



Enhancing global Cooperation in satellite based Emergency Mapping

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DLR Background

- DLR strongly engages in the domain of space technology supporting disaster management and crisis relief
- R&D and operational developments in this domain since many years
- DLR supports the International Charter Space and Major Disasters since 2002, signatory to the Charter since 2010
- DLR operates the “Center for Satellite based Crisis Information” (ZKI) since 2004
- DLR supports UN-SPIDER since the early days and implementation and maintenance of the UN-SPIDER Bonn Office since 2007
- Active participation in the European Global Monitoring for Environment and Security Initiative (GMES) as well as GEO/GEOSS





Workflow for satellite based emergency mapping

Extreme Crisis or disaster

- triggering process
- situation briefing

① **Mobilization** 

- satellite tasking
- archive search
- auxiliary data

② **Data acquisition** 

- geometric correction
- image enhancement

③ **Pre-Processing** 

- Data fusion
- Information generation
- Validation of content

④ **Analysis** 

Integration of auxiliary data

⑤ **Map Production** 

- maps (printed; online)
- GIS-ready geodata
- information dossiers
- quality control

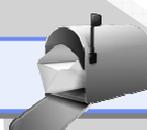
Integration in collaborative platforms

Satellite data is key – but it takes much more than data!

Collaboration and Coordination is a must!

Specialisation is a fact!

