FLOODIS

INTEGRATING GMES EMERGENCY SERVICES WITH SATELLITE NAVIGATION AND COMMUNICATION FOR ESTABLISHING A FLOOD INFORMATION SERVICE

Technical User Requirements for FLOODIS

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1 INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

This Technical User Requirements document has been prepared under WP 2 of the FLOODIS project – Integrating GMES Emergency Services with satellite navigation and communication for establishing a flood information service. It represents deliverable D2.2 under this Collaborative Project (no. 607220) awarded under the SPACE call SPA.2013.1.2-01.

The goal of this document is to twofold:

- To define the technical requirements for the FLOODIS service based on the users' response to the FLOODIS questionnaire, and
- To outline a demonstration scenario in collaboration with the Civil Protection Department of the Region of Veneto, Italy and the General Directorate of Civil Protection Albania.

It should be noted that this document is not the FLOODIS Technical Specification in a true engineering sense, but rather a translation of the user requirements into user-based technical requirements or technical requirements from the user perspective. More detailed engineering specifications for the FLOODIS system and app will be detailed in a subsequent deliverable from WP3 (GEO Gateway System Design and Flood Information)- the Technical Feasibility Study (D3.1).

1.2 STRUCTURE OF THE DOCUMENT

The document is organized as in the following:

- **Chapter 1** is this introduction and description of the document itself;
- **Chapter 2** outlines the technical requirements of the FLOODIS service;
- **Chapter 3** describes the service use case;
- In **Chapter 4** we have included a proposed demonstration scenarios for WP7.

1.3 DEFINITIONS

MUST: This word, or the terms "REQUIRED" or "SHALL", mean that the definition is an absolute requirement of the specification.

MUST NOT: This phrase, or the phrase "SHALL NOT", means that the definition is an absolute prohibition of the specification.

SHOULD: This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.

SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED" means that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.

NICE-TO-HAVE: This priority category refers to features that the users have requested, but which were not foreseen in the original WPD. At this early stage of the project, it is not clear if such features are technically feasible or within the scope of the project.

REGISTERED USERS: This refers to users that have been authorized/vetted by the Emergency Operational Centres for the submission of real-time geolocated information to the FLOODIS platform via a professional FLOODIS device (smartphone or tablet). Also referred to as professional users, e.g. in-field emergency response personnel or volunteers.

SUBSCRIBED USERS: This refers to citizens that have subscribed to the FLOODIS service to receive relevant flood information via the FLOODIS app and will submit real-time geolocated information to the FLOODIS platform via their smartphones or tablets (mass market devices).

1.4 ACRONYMS LIST

CFD	The ‘centro funzionale decentrato’ of the Region of Veneto
CO.R.EM	‘Cordinamento regionale in Emergenza’ of the CP Veneto
CP	Civil Protection
CPA	Civil Protection Authorities
DMC	Disaster Management Centre
EDAS	EGNOS Data Access Service
EFAS	European Flood Awareness System
EGNOS	European Geostationary Navigation Overlay Service
EMS	European Emergency Management Service
EO	Earth Observation
ERU	Emergency Response Units
Galileo	Europe’s GNSS system
GD	General Directorate
GIO	GMES Initial Operations
GNSS	Global Navigation Satellite System

1.5 REFERENCE AND APPLICABLE DOCUMENTS

ID	Title	Issue	Date
[RD01]	FLOODIS GA Annex 1 (Description of Work) Part A	1	19/06/2013
[RD02]	D2.1.1 Synthesis of Civil Protection User Requirements	2	10/06/2014
[RD03]	ANNEX 1 to D2.1 – User Questionnaire completed and validated by CP Veneto	2	23/01/2014
[RD04]	ANNEX 2 to D2.1 – User Questionnaire completed and validated by GD CP Albania	2	10/06/2014

2 TECHNICAL REQUIREMENTS FOR FLOODIS

In this chapter, we have translated the user requirements described in D2.1 [RD02] and the Appendix to D2.1 – Users Questionnaire completed and validated by CP Veneto [RD03] and by General Directorate CP Albania [RD04], into technical requirements for the FLOODIS system and app development.

