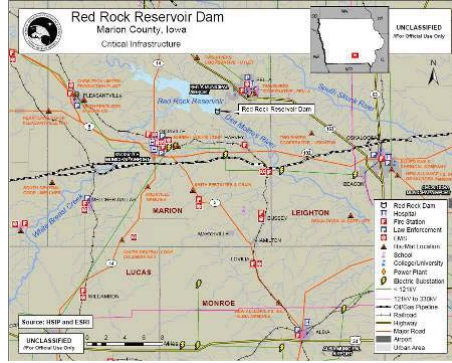




Critical Infrastructure



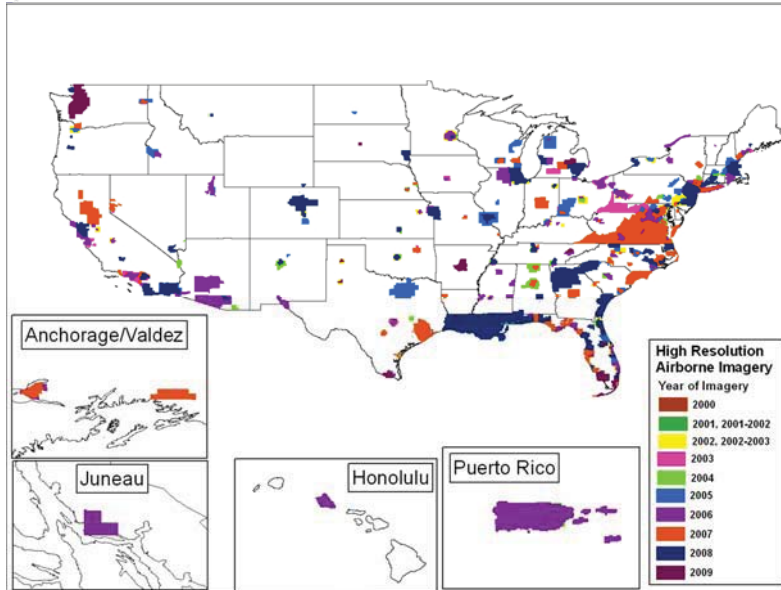
Port Graphics



Infrastructure Analysis



High-Resolution Airborne Imagery Coverage





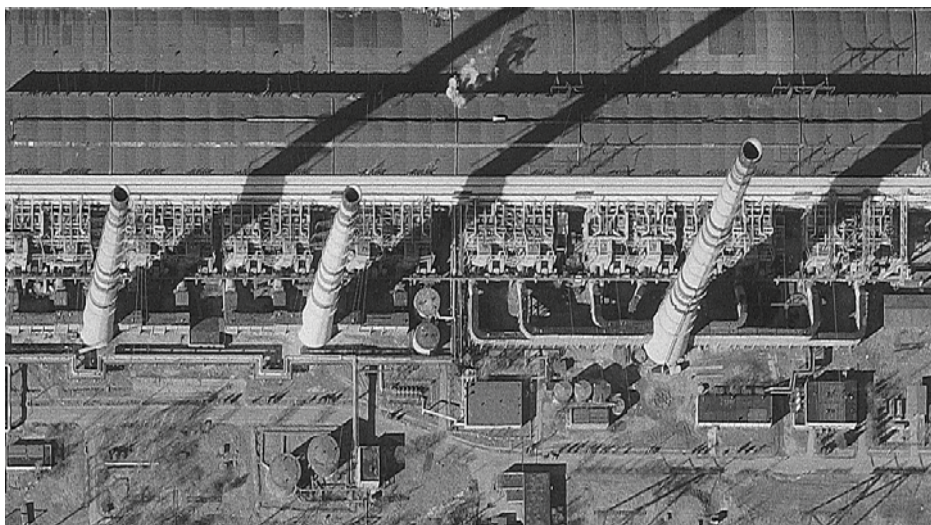
Security of Critical Infrastructure Open Skies as a Data Source



- **Over 650 Open Skies missions since 2002 available to State Parties**
 - 550+ missions over Europe & Russia
 - 26 missions over the United States/Canada
- **Imagery would need to be digitized**



Power Plant Imaged on Open Skies Mission





Power Lines Imaged on Open Skies Mission



An OSCE Infrastructure Program?



