A Satellite-Based Communication Channel for the Reliable Distribution of Early Warning Messages: The Alert Interface via EGNOS (ALIVE) for Disaster Prevention and Mitigation

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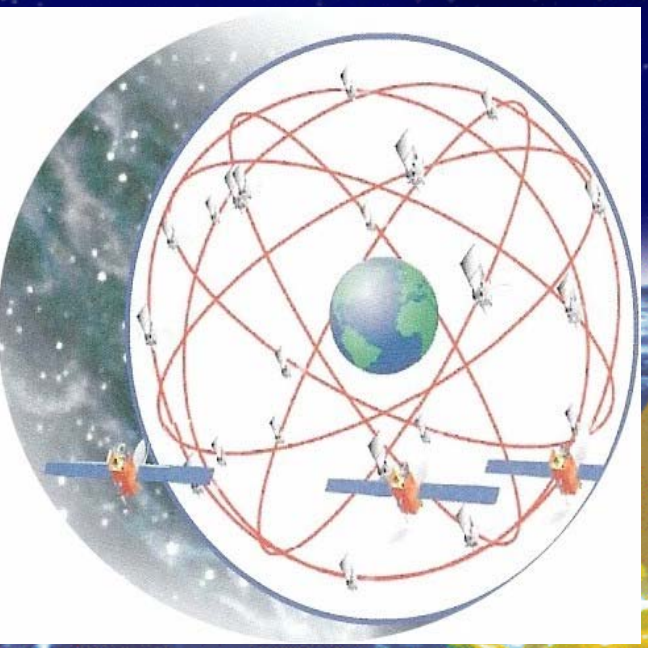
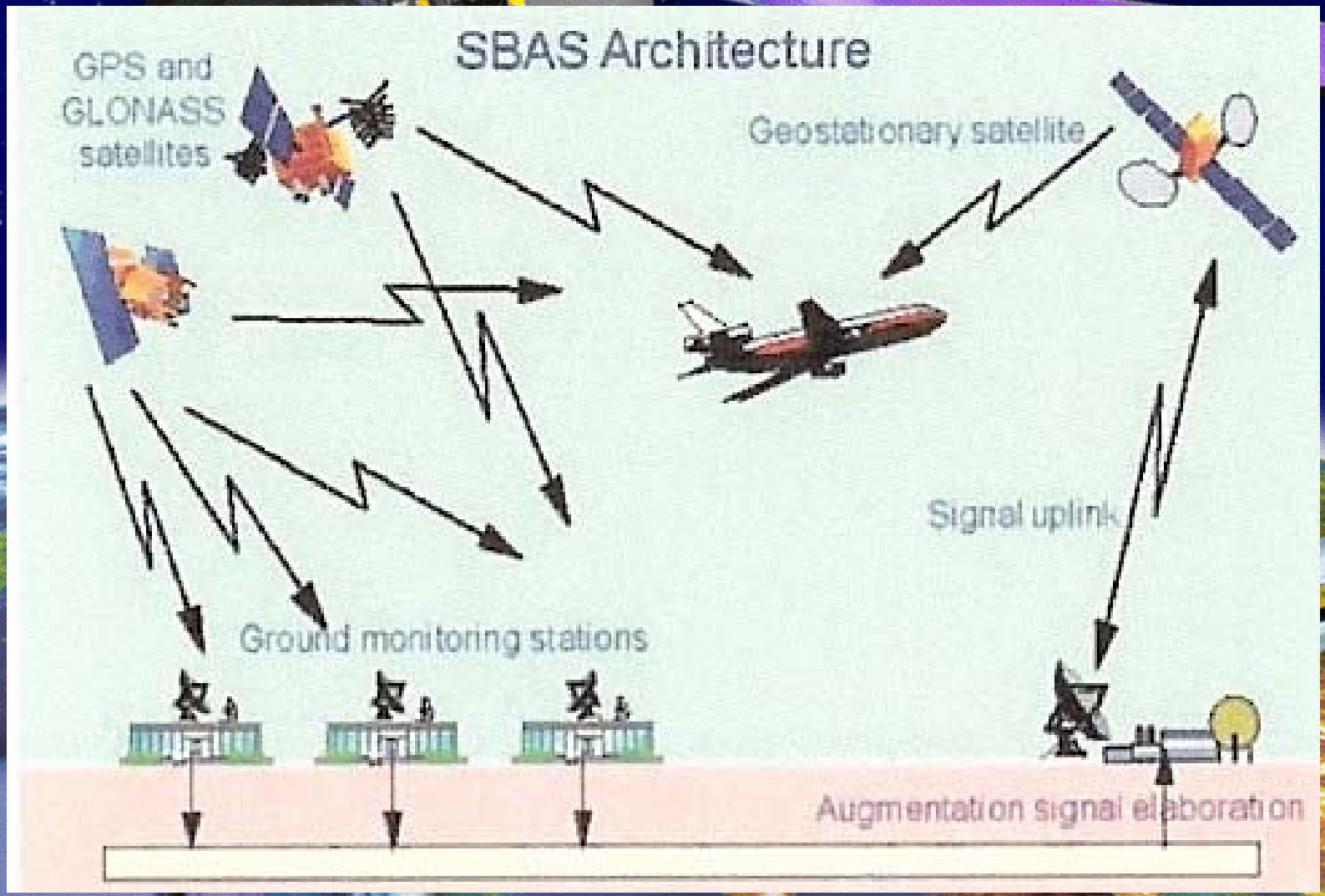
- Satellite-Based Augmentation Systems (SBAS)
- The European Geostationary Navigation Overlay System (EGNOS)
- The Alert Interface Via EGNOS (ALIVE)
- Implementation Strategy for ALIVE