In recognition of the fact that FLOODIS is not developing a system solely for a particular user group, these technical requirements have been non-user specific. However, the FLOODIS system will be demonstrated to a specific user group. In chapter 4, we include the technical specifications and service use case for a demonstration with the CP Veneto, and in issue 2, also the service use case for a demonstration with GD CP Albania.

In this context, we define the following operational levels in decreasing scale – European, national, regional, provincial and municipal.

2.1 TECHNICAL REQUIREMENTS LIST

ID #	Description	Priority	Origin [RD03, RD04] (user response #)
1.	FLOODIS must develop a platform that runs GIS software to produce flood extent maps and flood forecasts	absolute	DoW
2.	FLOODIS must make flood maps and forecasts available on the Internet and FLOODIS app	absolute	6.5
3.	FLOODIS must develop a smartphone/tablet application that is able to display the river and flood maps	absolute	DoW

ID #	Description	Priority	Origin [RD03, RD04] (user response #)
4.	FLOODIS must distinguish between information received from registered and subscribed devices (smartphones/tablets)	absolute	6.3
5.	The user interface of the FLOODIS app must be designed and implemented to ensure ease-of-use by all	absolute	6.2
6.	The FLOODIS app should have the pan and zoom features similar to Google maps (for mobile devices) to ensure ease-of-use	recommended	
7.	FLOODIS professional registered devices must be capable of reporting positioning to within 2-5 m accuracy (EGNOS positioning).	recommended	DoW
8.	The FLOODIS platform must receive the geo-location (GPS or EGNOS position) of the registered devices and display these together with device identification on the map	absolute	4.1
9.	FLOODIS must receive FLOODIS alert messages from EFAS or regional DMC via email	absolute	3.1.4
10.	On orange/red (TBD) alert (warning), FLOODIS must activate its processes	absolute	3.1.4
11.	FLOODIS must be capable ingest EO images (at various resolutions) from EMS as soon as they have been received	absolute	DoW
12.	FLOODIS must produce underlying map layer in GIS (scale to be determined by EMS images received)	absolute	Deduced from 2.1.3
13.	FLOODIS should investigate if data from EFAS (and the LISFLOOD model) is useful for regional flood alerting for regions that already rely on a local alerting system to advise the	recommended	

ID #	Description	Priority	Origin [RD03, RD04] (user response #)
	relevant Operational Centres		
14.	FLOODIS should investigate if data from regional automatic hydromet monitoring systems (in-situ data) is useful for flood mapping and forecasting	recommended	3.2.5
15.	FLOODIS should investigate which data and/or maps from the DEWETRA platform are useful for FLOODIS	recommended	3.1.5
16.	FLOODIS should advise the CIMA Foundation on how the FLOODIS EO-based maps could be used by the DEWETRA platform	nice-to-have	3.2.6
17.	FLOODIS should investigate the feasibility of including provincial and municipal 'hotspots' within a GIS layer of the flood map	nice-to-have	3.2.11
18.	FLOODIS to investigate if visible infrastructure from the EO images (such as buildings, houses, road and bridges) will be retained as a GIS layer of the flood map	recommended	Deduced from 3.2.11
19.	FLOODIS should investigate the categorisation of areas along the river/s according to population number and housing density (size of area tbd) by colour coding of the surrounding areas in a GIS layer for example.	nice-to-have	3.2.11
20.	FLOODIS must respond to users' question on whether FLOODIS devices (tablets and smartphones) can be communicate information back to the DMC via VHF radio	absolute	5.1
21.	FLOODIS must enable GSM (GPRS or 3G) communications between the professional devices and the FLOODIS platform	absolute	DoW
22.	FLOODIS should investigate the use of TETRA (digital radio) for transmission of information for FLOODIS between DMC and field-officers	recommended	5.2