- **Open Skies imagery could serve as a data source for an OSCE-sponsored infrastructure database**
- **Database would provide a foundation for cooperation and coordination among various countries and organizations**
- **Would help avoid unnecessary duplication efforts**
- **Could promote public-private partnerships**



Disaster Relief Uses of Open Skies Assets



- **Selected Events**
 - Oder River Flood (Germany-Poland) - 1997
 - Hurricane Mitch (Honduras, Guatemala) - 1998
 - Pre-hurricane (Caribbean Islands) - 2000
 - Hurricane Lothar (France-Germany) - 2000
 - Hurricane Katrina and Rita (US) - 2005
 - Haiti Earthquake - 2010
- **No constraints by Treaty on sensor type or image resolution**



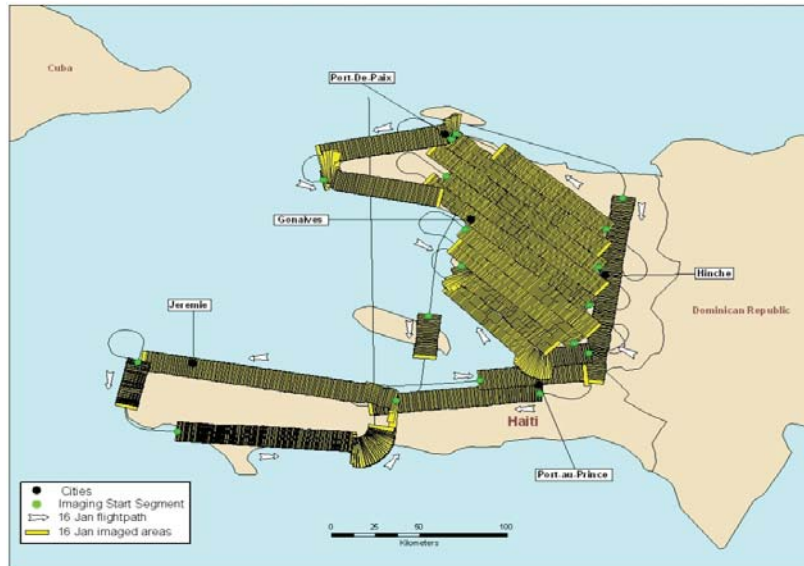
OC-135 Support to Haiti Quake



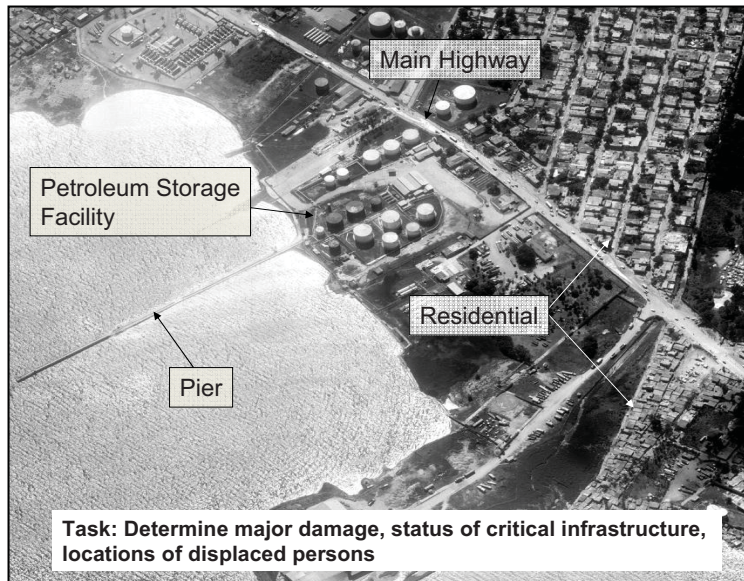
- **12 January - 7.0 earthquake hits Haiti**
- **14 January - Open Skies assets tasked**
 - Determine status of key infrastructure, mass migration, etc.
 - Locate unreported earthquake damage
- **15 January - Aircraft staged and mission planning**
- **16 January - 75% of Haiti imaged and processed**
- **17 January - Imagery review initiated (22 hours later)**



