

Broadcast of Disaster Alerts through SBAS

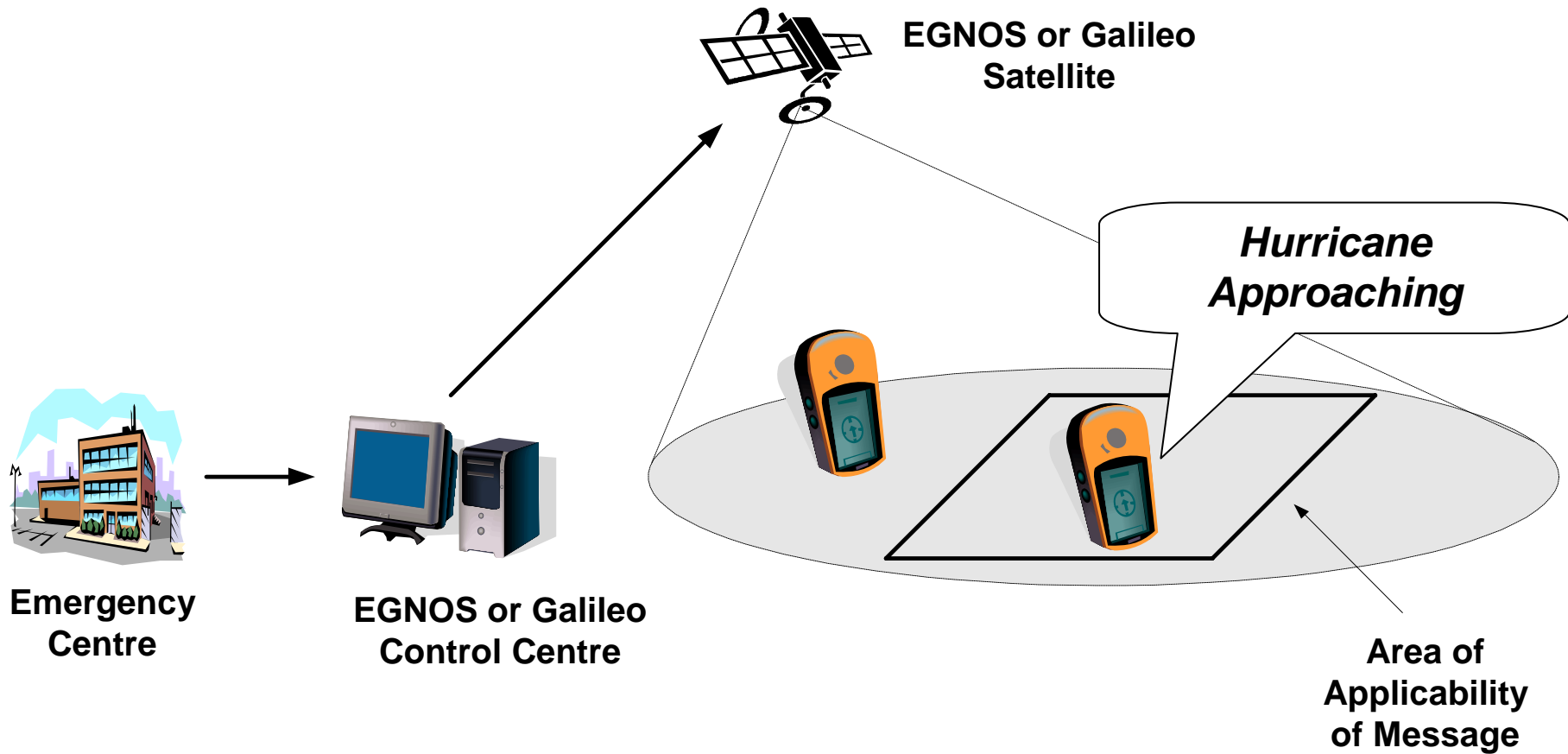
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Topics

- Concept
- Requirements
- Comparison with current systems
- System architecture and data capacity
- Way forward

Concept of using EGNOS or Galileo for Disaster Alert Broadcast



Coupling Alerts with Positioning

- The nature of the alerts is that they are only valid over a certain area.
- Users equipped with GNSS receivers know their position.
- A disaster alert messaging service via GNSS can transform any GNSS-enabled device into a satcom receiver of emergency messages.
- GNSS functionality is already being embedded in mobile phones and many other personal electronics (e.g. photo camera).