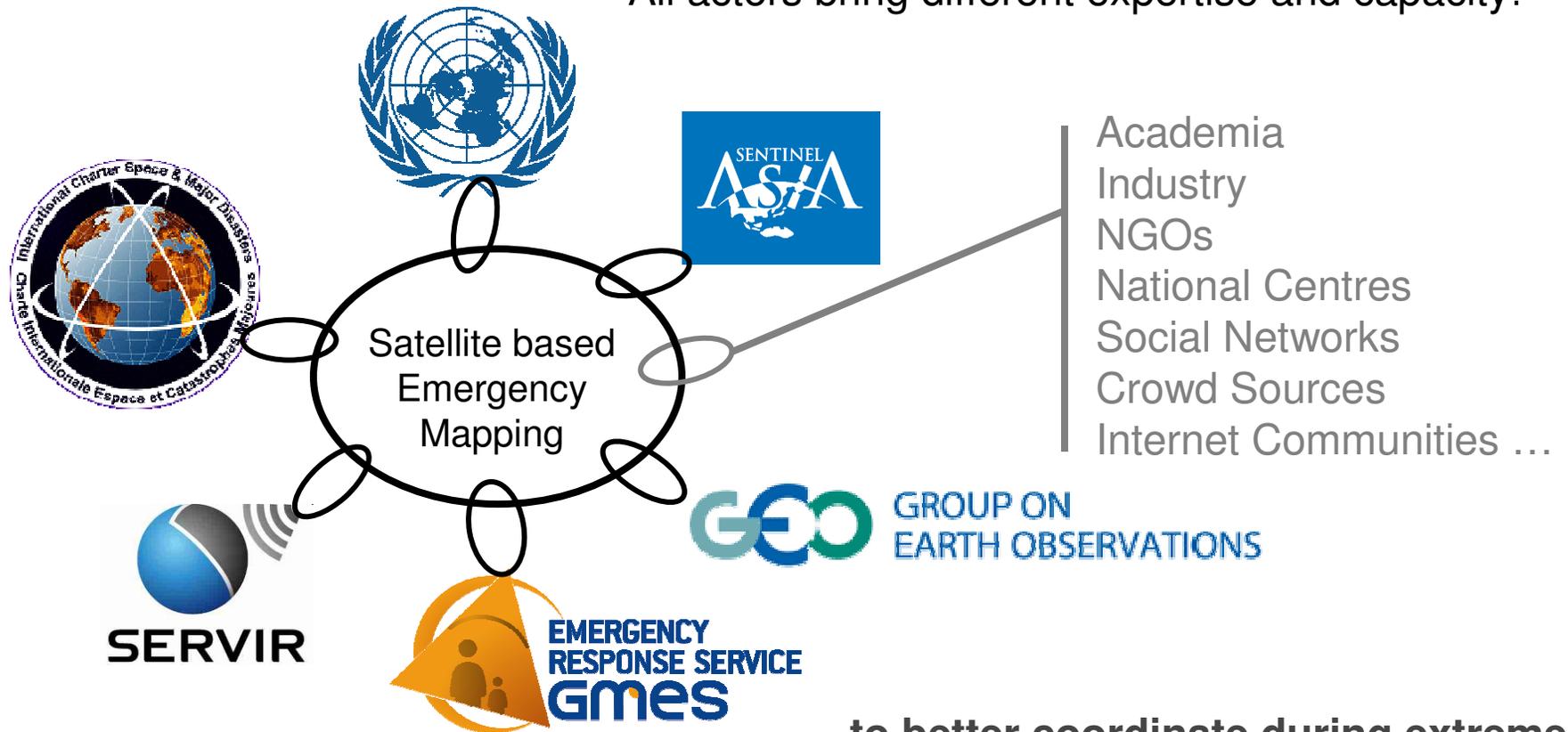
Planning and Decision Support

⑥ **Dissemination** 

- Liaison with National/ local authorities
- Humanitarian relief community
- Public,...

The community has grown over the past years and is mature enough to take the next steps...

All actors bring different expertise and capacity!