ID #	Description	Priority	Origin [RD03, RD04] (user response #)
23.	FLOODIS must investigate the use of both GSM 900 MHz (emergency) and 1800 MHz (normal) for transmission of information for FLOODIS between DMC and field-officers	recommended	5.1
24.	FLOODIS must investigate the requirement for the inclusion of satellite communications within the FLOODIS concept	absolute	3.3.2 and 5.2
25.	FLOODIS must investigate the option of using WIFI for the last-mile communications with satellite communications from the field-officers	recommended	DoW
26.	FLOODIS must run the inundation model to predict the flood extent on the map for up to 9 days in advance (tbc)	absolute	DoW
27.	FLOODIS must make the flood map and forecasts available on a web site with simple to use interactive capabilities (for panning, zooming, visualisation of layers, etc.)	absolute	DoW
28.	FLOODIS must make flood maps and forecasts available to the FLOODIS app running on registered tablets and smartphones	absolute	DoW
29.	FLOODIS should investigate the value of the output from dynamic flood model for river/s and its usefulness within the FLOODIS concept	nice-to-have	3.1.6
30.	FLOODIS must start 24/7 accessibility when early alarm is called by DMC with periodic, automatic updates of information as new data is received	absolute	Deduced from 3.2.1
31.	FLOODIS platform should receive regular updates (timing to be discussed) from the automatic monitoring systems to improve the flood forecasting	nice-to-have	2.1.3
32.	FLOODIS must update flood extent maps every 3 hours (to be agreed) for DMC	absolute	2.1.3

ID #	Description	Priority	Origin [RD03, RD04] (user response #)
33.	FLOODIS should investigate if speed of water can be visualised in a GIS layer on the flood extent map	nice-to-have	3.2.11
34.	FLOODIS app (for both professional and mass market devices) must include functionality that communicates the tablet's/smartphone's GPS position to the DMC automatically and at the touch of a button (on command)	recommended	6.2
35.	FLOODIS app for must include a simple button that will link to/call up the in-built camera (for both professional and mass market devices)	recommended	6.3
36.	FLOODIS app must include a 'send photo' option to enable transfer of the photo to the FLOODIS platform (for both professional and mass market devices)	absolute	Deduced from 6.3
37.	FLOODIS platform must receive geo-located photos from professional devices (via GSM network)	absolute	6.3
38.	FLOODIS app must include a specific input form for textual information to be filled in by professional users	recommended	DoW
39.	FLOODIS platform must receive geo-located textual information from professional devices (via GSM network)	recommended	DoW
40.	FLOODIS must display geo-located information (photos, textual information) from professional devices in near-real time on flood map using pop-up windows	absolute	6.3
41.	FLOODIS must update flood forecast maps – at 6-hourly (to be agreed) time intervals	absolute	2.1.3

ID #	Description	Priority	Origin [RD03, RD04] (user response #)
42.	FLOODIS must update the flood extent map based on analysis of the location based photos from professional devices	nice-to-have	DoW
43.	FLOODIS must update the flood extent map based on textual information from professional devices	recommended	DoW
44.	FLOODIS platform must distinguish between location based information from registered devices and non-registered devices (subscribed users)	recommended	6.4
45.	FLOODIS platform should receive location based information (photos and comments) from the FLOODIS app from subscribed users	recommended	6.5
46.	FLOODIS should collate and display the location based information from non-registered devices on a separate electronic bulletin board	recommended	Deduced from 6.5
47.	FLOODIS to carry out trend analysis on information from non-registered devices	nice-to-have	6.5
48.	FLOODIS must monitor social media sites (FB, Twitter, etc.) for flood trend confirmation	recommended	DoW
49.	FLOODIS must make FLOODIS app widely available for download	absolute	6.5
50.	FLOODIS can end 24/7 accessibility when end of alarm is called by DMC	absolute	Deduced from 3.2.1
51.	FLOODIS must prepare demonstration scenarios for CP Veneto in the Veneto region and for General Directorate of Civil Protection Albania in the region of Lake Shkodra.	absolute	DoW

Table 2-1: Table of FLOODIS technical requirements

3 SERVICE USE CASE

The service use case outlines the interaction flows and highlights the critical processes and timing of events for the proposed FLOODIS service. For this, we have distinguished two service use cases corresponding to the first three phases of a flood event (phases as defined by the civil protection community). This includes a service use case for the alert/warning phase, and a service use case during the actual flood event. This was necessary since there are key differences in how FLOODIS will operate during these two periods. The development of the service use case has been based on the current operations of the CP Veneto in the case of a flood alert and alarm (section 3.2.8 in [RD02]). No description is given for the final phase of a flood event – that of the end of alarm – since FLOODIS will not play a role during this phase.

