Overview of 2nd Workshop on Geostationary Fire Monitoring and Applications

- Review of 1st Workshop
- Goals and Objectives for 2nd Workshop

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The GOFC/GOLD project provides a forum for international exchange of information, observation and data coordination and serves as a framework for establishing long-term monitoring systems.

GOFC/GOLD Fire Mapping and Monitoring Theme

Focused on determining international observation requirements and making the best use of products from existing and future satellite systems for fire management, policy decision making, and global change research.

Geostationary Goal

A specific goal of the GOFC/GOLD-Fire program is to develop and foster the implementation of a near real-time operational global geostationary fire monitoring network using current (GOES, MSG, MTSAT, FY-2C) and future geostationary platforms (INSAT-3D, Russian GOMS Electro N2, Korean COMS).
Global Earth Observation System of Systems (GEOSS)  
Group on Earth Observations (GEO) 2006 Work Plan

- Initiation of “a globally coordinated warning system for fire and monitoring for forest conversion, including the development of improved information products and risk assessment models (DI-06-13)” and

- Expanding “the use of meteorological geostationary satellites for the management of non-weather related hazards (DI-06-09).”

Co-ordination Group for Meteorological Satellites

- Both CGMS XXXII (Sochi, Russia) and CGMS XXXIII (Tokyo, Japan) included action items regarding the use of satellites for fire detection/monitoring

- There may be a possibility of creating a CGMS Fire Working Group
### Global Geostationary Active Fire Monitoring Capabilities

<table>
<thead>
<tr>
<th>Satellite</th>
<th>Active Fire Spectral Bands</th>
<th>Resolution IGFOV (km)</th>
<th>SSR (km)</th>
<th>Full Disk Coverage</th>
<th>3.9 μm Saturation Temperature (K)</th>
<th>Minimum Fire Size at Equator (at 750 K) (hectares)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOES-E/W Imager</td>
<td>1 visible 3.9 and 10.7 μm</td>
<td>1.0 4.0 (8.0)</td>
<td>0.57</td>
<td>3 hours</td>
<td>&gt;335 K (G-11) 335 K (G-12)</td>
<td>0.15</td>
</tr>
<tr>
<td>GOES-10 Imager (South America, 2006)</td>
<td>1 visible 3.9 and 10.7 μm</td>
<td>1.0 4.0 (8.0)</td>
<td>0.57</td>
<td>3 hours (Full Disk) 15-min (SA)</td>
<td>~322 K (G-10)</td>
<td>0.15</td>
</tr>
<tr>
<td>MSG SEVIRI</td>
<td>1 HRV 1.6, 2 visible 3.9, 3.75, 3.9 and 10.8 μm</td>
<td>1.6 4.8 4.8 4.8</td>
<td>1.0 3.0 3.0</td>
<td>15 minutes</td>
<td>~335 K</td>
<td>0.22</td>
</tr>
<tr>
<td>FY-2C SVISSR (FY-2D, 2006)</td>
<td>1 visible, 3.75 and 10.8 μm</td>
<td>1.25 5.0</td>
<td>30 minutes</td>
<td>~330 K (?)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTSAT-1R JAMI (HRIT)</td>
<td>1 visible 3.7 and 10.8 μm</td>
<td>1.0 4.0</td>
<td>1 hour</td>
<td>~320 K</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>INSAT-3D (4th Qtr, 2007)</td>
<td>1 vis, 1.6 μm 3.9 and 10.7 μm</td>
<td>1.0 4.0</td>
<td>0.57 ? 2.3 ?</td>
<td>30 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GOMS Elektro N2 MSU-G (2010)</td>
<td>3 visible 1.6, 3.75 and 10.7 μm</td>
<td>1.0 km 4.0 km</td>
<td></td>
<td>30 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMS (2008)</td>
<td>1 visible 3.9 and 10.7 μm</td>
<td>1.0 km 4.0 km</td>
<td></td>
<td>30 minutes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Why Use Geostationary?

- Most fire activity has a strong diurnal cycle.
- In some regions the fires are short-lived, lasting no more than a couple of hours.
- Polar orbiting satellite systems provide only a sample of the daily fire activity especially in low to mid-latitudes.
- Geostationary systems provide frequent acquisitions and give a unique opportunity to detect and monitor active fires from space.
- Operational meteorological geostationary satellites ensure long-term stable monitoring.
MSG 3.9 micron Fire Observations in Africa
“Optimism” for Geostationary Satellite Remote Sensing of Fires

August 1988, GOES-7 3.9 micron data

“About the only thing we can’t see is the guy lighting the match.”

W. Paul Menzel

From “Scientists turn satellite’s eye to Amazon”, Terri Devitt, Wisconsin Week, July 25, 1990

Photo by: Cary Shlimovitz
Overall Goal

discuss, plan and coordinate the development and eventual implementation of a global operational geostationary fire monitoring applications system

Workshop Assessment

- Geostationary systems have an important contribution to make to active fire and smoke detection and characterization with applications in fire management, emissions and air quality studies, and global change research.

