



GEOSS AIP-2 Development Disaster Management Scenario 10th User Interface Committee Meeting

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Overview

- Objectives
- Disaster Cycle
- Disaster Management Working Group Activity
- Disaster Scenario Overview
- Future steps



Objectives

- Help space community understand specific needs of disaster management community, as well as operational mechanisms and interactions (local, regional, and national)
- Collect information on needs of users to establish requirements
- Establish ‘virtual constellation’ of satellites to address each phase of disasters, working through existing bodies such as International Disaster Charter and Committee on Earth Observation Satellites (CEOS)



Disaster Cycle



Tailored Solutions in Each Phase

- For *Response*, broaden International Charter by inviting Group on Earth Observations (GEO) Member states to designate authorized users; encourage new Charter membership
- For *Mitigation/Warning/Recovery*, use pilot project approach with selection of regional champions that can integrate satellite data; organize volunteer contributions on mission-by-mission basis; define global “baseline” imaging scenario



Disaster Management WG Activity

- Concentrating on development of Flood Scenario as part of Global Earth Observation System of Systems (GEOSS) phase 2 Architecture Implementation Pilot (AIP-2)
- Over 60 participants in Disaster Management Working Group (WG)
- Periodic Flood Pilot teleconferences, Emails, Steering Committee meetings
 - Identified need for local/regional and global approaches
 - Smaller scale regional allow for broader use of different data types (in situ ,socio-economic data and high resolution satellites)
 - The global approach allow to access systems that can be used rapidly and anywhere in the world.
 - Possible example for scenario was outlined
 - Flood Pilot for the Caribbean and annual flood season in Africa
 - Interoperable component and service interfaces allow overlay of flood maps, population, road status, and other emergency response data using internet and open source tools



Disaster WG Activity

- GEOSS AIP-2 Disaster Management WG Email list
 - https://lists.opengeospatial.org/mailman/listinfo/aip_disasters
- A day-to-day collaborative workspace
 - <https://sites.google.com/site/geosspilot2/Home/disaster-response-working-group>
- First draft of Disaster Scenario released
 - <https://sites.google.com/site/geosspilot2/Home/disaster-response-working-group/disaster-wg-documents>





Disaster WG Activity: Collaborative workspace

News and Events

- Sept 25-26: WG Session(s) at the Pilot Phase 2 Kickoff Workshop

Recent Messages

 [How to join the Email list for the Disaster Working Group](#) To join the Email list for the GEOSS AIP-2 Disaster Management Scenario, please click on the following link:
https://lists.opengeospatial.org/mailman/listinfo/aip_disasters
 Posted Nov 14, 2008 8:55 AM by D Gi

 [Tuesday 28 October 2008: First telecon](#) Dear Colleagues, I am sending this note to invite you to participate in a Flood Pilot activity that will attempt to bring together several on-going flood efforts from a ...
 Posted Nov 11, 2008 12:06 AM by D Gi

Showing posts **1** - **2** of **2**. [View more »](#)

[Minutes of the Flood Pilot Telecon 28 October](#)

Issues and Discussions

Recent List Items

Item	Status	Description	Document
Disaster scenario	✓	Disaster Scenario for flood event	Disaster WG documents

Showing **1** items from page [Disaster Issues and Discussions](#) sorted by edit time. [View more »](#)

Work Items

Recent List Items

Raised by	Description	Action
Disaster Group	have parts of the Flood Pilot working for the upcoming annual flood season in Africa for the Zambezi River Basin and the Lake Victoria region	Bob Adler (University of Maryland) volunteered to forward his flood map presentation to the entire group
Disaster group	The group will analyze a Miramar flood study performed by CUNY that	Contact Yuri Gorokhovich (yuri.gorokhovich@gmail.com - TBD?) for more information

Participants

Recent List Items

Name	Role	Organization	Liaison-with
Stuart Frye	Co-chair	NASA GSFC	
Didier Giacobbo	Co-chair	Spot Image	
Dan Mandl	Contributor	NASA GSFC	

Showing **3** items from page [Disaster WG Participants](#) sorted by edit time. [View more »](#)



Disaster Management Scenario Overview



Disaster Management Scenario

Brief Summary

- As stated on the GEO Task DI-06-09,
 - Weather satellites have made contributions to disaster warning and prevention and particularly hydrological disasters.
 - Dozen of Earth Observations systems that should be part of the system, both for accurate warning system (mainly from low resolution satellite) or to generate accurate map after the disaster to assist responders.
- One objective of the scenario is to make a link between global system (based on Weather satellites) and local/regional system (based on Low & High resolution satellites, In Situ sensors, and other local/regional data).