OC-135 Mission over Haiti 16 January 2010



Haiti Damage Assessment OC-135 Imagery



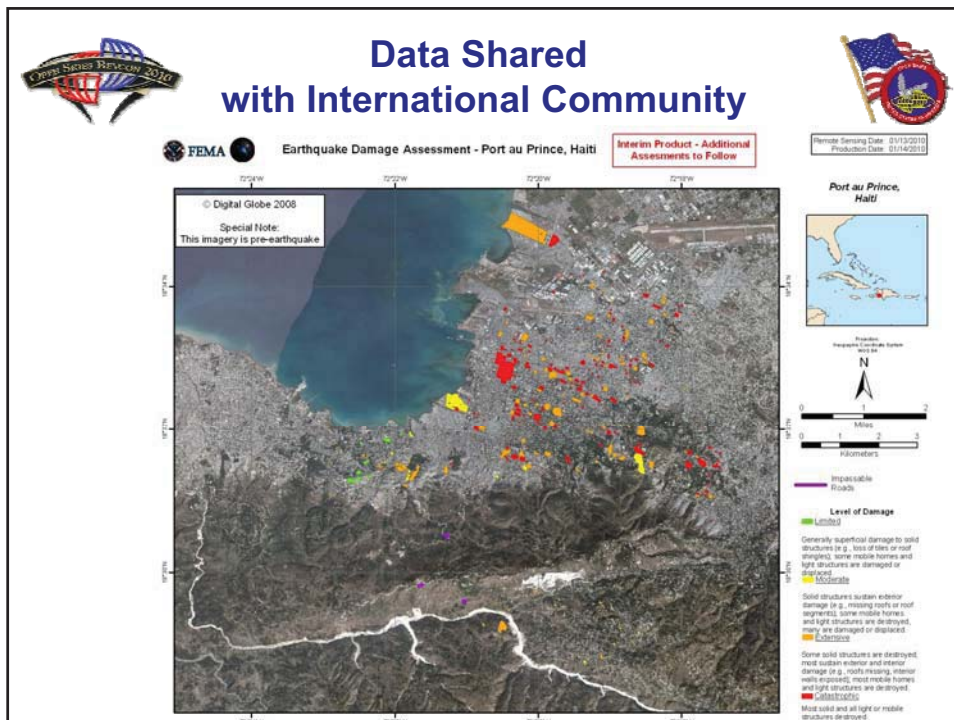




Earthquake Epicenter Leogane, Haiti



Displaced Persons Camp





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- ## Results of OC-135 Mission
- 
- **Approximately 21,000 sq km imaged within 5 hours**
 - **Provided value-added data on critical infrastructure**
 - Status of airfields, hospitals, roads, bridges, ports, etc.
 - Data used for expanding relief operations
 - **Discoveries assisted initial relief efforts**
 - Identification of new displacement camps
 - **Hardcopy imagery limited its use**