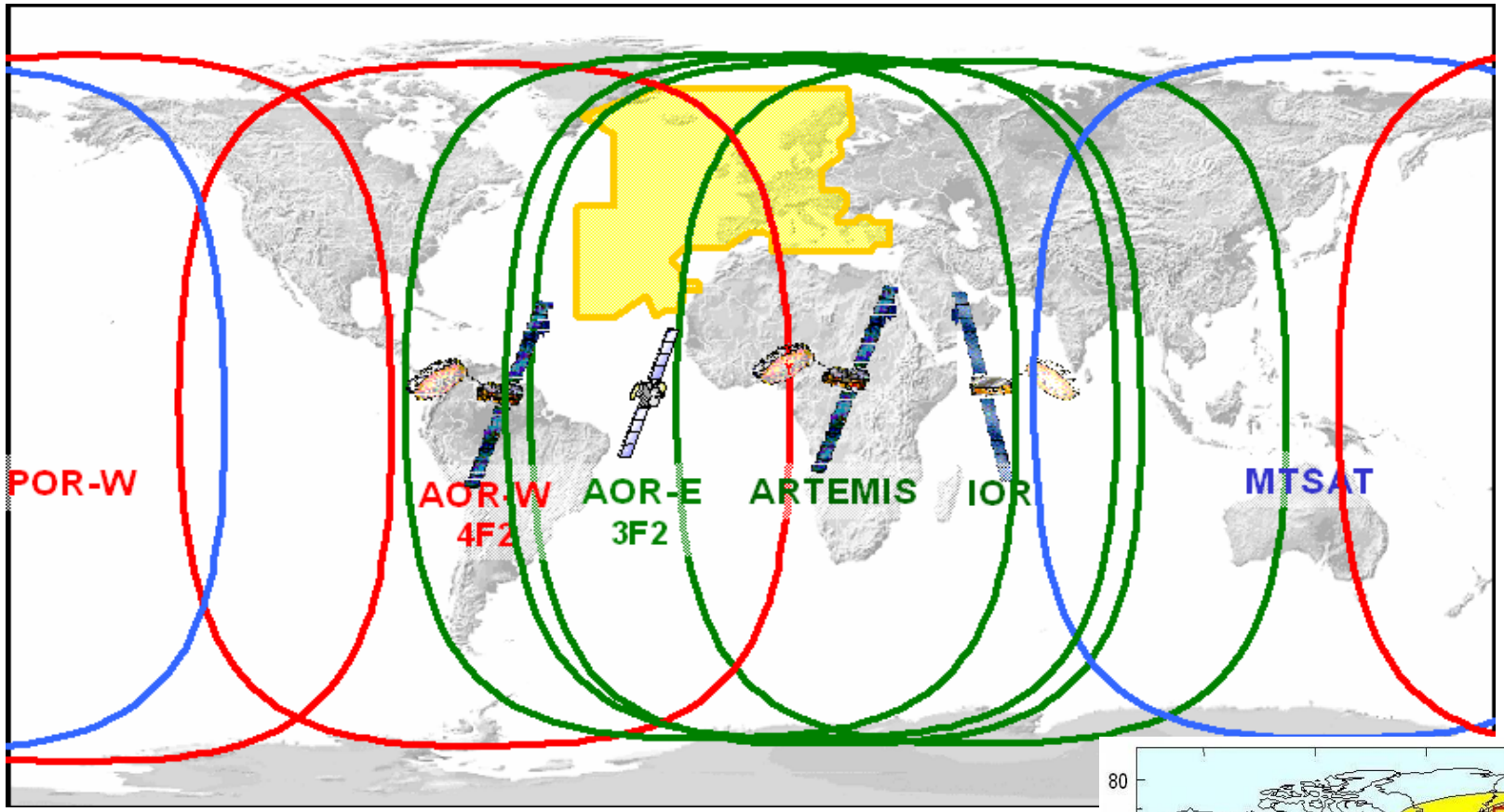
Satellite-Based Augmentation Systems



Satellite-Based Augmentation Systems



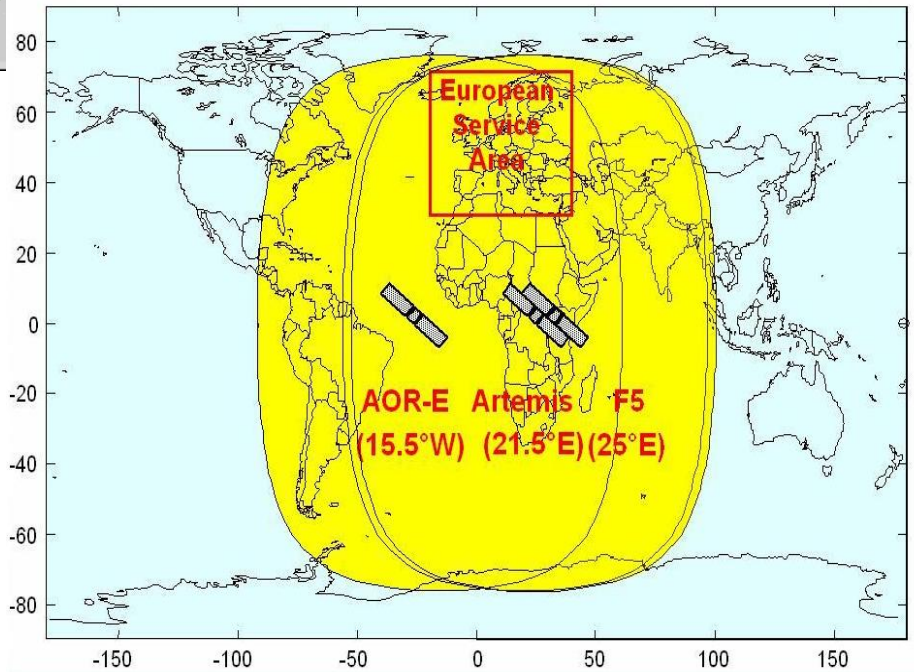
Satellite-based Augmentation Systems



Three SBAS Systems:

- USA: Wide Area Augmentation System (WAAS)
- JAPAN: Multifunction Satellite Augmentation System (MSAS)
- EUROPE: European Geostationary Navigation Overlay System (EGNOS)

POTENTIAL FOR A GLOBAL SERVICE



Satellite-based Augmentation Systems

SBAS Characteristics:

- Institutionally controlled, secure, operated for safety of life applications.