3.1 ALERT/WARNING PHASE

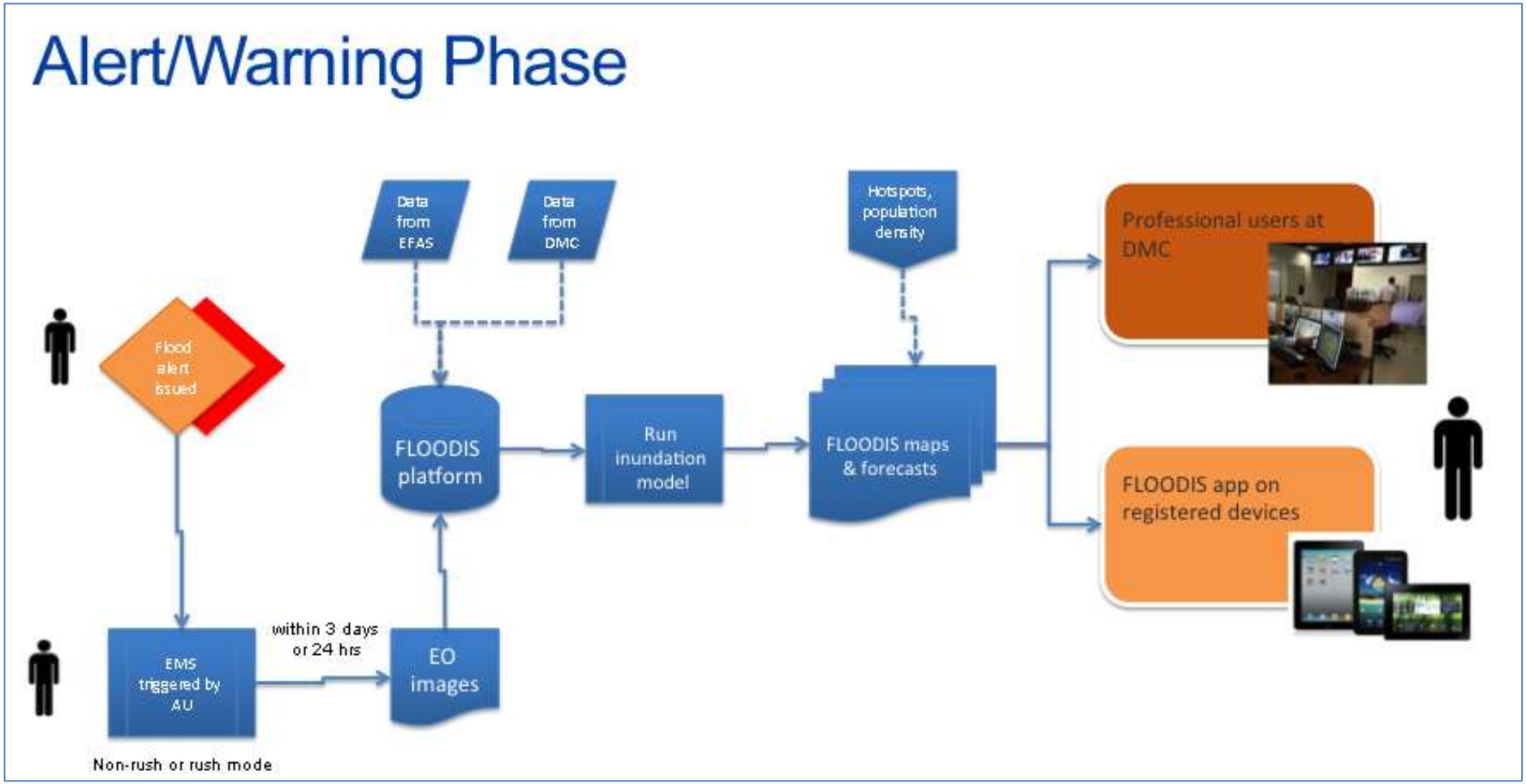

Figure 3-1: Service use case during flood alert phase

The generic use case for the alert/warning phase can be described as follows:

1. Using existing local flood alerting mechanisms, an orange or red alert is issued by the local authorities (CP department or hydrographic office) based on rainfall forecasts and the soil situation. The situation where no local flood alerting is in place has not been investigated, since both the FLOODIS user groups already have a local flood warning system in place (but neither are currently connected to EFAS). It is possible that the EFAS could provide such an alerting service if the region can supply some basic data to EFAS (assuming there is a MoU between the two in place).
2. FLOODIS is also alerted at this time via email.
3. The authorised user (AU) in the country is then notified, and depending on the severity of the alert, the AU will trigger the EMS mechanism for EO images of the area of interest (specified by the CP authority or hydrogaphic office) in either non-rush mode (for orange alerts) or rush mode for red alerts.
4. When the EO images are released by EMS, FLOODIS ingests these on their platform. This could be supplemented with data from the EFAS and automatic hydromet monitoring systems (if in existence) – this feature still needs to be investigated under FLOODIS.
5. FLOODIS runs their inundation model on the derived EO map and delivers a flood map and flood forecasts to the local Disaster Management Centre (DMC).
6. If possible, FLOODIS also shows areas of high population density and infrastructure 'hotspots' on the maps. This option still needs to be investigated under FLOODIS.
7. The FLOODIS maps and forecasts are also made available to FLOODIS apps running on Windows 8 smartphones and tablets (used by officers in the field).
8. If at this stage the alert is downgraded, the FLOODIS processes can stop. If the alert is upgraded to a pre-alarm or flood alarm, then FLOODIS moves into the next phase of operations.