Disaster Management Scenario

Actors

- Decision maker who needs to affect resources (**Initiator**)
 - e.g. Caribbean Disaster and Emergency Response Agency (CDERA)
- Regional civil protection preparing to face a natural disaster or looking for information on a daily basis to react (**Actuator**)
- Data provider providing information and/or data to regional civil protection (**Processor**)
- The public looking for information either to face the situation or to find out what can be done to help (**Public**)



Disaster Management Scenario

Context and pre-conditions

- User requirements for flood analysis using the EO data

Phase Requirements	Mitigation	Warning	Response	Recovery
Target/data	<p>Topography Hydrological models Historical atlas of floods Flood models/simulations New infrastructure, houses Land-use classification Monitoring of dikes and dams</p>	<p>Precipitation Water level (rivers, lakes) Weather forecast Soil moisture Snow-water equivalent Signs of catastrophic infra failure</p>	<p>Water level (rivers, lakes) Extent of flood Status of critical infrastructure Weather forecast</p>	<p>Status of critical infrastructure Damage assessment Flooded areas</p>
Revisit	<p>1 to 3 years (imagery) 5 to 10 yrs (topography)</p>	<p>Daily or better during high risk period</p>	<p>Daily in early morning; twice daily if possible</p>	<p>Weekly (major floods) for several weeks to several months</p>
Timeliness	<p>Weeks</p>	<p>Hours</p>	<p>Hours (2-4 max)</p>	<p>1 day</p>
End use	<p>Integration in land use planning/zoning Baseline for response</p>	<p>Decision support for warnings & evacuation</p>	<p>Situational awareness Resource allocation support Initial damage assessment</p>	<p>Tracking affected assets Charting progress</p>



Disaster Management Scenario

Scenario Events (monitoring before event)

- Step 0 - The **Initiator (CDERA)** searches for services about potential flood by accessing GEOSS Portals
- Step 1 - The **Initiator** identifies a map based on Global Flood Potential Model and asks **Actuator (Regional Civil Protection)** to monitor his area of interest
- Step 2 – **Actuator** asks **Processor (Global Data Provider)**
 - informs **Initiator** about possible flood event
 - provides global real time data over a given area
- Step 3 - **Initiator** contacts **Actuator (Regional Civil Protection)** in order to activate monitoring on daily time
- Step 4 – **Actuator (Regional Civil Protection)** delivers daily Flood Map products to **Initiator**



Disaster Management Scenario

Scenario Events (activation during event)

- Step 5 - Based on new event, **Initiator** provides authorization for asking more resource as accurate data
- Step 6 – **Actuator (Regional Civil Protection)** requests **Processor (Global Data Provider)** for imagery pre and after damage
- Step 7 - **Processor** provides feasibility acquisition
- Step 8 – **Actuator (Regional Civil Protection)** accepts one or more **Processor (Global Data Provider)** acquisition proposals
- Step 9 - One (or more) **Processors** acquires image or extracts from archive and makes it available (pre and after)



Disaster Management Scenario

Scenario Events (activation during and post event)

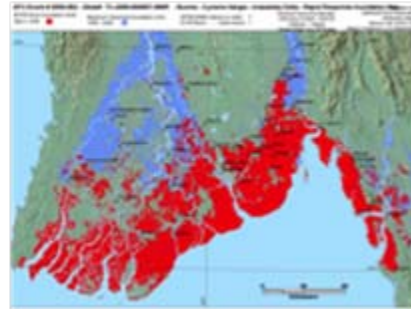
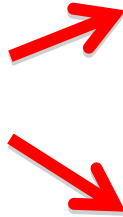
- Step 10 – **Actuator (Regional Civil Protection)** accesses the data and may ask value-added companies for data processing
- Step 11 - Data are processed and delivered to **Actuator (Regional Civil Protection)** and **Initiator**
- Step 12 - Map produced are released by **Initiator** and used for
 - **Public** communication by **Initiator**
 - Evacuation plan by **Regional Civil Protection**
 - Damage assessment by **Regional Civil Protection**



Example of Flood Sensor Web Scenario

Product Service Chain

Global Flood Potential Model – based on TRMM and other satellites
Adler Univ. of Md



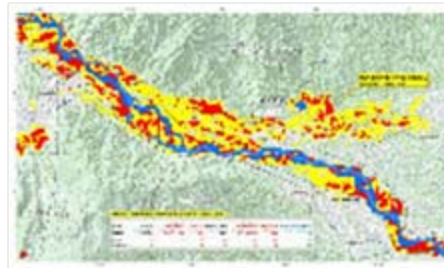
Daily MODIS Flood Map
- Brackenridge, Dartmouth
Flood Observatory



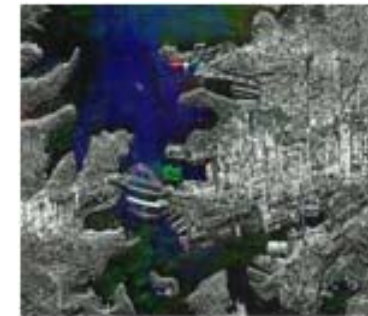
High resolution optical
Such as EO-1, Spot-5, etc.



**Multi-sensor
campaign manager**
-GSFC et al



Envisat Flood Map
- Kussul, Skakun, National
Space Agency of Ukraine



High resolution radar
such as TerraSAR,
Radarsat-2, or ALOS

MODIS Global Water Mask

Univ. of Md –Sohlberg



Disaster WG Activity : future steps

- Review and finalize the Disaster Scenario and Use Case descriptions
- Evaluate existing Flood Monitoring and Forecast Models
- Pursue effort to encourage participants to enter their components and services into the GEOSS registry
- Have a list of components and services that are in development and planned to come on-line during the Pilot timeframe ->co-chairs to keep this list and contact participants
 - E.g. Jaxa for Advanced Land Observation Satellite (ALOS) Catalog Service for the Web
- Coordinate with Transverse WGs in AIP-2, CEOS Disaster Societal Benefit Area (SBA) Team, CEOS Working Group on Information Systems and Services (WGISS), and end user participants in local/regional arena
- Caribbean Flood Pilot now part of new GEO 2009-2011 Work Plan under Task DI-09-02b