... to better coordinate during extreme disaster situations like Haiti 2010



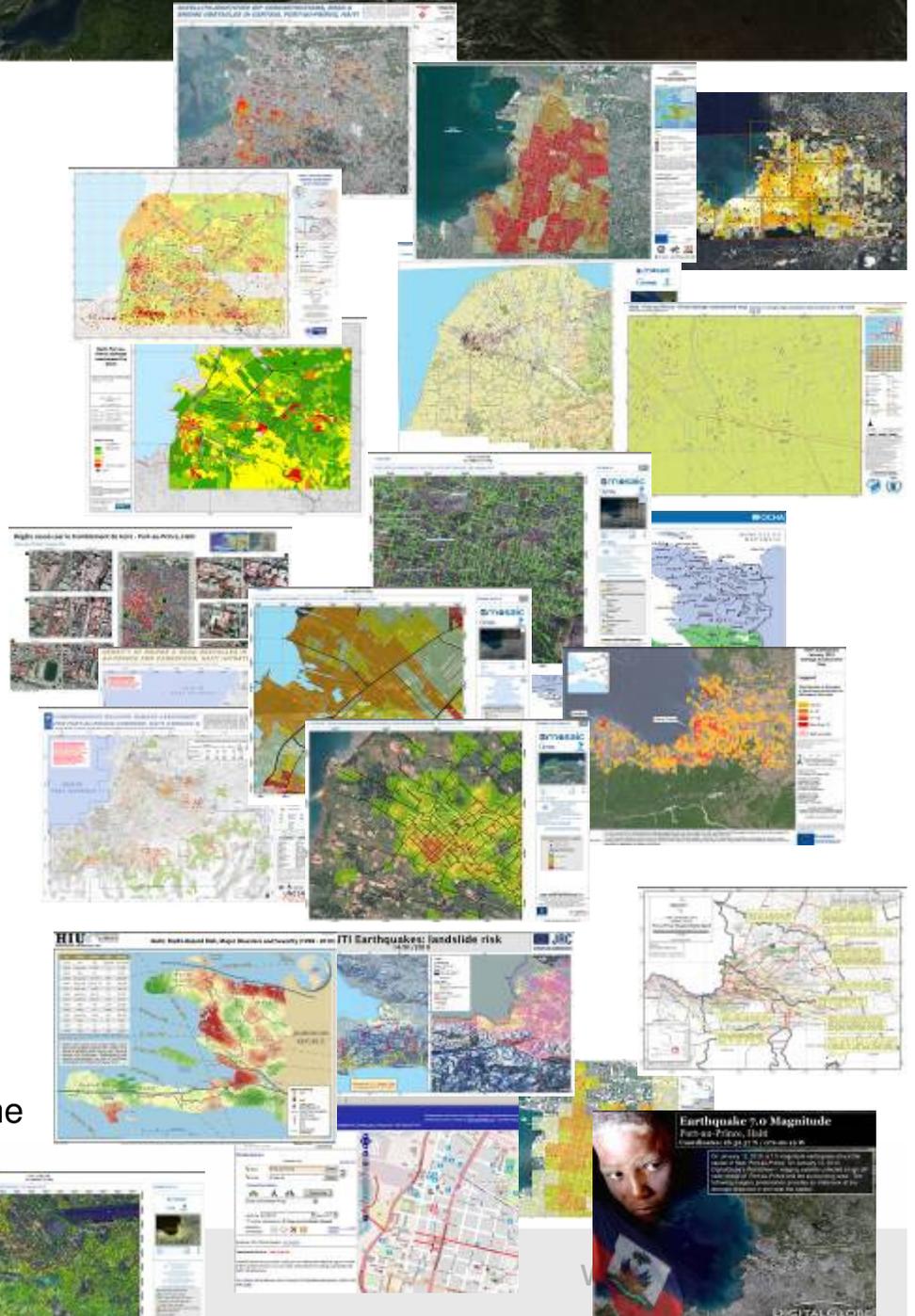
The experience of the recent years has shown that there is a **need for structured and coordinated global** cooperation in satellite-based emergency mapping - especially during **extreme events.**