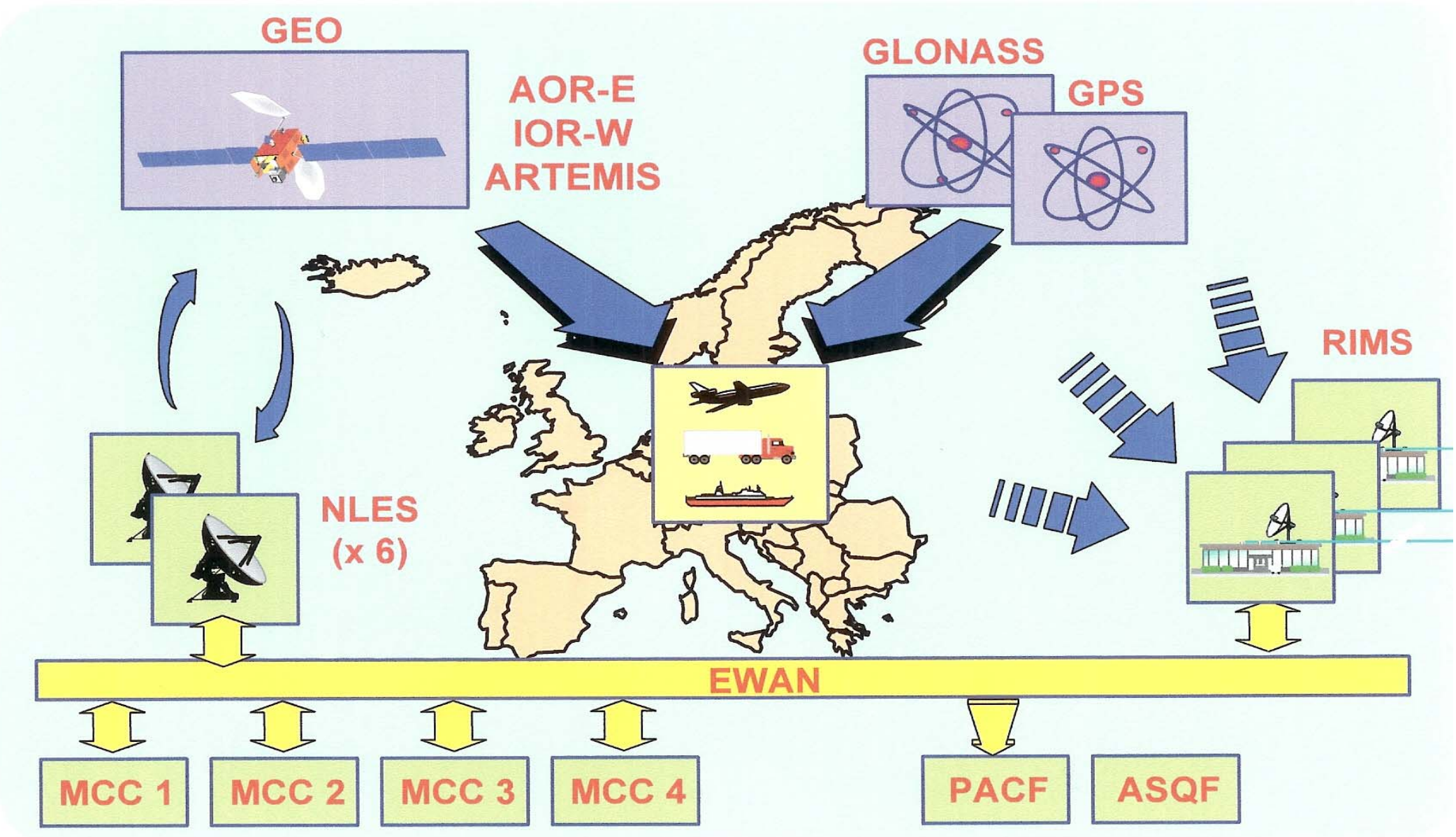
- Designed to
  - guarantee adequate message broadcast,
  - integrity of messages,
  - confirmation of transmission,

- Receivers are
  - based on GPS receivers,
  - share same globally accepted standards,
  - are by far the most abundant “satellite communication receivers” in the world.

- Receivers combine the capability of receiving messages with the ability to determine the location of the receiver.

- The three existing SBAS together provide a global coverage.

