GMES Fast Track
Emergency Response Core Service

Strategic Implementation Plan*
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* DISCLAIMER: this is a working paper of the Implementation Group on GMES "Emergency Response". It does not necessarily represent the opinion of the European Commission.

Outlines

The objective of the Global Monitoring for Environment and Security (GMES) is to provide, on a sustained basis, reliable and timely services related to environmental and security issues in support of public policy makers' needs. GMES is an EU-led initiative, in which ESA implements the space component and the Commission manages actions for identifying and developing services, relying on both in-situ and space-borne remote sensing data. GMES will use, to the maximum extent possible, existing capacities in Member States or at European level.

The implementation is starting with three "Fast Track" Services (FTS) addressing Land Monitoring, Marine Monitoring and Emergency Response.

As announced in the Commission Communication in November 2005, the choice of these FTS has been driven by (i) their technical maturity, (ii) their uptake by the user communities (relevance for policy making and policy implementation); and (iii) existing conditions for long-term sustainability of demand and supply.

After user consultation workshops organised in 2005, three Implementation Groups (IG), composed with representatives of the various user communities, were set up for these three FTS in 2006.

In accordance with its terms of reference, each IG analyzed the main issues related to FTS implementation, including the scope of the service and its potential evolution, its functionality and architecture, its main structure and governance principles, as well as its requirements regarding observation infrastructure and data needs, data integration and information management issues.

The IG capitalised on previous and ongoing research activities financed under EC (FP6) and ESA schemes (GMES Service Element (GSE)).

The main outcomes of the IG analysis have been gathered in the enclosed Implementation Reports, which provide recommendations regarding the main FTS implementation issues based on the initial scope of the service (or "fast-track") as well as its evolution.

Special attention has been given to the functions and structuring of the FTS at European level. More specifically, the GMES services are structured around 'Core' and 'Downstream' service layers. 'Core services' are pan-European in scope and generic in nature. More specialised 'downstream services' to meet the needs of a range of different users (e.g. national, regional or local) can be derived from them by further value-adding and customisation.

As a user-driven initiative, GMES should ensure a continuous user uptake through constant consultation with users and integration of their changing needs in an iterative process.

In the short term, the analysis included in IG reports will be used as a basis for current R&D and demonstration activities, in particular those that will be funded within the Space Theme of FP7. In the long-term, these reports will be fine-tuned through further interaction with user communities and consultation process and could contribute to the design of the overall GMES structure and governance.

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Introduction

1.1 Background

Recognising the importance of coordinated European response to crises and the potential contribution of GMES, the Commission launched a number of preparatory activities in coordination with relevant stakeholders for the establishment of an Emergency Response GMES Core Service (ERCS).

A workshop was organised in November 2005. The workshop confirmed the potential of the GMES core service. Its initial scope was set to correspond to the response part of the crisis management cycle although the service could evolve to address some activities before (e.g. preparedness) and after (e.g. long-term reconstruction). The initial products would be focused on rapid mapping including reference and damage assessment maps. The user communities of the Emergency service include: civil protections, ministries of foreign affairs of Member States, humanitarian aid actors including the United Nations and NGO's, the Commission (Directorates-General for Environment, External Relations, Humanitarian Aid) and the bodies of the EU Council Secretariat. The service was set to address different types of emergency (natural and technological disasters and complex emergencies) both over Europe and for the rest of the World focusing on some "hot spots".

Following the workshop a small Implementation Group was set up. It was given the mandate of supervising and validating the implementation of the service, in open cooperation with the relevant user communities. Its Terms of Reference are reproduced at Annex a.

The Emergency Response Implementation Group (IG) is comprised of representatives of civil protections, and of the relevant Commission services (Environment, Humanitarian Aid, and External Relations).

According to its Terms of Reference, the main issues to be addressed by the IG should be:

1. **Type of emergency situations relevant for Response Emergency** and especially their classification depending on their **characteristics** (geographical location, spatial extension and evolution timescales, …);
2. **Functions of Emergency Response**, and especially the various functional components required to process the data and deliver the emergency information, and the general architecture associated to these functions;
3. **Space infrastructure**, including the requirement for and continuity of current European capacities (space and ground segments), the links and dependencies from other capacities, and the co-ordination and optimisation of satellite tasking and data dissemination
4. **Other data sources for Emergency Response**, including in situ data, but also the dependencies with regard to other data and information sources, e.g. meteorological, hydrological and seismic information centres, including European and non-European ones
5. **Structure and governance of Emergency Response**, including, for example, the sharing of activities and operational responsibilities between the potential service provision partners, who could be associated in a "Provider Consortium"; **and** the **associated service level agreement process**, defined between the GMES Management Authority, representing the user communities, and, for example, the "Provider Consortium" (once its composition becomes clearer), including the impacts of this service level agreement on the consortium partner status and on **service information policy**

6. **Integration of Emergency Response information and services in the operational user processes**, including communication, navigation and data integration especially for the support of ground operations, e.g. for Civil Protections, and the associated contractual issues
7. **Action plan and main milestones** until and beyond 2008 for the implementation and the operational validation of ERCS, keeping in mind that the operational phase should start in 2008
8. **Funding issues**, and especially full cost estimate of ERCS operations, including consolidated national contributions and European Commission additional support

The IG set up working groups to work on more specific technical issues (i.e. space infrastructure and "in situ" data). Additional support was provided by experts on an ad hoc basis as follows: data integration, Galileo, integration of results from EC-funded research projects and ESA GMES Service Element (GSE) projects, EUMETSAT data and products.

On the basis of the above work, the IG issued this report whose purpose is the strategic design of an information service, able to enhance and increase the Europe's capacity to respond effectively and rapidly to crisis as well as to support emergency rescue, humanitarian relief, geopolitical activities and rehabilitation/reconstruction operations.

The Strategic Implementation Plan may represent a rational and functional guide on how to govern interactions between local, national and European authorities, to federate national contributions, to organise service access rules, to share activities and information and operational responsibilities among the different actors and territorial levels.

This report will be submitted to the GMES Advisory Council (GAC) and will be tested with relevant user communities in the course of 2007. It will provide an initial source of ratified advice and prioritisation to research, development and demonstration activities.

Further analysis on more specific issues is envisaged in particular for governance, data policy, legal and socio-economic issues interfaces with other GMES services, and cost estimates. These will be part of the 2007 workplan of the IG.

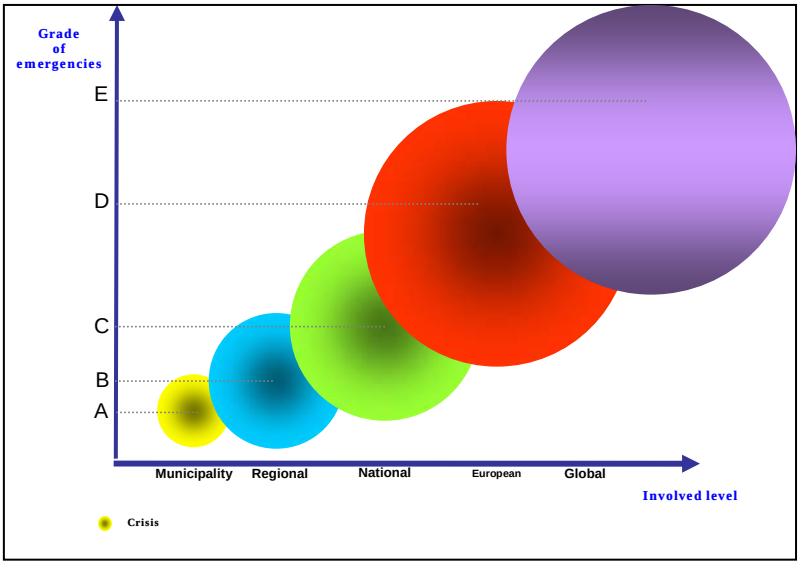
In parallel, Commission services will undertake a more dedicated analysis of the evolving needs of the EU as global actor in the field of emergency management. The results of this analysis will be used to fine-tune the implementation plan of the service.

2 Scope of the Emergency Response Core Service

2.1 The need for support to crisis management

Since the Asian tsunami, the EU action plan, and the resolution of the European Parliament, discussions have been on going on the way to "*reinforcing the EU's emergency and crisis response capacities*". There is a general agreement on the need to reinforcing the Union's response capacity, in particular its capacities of analysis, improving coordination and effectiveness of the various instruments available for crisis or emergency situation. The emergency or crisis situation coordination manual[1] provides a brief description of the main community instruments, in particular ECHO and the Civil Protection Mechanism. Humanitarian assistance is provided outside the territory of the Union, especially in developing countries, for natural disasters as well as for complex emergencies, whereas civil protection assistance is provided inside and outside the territory of the Union, for natural or technological disasters[2].