- Geostationary systems can provide valuable diurnal information that is complementary to fire products produced by higher resolution polar orbiting instruments.

- A global geostationary fire monitoring network is technically feasible, but that it must be supported by the operational agencies in order to sustain the activity and produce standardized long-term data records and fire inventories of known accuracy.

- In order to demonstrate the science and show the benefits and feasibility of a global geostationary fire monitoring network, a demonstration/feasibility project was planned.
Components of Global Geo Demonstration Project

- Implement a rapid scan GOES-10/-12 Wildfire ABBA in the U.S. to show impact of high temporal geostationary fire monitoring capabilities on fire detection and suppression efforts.

- NOAA/NESDIS ORA and UW-Madison CIMSS will adapt the operational GOES-10/-12 WF_ABBA to MSG with an experimental version in place by June 2005 and make the MSG near real-time fire products (fire locations and sub-pixel fire characteristics) available to the EU civil protection and fire service customers during the summer of 2005 to solicit their feedback and support.

( EUMETSAT anticipates producing a fire product after the demonstration phase at the end of 2005 at the earliest. )

- NOAA/NESDIS/ORA and CIMSS will adapt the WF_ABBA to MTSAT-1R JAMI after launch.

- NRL-Monterey will demonstrate the impact of assimilating all available global geostationary fire products (GOES, MSG, MTSAT-1R) into the operational NAAPS to diagnose and predict aerosol loading and transport.

- Validation efforts will be performed in coordination with the CEOS LPV working group.

- Results of the demonstration/feasibility project will be documented and publicized to the broad community of data users for evaluation and feedback and to the operational satellite and user agencies.
Issues and Needs

- Support/commitment from operational agencies
- Need more involvement from Africa, eastern Europe, Asia, and Australia especially with the recent/near-term launch of FY-2C, MTSAT-1R, INSAT-3D, GOMS Electro N2.
- Need for more systematic validation efforts to understand cross platform differences and coordinated validation activities with CEOS LPV
- Need R&D in the area of fused polar and geostationary fire products with the goal of improved merged products. This includes fire location and characterization (e.g. Dozier & fire radiative power)
- Each platform in the global geostationary network has unique fire detection and characterization capabilities. How do we characterize these differences and create a consistent global product?
- So much to do ..... so few working in the field of geostationary fire development, validation, and implementation
2nd Workshop on Geostationary Fire Monitoring and Applications

**Overall Workshop Goal**

Assess progress made since the last workshop and discuss ongoing activities and plans for the development, implementation, validation and application of *regional* and *global* geostationary fire products.

**Primary Deliverable**

Report outlining the major conclusions, accomplishments, and future plans.
Specific Objectives and Topics

Assess the status of current geostationary satellite sensors and capabilities for active fire detection and pre- and post-fire monitoring applications.

Survey current distribution of geostationary DB stations generating fire products.

Review and exchange experiences in geostationary algorithm development activities, product generation and distribution.

Discuss current and future applications of geostationary fire products (e.g. air quality, hazards, real-time aerosol model data assimilation, fire dynamics modeling, global change research, etc.).

Review progress in geostationary fire product validation.

Assess progress in satellite data fusion and inter-use for fire monitoring and analysis.

Review the status of the Geostationary Demonstration Project recommended in 2004.

Assess progress towards a coordinated near real-time global geostationary fire monitoring applications system.

Discuss future geostationary fire capabilities.
Workshop Format

**Oral Sessions:**

1. Overview and Introduction
2. International Working Groups/Fire Initiatives
3. Agency Fire Monitoring Programs: Current Capabilities, Requirements, and Future Plans
4. Product Development and Applications
5. Applications in Emissions Monitoring and Modeling
6. Intercomparisons and Cal/Val

**Poster Session:** ~ 17 posters covering all topics, but focusing on product development and applications
Discussion Session 1: Global and Regional Requirements and Needs: Role of Geostationary Fire Monitoring.

International and agency needs/requirements and specifications, priorities, current capabilities, planned activities. How can current or future geostationary fire products help meet these needs/requirements? How will they be used in conjunction with other products? Should we propose a CEOS constellation concept? How does this effort fit into CGMS plans?

Discussion Session 2: Status of Algorithm Development and Applications

What algorithms exist? What are the products? What are the applications? Can existing algorithms be applied globally to different operational geostationary instruments? What is the feasibility of a common cross-platform algorithm/product? What meta data are needed? What further works needs to be done?

Discussion Session 3: Global Geostationary Fire Monitoring System Status and Plans

Where do we stand in meeting goals of last meeting? What are the plans of operational agencies? What is the feasibility and timeline for implementing a coordinated real-time global geostationary fire monitoring applications system. What are the plans for operational multi-sensor implementation? Data fusion? Cal/val?
END