

# Status Report for DI-06-09

## Use of Satellites for Risk Management

Guy Seguin (CSA),  
Chair, CEOS Disaster SBA Team,  
PoC for DI-06-09 and DI-09-02B



# DI-06-09 – Use of Satellites for Risk Management

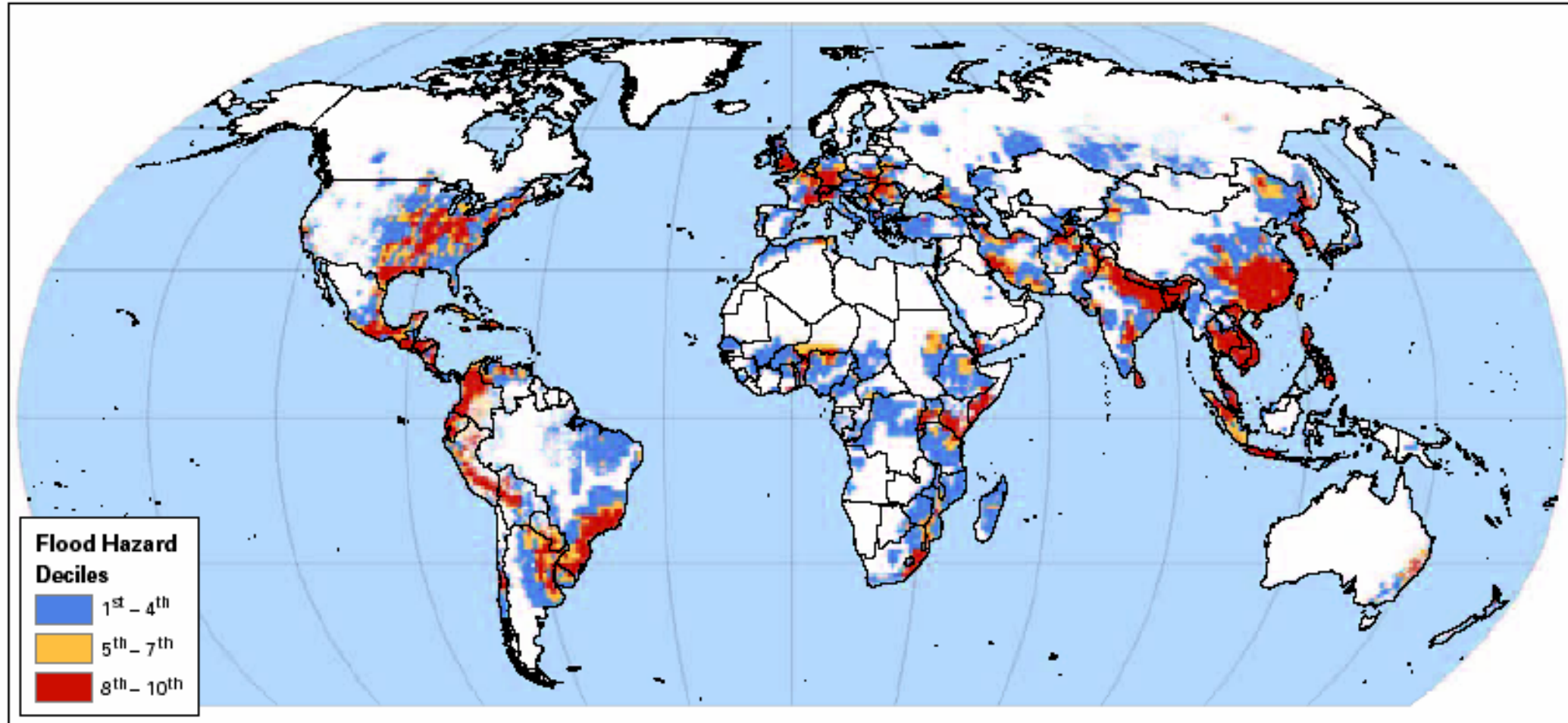


**1. Define and facilitate implementation of satellite constellations for risk management from a multi-hazard perspective.**

**2. Undertake the consolidation of the validated requirements and examine options for system development and implementation**

- ❖ **Work on first draft of architecture report (gaps and analysis), with initial focus on floods, to be followed by a multi-hazard analysis,**
  - **Q4-fall 2010**
- ❖ **Development of plan for satellite data use by disaster management community**
  - **Q2-2011**
- ❖ **Recommendations for future satellite systems and final plan for satellite data use**
  - **Q4-2011**

# Flood Hazards Deciles



# DI-06-09 – Approach



- ❖ Consolidated user requirements developed with UNOOSA in 2008
- ❖ Examine high level conclusions from user needs
- ❖ Derive architecture/measurement requirements
- ❖ Perform gap analysis and examine results
- ❖ Review GEOSS 10-year objectives
- ❖ Establish roadmap for improved activities for each disaster cycle phase
  - mitigation
  - warning
  - response
  - recovery
- ❖ Develop disaster video (tbc)