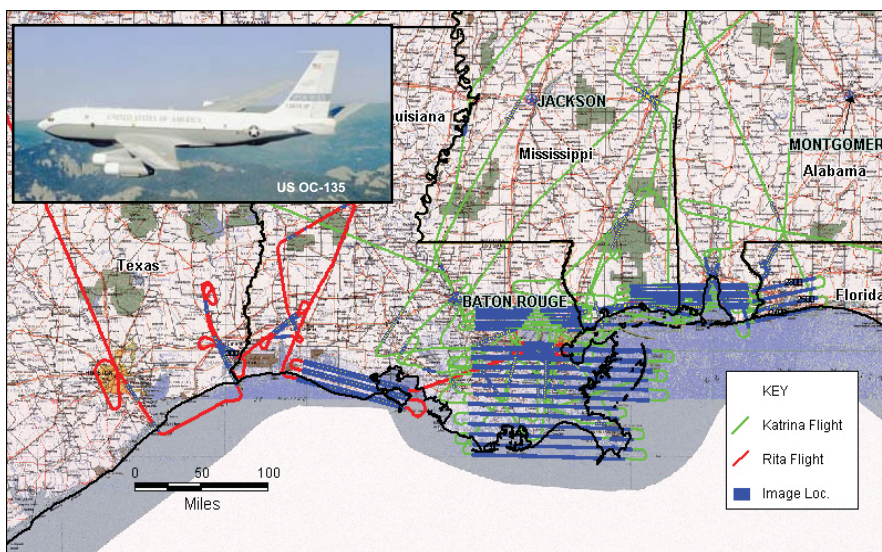
Environmental/Climate Change Monitoring



- **Open Skies assets can be effective in monitoring events such as:**
 - Severe weather (hurricanes, cyclones)
 - Heavy precipitation & flooding (coastal, interior)
 - Ice melt and water supply
 - Wildfires, deforestation
 - Human migration
 - Environmental contamination