EGNOS


GEO
AOR-E
IOR-W
ARTEMIS
GLONASS
GPS
RIMS
NLES
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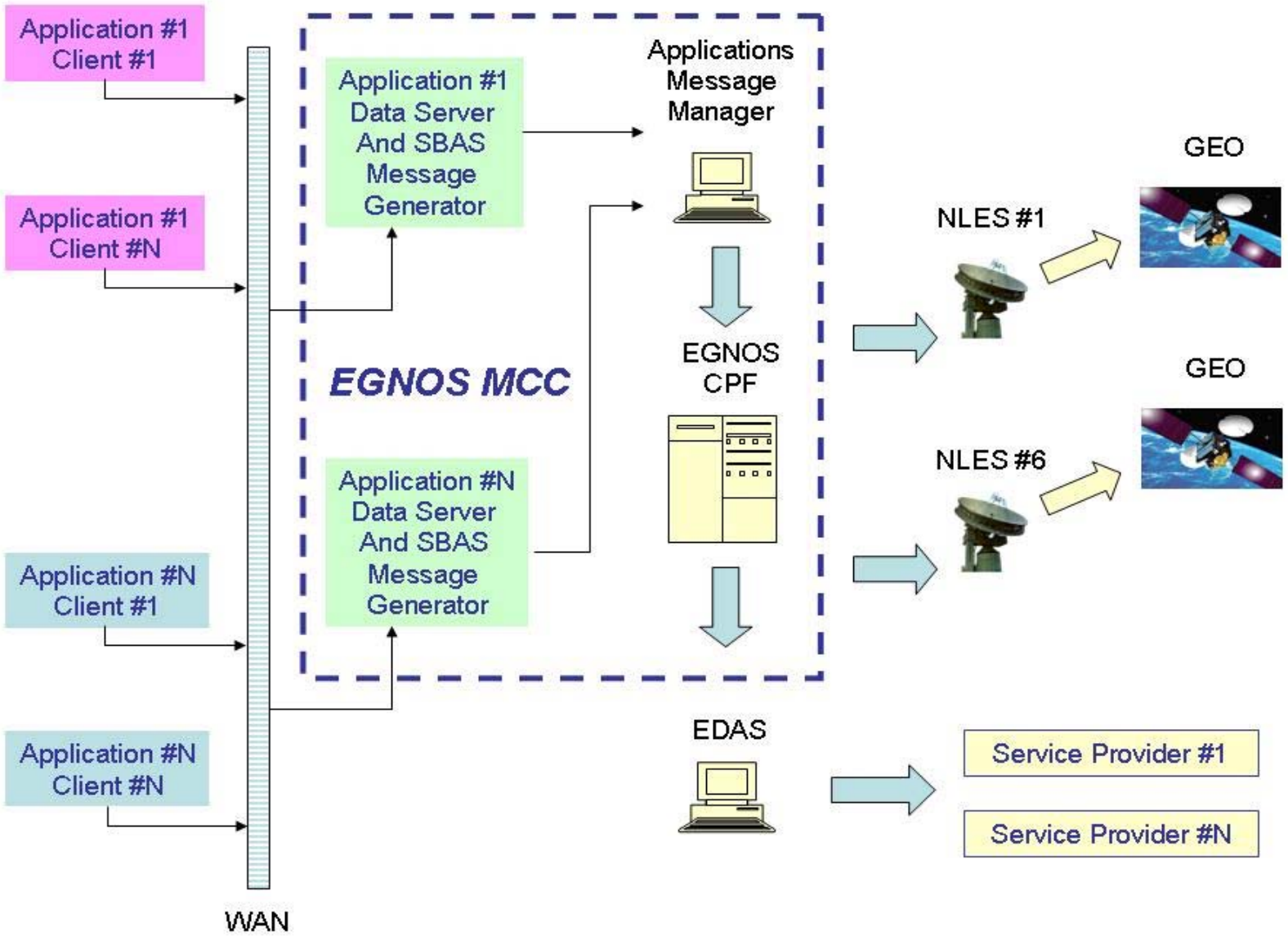
EWAN
MCC 1
MCC 2
MCC 3
MCC 4
PACF
ASQF