# Flood Disaster Cycle Phases



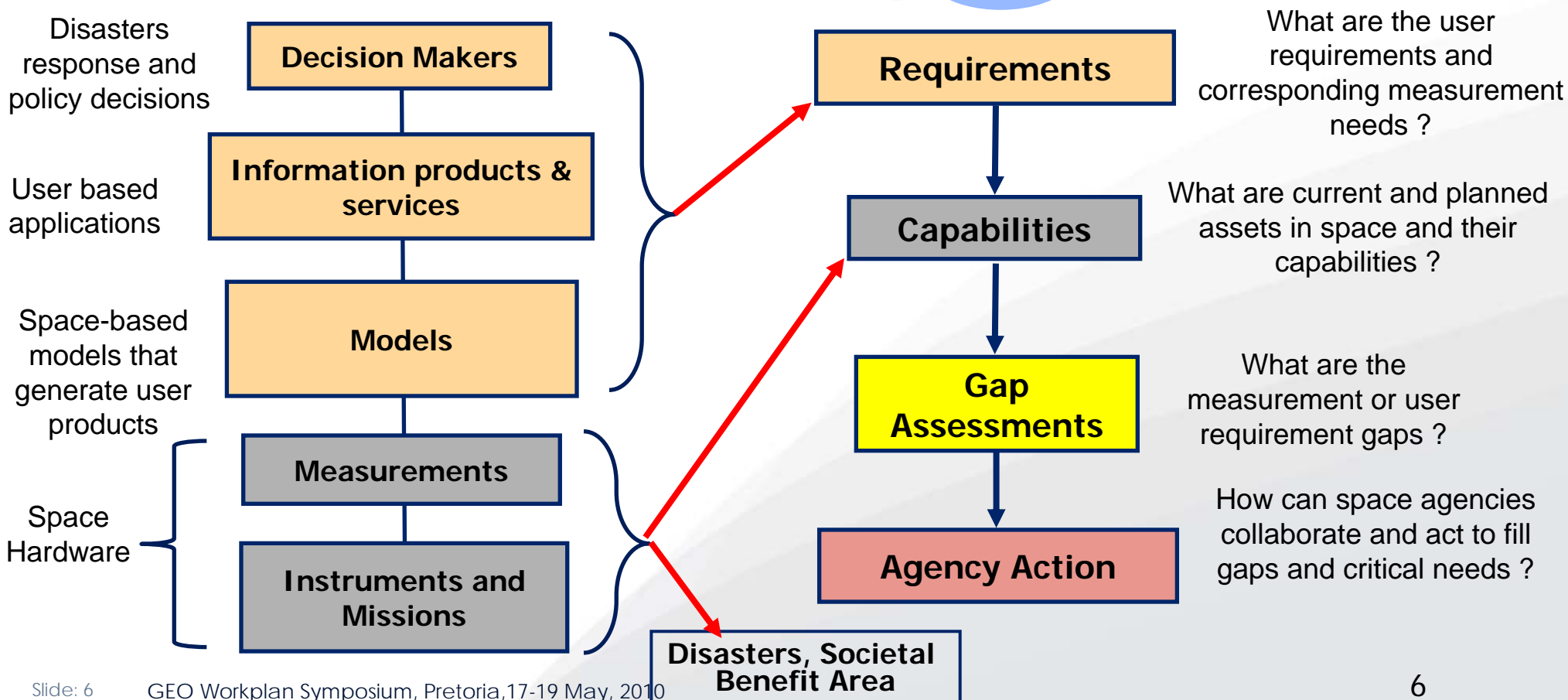
Phase Requirements	Mitigation	Warning	Response	Recovery
Target	Topography Hydrological models Historical atlas of floods Flood models/simulations New infrastructure, houses Land-use classification Monitoring of dikes and dams	Precipitation Water level (rivers, lakes) Weather forecast Soil moisture Snow-water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

# Systems Approach to Disasters



## CEOS Systems Database

## Strategy for collaboration and action





# Satellites for Risk Management: Measurements and Gap Analysis



## SBA: Disasters

Measurement	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Aerosol absorption optical depth (column)	18	21	20	20	13	12	11	8	8	8	10	12	14	11	8	8	7	5	4	4
Aerosol effective radius (profile)	13	18	13	15	11	12	11	8	7	9	5	6	4	4	4	3	2	2	2	1
Atmospheric Chemistry - BrO (profile)	5	3	3	3	3	2	2	2	2	2	3	3	3	2	2	2	2	1	1	1
Atmospheric Chemistry - C2H2 (profile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atmospheric Chemistry - C2H6 (profile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atmospheric Chemistry - CFC-11 (profile)	3	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atmospheric Chemistry - CFC-12 (profile)	3	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atmospheric Chemistry - CH2O (profile)	0	0	0	0	0	0	1	1	1	1	3	4	5	4	4	4	4	3	3	3
Atmospheric Chemistry - CH3Br (profile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atmospheric Chemistry - CH4 (profile)	12	12	11	11	7	6	5	4	4	4	4	5	5	4	3	3	3	2	2	2
Atmospheric Chemistry - CHOCHO (profile)	0	0	0	0	1	1	2	2	2	2	3	4	3	2	2	2	2	1	1	1
Atmospheric Chemistry - CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

