SAFER and the GMES Emergency Response Service: One step closer to full-scale operational deployment

UNSPIDER conference – October 12th 2010

David HELLO, SAFER project coordinator – Spot Image

SAFER project rationale

- **Implement and validate a pre-operational version of the GMES Emergency Response Service**, reinforcing the European capacity to respond to emergency situations.

- First priority = focusing on **rapid mapping** during the **crisis phase**
- Enrich this service with a wider set of **thematic products**.

- Long term = the GMES Emergency Response Service will provide an **operational capacity in Europe and worldwide**, with benefits in terms of better quality of life, better health, and increased safety.

SAFER : key figures

Services and Applications For Emergency Response

- EC/FP7 project – GMES program
- 3 years project (01.2009 – 12.2011)
- Budget: 40 M€. EC Grant: 27 M€
- 53 partners from 16 countries:
  - ➢ 29 private organisations (18 SME)
  - ➢ 24 public organisations
- Coordinated by Spot Image
- Service management board: Spot Infoterra, DLR, e-GEOS
- Project User Board: DPC, WFP, BBK, UNOSAT, DSC
- Contract signature in December 2008 - Kick-off in January 2009

SAFER already
at a pre-operational stage

SAFER operational model up and running

- SAFER Focal Point on call duty 24/7
- Rapid Mapping Service Providers on call duty 24/7
- EO coordinated data access 24/7 (ESA GSCDA - GEST)

Four main types of products for Civil Protection units and Humanitarian Aid organisations

Early warning

SEVIRI MIR 070825_0945 UTC

Preparedness / Prevention
Reference maps
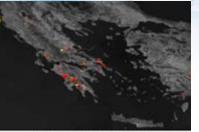**Pre-disaster situation**
(target = within 24 hours
after activation confirmation**)**

Emergency Response
Disaster extent
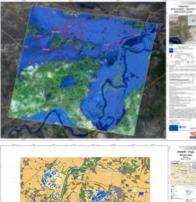**Damage assessment**

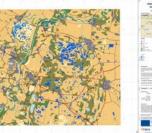(target = within 8 hours

after reception of the EO data)

Recovery
Post-disaster situation
Monitoring

**For headquarters,
decision-makers
and in-field operatives
In Europe and worldwide**

Safer
Services and Applications For Emergency Response

Who are SAFER registered users ?

Now

- Members of the Project User Board
  - DPC, WFP, BBK, UNOSAT, DSC
- Members of the External User Advisory Committee
  - ✓ 6 Civil Protection offices
  - ✓ 8 international humanitarian organizations
  - ✓ 3 EU entities (DG ECHO/MIC, DG RELEX, SG)
- … and by default, all EU Civil Protection authority.

Future

- National User Focal points (to be appointed and trained thanks to LinkER project)
- Interface at EU level (to be discussed) to process other demands e.g. UN bodies, NGOs

EUAC enrolment form

By filling a Service Request Form and sending it to the Focal Point

- Requestor details
- Type of event
- Location
- Requested products (within the portfolio)
- Delivery options
- Map printing options
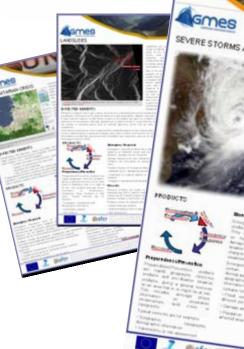- Publication restrictions if any

What registered users can get ?