High Level Requirements

- Institutional control and regulated operations.
- 24/7 operation.
- Reach maximum number of people.
- Service characteristics similar to a Safety-of-Life Service in terms of integrity of data, availability, acknowledgment of message broadcasts,...
- Long service life-time.
- Same level of service regardless of user conditions (inclusivity), whether fix or mobile, high-tech or low tech, ...
- Free service.
- Response on the order of 10-15 of minutes (timeliness)
- Continuous transmission during alerts.
- Provision of alerts covering local to large regional areas.
- Capability to support different type of alerts simultaneously
- Follow international standards

Current Alert Means

- TV and radio broadcast
- Public address systems
- Public fix telephone
- Public mobile telephone (SMS cell broadcast)
- Private radio
- Internet/e-mail
- Commercial satcomms
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Qualitative Comparison

	SBAS	Commercial Satcomms	Public mobile	Public PSTN	Private mobile data	Broadcast (TV, Radio)	Internet / Email	Public Address
Social Requirements								
Inclusivity	Orange	Red	Orange	Orange	Red	Green	Red	Green
Population penetration	Orange	Red	Orange	Orange	Red	Orange	Red	Orange
Institutional Control	Green	Red	Red	Red	Red	Orange	Green	Green
Language	Orange	Green	Green	Orange	Green	Orange	Green	Orange
Financial Requirements								
User Cost	Orange	Red	Orange	Orange	Red	Green	Orange	Green
Operational Cost	Green	Red	Red	Orange	Red	Green	Green	Red
Operational Requirements								
Automation	Green	Green	Green	Orange	Green	Red	Orange	Green
Self Monitoring	Green	Green	Orange	Orange	Orange	Orange	Orange	Red
Availability	Green	Orange	Red	Red	Red	Orange	Red	Orange
In Service Lifetime	Green	Orange	Green	Green	Orange	Green	Green	Orange
Functional Requirements								
Coverage	Green	Green	Orange	Orange	Red	Green	Orange	Red
Timeliness	Green	Green	Red	Red	Green	Orange	Red	Orange
Continuous Transmission	Green	Green	Orange	Orange	Green	Green	Orange	Green
Content	Green	Orange	Green	Orange	Orange	Green	Green	Orange
Scaleability	Orange	Red	Orange	Orange	Red	Orange	Orange	Red
Alert Interleaving	Green	Green	Orange	Orange	Green	Green	Green	Red
Technical Requirements								
Receivers	Orange	Red	Orange	Orange	Red	Green	Orange	Orange
Required Upgrades	Red	Orange	Orange	Green	Orange	Green	Green	Red
Standardised Transmission Format	Orange	Orange	Orange	Orange	Orange	Red	Orange	Orange