According to the principles of proportionality and subsidiarity, emergency response is proportionate to the level of disaster and it is common practice to grade emergencies, whether they require a local, regional, national or European and international response.



Crises are classified into three main categories (A, B, C) corresponding to local, regional, national level of intervention.

It is suggested to introduce: a 4th category (D) corresponding to a European level and a 5th category (E) corresponding to a Global level. The European level will correspond to intervention by national actors within or outside Europe. The Global level will correspond to interventions outside Europe coordinated by the EU and implemented by appropriate mechanisms and interfaces. This will be subject to further analysis.

2.2 The initial scope: rapid mapping

The initial scope of the Emergency Response service is to provide rapid mapping services. These are intended to gather together all the activities aimed and necessary to produce in digital format or on a paper, a synthetic, structured and compound representation of the information believed to be necessary and sufficient to know:

- the incoming anomalous events and the following critical effects, as well as, their time and space evolution
- the distribution in space and time of the available resources (rescue teams, forces that help re-establish the basic conditions for peace and development material and

[1] Council document 9552/2/06
2 Indicative references:
"Reinforcing EU Disaster and Crisis Response in third countries" COM(2005) 153]
"Improving the Community Civil Protection Mechanism" [COM(2005) 137]
Council Regulation establishing a Community Instrument for Stability (Reg. 1717/2006 of 15.11.2006)

equipments) to be used to contrast such critical effects, to protect human lives and to, safely, assist the population
- the general assets linked to the expected risk scenario to tactically design and dynamically adapt the intervention approach
- The effective damages, also to forecast and design the restore of normal life ordinary conditions.

The time and space scale of the critical phenomena, forecasted and/or observed, defines the mapping scale, whereas, the type of such phenomena along with the operational needs establishes the mapping temporal constraints.

Speaking about informative contents (thematic layers), the type of features to be identified in general-purposes reference maps are: general assets, networks and main infrastructures, population, ethnic, religious distribution and movements, whereas, the requirements about specific informative contents for situations and damage assessment depend on the geographic theatre (inside or outside the EU) and on the type, scale and critical intensity of the crisis or of the emergency.

GMES Emergency Response services will rely on information provided by advanced technical and operational capabilities making full use of space earth observation and supporting their integration with other sources of data and information. Data and information generated by these services can be used to enhance emergency preparedness and early reaction to foreseeable or imminent crises and disasters.

GMES Emergency Response services are world wide (outside Europe i.e. for the rest of the world); however the following should be considered as priority areas:

- For Natural Disasters: all regions where international assistance may be solicited and primarily Central America, Africa and South-East Asia

- For Complex emergencies: all regions where international assistance may be solicited primarily EU Neighbourhood regions (Northern Africa, Near/Middle East, Eastern Europe)

Users will include EU national teams (such as, civil protection entities, EU national agencies and European NGOs active in humanitarian situations occurring outside the EU space) and actors from the UN system, Red Cross & Red Crescent movement, and international NGOs; in particular all UN humanitarian agencies and international NGOs linked to the UN humanitarian coordination system, through the established EU-UN communication channels[3].

2.3 Potential evolution of the service

The service will evolve in time into a fully fledged GMES security relevant service, particularly outside the EU, by extending it to cover the entire crisis cycle. The service will thus expand beyond the emergency response part of the cycle. The service should evolve to cover crisis prevention and early warning as well as post crisis reconstruction and situation assessments as well as monitoring post crisis development – this is particularly relevant to the scope of the service outside the EU

The service will also evolve to include cooperation with a larger community of users that will include operations/situation centres of the EU (e.g. Commission Crisis mechanisms such as ARGUS, RELEX Crisis Platform, ECHO Crisis Room, Monitoring and Information Centre, Council Secretariat Joint Situation Centre etc.) and other agencies of the UN (e.g. UNDPKO). It should thus evolve to include activities in support of CFSP including potentially civilian ESDP. This includes humanitarian and rescue tasks, peace keeping/ making tasks.

The evolution of the service could also cover new emergency types such as health emergencies and intentional attacks.

Strategic surveillance will be the most advanced form of the evolved GMES service and will cover tasks to support crisis prevention and early warning and could include monitoring compliance with international treaties (e.g. FLEGHT, Kimberley Process, polluting emissions), non-proliferation and illicit activities.

[3] For a full list of potential users under the Stability Instrument, see article 10 (Eligibility) Reg. 1717/2006 of 15.11.2006.

3 Types of emergency situations

3.1 Types of emergency situations

A natural disaster or complex emergency becomes emergency when the country affected is not able to cope and asks assistance to civil society.

The international community adopts the following definitions, which are also used by donor governments and United Nations bodies:
Natural disasters: they are caused by the impact of natural phenomena on society and the built environment;

Man made disasters: referred also as technological disasters, they are caused by direct human intervention like industrial accidents, chemical spills and nuclear accidents (but not war, terrorism and complex political crises). Man-made disasters include so-called Na-techs, which are an emergency caused by the interaction between natural and man-made hazards (for example an earthquake causing a chemical spill); developing countries are vulnerable due to their generally low standards in vigilance on the industry and to their governance systems. For the Commission's Directorate-General for Humanitarian Aid, man made crises are defined in the Humanitarian Aid Regulation (EC) No 1257/96) as "wars and outbreaks of fighting, or exceptional situations or circumstances comparable to natural or man-made disasters."

Complex (Political) Emergencies: civil war and unrest or armed conflict with widespread impact on civilian populations, often leading to massive displacement of people across regions and national borders. In such cases the humanitarian community shall comprise assistance, relief and protection operations on a non-discriminatory basis to the victims of conflict not to stop the conflict itself (peacekeeping). When natural disasters occur in areas affected by complex emergencies these may be referred to also as Compound Emergencies.

The portfolio of emergency services to support the action of Member States and the Community will address all three classes defined here above and will deal with:

Disasters - Natural risks

Earthquakes and volcanic risk: all regions of the world (except US, Canada)
floods: major vulnerable areas (regions and basins) of the world - to be identified
wild fires: (focus on vulnerable biomes) – world except US and Canada
tsunami: all major tsunami prone coastal areas
hurricanes, storm surges, typhoons, etc - world except US and Canada
drought and food shortages

Disasters - Technological risks

major industrial accidents
hazardous materials spills due to natural disasters
major transport accidents: air, road and sea
other confirmed risks and vulnerabilities capable of leading to an emergency

Complex and compound emergencies
humanitarian consequences of conflicts (assistance to civilians and victims through the established EU-UN communication channels),
mediation support to early reconstruction planning

Internally Displaced Persons (IDPs) & refugees (due to both natural disasters and conflict)

Information on population densities and population characteristics is needed in all phases of disaster relief and crisis management. Disasters unfold when natural hazards or complex emergencies (conflicts) impact populated areas. National civil protection departments and international humanitarian actors bring relief and aid to the affected population. These institutions require geographic information concerning population, their environment and risk assessment to gauge the aid needed and to put in place the operations that can deliver the aid.

In post disaster situations the needs vary according to the phase of the disaster. During the notification or alerting process, in the immediate aftermath of the occurrence of a rapid onset disaster or crisis, information is needed on the habitation in the affected areas and what kind of constructions and transport infrastructure exists. The pre-requisite for alerting is thus a global population dataset with sufficient detail to provide assessments on the affected people in the potentially affected area.

The emergency response phase requires information on the location and condition of survivors. This information combines population density and their vulnerability. This phase thus requires detailed information on population that may come from local authorities. International aid organizations have at their disposal census information available through UN agencies that include the UN Population division and FAO and WFP.

Survivors in the aftermath of crises are often concentrated in safe areas such as in IDP (internally displaced people) or refugee camps. Refugees and IDP's often rely heavily on the support of the international community and are some of the most vulnerable people. Assessing their number is essential to tailor the aid operations that aim to allowing the people to recover from the disaster and reconstruct their life.

3.2 Types of emergency situations over Europe

The analysis of emergency situations in Europe and along the Mediterranean basin [see Annex b], the thematic classification and geographical distribution of risks, underline a general difference between the northern part and the southern part of Europe and several differences at the regional level.