- **Scale of:** Tsunami 2004, Haiti-EQ 2010, Pakistan-Flood 2010
- **Many actors** and numerous satellite mapping / analysis efforts, on ad hoc basis...
- **Coordination** needed on who does what, what is needed and how to better collaborate...
- ... to avoid a **“mapping disaster”!**



„Haiti Mapping Disaster“

- In earlier cases - only a limited number of actors were involved in satellite mapping activities
- In the Haiti 2010 case - we saw a large number of organisations providing satellite mapping and analysis
 - in a poorly coordinated way
 - hundreds of maps ended on UNOCHA/ReliefWeb
- Resulting in:
 - overflow of mapping information
 - Partially inconsistent, at least largely diverging, mapping and satellite imagery analysis
 - completely different representation of damage classes, map features,....
 - confusion, frustration and resignation of the “user” community with respect to satellite maps/analysis

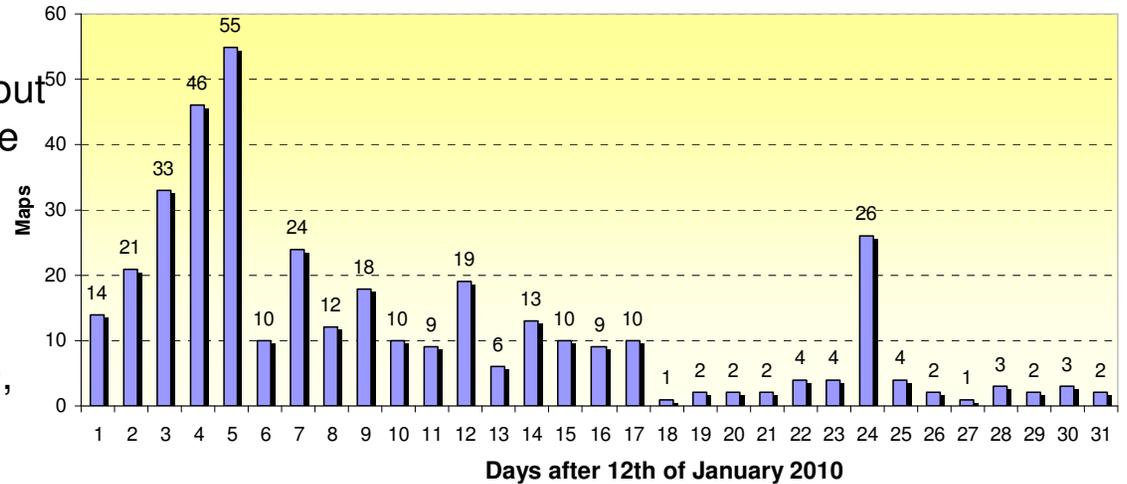


„Haiti Mapping Disaster“

Maps per Day
(380 Maps in 4 Weeks)