- All SAFER products & services are described in details in the SAFER portfolio

Product type	Scale*	Area / map extent*
1. Preparedness / Prevention		
1.1 Geographic Reference - Overview	1:25,000 - 1:500,000	~ 245 - 96500 km²
1.2 Geographic Reference - Detail	1:5,000 – 1:25,000	~ 10 - 245 km²
1.3 Pre-Disaster Situation - Overview	1:25,000 - 1:500,000	~ 245 - 96500 km²
1.4 Pre-Disaster Situation - Detail	1:5,000 – 1:25,000	~ 10 - 245 km²
2. Emergency Response		
2.1 Disaster Extent - Overview	1:25,000 - 1:500,000	~ 245 - 96500 km²
2.2 Disaster Extent - Detail	1:5,000 – 1:25,000	~ 10 - 245 km²
2.3 Damage Assessment - Overview	1:25,000 - 1:500,000	~ 245 - 96500 km²
2.4 Damage Assessment - Detail	1:5,000 – 1:25,000	~ 10 - 245 km²
3 Recovery		
3.1 Post-Disaster Situation - Overview	1:25,000 - 1:500,000	~ 245 - 96500 km²
3.2 Post-Disaster Situation - Detail	1:5,000 – 1:25,000	~ 10 - 245 km²
4. Additional		
4.1 Refugee / IDP - Overview	1:10,000 - 1:50,000	~ 38 - 970 km²
4.2 Refugee / IDP - Contextual	1:2,000 – 1:50,000	~ 1,5 - 970 km²

- For each type of event (wild fires, storms, tsunamis etc), a user friendly datasheet is also available

What are our commitments towards the users ?

A Service Level Specification document presents the minimum level of commitment in the following categories

- ➢ Pre-crisis activation alert mode
- ➢ Ordering/request
- ➢ Confirmation
- ➢ Guidance/support/information
- ➢ Timeliness/Response time
- ➢ Service provision
- ➢ Product delivery
- ➢ Product Reliability/quality assessment
- ➢ User modification to outputs
- ➢ Post delivery Helpdesk

Users are asked to provide feedback in order to improve the service

Validation & Quality assurance are fully embedded within our process for the sake of continuous improvement

Example

The first usable reference product will be provided to the users within 24 hours after activation confirmation; and the provision of the first usable disaster assessment product within 8 hours after the service provider receives the Earth Observation data.