In fact, while the seismic risk is certainly more present in the southern Europe and in the Mediterranean area, floods appear to be diffused all over the analyzed area. However, this is not right and, at least, as it has been done in PREVIEW, it must be distinguished between the flash floods, frequently affecting the mountain areas of Spain, France, Italy, Austria, Greece, etc. and the medium range floods affecting the plain areas of the northern European countries.

The same quite large difference in geographic distribution appears to exist among the other risks and the regional scale has always to be accounted.

On the basis of the previous considerations, ERCS services needed to be integrated with national existing services to feed correctly and effectively the downstream services and to use the local knowledge and expertises. Moreover, they have to be dynamically and geographically differentiated to cope with the different level of crisis and the geographic distribution of each specific risk.

3.3 Types of emergency situations for the rest of the world (ROW)

DISASTERS - Over the last three decades the impacts of natural hazards have become an issue of global concern. The number of affected people is increasing steadily. At current trends economic losses are bound to increase to unprecedented size. In 2005 alone direct economic loss due to disasters hit the record figure of 210 billion USD (the most expensive year after 1995).

Experts recognise three main families of disasters: hydro-meteorological disasters (weather related disasters), geological disasters (essentially earthquakes, landslides, volcanic eruptions, etc), and biological disasters (epidemics, infestations, insects, etc). Over the past century, weather related disasters accounted for 80 of all disasters; other significant disasters are earthquakes and landslides, while volcano eruptions account for much less victims.

The protection of citizens against natural and other hazards is one of the main responsibilities of national governments, but the international community considers the global increase in vulnerability a worrisome issue. Disasters like earthquakes and storms are considered rapid on-set disasters. Drought is considered a slow on-set natural disaster.

The impact of disasters on people is increasing although the number of deaths has been decreasing steadily in absolute figures through the decades. This means that vulnerability of societies is on the rise but preparedness and emergency response have advanced over time.

It is evident that societies around the world are exposing themselves to ever increasing vulnerability, which in turn increases the risk of major disasters in developing countries. As donor resources are finite, this increase in natural disasters affects the capacity of the international community to concentrate on humanitarian crises around the world, such as conflicts, refugee crises, and still be able to accomplish contingency planning for disasters.

HUMANITARIAN CRISES – Humanitarian crises occur in developing countries when conflict, civil unrest or other causes have massive consequences on civilian populations forcing them to flee or become innocent victims or live below basic living standards. In such situations, the international community launches humanitarian response operations that have the objective of relieve the consequences of these situations. At the same time, the UN, the EU and other diplomatic initiatives try to solve the causes of the conflicts to avoid the repeating of their humanitarian consequences.

The international community is active on a number of crises and disasters every year. However, there are numerous ongoing humanitarian crises, especially in Africa, that have been neglected and forgotten for years. This problem is linked to the limited availability of funds internationally and to other elements influencing donors policies. EO can be used to identify, analyse and illustrate current forgotten crises with reasonable costs.

Humanitarian crises are today concentrated in Africa with some exceptions (Nepal, Myanmar, Afghanistan, etc), but GMES Emergency Response services will support the observation of countries susceptible of developing humanitarian situations due to political or military conflict. Early information is key to humanitarian response.

The impact on people of complex crises is larger than the one of natural disasters in every aspect. Conflict, famine and ethnic violence kill more people than disasters. Over 20 million people live as refugees or internally displaced persons in developing countries today.

CONFLICTS - situations posing a threat to democracy, law and order or a post-disaster situation threatening to escalate to a conflict.

4 Emergency Response Core Service

4.1 Outline

The purpose of the ERCS is to make available and deliver a set of basic services based upon a common denominator to improve the capability of the users emergency response to face major emergencies at the national level (C), at the European level (D) and at the Global level (E) to face major emergencies either within Europe or outside Europe.

Although ERCS is expected to deal with the entire emergency management cycle initial focus is given to the period starting with early warning, just prior to the event, and ending with damage assessment, shortly after immediate assistance, spanning over days to few weeks.

Furthermore, the first aim of the IG has been to limit the ERCS set of services, expected to be generally needed and useful, to rapid mapping services and products required to be available immediately before, then during and post crisis.

Rapid mapping services [see annex c] are intended as activities aiming at producing, either in digital form or as pictures, charts and texts, a synthetic, structured, compound representation of information considered necessary and sufficient to know the event and its following effects, forecasted or occurring, and moreover of resources (rescue teams, materials and equipments, …) to be used to contrast the effects and also to assist the population for the human life protection and for the restore of normal life conditions.

The proposals contained here will not lead to the replacement of any activities available and currently utilised by the overall user community GMES Emergency Response services – for instance mapping and assessment support in case of crisis and emergencies. There are service capabilities available to the user community of GMES Emergency Response services. These capabilities are either national, European or international and, in particular, comprise capabilities for mapping and assessment support in case of crisis and emergencies. In the case of existing national capabilities, there is need to enhance their existence, guarantee continuity of the services already provided, enlarge their presence and importance in the current European and global activities and interventions and use them as assets for an all encompassing system of systems.

Moreover, the emergency intervention systems are deeply linked with early warning and alert systems. In fact, while some events are sudden with little or no tangible warning, others can, to a large extent, be forecast and the ERCS should establish or strengthen links with recognised forecast and warning centres operating with a clear mandate within the Member States or at international level.

Even if the proposed set of services and products are mainly tailored on the civil protection users needs and requirements, the IG is considering them quite generally applicable to a large ensemble of emergency types and then they can be very useful for other institutional users communities.

Access to the ERCS set of services must be guaranteed to:
CP - Civil Protections (including all EU national teams active in humanitarian aid)
HA - Humanitarian Aid (including humanitarian aid actors from the UN system, Red Cross & Red Crescent movement and international NGOs accessing the service through a coordinated EU mechanism)
S - Security (including defence and antiterrorism)
E - Environment (including events with high environmental impact)

GEO – Geopolitical (including External Relations)

4.2 Users characterisation

4.2.1 EU 27 level

The standardisation of user needs and requirements for ERCS is not possible without the knowledge and a deep thought about the variety of national situations.

In fact, to enable an effective use of ERCS services and their integration in the operative routines, it is necessary to make some analysis about the "level of competence" of users and their national existent organisation.

This issue is strictly related with the scope of a European service, such as ERCS, and with the need of harmonization between European and National levels: governmental and operational.

The IG has assumed that the European level of ERCS will be:
Subsidiary as regards as the national competences and capabilities;
Able to manage directly information needs for trans-national events, on the basis of a predefined classification;
Able to support Europe's action worldwide, in particular in case of "extensive to catastrophic" events and for humanitarian aid purposes (see also below).

4.2.2 Outside the EU (ROW)

For crises and disasters outside EU territory, the GMES Emergency Response services will provide a portfolio of geo-information services to support EC actions for the rest of the world (ROW) in humanitarian aid and emergency response. They include services to support humanitarian interventions coordinated at International level by the United Nations and channelled at EU level by the European Commission's Directorate General for Humanitarian Aid (ECHO) through its implementing partners. They also concern EU response coordinated in close cooperation with national and local authorities in the affected countries, as well as non-governmental organisations.

The geospatial information requirements of the donor, decision-makers in the Commission, the Member States and the UN, and international humanitarian communities are as diverse as the operations and functions it performs.

The GMES emergency service will produce information products that are customized for at least 3 types of users. Donors, aid implementing organizations at headquarter level and at field level. Additional analysis is necessary on the working modalities with international and regional partners such as UN agencies, World Bank or Regional Banks.

Donors that include European Commission and EU member states require information that gives an overview of the situation, in order to consult with other decision-makers in the EU and MS, negotiate with their partners including the UN, and to inform the media and the public. They need information that allows them to understand the key issues related to the crisis or the disaster, be aware of assistance and interventions being provided and be warned of any emerging problems. They also need this sort of information in order to understand the needs for post-disaster/crisis reconstruction and stabilisation. Quite often, especially in the case of complex emergencies, they are faced with conflicting information and confusion of facts. They need a coherent picture of the situation, delivered to them in a timely manner, in order to understand and address the humanitarian issues and needs.

Humanitarian aid implementers are largely the United Nations agencies and programs as well as international NGOs and international organisations like the Red cross. They require geo-spatial information for planning operations both at headquarter and field levels for more effective delivery of aid to the affected communities.

At headquarter level they require updated information on road network, bridges, status of airports in the affected areas to make plan operations and ensure that the aid arrives in the affected region. Field operators of aid services will require detailed information on the affected area.