➤ Within four Weeks 380 maps were posted on UNOCHA/Reliefweb, about half of which were based on satellite data

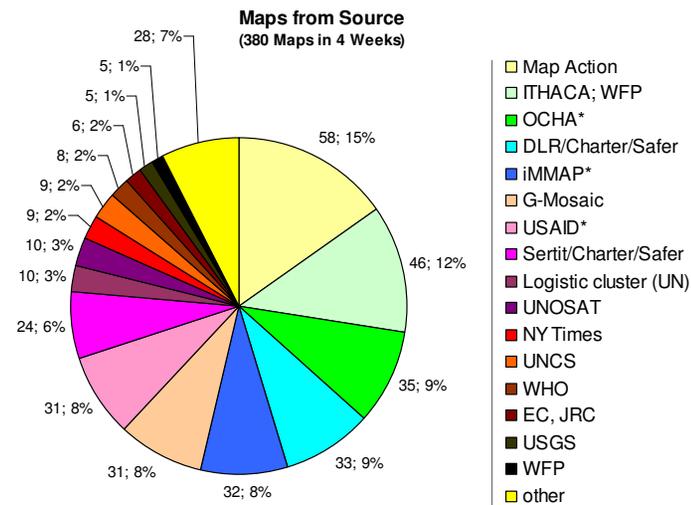
➤ 34 different producers/sources - CartONG, DLR, EC/JRC,ITHACA MapAction, Sertit, UNOSAT,USAID, WHO, WFP,...



➤ Different type of maps: reference maps, damage assessment, situation maps, overview maps and further specialised maps

➤ Different scales, from 1:5.000-1:500.000

➤ Partially contradicting information





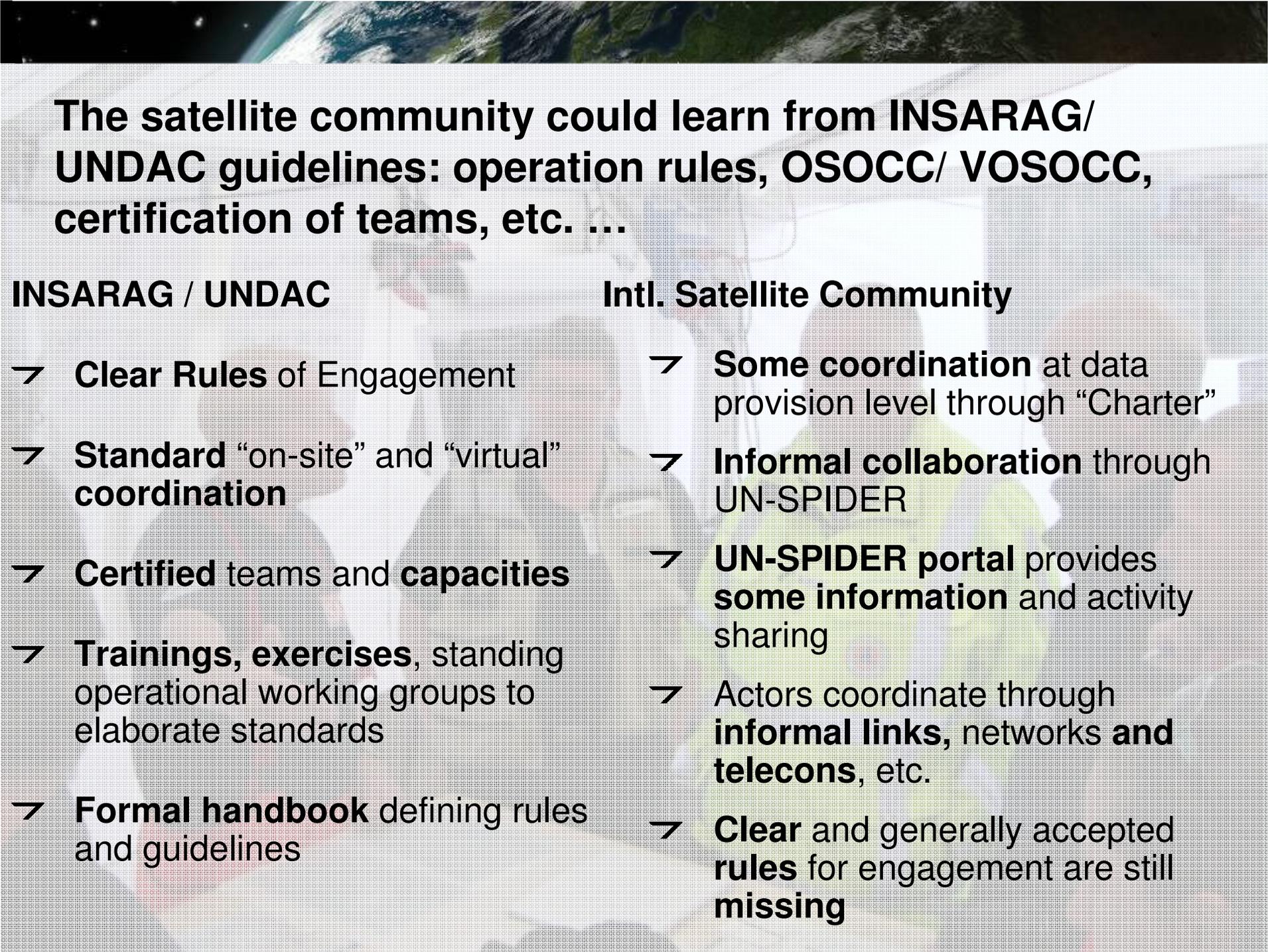
Where do we stand as a global community in satellite based emergency mapping?