| Call ID	Activation ID	Triggering	Closure	Operation Type	Event	Country/Region	SAFER User
01	01	06/04/09	08/04/09	Test	EQ	Italy/Abruzzo	ITF
02	02	20/04/09	22/04/09	Exercise	EQ/LS/FL	France/Lourdes	DDSC
03	03	11/05/09	20/05/09	Test	FL	Brazil	DLR
04	04	27/05/09	08/06/09	Charter Call 256	FL	Bangladesh	WFP
05	05	23/07/09	04/08/09	Activation	FR	France / Marseille	DSC
06a	06a	25/07/09	04/08/09	Activation	FR	France / Corse	DSC
06b	06b	25/07/09	04/08/09	Activation	FR	Italy / Sardinia	DPC
07	07	23/08/09	02/09/09	Charter Call 262	FR	Greece	Greek CP
08	08	01/09/09	11/09/09	Activation	FR	Portugal	MIC + Portughese CP
09	09	08/09/09	11/09/09	Auto activation	EQ	Indonesia	DLR
10	10	09/09/09	15/09/09	Activation	FR	Italy	DPC
11	11	10/09/09	15/09/09	Charter Call 268	FL	Turkey	Turkish CP
12	12	16/09/09	17/09/09	Exercise	FL	Germany	BBK
13	13	27/09/09	05/10/09	Charter Call 271/27!	FL	Philippines/Manila	WFP/UN OCHA
14	rejected	29/09/09		Charter Call 274	EQ	Sumatra/Padang	WFP
15	14	30/09/09	30/10/09	Activation	EQ	Sumatra/Pariamar	WFP/RELEX/MIC
16	15	01/10/09	07/10/09	Activation	ST	Philippines	WFP
17	16	02/10/09	30/10/09	Activation	EQ	Sumatra/Sungai	BBK
18	17	15/10/09	23/10/09	Activation	IDP	Yemen	UNHCR
19	18	18/10/09	26/10/09	Activation	ST	Philippines	WFP
20	19	29/10/09	04/11/09	Activation	ST	Philippines	WFP
21	20	29/10/09	05/11/09	Exercise	Other	Hungary	NDGDM
22	21	19/11/09	24/11/09	Activation	FL	Sri Lanka	WFP
23	22	30/11/09	07/12/09	Activation	FL	Ireland	Office of Public Work (SERTIT)
24	23	07/01/10	13/01/10	Charter call 286	FL	Albania	MIC
25	24	11/01/10	27/01/10	charter call 287-290	EQ	Haiti	WFP/UNOOSA/COGIC/BBK
26	25	01/02/10	05/02/10	Exercise	EQ	France	DDSC/COGIC
27	26	21/02/10	03/03/10	Activation	FL-LS	Madeira	PROCIV/GMOSAIC
28	27	22/02/10	02/03/10	Exercise	FL	Ireland	OPW / River Agency (SERTIT)
29	28	25/02/10	04/03/10	Activation	OS	Italy	DPC
30	29	27/02/10	15/03/10	Activation	ST/FL	France	DDSC
31	30	03/03/10	15/03/10	Activation	FL	Hungary	NDGDM
32	31	08/03/10	15/03/10	Activation	FL	Mozambique	WFP
33	32	09/03/10	16/03/10	Charter Call 303	EQ	Turkey	Charter
34	rejected	18/03/10		Charter Call 304	TS	Fujuna and Wallis	Charter
35	33	14/04/10	23/4/10	Activation	EQ	China	WFP on request of UNOOSA to support NDRCC
36	34	15/04/10	23/4/10	Activation	FL	India/Bangladesh	WFP
37	35	21/04/10	26/4/10	Charter Call 307	VO	Iceland	Charter (COGIC)
38	36	14/05/10	03/06/10	Exercise	EQ-FL-LS-FR	Aude	COGIC - EU Command Post 2010
39	rejected	18/05/10		Activation	ST	Hungary	NDGDM
40	37	18/05/10	02/06/10	Activation	FL	Sri Lanka	WFP
41	38	19/05/10	01/06/10	Activation	FL	Poland	National HQ of the State Fire Service
42	39	27/05/10	08/06/10	Activation	FL	Germany	BBK
43	40	02/06/10	15/06/10	Activation	ST/FL	Pakistan	WFP
44	41	07/06/10	02/07/10	Activation	ST/FL	Poland	National HQ of the State Fire Service
45	42	15/06/10	25/06/10	Activation	FL	France	COGIC
46	43	29/06/10	15/07/10	Activation	FL	Romania	Romanian Space Agency
47	44	08/07/10	16/07/10	Activation	FL	Moldavia	MIC
48	45	20/07/10	26/07/10	Activation	FL	Romania/Moldava	Romanian Space Agency
49	46	26/07/10	30/07/10	Activation	FL	Bulgaria	DG Civil Protection, Ministry of Interior
50	47	30/07/10	06/08/10	Activation	FL	Burkina Faso	UNSPIDER through WFP
51	48	30/07/10	30/08/10	Activation	FL	Pakistan	WFP + ICRC
52	49	09/08/10	13/08/10	Charter Call 320	FL	Czech Republic	Czech Ministry of Interior
53	50	09/08/10	20/08/10	Activation	FL	Germany	GMLZ
54	51	11/08/10	18/08/10	Activation	FL	Niger	WFP
55	52	13/08/10	30/08/10	Activation	FL	South Pakistan	WFP (Extension GERS048)
56	53	13/08/10	20/08/10	Activation	FL	Poland	National HQ of State Fire Service (extension GERS50)
57	54	24/08/10	30/08/10	Activation	FL	South Pakistan (2)	WFP (Extension GERS048)
58	55	30/08/10	03/09/10	Exercise	EQ	England	LinkER - ORION Exercise
59	56	31/08/10	03/09/10	Activation	FR	South France	COGIC
60	57	10/09/10	16/09/10	Activation	FL	Senegal	WFP on request of UNOOSA
61	58	20/09/10	27/09/10	Activation	FL	Croatia	National Protection and Rescue Directorate
62	59	20/09/10	27/09/10	Activation	FL	Slovenia	Administration of the Republic of Slovenia for CP and Disaster

- 62 activations
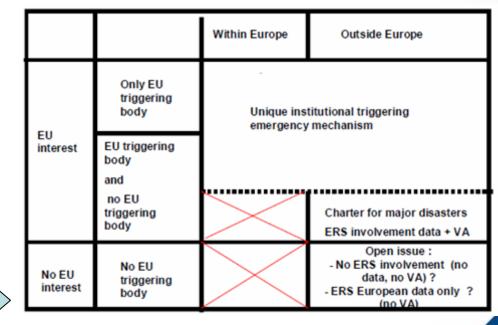
- ~1 activation per week since Jan 2010