EGNOS



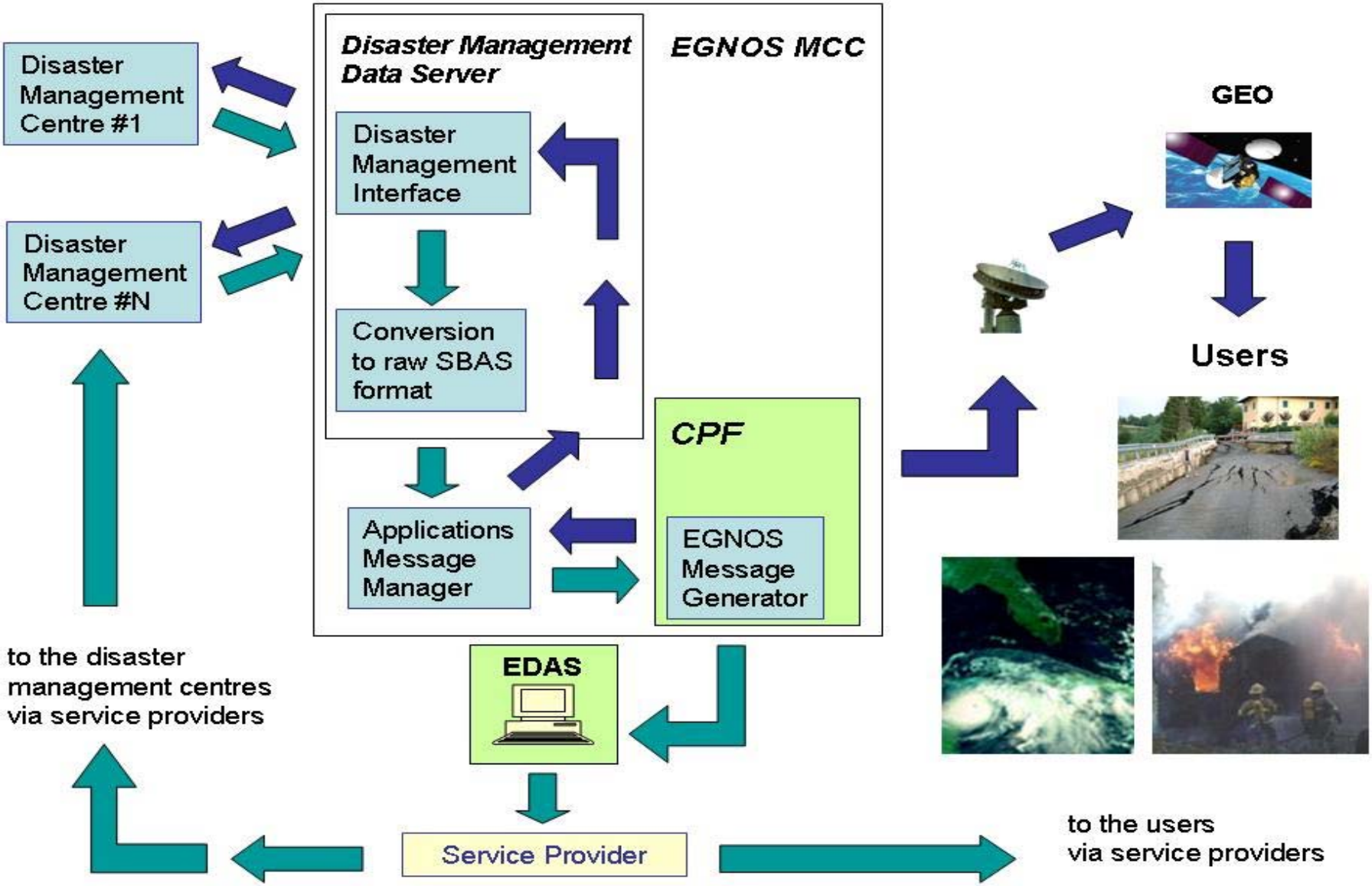
Broadcast of information through EGNOS

EGNOS

- Communication capacity larger than required for system operation: there is therefore sufficient margin to send additional messages
- Inherent characteristics most appropriate for alert messages
- Ground-based infrastructure is very unlikely to be affected by a disaster/crisis
- SBAS communication channel cannot be disrupted in a crisis situation

Unique opportunity for broadcasting of alert messages

The Alert Interface Via EGNOS (ALIVE)



Architecture of ALIVE Implementation

The Alert Interface Via EGNOS (ALIVE)

Why SBAS?

SBAS receivers get alert messages and also have their position simultaneously: Only users in target areas need to act;

Unique worldwide standard: All SBAS receivers are identical;

SBAS operated with all guarantees: Safety of Life, institutional control, 24 hours non stop; confirmation message is broadcast in time

Can be implemented in very short time: pragmatic approach;

Works in places with no operational infrastructure;

Potential global coverage together with all other SBAS;

Galileo enabler: Service continuation/redundancy through Galileo.

Possible Implementation Strategy

Step 1: Presentation of the ALIVE concept to relevant Disaster Management authorities for their consideration (in progress)

Step 2: Feasibility assessment of generic SBAS communication functionality, including ALIVE

Step 3: Consolidation of ALIVE Mission Requirements with Disaster management expert groups

Step 4: Propose the SBAS communication functionality (incl. ALIVE) in the context of the GNSS Accompanying Program for ESA delegations consideration

Step 5: Detailed specifications; message standardization; detailed definition study; test services
through the ESA/EC EGNOS test Bed; detailed technical/operational interface assessment of the EGNOS ground segment with the various Disaster Alerting Systems; SBAS ALIVE enabled receiver detailed design; detailed definition of the general SBAS communication function.

Step 6: SBAS communication function (incl ALIVE mission) Implementation Phase and development of SBAS ALIVE enabled receivers

Step 7: Operational integration of the SBAS communication functionality (inc ALIVE mission) in EGNOS

Step 8: Disaster prevention/mitigation qualification and start of operations (could start in early 2008)

The ALIVE concept provides an unique opportunity to implement robust global broadcasting capacity for alert messages with minimal resources in short time and with a excellent perspectives for future extensions.