They need information and relevant technologies to support their operational efforts. They need: information that can define the extent of the crises, damage and people affected; and the means to share and disseminate information between HQ and the field and between the different actors involved in the field

They need this information to: plan and carry out delivery of humanitarian assistance; plan of evacuation routes, localisation of temporary shelters and camps; and to prioritise where humanitarian assistance should be focused.

A variety of products and service themes coupled with appropriate delivery methods will ensure that users' needs are met as they arise by using the most efficient methodologies possible in the most practical timescale possible.

4.2.3 Relationship between national and European services level

Then, it is quite important to focus when and if rapid mapping services can be managed at national level and when they have to be accomplished by European level.

Certainly, if a structured end-user system, able to support and take decisions in all phases of the emergency cycle, exists at the national level, it is easy to assume that a predominant part ERCS services related to that country will be managed at national level. However, still, there will be some ERCS services which may be managed more efficiently at the European level

Moreover, for a much extended event that implies the connected involvement of two or more countries, the European-level added value truly increases in coordinating and integrating the national contributes.

The European-level added value will be maximum when ERCS has to support the civil protection activities in a country where no rapid mapping facilities exist. This is also the case in support of decision making at EU level.

So, the rationale for a European level of services is grounded in the principle of subsidiarity: civil protection national authorities will ask European intervention whenever a task cannot be performed more effectively at national level.

National gaps can concern EO data resources, specific EO data processing capabilities, expertises on specific events (forecasting models, simulation of scenarios).

Therefore, the level of complexity and the numbers of services that can be requested at European level may be considered complementary to the national "level of competence".

National service chains can be defined as "downstream services". So, a downstream service can be constituted by data, service and information providers (both institutional and commercial) that take part (operationally) in the emergency response chain deployed at national level.

4.2.4 Global services level

This level addresses the areas of competence of the EU as a global actor. Dedicated analysis will be performed by the Commission services to identify the boundaries, detailed areas of interest and appropriate coordination mechanisms of European and international actors active in external action.

4.3 ERCS services level

4.3.1 Complexity levels of ERCS services

Considering the effective chain to produce and deliver a rapid mapping product, on the basis of different end-user competence and taking into account the need to enable an effective use of products and their integration in the operational routines, the ERCS services will provide at least three levels of products.

The first one foresees that user requests are strictly limited to basic EO datasets[4], both historical coming from archives and new one to be planned for acquisition. These dataset are then used by national competences to generate the final maps, addressed to decision-making authorities.
The provision of this kind of services is based on the effective availability at European level of multi-mission access capability.

The second one foresees that a user requests value added EO datasets[5]. Also in this case, the service can deliver archived products or new products generated after a new acquisition "on-demand". These products are often of "general purpose", and they are to be used by end-users with the competence to generate final maps. At this stage, the European production and delivery system can take advantage from using a GIS environment, as well as, accessing to specific geographic and socio-economic information.
The provision of this kind of services is based not only on the effective availability of multi-mission access capability, as in the previous case, but also on the operational capability to generate EO value added products and/or to deliver archived ones.

The third one concerns the delivery of final thematic maps.
At this stage, the production and delivery system can take advantage from using GIS environment, in-situ data, models, as well as, from accessing to specific geographic and socio-economic information. Final maps can contain observed parameters or forecasted

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[4] As basic EO data/products, we define data/products delivered by ground segment of specific mission, directly or through a commercial distributor.
Following CEOS classification, such data/products are of level 0 to level 1a/b/c/d data.

[5] As value added EO data/products we define information derived by processing basic EO data/products.
Following CEOS classification, such data/products are of level 2 or 3 products, where each pixel represents the value of a geophysical parameter.

ones. This level of products, the more complete, involves entities that have both operational capability and competences to generate such items.

For all these levels of products there is a clear role for industry as providers. This role clearly increases with the complexity of the required products.

4.4 Functional architecture

The functional decomposition of ERCS foresees:
the access gateway
the European focal point
the national focal points
the ERCS focal point
the three basic components of production service
the quality control service component, because the system shall provide only well qualified information
A governance component, ensuring system monitoring and control.

4.4.1 The access gateway

It is a system of sub-services which mainly allow the users to know and chose available services/products, to select possible alternatives and eventually to obtain the service. It enables also the interaction between focal points.
It should be designed in such a way that allows treatment of confidential/sensitive data and allows for service evolution towards security-related applications.

4.4.2 The focal points

Considering that ERCS service provision should be based on a "user information request", it's important that a unique end-user authority is in charge of making such a request.

The "European focal point" will be the entry point for requests from UN partners but possibly also from NGOs and third countries. The "European focal point" will analyse such requests and authorise access to the ERCS service. It will hence include sufficient technical expertise to perform such analysis for most of the elements shown for the "national focal point" below.

The "national focal point", represented by an authorised end-user community, interfaces the service directly trough the "ERCS focal point".

The "national focal point" must be aware of the needs and requirements of the community it represents and be able as far as possible:
To precisely formulate orders (area of interest, sensor, acquisition mode, product type, resolutions, vinculums, maximum delivery times, tolerances, etc...)
to browse catalogues
to effectively negotiate data availability
to formulate alternative requests
To assume responsibility of delivered products, integrating them in the operational national routines.

The "national focal point" has to state if user requests are to be accomplished:
at national level trough the downstream services
at the European level through ERCS services

By merging capabilities, at the national, international and European level, and ensuring harmonisation between all levels.

The "ERCS focal point" represents an "expert layer", able:
to harmonise and coordinate the activity of the providers consortia and of European agencies and centres;
to receive through the national or European focal point user information requests
to perform the request assessment and, if the user request is not sufficient detailed, to define proper service processing chain,
to derive lists of suitable inputs (EO and auxiliary information),
To decide and to finalise effective operational steps (e.g. – to perform the negotiation with a mission plan to acquire new data, to verify the suitability of the actual available input dataset, etc…).

4.4.3 The basic production components

The three basic components of production service are relative to the three complexity levels of ERCS products.

The first component acts as access point for operational EO missions of interest (funded by ESA, by national programs, by non-European space agencies), allowing generation and delivery of EO basic products. It is in charge:
to harmonise multi-mission/multi-sensor requests;
to address requests for each data ground segment;
To know, for each mission, the planned acquisition and/or to require new acquisitions (and the revisit routines).
This component is also the access point for EO mission catalogues (and versus commercial distributors), allowing to delivery historical dataset.

The second component is the "EO value-added providers" module. It represents the access point for requests relative to post-processed EO data and information. This service typically uses auxiliary (non-EO) data sources. Input EO basic products are supplied by "multi-mission data ground segment interface" component, and they come from archives or new acquisitions.

The third component is the "thematic map providers" module. It represents the thematic expertise able to produce complex mapping, either for basic or for assessment user procedures. It relays on EO data, EO VA products and non-EO information. At European level it may represent a "multi-risk expert centres" network.
Maps shall be delivered to users together with an "interpretation report", prepared by experts.