- 9 collaborations with the International Charter

Collaboration with the International Charter

- Collaboration scheme in place since 2009 and valid until end of 2011
  - First focusing on SAFER Value-Added (= mapping) capacity
  - Then, also considering SAFER capacity to complement the Charter EO data provisioning and provide its VA capacity
    - Objective: optimize resources both on EO side and VA side

- Long term collaboration between the GMES Emergency Response and the International Charter (proposed but still to be endorsed)

		Within Europe	Outside Europe
EU interest	Only EU triggering body	Unique institutional triggering emergency mechanism	
	EU triggering body and no EU triggering body		Charter for major disasters ERS involvement data + VA
No EU interest	No EU triggering body		Open issue : - No ERS involvement (no data, no VA) ? - ERS European data only ? (no VA)

GALLERY OF PRODUCTS
Sample of past activations – 2010

GMES

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Earthquake in Haïti – January 2010

- **Challenges**
  - Fulfilling many users' requests coming from different channels
    - Cooperation with the International Charter Space & Major Disasters
    - Cooperation with GMOSAIC
  - Coping with high pressures from medias
- **More than 50 maps produced**

Earthquake in China – April 2010

S. Detailed damage assessment and detailed reference maps

S Flood impact maps
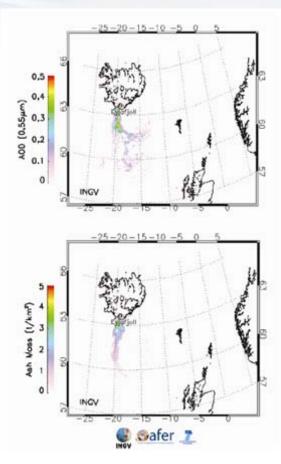
Volcano in Iceland – April 2010
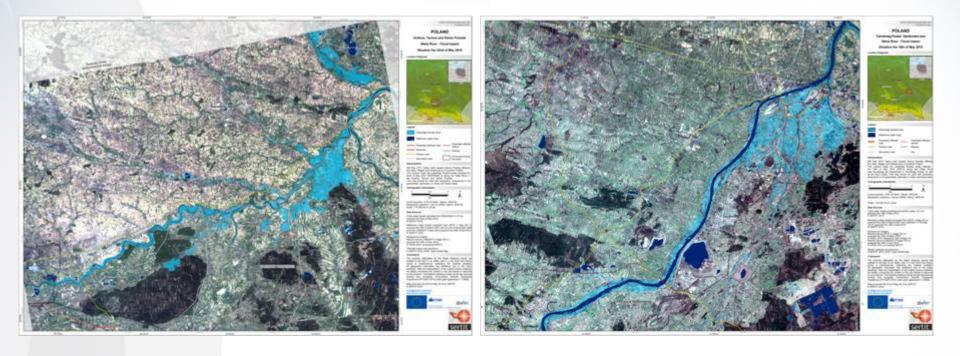
- Observation of the volcano activity
- Preliminary estimation of the volcanic ash mass emitted
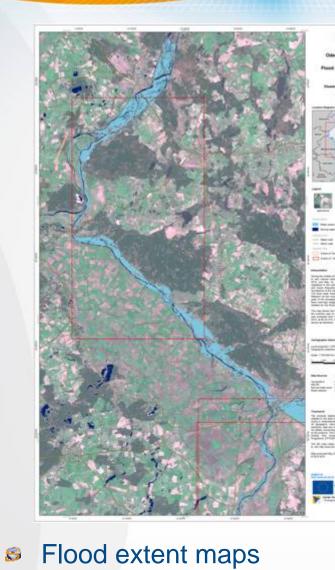
Flood extent maps

Floods in Germany – May 2010

🌐 Flood extent maps

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Flash floods in France – June 2010