3.2 EARLY ALARM AND ALARM PHASES

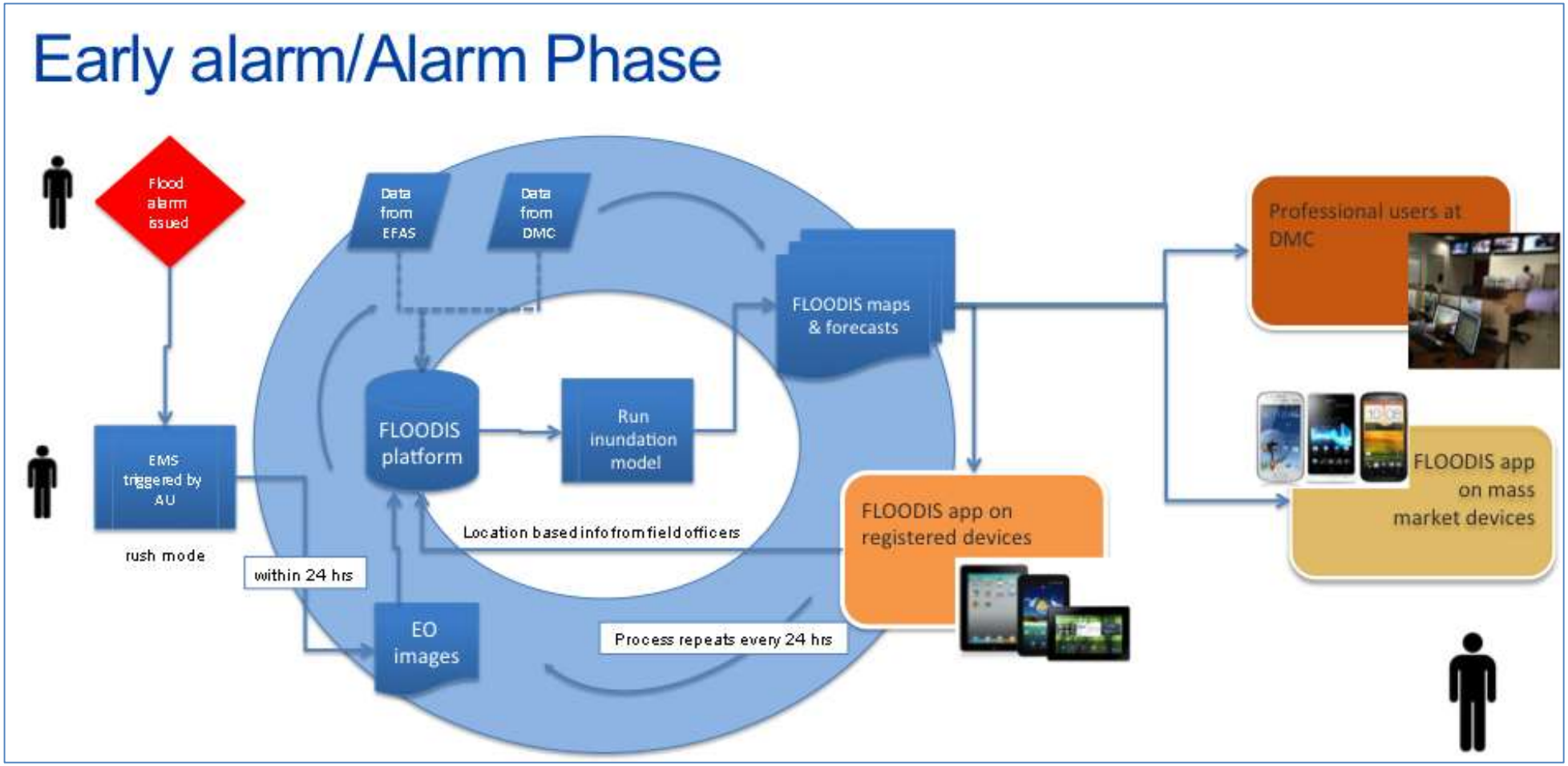

Figure 3-2: Service use case during flood event

The generic use case for the pre-alarm/alarm phase can be described as follows:

1. This phase starts when a flood event is already in progress.
2. FLOODIS is notified of the alarm.
3. The authorised user (AU) in the country is then notified, and triggers the EMS mechanism in rush mode for EO images of the area of interest.
4. As the EO images are released by EMS (usually within 24 hours), FLOODIS ingests these on their platform.
5. FLOODIS runs their inundation model on the derived EO map and delivers a flood map and flood forecasts to the local Disaster Management Centre (DMC). This could be supplemented with data from the automatic hydromet monitoring systems.
6. The FLOODIS maps and forecasts are also made available to FLOODIS apps running on Windows 8 smartphones and tablets (used by officers in the field).
7. The field officers communicate geo-referenced information (photos, SMS) back to the DCM via the FLOODIS app.
8. These communications are visualised on the FLOODIS map and the maps and forecasts are consequently updated (to be verified).
9. As illustrated above, this full process is repeated every 24 hours as new EO images become available.
10. However, more frequent update cycles are needed as new information and data is received from the automatic hydromet monitoring systems and from the field officers. The update times for the FLOODIS maps and forecasts still to be agreed.
11. If at this stage the alarm is downgraded, the FLOODIS processes can stop. If not the process continues and is repeated as required.

3.3 END OF ALARM

When the flood alarm is called off, the FLOODIS service stops.

4 DEMONSTRATION SCENARIO

During our discussions with the user groups, the FLOODIS team have come to the conclusion that it will not be possible to run the in-field testing (demonstrations) during an actual flood event. This is mainly due to two factors – firstly it is unlikely that a flood will occur when the in-field testing has been scheduled, but more importantly the CP personnel cannot dedicate time to the project during a flood event when they have more important tasks to perform. Thus, the team will not be able to request EO images from EMS in rush-mode but will have to trial the reception of an imagery in non rush mode. Consequently it is unlikely that the team will be able to demonstrate the value of EO-derived flood maps (recognising also that the timing of the images may also be problematic since the images will be at least 24 hours old – even in rush mode). Instead, the testing will focus on the demonstration of the value of providing an interactive GIS map and simulated flood forecasting with supplementary geolocated information from the field in real-time.