4.4.4 The Quality Control component

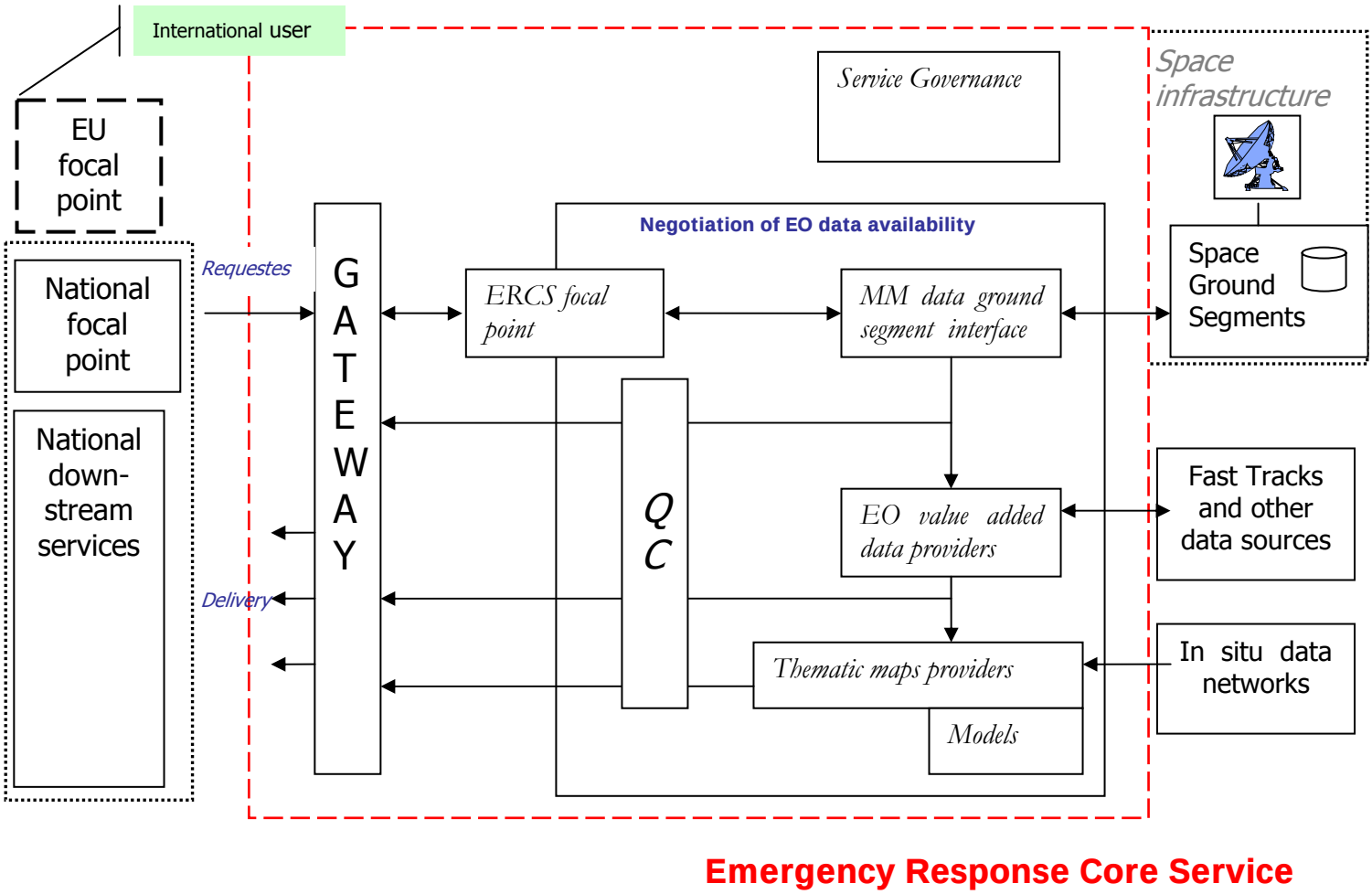
This component allows ensuring the quality control of products to be delivered. Moreover, it is in charge to perform periodically calibration campaign, to validate ERCS service.
Routinely, a quality control activity on products can be performed directly by product/service providers, during and after production.

4.4.5 The management and monitoring component

This centralised component is in charge to manage the ERCS distributed system and to monitor its components and the network.

4.4.6 The general architecture

The general functional architecture associated to the previous analysed components is represented in the following figure.



It is evident that GMES Emergency Response services need to be provided in a manner to ensure they specifically meet requirements of EU national teams (such as EU national agencies, civil protection entities and European NGOs active in humanitarian situations occurring outside the EU). In addition for GMES services concerning Emergency Response outside the EU, coordination is needed in order to ensure that both GMES Emergency Response services and services provided by dedicated capacities from within the international humanitarian community (e.g. UN) are specifically meeting requirements of actors from within the UN system, Red Cross & Red Crescent movement, and international NGOs.

This will guarantee:

- Maximum efficiency in supporting EU humanitarian actions outside EU space
- Coherence, synergy and support to UN coordinated actions in humanitarian relief operations
- Enhancement of the services over time based on mutual (EC/UN) lessons learned processes

For services delivered outside the EU space, as indicated in the European Parliament legislative resolution on the proposal for a Council decision establishing a Community civil protection mechanism (COM(2006)0029), the operational coordination shall cover coordination with the affected country and with the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and other relevant actors contributing to the relief effort.

The definition of services, user requirements, the structure of the service supply organisation and delivery methods need to take into account the existing UN humanitarian system, especially its coordination and implementation practices as overseen by OCHA.

To achieve concrete measurable results, specific liaison and co-ordination mechanisms already in place with the UN humanitarian coordination system should be exploited.

Establishing a capacity for GMES Emergency Response services to support the UN humanitarian coordination system, requires building on the experience, results and lessons learned from RESPOND, which concentrates on international humanitarian activities and has a user federation mechanism led by actors from the UN community

As soon as GMES Emergency Response becomes operational within the EC, existing coordination channels must be used in order to ensure the successful provision of GMES Emergency Response services to support the international humanitarian coordination system. This can be established through, for instance, the EC Monitoring and Information Service which liaises already with the international humanitarian system via the UN OCHA.

This interface mechanism will ensure real-time collaboration and exchange of information to rapidly access and use GMES Emergency Response services, maximise synergies and minimise duplication of effort. For service delivery to the international humanitarian system, a single entry point to the UN is necessary in order to maintain effective and rapid coordination.

4.5 Operational service lines

The IG has identified three main operational service lines:
Production of ERCS information and data
Dissemination of ERCS products
Upgrade of the system and research

4.5.1 Production

The production activities are supported and alimented by the following service lines:
Access to real time and archive in-situ data and information
Access to data and information produced by other European services and/or resources;
EO basic data provision (level 1);
Added value products generation (level 2 and 3).

Two different families of added value products have been identified:

- Reference maps;
- Damage assessment maps.

Reference maps are maps, either derived from pre-existent data or obtained by pre-event simulations, containing cartographic information as well information about population (location and density), urban and rural habitat, economic assets, main infrastructures

(dam, bridges, industrial plants, airports, bus and railway stations, hospitals, stadiums, refugee camps,…), networks (roads, railways, power and water …), possibly completed with DEM information and combined in a proper GIS working environment). The proper scaling moves from the overview scale (typically 1:100.000) to the tactical one (1:25.000).

Reference maps would be delivered mainly "on routine", especially for continuous medium and long term monitoring and periodic up-to-date of the satellite images inventory, as well as of the basic data and information (assets, DEM,…). However Reference maps must be ready to be delivered whenever required.
Reference maps are expected to be delivered within 6 hours before the availability of observed products and they have be also updated on the basis of event forecasted and observed new information.

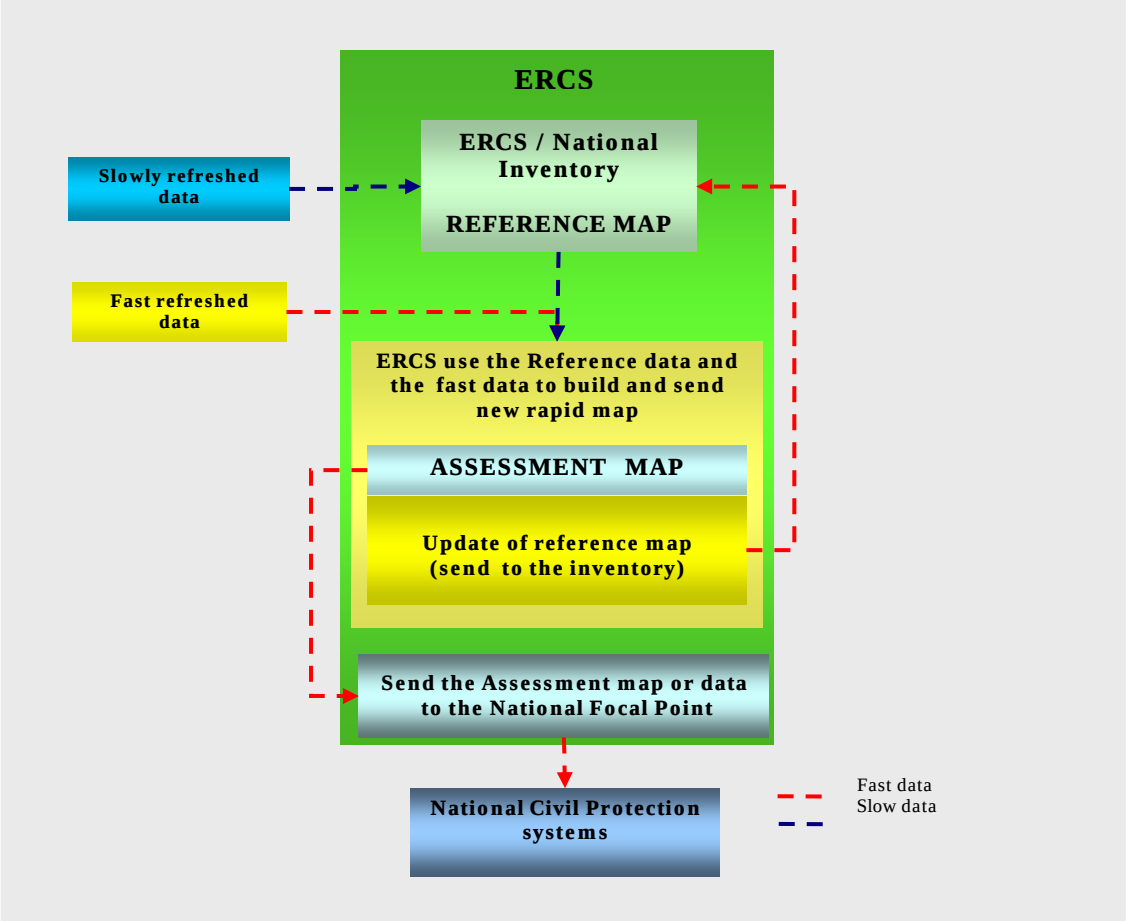
Assessment maps are maps either directly derived from in-situ data and EO images acquired during the crisis or indirectly obtained through numerical modelling and comparison between post crisis and archive information.
They provide information about the event timing, location, extent, level of hazard and damage. The proper scaling moves from detailed scales (1:10,000- 1:25,000) and overview scales (1:50000- 100,000).