- Flood extent map and VHR damage assessment

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Flood impact
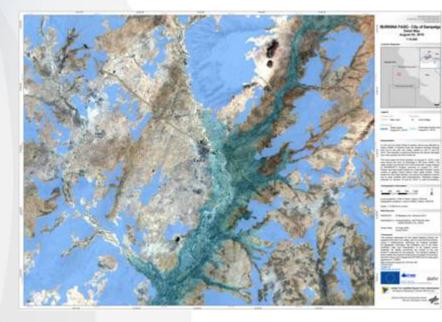
Floods in Bulgaria – July 2010

Flood extent maps

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🌀 Flood extent maps
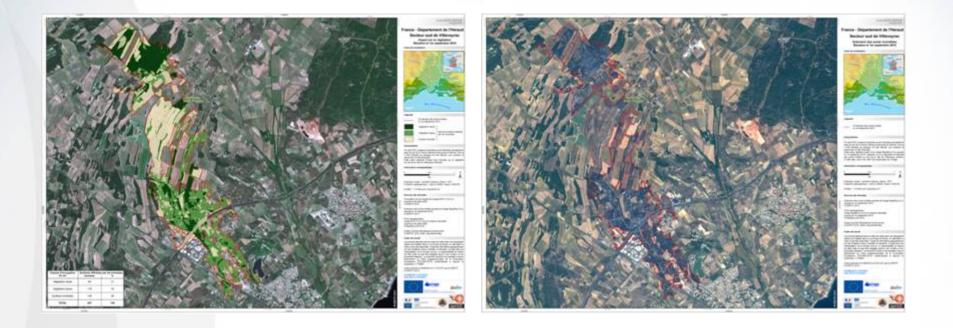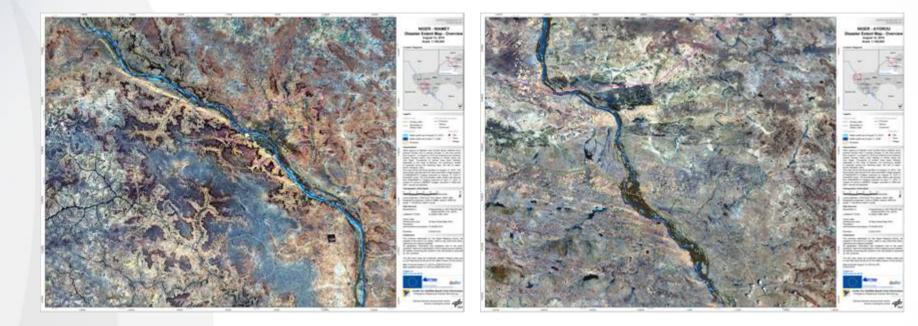
Environment damage assessment and burnt area extent

Floods in Niger – August 2010

🌀 Disaster extent maps

Disaster extent map and reference map

Flood in Pakistan – Timeline – SAFER Activations

Event Start – July 2010
« Unprecedented monsoon rain »

Closure Activations (30/08/2010)
Follow up with SAFER **Emergency Support** (Non Emergency)
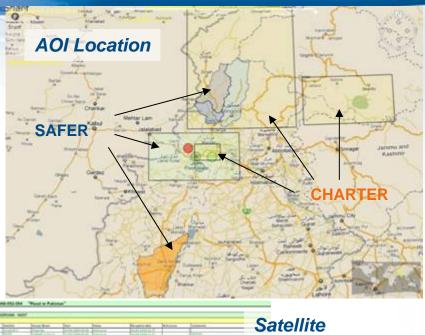
SAFER 1st Activation
July 30th, 2010

SAFER 2nd Activation
August 13th, 2010

SAFER 3rd Activation
August 24th, 2010

July - Week #30	*August - Week #31*	*Week #32*	*Week #33*	*Week #34*	*Week #35*

GERS #048

North Pakistan

- *Requestor = WFP; ICRC*
- *#AOIs = 6*
- *# Products = 14*
- *Requirements / Type of products*
Reference Maps (Overview, Detailed)
Flood Extent (Overview, Detailed)
Damage Assessment detailed
Shape « flood extent »
- *Thematic Analysis =*
Modelisation Warsak Dam Breach (simulation of flood propagation)