SBAS Advantages

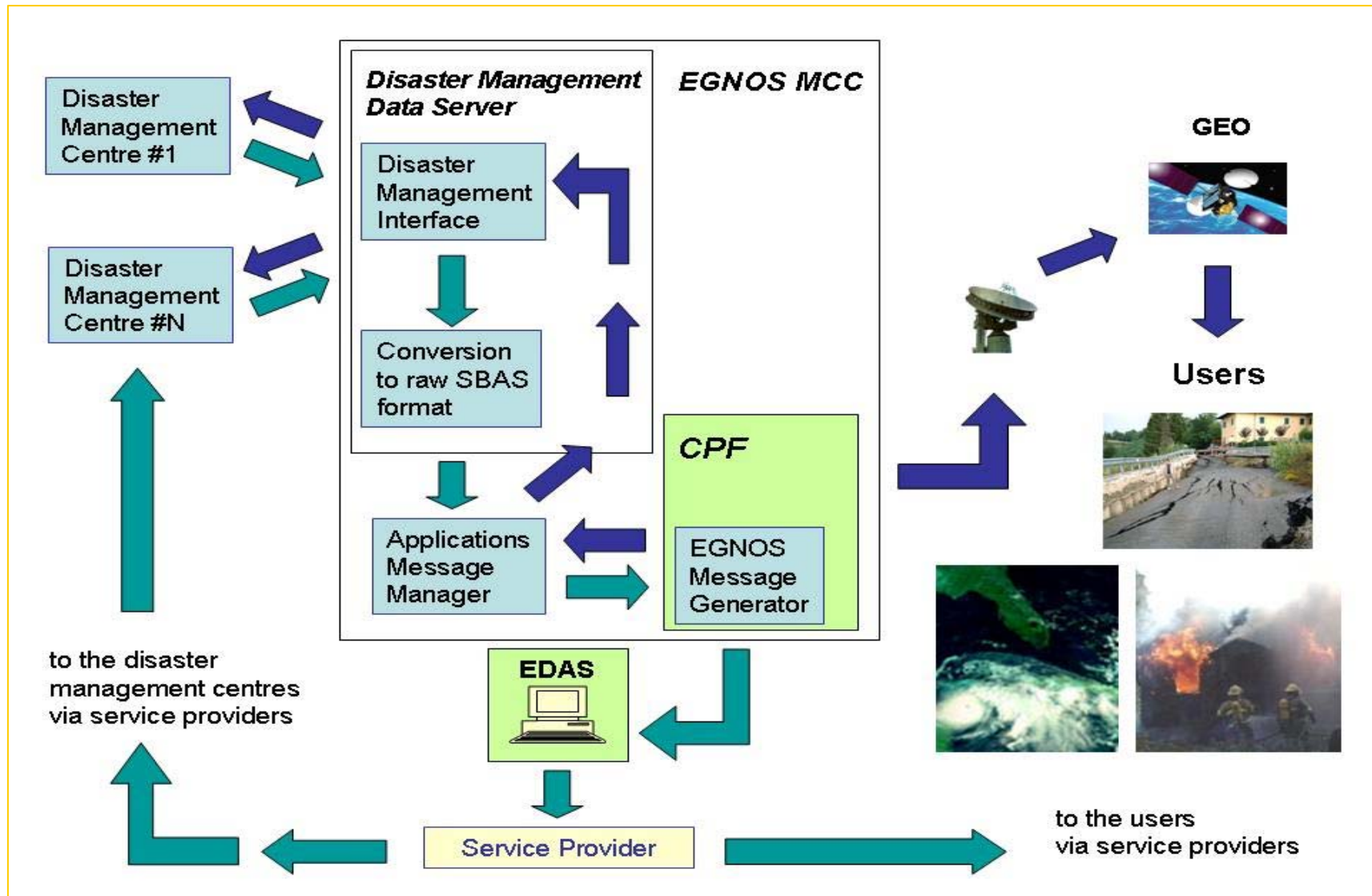
- Warning and location in same equipment allowing for meeting technical requirements with low complexity.
- SBAS conceived as safety critical system, therefore capable of guaranteeing timeliness of delivery, confirmation of transmission and service availability.
- SBAS are institutionally controlled and may readily support the regulated structures to control service provision.

SBAS Advantages (cont'd)

- Global coverage achieved by interoperability of SBAS's.
- It does not require local infrastructure. Resilient to terrestrial infrastructure damage.
- Potential for low operational costs.

GNSS/SBAS-enabled devices will be everywhere: by far the most abundant “*satcomms receivers*” in the world.

The Alert Interface Via EGNOS (ALIVE)



Message Capabilities

- SBAS has to respect minimum update rate of corrections and integrity messages to comply with safety-of-life requirements (primary mission).
- About 35% of bandwidth is still available:
 - A 250 bit message every 3-4 seconds (75 bps).
- Current minimum update rates were established assuming Selective Availability errors. Since SA policy has been discontinued, update rates of SBAS messages could be revised allowing for larger data capacity (140 bps).
- The required data/message capacity of the disaster alert service has not been assessed yet but it is believed to be within the existing spare data capacity of SBAS/EGNOS.

Way Forward

- The ALIVE concept has been already presented:
 - IGOS Geohazards workshop, June 2005
 - ION GNSS September 2005
 - Third International Conference on Early Warning, March 2006
- Positive reception, however more awareness still needed for the Disaster Alert Service (DAS) community to include in their plans the opportunity offered by SBAS.
- SBAS Alert Service definition studies should be initiated involving DAS community leading to a standardization of message across SBAS.

Propose to establish a dedicated working group within ICG and with interfaces to the DAS community to develop an action plan.

Conclusions

- SBAS provides a unique opportunity for an efficient and rapid way of implementing a global disaster alert service.
- SBAS service is complementary to current means. Hybrid systems (SBAS/cell broadcast) would meet the majority of the user requirements.
- SBAS service would lead to the introduction of similar services in the global constellations (Galileo, GPS, GLONASS).