Assessment maps would be provided mainly in case of crisis and "on-demand", along with the needed Reference maps and the relative basic information. Assessment maps are expected to be delivered within 12-24 hours.
In order to realise, increase and maintain the "basis of knowledge" needed, also and mainly, to support the real time civil protection activities, the ERCS have to relay on a data cycle able to efficiently reuse the obtained and produced information.

Basic information – i.e. a dataset of images acquired before the event, updated, on the specific area of interest, generally acquired by a specific sensor and in proper operative mode – has to be used to generate both general reference information and damage assessment information. In fact, the assessment information are mainly produced by comparing pre and post-event EO data and the post-event new acquired information must be evaluated and safely conserved. The assessment can be complemented and/or better sustained by using in-situ data collected from the field when applicable.

Since the service will be based on the availability of satellite image data already acquired, the archives, populated through operational monitoring routines, will play an important role in the required infrastructure.

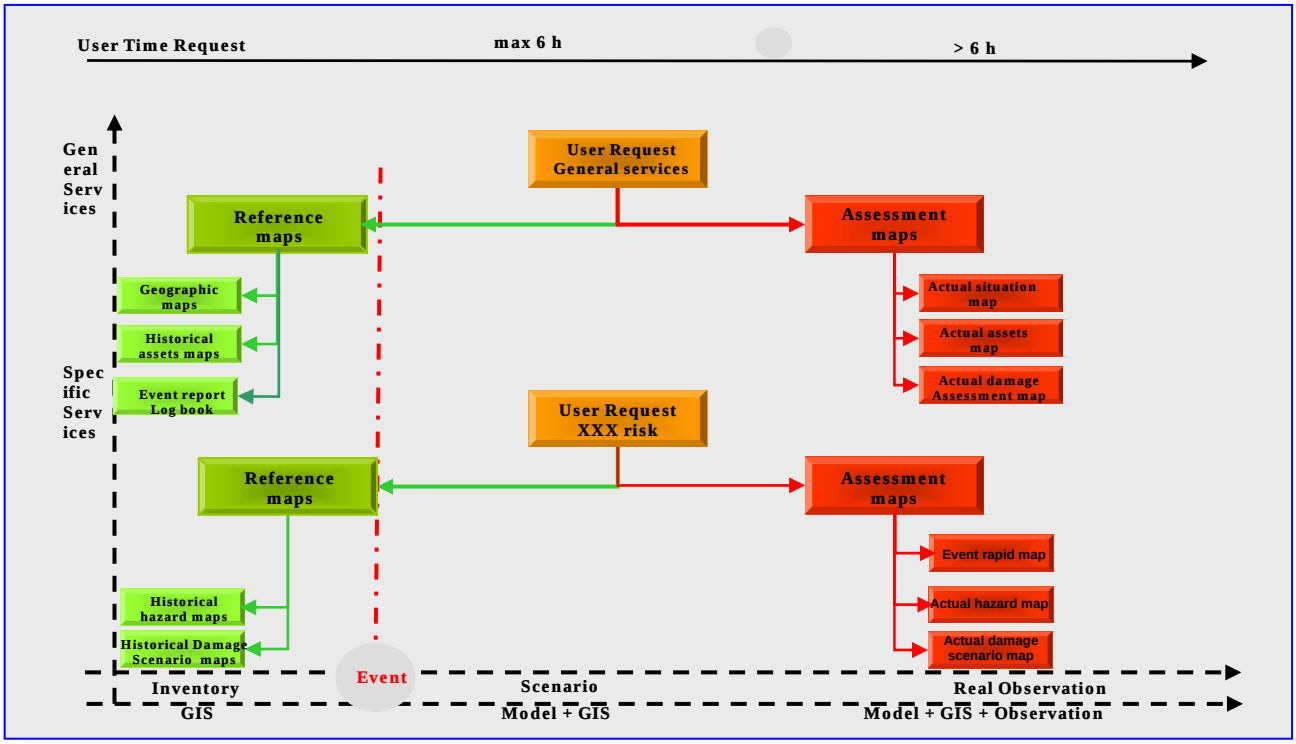
The dynamic relation between the feeding of archives and/or inventory and the delivery of products within ERCS is shown in the following figure.



Moreover, the obtained information may also came from other Fast Tracks Services, European and national agencies and centres, national downstream services competent in different matters, also in real or near real time.

In such a contest, the IG recommends to pursue an efficient data management and information sharing system which takes INSPIRE duly into account.

The figure represents the links and the hierarchy among such products, distinguishing between the information flux needed for the Reference and the Assessment maps production, as well as, between products which basically require near static historical data (the green line on the left-hand side of the figure below) and products that require a new fast acquisition of data (the red line on the right-hand side of the figure below).



It is relevant to distinguish between "general services", i.e. services that represent common information needs, delivering all-purposes maps, and "risk-specific" services, i.e. services delivering products more strictly related to the occurring event.

In Annex c, an extensive and detailed description of the rapid mapping products is given. Additional analysis of products is necessary for the EU's external action needs.

The products provision is triggered by user demand and the very short production and delivery time is the dominant feature of the service: within 6 hours the user shall have maps derived from data already existent, within 24 hours, maps that requires real time data (new acquisitions and in situ data). During a crisis management, it's requested to upgrade information daily.

Diverse sources of data and information are used to obtain such assessment mapping: EO data, in-situ data, products delivered by other GMES services, products delivered by other facilities (e.g. meteo). Considering the very short time needed for production and delivery of products, it is mandatory to have fast access to these resources as well.

Consequently efficient and large archives, as well as catalogues and inventories, constitute a pre-condition for timely delivery of ERCS products. They must concern all the geographical areas of competence and be organised through a distributed readily accessible network.

Furthermore, the emergency preparedness activities need a routine monitoring of the territory of interest to construct a proper base of knowledge: other fast track services can contribute to feed rapid mapping chain effectively.

Eventually, the user must be able to know before what kind of data are available and easily accessed through consistent and up-to-date catalogues and inventories.

In a nutshell the rapid mapping service should be:

- Fast (very short delivery time)
- Available (24 hours a day, 7 days a week)
- Reliable (providing products of known quality)

Validation is an important part of producing maps and GIS layers for the humanitarian community. However it should be noted that field validation is not always possible when producing maps in the short timescales required by humanitarian aid and disaster management organisations (such as for instance in the event of a rapid onset crisis such as the Asian Tsunami of 2004).

As a result of the rapid turnaround required by users for the majority of products and services, and the limited access available to many of the areas being mapped validation often has to occur 'after the event'. However validation is necessary where possible to ensure consistency in the validation process. As a result different levels of validation are needed, validation which applies to basic mapping and pro-active thematic mapping (particularly where field access is available) and validation associated with reactive crisis-specific mapping. In some cases quality control requirements may need to be relaxed to allow for the rapid turnaround required by users although in such case the latter should be informed accordingly.

4.5.2 Dissemination

On the basis of the observations given in the previous paragraph, the dissemination activities have to be organised in the following service lines:
Catalogues and inventories maintenance
Access, load, search and discovery, viewing, downloading of the products;
Support and training

The dissemination will be subjected to the data policy to agree upon.

Products should be accessible trough a specialized either portal or web-log environment, according to procedures that are clearly documented and evolve upon common agreed decision between users and providers.