GERS #052

South Pakistan – Indus delta

- *Requestor = WFP*
- *#AOIs = 2*
- *# Products = 5*
- *Requirements / Type of products*
Flood Extent Maps (Overview)
Shape « flood extent »

GERS #054

South Pakistan – Sindh Province

- *Requestor = WFP*
- *#AOIs = 2*
- *# Products = 8*
- *Requirements / Type of products*
Flood Extent Maps (Detailed)
Damage Assessment Maps (Detailed)
Flood Dynamic Maps
Shape « flood extent »

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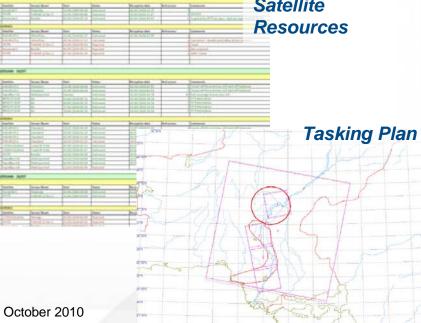Services and Applications For Emergency Response

SAFER – Collaboration with Charter

- Application of the model of cooperation Charter-SAFER
  - ➤ Same event
  - ➤ 2 distincts requests from Charter AU and SAFER Registered Users

- Organisation between SAFER FP and Charter PM :
  - ➤ AOIs location
    - ✓ Avoid duplication of effort
    - ✓ Coordination over Common AOI
  - ➤ Tasking Plan
    - ✓ Avoid dual/conflictual tasking
    - ✓ Information on collection plan
  - ➤ Satellite Resources
    - ✓ Avoid duplication
    - ✓ Full transparency on EO data resources

AOI Location

SAFER

CHARTER

Satellite Resources

Tasking Plan

SAFER – Participation to the global effort of coordination

- **Regular Phone conference with Major actors in Geographic « crisis » information**
  - Organised by USGS
  - Daily frequency (crisis peak) to weekly frequency (end of August)
  - Participants
    - Representative of Pakistan = SUPARCO (in close contact with Pakistan authorities)
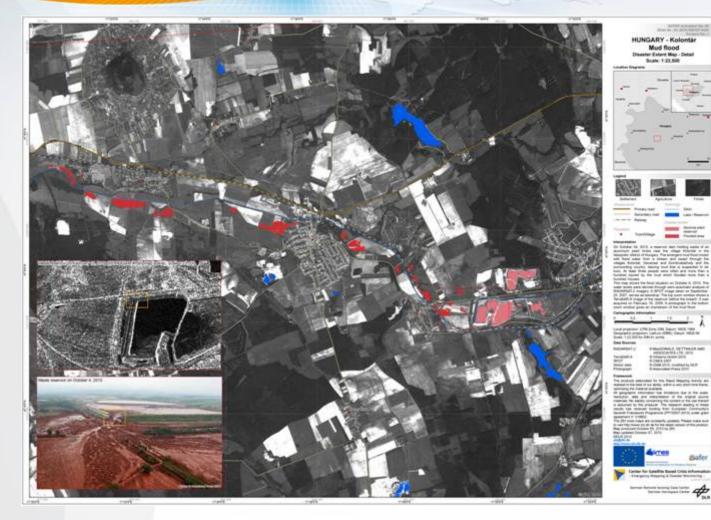   - CHARTER   = Charter PM and VAC
    - SAFER   = SAFER FP and RMSP
    - International Organization   = ICRC, World Bank
    - UN Organizations   = UNITAR/UNOSAT, UN spider, WFP, UNESCO, UNOOSA…
    - US Organizations   = US OFDA, USAID, USGS, NGA, US State…
  - Scope
    - In-field feedback from representative of Pakistan (SUPARCO)
    - Status (Production, EO data collection) of each initiatives (Charter, SAFER….)

- **Wide, immediate and free distribution of SAFER products**
  - To SAFER Registered Users (WFP, ICRC)
  - To Charter PM / AU
  - To all participants of the Global effort of Coordination

🌐 Disaster extent map – October 6th

One word regarding Emergency Support Mapping …

What about emergency support activities ?