Thus we propose the following:

- The team in collaboration with the user groups, simulates a flood event in their region. The OC (Operational Centre) issues a simulated orange or red alert.
- FLOODIS receives the alert via email or by phone.
- The FLOODIS team requests local imagery from EMS in non-rush mode some weeks in advance of the in-field tests.
- FLOODIS ingests the EO images on their platform. This could be supplemented with data from the EFAS and/or local automatic stations – this feature still needs to be investigated under FLOODIS.
- If possible, FLOODIS also shows areas of high population density and infrastructure 'hotspots' on the maps. This option still needs to be investigated under FLOODIS.
- During the testing, the FLOODIS team supports the CP personnel to complete an EMS request form to familiarise themselves with this process.
- FLOODIS provides a map of the area of interest – at DMC and via the FLOODIS app – showing the relevant river/s and infrastructure.
- FLOODIS provides a simulated flood forecast based on as illustration

- The FLOODIS maps and forecasts are also made available to FLOODIS apps running on Windows 8 smartphones and tablets (used by officers in the field).
- FLOODIS demonstrates how precisely located information (photo, text) can be received from registered devices (EGNOS enabled) and displayed on the maps
- FLOODIS demonstrates how geolocated information (photo, text) can be received from volunteers (acting as subscribed users with mass market devices)
- The 'crowd-sourced' information is collated separately and displayed on a bulletin board.
- FLOODIS makes a presentation on the advantages and limitations of social media in an emergency event.

Below we describe the tasks in more detail and how the testing should be customised for the two in-field testing locations in Veneto and Albania. Please note that the scheduling of these in-field testing requirements is not presented here. These will be developed in WP 7 – Demonstration.

4.1 TECHNICAL REQUIREMENTS FOR DEMONSTRATION WITH CP VENETO

We proposed to run the first FLOODIS demonstration in Italy in collaboration with the Civil Protection department (CP) of the Region of Veneto. The exact location (i.e. city) still has to be decided between the FLOODIS team and CP Veneto. At a user workshop with CP Veneto, they proposed the city of Vicenza along the Bacchiglione river in Veneto, but the technical feasibility of visualising this river on EO images from the EMS still needs to be verified by the FLOODIS team. The Bacchiglione river is around 100 km in length, with the 40 km stretch between Padova and Vicenza being the most critical. In Vicenza the river is around 23 m wide, and the depth varies between 1.8 and 4 m. Due to its dimensions, a map of the Bacchiglione in Vicenza might only be possible from high resolution (HR) imagery – however this type of EO image cannot be requested in rush-mode (to be verified if this is possible in non-rush mode).

ID #	Description	Comments/clarifications	Priority
1.	FLOODIS must supply an email address to CFD for inclusion in the mailing list for floods alerts		absolute
2.	FLOODIS receives a simulated flood alert messages from CFD via email		absolute
3.	On simulated orange/red alert (warning), FLOODIS activates its processes		absolute
4.	FLOODIS should facilitate MoU between CFD and EFAS (tbv) enabling a possible data exchange		nice-to-have
5.	FLOODIS should set up connection to automatic monitoring system at CFD	FTP server of SIRAV (automatic monitoring 100 hydrometric stations	nice-to-have
6.	FLOODIS should advise CP Veneto if the EFAS processes (including the hydrological LISFLOOD model) will improve flood alerting for the Veneto region		recommended
7.	FLOODIS should agree with CP Veneto on the selection of a test site for FLOODIS	Proposed – city of Vicenza along the Bacchiglione river, or a location along the Po river	recommended
8.	Duration of demonstration to be agreed with CP Veneto		absolute
9.	FLOODIS to request EO images in advance from EMS in non-rush mode for area around agreed test-site		absolute

ID #	Description	Comments/clarifications	Priority
10.	CFD to complete EMS product data sheet (with FLOODIS support) for an area at risk, and have contact details for AU in Italy (Centro Situazioni, CP, Rome) for EMS		recommended
11.	FLOODIS should investigate the feasibility of requesting HR imagery of the city of Vicenza from EMS (non rush mode)		recommended
12.	FLOODIS must receive EO images from EMS and ingest this in a GIS system running on the FLOODIS platform	EO images possibly covering the agreed location of the demonstration	absolute
13.	FLOODIS must produce underlying map layer in a GIS (scale determined by EMS imagery)	Showing the agreed location of the demonstration	absolute
14.	FLOODIS must make interactive maps and simulated flood forecasts available on the Internet for visualisation at CFD		absolute
15.	FLOODIS must demonstrate that the FLOODIS apps can be downloaded onto professional and mass market devices		recommended
16.	FLOODIS should identify which data from SIRAV is useful for flood mapping and forecasting		nice-to-have
17.	FLOODIS should receive and ingest appropriate data from the FPT server of SIRAV		nice-to-have
18.	FLOODIS should investigate the feasibility of including 'hotspots' within the visualisation of the FLOODIS flood map	Threatened infrastructure (such as bridges) identified by CP Veneto for the selected	nice-to-have