There should be a specialised portal for each risk or at least for each user community. Each specialised portal will be in charge of the connection to all relevant sets of data and information necessary to rapid mapping production and must be able to support the products load, transfer and download service by adequate facilities for sustained scheduled delivery of high volume of data in real time

In compliance with other GMES Core Services data policy, *data must be preserved so that their usefulness will be retained for all time. They must also be distributed so that a user can easily merge them with other relevant datasets. They must be catalogued in a way which will facilitate their use. This is the purpose of correctly defining data format as well as maintaining metadata (data on the data) that need to be preserved for future processing*.

A common vocabulary to record metadata, as well as, standards for spatial data and information, may be achieved through INSPIRE implementing rules.

INSPIRE shall be based on infrastructures for spatial information established and operated by the Member States. The components of those infrastructures shall include: Metadata for data and services; spatial data themes (as described in the Annexes of the Directive) and spatial data services; network services and technologies; agreements on sharing, access and use; and co-ordination and monitoring mechanisms, process and procedures.

Details about INSPIRE and its relation with GMES are in annex h.

4.5.3 Upgrading of the system and research

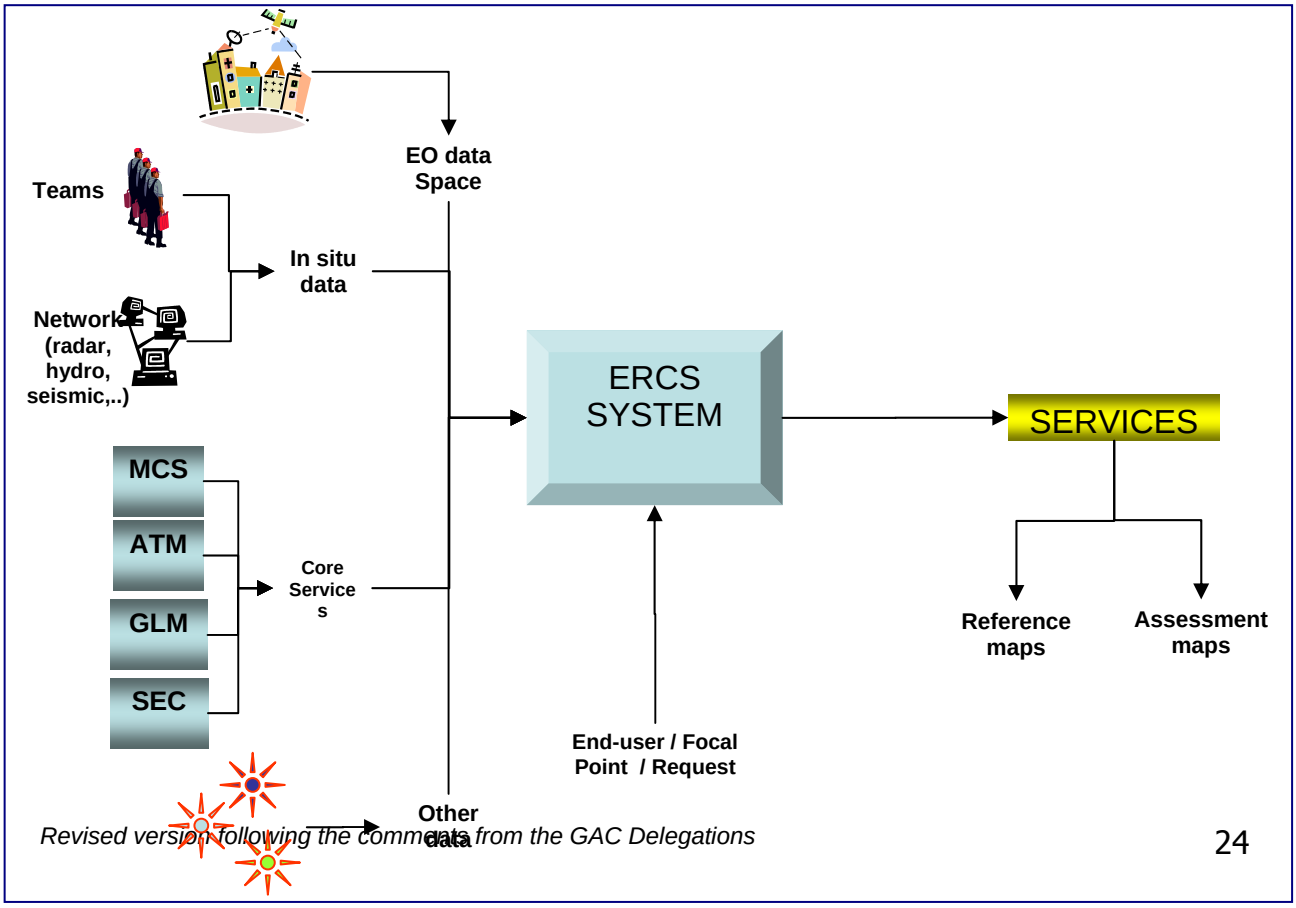
The link between the ERCS services and products and R&D activities has to be ensured in the context of service evolution and for further service development.

4.6 Data supply

Continuity in service provision can only be secured if dedicated attention is given to ensure properly input data supply, and if a dedicated attention is given to define and maintain a proper infrastructure.

Data acquisition facilities are external to ERCS. However, the latter should have the responsibility to identify required data and priority with respect to their availability, to ensure adequate data collection mechanisms, to define proper rules to manage them.

The following graph shows the different data that are using in the ERCS Centre: EO data space, in situ data, other Fast Track services and from the other source.



A critical aspect is the EO data supply, because on this is based the service sustainability. Two aspects have to be addressed:
the archive population
the access and the requests of new acquisitions.

The ERCS services is intending to use as data suppliers existent infrastructures and other facilities. In particular, EO data are supplied by space ground segments of mission of interest, each one with proper access rules and data policy.

4.6.1 Space infrastructure

The main requirements for space-based observation infrastructure are as follows:
All-weather observations at a resolution from better than 1 meter to 3 meters (both SAR and optical);
All-weather observations at a resolution of 3 to 30 meters and wide swath (100-300 km) both with SAR and optical sensors;
A reference, readily available archive of similar data; and
24 h revisit redundant capabilities with re-tasking time of less than 12 to 24 hours.

The following missions are relevant to the Emergency service: SPOT, Rapid Eye, Pleiades, TerraSAR-X, Tandem-X, Cosmo Skymed, DMC-UK, TopSat, RADARSAT, CHRIS, ERS, ENVISAT, Sentinel-1 and Sentinel-2, SeoSat.

At detailed level, there will be full compliance with the set of optical missions Pleiades, possibly complemented with the SPOT5 mission and 3rd party missions, and radar missions CosmoSkymed, TerraSAR and Radarsat.

At overview level, the Sentinel-1 and Sentinel-2 provide the necessary information, except for some observation requirements in the 2.5-5 meter range – typically asset damages – and the desirable level for flood extent and forest damage, currently addressed by SPOT5 and possibly RapidEye. The Sentinel-2 should ensure continuity with LANDSAT and SPOT4 series, including a MIR channel at 20 meters.

Regarding tasking, revisiting and delivery time, there is compliance for the VHR optical missions, if the fastest access can be guaranteed. For VHR radar sensors, the set COSMOS+RADARSAT-2+TerraSAR-X should fulfil the requirements. Availability issues start by 2012 onwards.

For HR optical data, SPOT5 has proved to have a time delay of 36 hours (24 hours re-tasking time plus 6-12 hours for data delivery) needing consolidation, and it is the only mission providing HR optical data in the range 3-6 meters. The RapidEye mission provides a 24 hour revisit time, but the re-programming time is unknown, as well as its operational performances. Conversely, the set of 2 SENTINEL-2 spacecraft has a fast tasking and data provision requirement but it will ensure a 3-day revisit only.

For HR radar data the SENTINEL-1 mission has an explicit fast delivery requirement (few hours) and the pair of 2 satellites would ensure daily coverage as of 2012 with a re-tasking time of 24 hours. Until this date, other options with a combination of RADARSAT-2/3,ALOS and COSMO, ENVISAT should be envisioned.

The following recommendations are made:
Arrange procurement of VHR data from 3rd party to fill the gap in optical VHR data until completion of Pleiades constellation;

Implement operational (including fast re-tasking and acquisition) agreement with 3rd parties (Rapid Eye, IRS, FORMOSAT etc) to obtain better coverage, both over Europe and Mediterranean basin globally, to match stringent requirements of 12 hours response ;
Qualify and confirm fast operation mode of all missions;
Ensure effective coordinated mission planning of GMES missions following the Charter experience through agreed data policies and provision of adequate procedures and software ;
Establish an operational European entity with a robust mandate and budget to provide space based services for European disaster and crisis management support;
Considering the likely role of space agencies in the GMES space infrastructure emergency tasking, the group offers to contribute further to the implementation, in particular for this function.