- Emergency support mapping portfolio
  - Preparedness / Prevention
    - Geographic Reference – Overview
    - Geographic Reference – Detail
    - Pre-Disaster Situation - Overview
    - Pre-Disaster Situation– Detail
  - Recovery
    - Post-Disaster Situation - Overview
    - Post-Disaster Situation– Detail
  - Additional
    - Refugee / IDP – Overview
    - Refugee / IDP– Contextual

Hot spot areas defined at early stages in the project that have been actually hit by typhoons/tropical storms in the past weeks (activations #13/15/18/19)

- The production in advance of geographic reference maps (=background production) remains a key success factor for the performance of the overall service
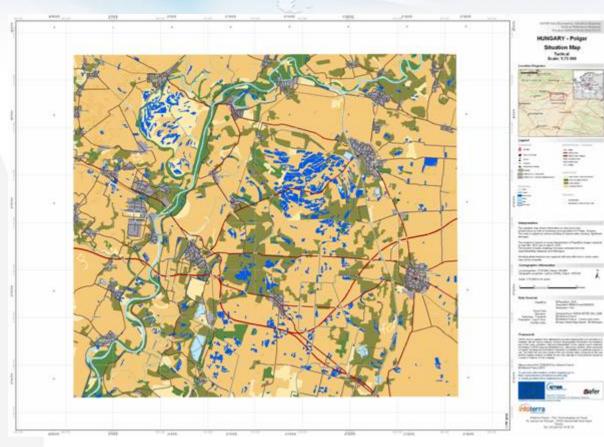
- Frequent recovery mapping on the mid-term (several weeks to several months) is also needed particularly in the field of humanitarian relief

Example of a situation map

- Situation map (tactical scale) made on-demand in non emergency mode
- Monitoring of area subject to serious pounding of subsoil water causing damages

Conclusion and next steps

Conclusions and main lessons learnt

- **Reactivity is a must from the end users' perspective**

- How to implement reactivity ?
  - Off course by being able to treat users requests on a 24/7 basis
  - By anticipating the events when possible (early warning systems – importance of in-situ data again + preparedness/prevention mapping)
  - By having a good understanding of the user' request (including flexibility at time of the activation and during the event)
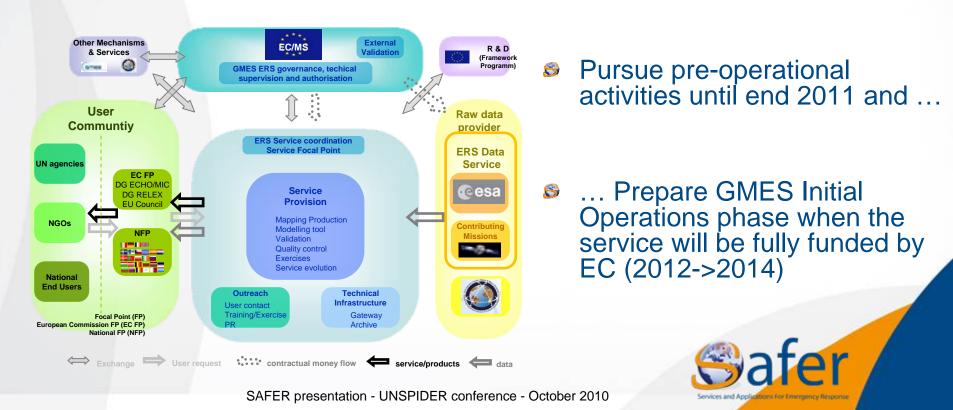 - By improving EO data provisioning
    - Process side
      - Define which is the "best fit for purpose" data/sensor … but also consider what will be available first !
    - Technical Side
      - Ensure availability/sustainability of a constellation of satellites (different sensors, swaths, resolutions etc)

Major next steps

- Entry Into Service of the SAFER gateway
  - service triggering
  - access to products via OGC-based interface
  - monitoring of the service
- Service Evolution: propose and integrate new services which complement Rapid Mapping and Emergency Support Mapping

- Pursue pre-operational activities until end 2011 and …

- … Prepare GMES Initial Operations phase when the service will be fully funded by EC (2012->2014)

Thank you for your attention!

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S P O T
IMAGE

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