Assets (+)

- **Various** global, regional and national **mechanism/services**
- **Good** general **availability** of **space imagery** (Charter, Industry, open access data...)
- **Ad hoc coordination** via individuals and mutual arrangements
- **Profile** of satellite based emergency mapping **is rising** globally
- **Internet communities** are developing

Deficits (-)

- No common **rules of engagement**
- No **guidelines** on how to operate and cooperate
- No **qualifying and certifying** of capacities => all is best effort
- No **best practices handbook**, no common **quality assurance or validation**
- No **global coordination** scheme
- No common **training and exercising** of procedures and collaboration



The satellite community could learn from INSARAG/UNDAC guidelines: operation rules, OSOCC/ VOSOCC, certification of teams, etc. ...

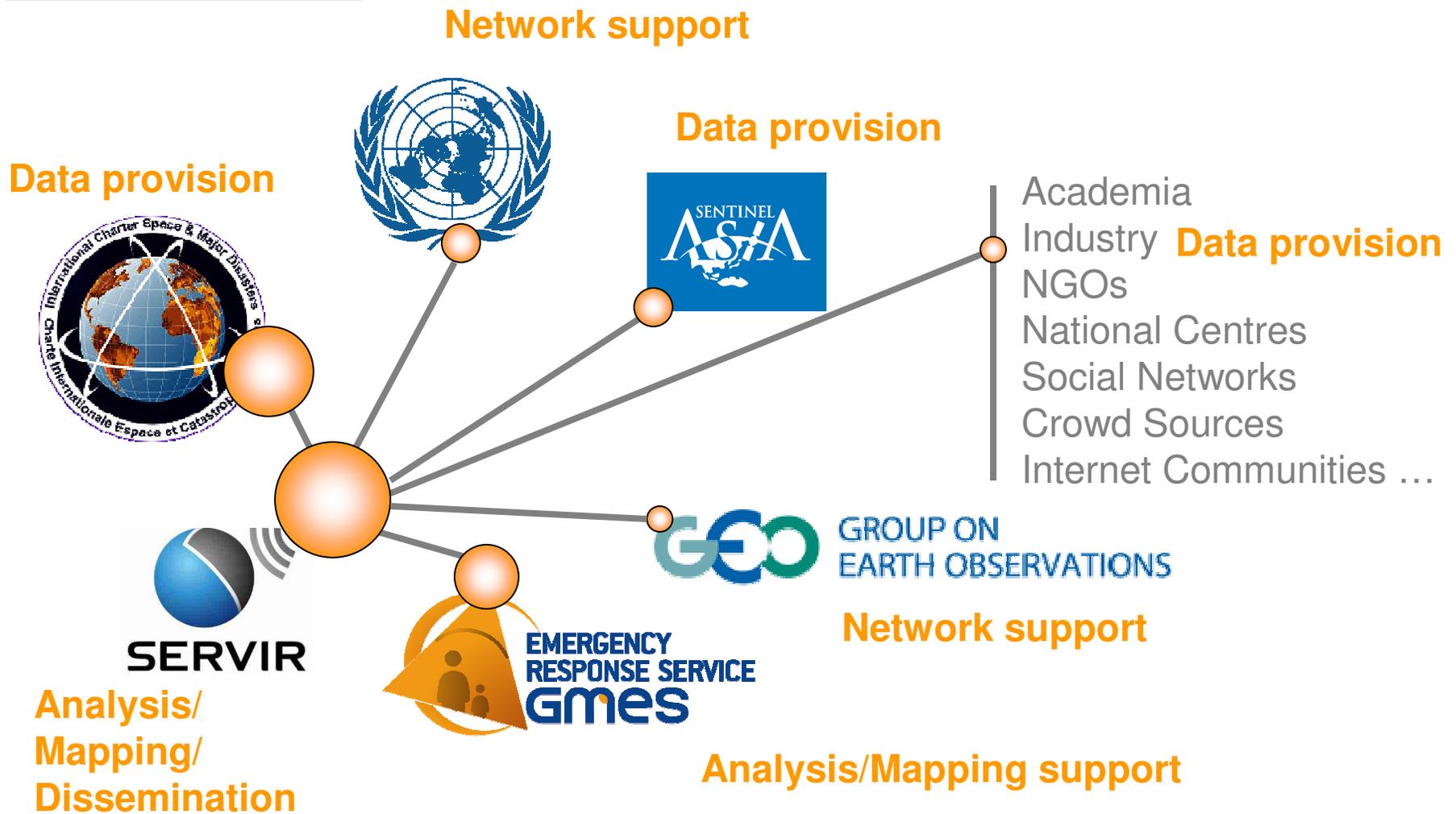
INSARAG / UNDAC

- **Clear Rules** of Engagement
- **Standard** “on-site” and “virtual” **coordination**
- **Certified** teams and **capacities**
- **Trainings, exercises**, standing operational working groups to elaborate standards
- **Formal handbook** defining rules and guidelines