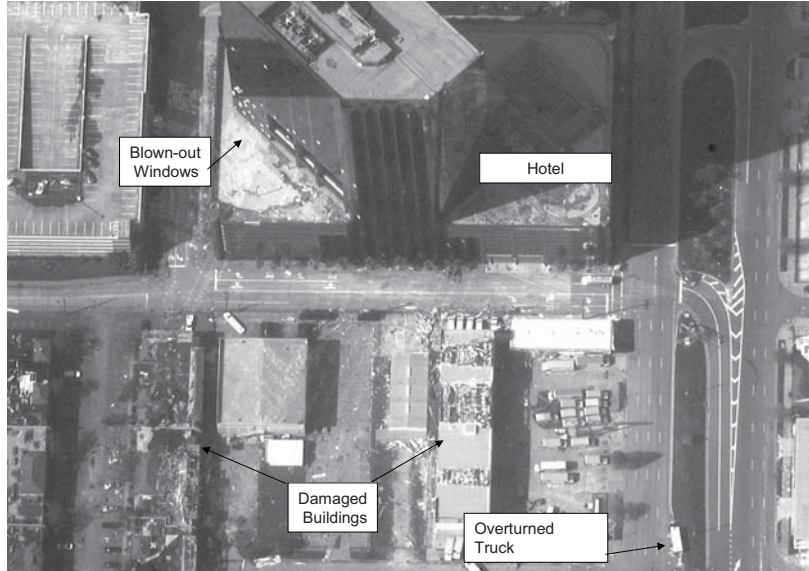


Open Skies Support to Hurricanes Katrina and Rita





Example of Damage Hurricane Katrina



Severe Weather Events

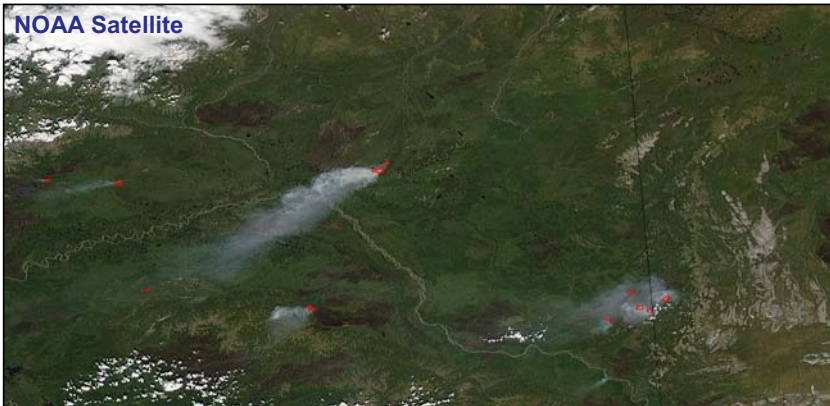




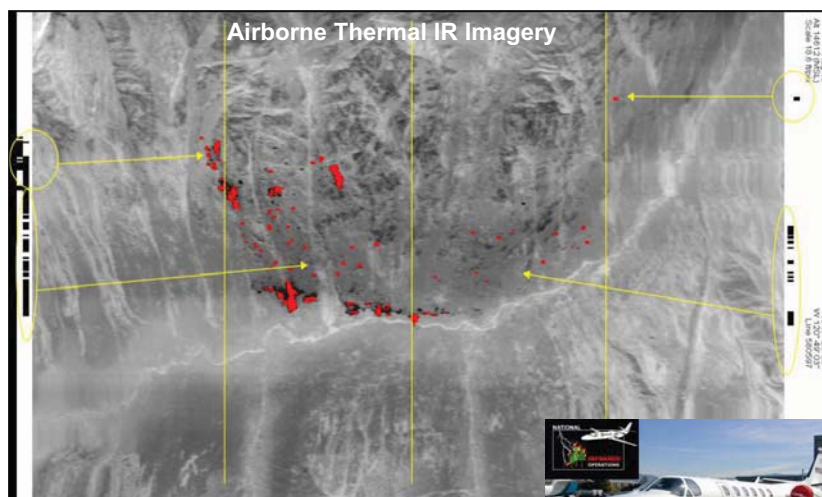
Wildfire Monitoring



- Climate change drought conditions may encourage wildfires
- Satellites used to detect new fires
- Airborne infrared sensors used to “pinpoint” and map fire areas both day and night.



Airborne IR Support to Onsite Firefighting Operations





Human Migration



- **Natural disasters and climate change factors can cause the displacement of large numbers of people**
- **Airborne sensors can monitor evidence of human displacement to include man-made and environmental factors such as**
 - Changes in land usage
 - Water shortages
 - Agricultural declines
 - Earthquakes, floods, volcanic eruptions, nuclear accidents, etc.



People Massing at Port Facility Port au Prince, Haiti





Displaced Persons Camp



Environmental Contamination



- **Environmental contamination caused by weather phenomena and man-made actions**
- **Airborne sensors can monitor activity such as:**
 - Erosion/landslides, etc.
 - Industrial Emissions (smokestacks, discharges, etc.)
 - Water quality
 - Oil Spills



Gulf of Mexico Oil Spill

NOAA Satellite Image



Use of Airborne Assets Gulf Oil Spill

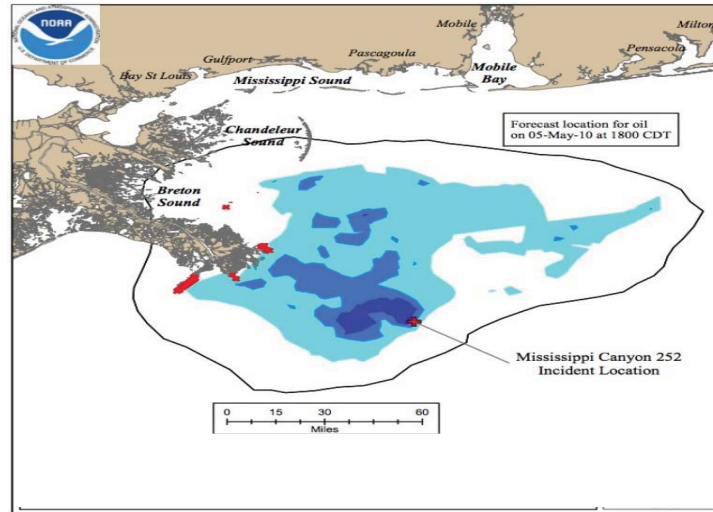


- **Numerous types of airborne assets and various sensors utilized**
- **Containment Boom Deployment**
 - Airborne imagery used for staging & locating
- **Oil Spill Extent Mapping**
 - Airborne complemented satellites





Oil Spill Extent Mapping



Environmental Monitoring?



- Numerous International Environmental Agreements require satellite or airborne monitoring and verification
- Could Open Skies assets be used to support these agreements?



Summary



- **Open Skies assets capable of supporting an extension of the Treaty into some additional fields**
- **Open Skies has a proven role in post-disaster missions**
- **Potential role in supporting issues such as:**
 - Transnational security threats (Energy Security, Protection of Critical Infrastructure)
 - Environmental/climate change monitoring
 - International environmental agreements



Questions ?



OSCE Open Skies Web Site:
<http://www.osce.org/about/13516.html>