4.6.2 In situ data

In situ data and forecasts can play a crucial role in emergency situations for two reasons:

for many of the emergency types **forecasts** and subsequently alert and **warning procedures** are possible, minimising thereby very much the impact of extreme events on human lives and goods.

- in situ data allow a precise interpretation of EO data and complement them for crucial information; this might be seismic data to localise duration or extent of earthquakes, meteorological data to assess damages by storms, droughts or floods, but also socio-economic data to provide optimal help and support after catastrophes or geodetic data to provide ground control points for geo-references.

In-situ data are also testimonies from the field acquired by crew on-the-field. They are not instrumental data. Moreover they have to be standardised and digitalised, then geo-referenced and used as inputs to generate assessment maps.

The concept for in situ and the usage of forecasts data has not been developed yet completely. Further analysis is needed for a number of key elements for a well structured approach usable within Europe and at a global scale, including information on:

- infrastructure components
- infrastructure elements
- technical developments to be foreseen and followed,
- necessary investments
- coordination frameworks on a European and global level

The operational phase of the service should be prepared by an extensive testing phase, which should show possible synergies which can be achieved by the cooperation between different European and international data providers, users groups and operators, as well as the practicability of new technologies in different environments.

The results of a thorough investigation on structures and technologies will lead to a clear formulation of necessary infrastructures to be maintained and sufficiently funded in the future. The optimised way to fund these institutions on a national and a European level has to find its basis in adequate economic models.

The way which these infrastructures are used will differ very much inside and outside Europe. In Europe well organised structures are existing in nearly all countries; necessary is for many questions a standardisation and the creation of synergies between different

partners. Outside Europe the quality of in situ data has a higher degree of variety and changes very much from country to country.

It can be anticipated that interventions will be needed in the future particularly in countries where the infrastructure for in situ data and forecasts is less developed than in Europe. An optimised concept for quality control of existing data sets, methods for gathering ad hoc in situ data during interventions and forecasts and early warning methods will be of primary importance.

Twining projects between the developed and less developed countries can be a good and efficient methods to demonstrate the feasibility of know how exchange in nearly all fields like measurement methods, data sampling and data management or providing local forecasts. A thorough identification process has to be set up for European and global opportunities.

As observation networks are of very different density in different parts of the world, the optimal combination and interface to EO data will be a function of the observed parameters and the observation network density.

Early warnings and coordinated alert systems for a wide range of foreseeable natural and human made disasters should be an essential part and complement of the in situ data.

Meteorological forecasts e. g. would not only allow damage mitigation by preparedness, but also possible repositioning of satellites in due time. The local know how of forecasters about the consequences of extreme meteorological situations and coordinated European efforts for standardisation and best technologies would create European – level added value and integrate the national and regional contributions.

Annex e contains details about in-situ data and other data sources required by Emergency Response.

In particular, the following need to be considered in the context of an operational service:

In support to image processing, in situ data should include:

- A global collection of high precision ground control points. The value adders will access to this database whenever there is the need to ortho-rectify the imagery or for any other processing
- Ad hoc collected information to support the analysis of the imagery. For damages it will be filed picture of damage (i.e., field collected damages). For risk analysis it will include information on GCP campaigns say for monitoring land slides.

In support to risk assessments, in situ data should include:
- Data to be used for hazard risk assessments
- For physical hazards this will include information derived from primary sources like seismological surveys or cartographic products like seismic risk maps
- In situ socio-economic information related to addressing risk and hazards are discussed separately. The information will be provided through a network of specialized institutions.

In support to political crisis analysis, in situ data should come from open sources.

A physical GMES infrastructure in the form of a geo-spatial repository and ancillary data will be available to store the data. The physical infrastructure will made of hardware and software and procedures to store and make the data available.

The physical GMES infrastructure will be geographically distributed among different institutions specializing each in a specific field. The infrastructure will be made of a number of databases that are interoperable and accessible through a common portal/infrastructure etc. that will be the GMES service. Each specialized institutions will be in charge of maintain the specific database they are in charge of.

Each Institution will prepare the data in a format that can be readily accessible by down stream services.

4.6.3 Galileo in the context of emergency management

Galileo is designed to support myriad of applications in different user domains: transport modes (aviation, maritime, transport on rail and road) and non-transport modes (e.g. integrated use with mobile communications for location-based services, etc.). The users will have access to the different services depending on their policy of access. This access will be agreed with the commercial operator (e.g. for the utilisation of the Commercial Service for professional applications) or with the organisations (like the European GNSS Supervisory Authority) that are responsible for the control of the services of public interests, namely the Search and Rescue, the Safety-of-Life, and the Public Regulated Service.

Today, the conditions of use of the Public Regulated Service are under discussion between the Member States, and there is a general agreement on its use for support to emergency management.

Galileo can contribute in the various phases along the disaster management cycle, including the Response Phase.

In the phase of the provision of assistance, the services offered by satellite navigation would be used for an efficient management of the rescuers and fleets (especially in difficult environment, thus increasing the safety of the rescuers), for the coordination and logistic support to the operations (one example being for the unmanned delivery of goods by parafoil), or aid to navigation in difficult environment. For the damage assessing, the capabilities of Galileo are useful to integrate positioning information for rapid mapping and building of damage maps.

In the post-disaster phase, Galileo can serve in the restoration of the infrastructure and in the reconstruction activities. In the pre-disaster phase, Galileo services are useful for risk assessment/mitigation/prevention, for example with the monitoring of landslides, earthquakes and sea level. Concerning the preparedness phase, the broadcast of alerts on a wide area is a potential service that could be implemented with the use of Galileo.

As the access to the services of Galileo (notably to the PRS) will be regulated, coordination with all the systems involved in emergency management is essential.

5 Way forward

The following need to be considered:

The role of the EU as global actor in the field of emergency management: Commission services will undertake specific analysis starting with this report.

Structure and organisation of the Emergency Response Core Service: based on the analysis of the necessary functions of the service, there should be additional analysis on the overall organisation needed to implement these functions. Analysis should take into consideration existing assets and identify additional actions and actors needed to implement the service.

More in-depth analysis of a number of technical issues such as data needs and policy, integration of information, in situ, legal and socio-economic issues and research needs.

Planning: identify key actions which need to be taken to implement the Emergency Response Core Service and gradually integrate it with existing procedures.

This report will be updated on the basis the results of the aforementioned analyses.

6 Abbreviations

CP	Civil Protection
DDSC	French Civil Defence and Security
DEM	Digital Elevation Model
DG	Directorate General
DLR	Deutschen Zentrum fűr Luft- und Raumfahart (German Aerospacew Center – German Space Agency)
DPC	Presidenza del Consiglio dei Ministri - Dipartimento per la Protezione Civile (Italian Civil Protection Department)
EC	European Commission
DTM	Digital Terrain Model
ECHO	EC Humanitarian Aid Office
EO	Earth Observation
ERCS	Emergency Response Core Service
ESA	European Spatial Agency
EU	European Union
FP	Framework Programme
GAC	GMES Advisory Council
GIS	Geographic Information System
GMES	Global Monitoring for Environment and Security
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GSE	GMES Services Element
IG	Implementation Group
INSCRIT	GMES Information Service in Response to Crises, Disasters and Emergencies
INSPIRE	Infrastructure for Spatial InfoRmation in Europe
JRC	Joint Research Centre
LMCS	Land Monitoring Core Service
MCS	Marine Core Services
MIC	EC Civil Protection Monitoring and Information Center
MM	Multi-Mission
MR	Medium Resolution
ORCHESTRA	Open Architecture and Spatial Data Infrastructure for Risk Management (IP EC project)
OSIRIS	Operational Solutions for the management of Inundation Risk in the Information Society (IST project)
PREVIEW	Prevention, Information & Early Warning (Eurorisk Project)
PRS	Public Regulated Service
QC	Quality Control
R&D	Research and Development
RESPOND	GMES Service Supporting humanitarian Relief, Disaster Reduction & Reconstruction (ESA project)
RISK-AWARE	Risk-Advanced Weather forecast system to Advise on Risk Events and management (Interreg III B project)
RISK-EOS	GMES Service Element for flood and fire risks management (ESA project)
SME	Small & Medium Enterprise