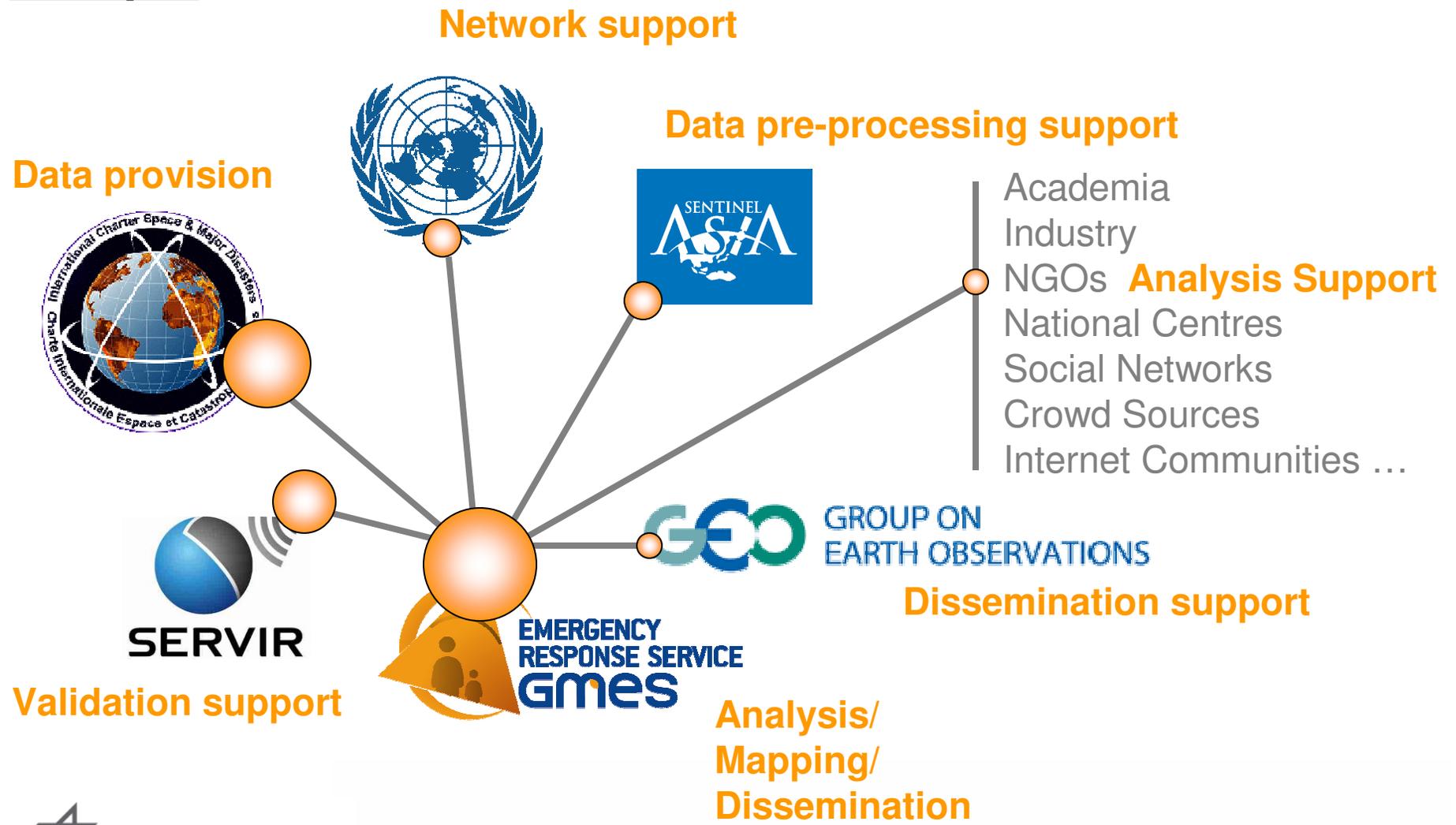
Intl. Satellite Community

- **Some coordination** at data provision level through “Charter”
- **Informal collaboration** through UN-SPIDER
- **UN-SPIDER portal** provides **some information** and activity sharing
- Actors coordinate through **informal links, networks and telecons**, etc.
- **Clear** and generally accepted **rules** for engagement are still **missing**

Hypothetical example (1) of a large scale disaster in Latin America:



Hypothetical example (2) of a large scale disaster in Europe:





The space community has achieved excellent progress in satellite based emergency mapping in the past years. However, there still is a great need to:

- ... improve global **collaboration in case of extreme disaster events** like Indian Ocean Tsunami 2004, Haiti Earthquake or Pakistan Flooding in 2010,
- ... define **rules of engagement** for collaborative satellite mapping by different actors,
- ... **derive best practises and guidelines** for processing, analysis, mapping and dissemination of data and information,
- ... ensure best possible **quality, validity and consistency** of mapping/satellite data analysis,
- ... organise **certification and accreditation** of mandated capacities,
- ... establish **an accepted collaboration procedure** among all relevant actors, member states and mechanisms,
- ... **avoid user confusion**, fatigue and frustration – in order to
- ... achieve a **functional, best-quality, efficient and internationally accepted** satellite mapping support for extreme disaster events in the future!



In conclusion it can be said that

- Envisioning such guidelines and best practices for satellite based emergency mapping for extreme disaster events with international response does not mean to change all the very well established national, regional or international activities in this domain. The modus operandi and the sovereignty of all these mechanisms is not to be changed. What is needed is a structured scheme of cooperation of all these mechanisms.
- To establish such guidelines and best practices for cooperation it would take mandated technical experts from all involved regional and international mechanisms as well as from member states elaborating them.
- If the international community considers it to be important to work on this topic the UN COPUOUS could have a significant role in helping to establish such global guidelines for satellite based emergency mapping in case of extreme disaster events.