## Disaster SBA Information

- Current SEO database contains shows **339** (of 415) missions, **391** (of 984) instruments and **88** (of 146) measurements relevant to Disasters.
- These measurements are a mixture of atmosphere, land and ocean parameters.
- Measurement requirements are based on the GEOSS 10-Yr Implementation Plan.

### "Stop-Light" Chart

**RED** = 0 missions

**YELLOW** = 1 to 5 missions

**WHITE** = > 5 missions

# Next Steps



## **Floods Requirements Development**

- Verification of identified models and products
- Identification of new models and products
- Identify required measurements and associated detailed parameters – need documents, contacts, etc
- Check against matrix to identify missing floods related measurements
- Run a high level gap assessment to identify missions and instruments

## **Mission and Instrument Details**

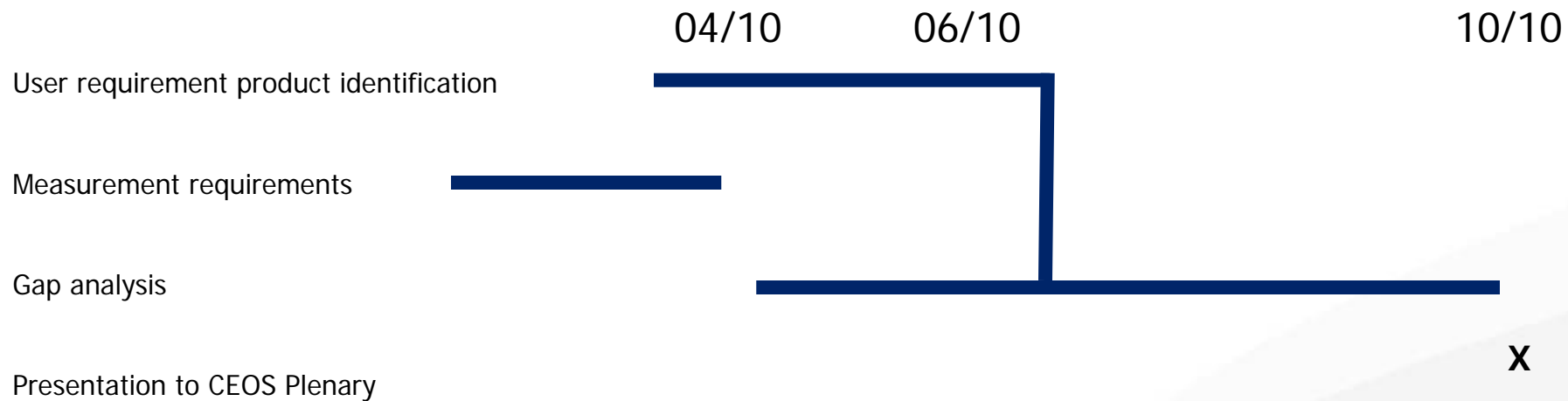
- For identified missions/instruments, populate the mission and instrument detailed parameters
- Without this information, online automation of the gap analysis process is not possible.

## **Gap Analysis Capability**

- Will be able to run gap analysis against products, models, or requirements
- Gap analysis will produce timeline charts of missions/instruments



# Gap Analysis



# GEOSS Targets and Achievements



By 2015 .....

- ❖ **More timely dissemination of data in support of full cycle of disaster management at local, national and regional levels**
- ❖ **Development of a multi-hazard, end-to-end approach for disasters**
- ❖ **Support implementation of Hyogo Framework**

# 2010 Potential CEOS Contribution to GEO Disaster Tasks



- ➔ • **DI-06-09: Use of Satellites for Risk Management**
- **DI-09-01: Systematic Monitoring for Geohazards Risk Assessment**
  - ➔ ○ a) Vulnerability Mapping and Risk Assessment
  - b) Seismographic Networks Improvement and Coordination
- ➔ • **DI-09-02: Multi-Risk Management and Regional Applications**
  - a) Implementation of a Multi-Risk Management Approach
  - ➔ ○ b) Regional End-to-End Disaster Management Applications
- **DI-09-03: Warning Systems for Disasters**
  - ➔ ○ a) Tsunami Early Warning System of Systems
  - ➔ ○ b) Implementation of a Wildland Fire Warning System at Global Level



# Thank you...