ID #	Description	Comments/clarifications	Priority
		test site	
19.	FLOODIS should investigate the categorisation of areas along the river/s according to population numbers (size of area tbd)		nice-to-have
20.	FLOODIS must include GSM communications for communication between the field officers and the CO.R.EM		absolute
21.	FLOODIS must include satellite communications for communication between the field officers and the CO.R.EM	to be agreed with CFD	recommended
22.	FLOODIS to make use of last-mile WIFI when sat comms is used	To be discussed with CFD	nice-to-have
23.	FLOODIS must run inundation model and predict flood extent on map of Vicenza up to 9 days in advance		recommended
24.	FLOODIS must supply CP Veneto with a limited number of smartphones or tablets for testing purposes	OS to be decided	absolute
25.	FLOODIS must make flood maps and forecasts available to the FLOODIS app running on FLOODIS tablets and smartphones		absolute
26.	FLOODIS should investigate the value of the output from dynamic flood model for Bacchiglione river and its usefulness within the FLOODIS concept		nice-to-have
27.	FLOODIS should investigate if it can incorporate existing hydraulic models for flood forecasting	the Adige and the Brenta rivers in the Veneto region	nice-to-have

ID #	Description	Comments/clarifications	Priority
28.	FLOODIS to advise if it is feasible to speed of water on flood extent map		nice-to-have
29.	FLOODIS must enable the display of the map on video wall at CO.R.EM		absolute
30.	FLOODIS platform must receive the geo-locations of the FLOODIS devices and visualise these on the flood map together with an identification tag		absolute
31.	FLOODIS app must communicate the tablet's/smartphone's GPS position to the CO.R.EM at the touch of a button (on command) via GSM		recommended
32.	FLOODIS must demonstrate that the FLOODIS app that will link to the in-built camera		recommended
33.	FLOODIS app must demonstrate the 'send photo' capability to transfer the photo to the FLOODIS platform		absolute
34.	FLOODIS platform must receive geo-located photos from professional devices (via GSM network)		absolute
35.	FLOODIS app must demonstrate the specific input form for textual information to be filled in by professional users		recommended
36.	FLOODIS platform must receive geo-located textual information from professional devices (via GSM network)		recommended
37.	FLOODIS must display geo-located information (photos, textual information) in near-real time on flood map using pop-up windows		absolute

ID #	Description	Comments/clarifications	Priority
38.	FLOODIS must investigate how to update the flood extent map based on analysis of the photos		recommended
39.	FLOODIS must distinguish between location based information from registered devices and non-registered devices		recommended
40.	FLOODIS platform should receive location based information (photos and comments) from non-registered devices		recommended
41.	FLOODIS platform should collate and display information from non-registered devices on an electronic bulletin board		recommended
42.	FLOODIS makes a presentation on the advantages and limitations of social media in an emergency event.		recommended

Table 4-1: Table of FLOODIS technical requirements for the demonstration under WP7

4.2 TECHNICAL REQUIREMENTS FOR DEMONSTRATION WITH GENERAL DIRECTORATE (GD) CE ALBANIA

We proposed to undertake a demonstration in Albania, along the Shkodra river with the support from the General Directorate for Civil Emergency GD CE) and the Red Cross in Albania. In Albania, an organisation called IGEWE carries out forecasting of natural risks – currently floods and fires – for GD Civil Emergency also with a view to early warning.

The exact location of the demonstration along this river will be decided between the FLOODIS team and the GD CE. The Buna or Bojana is a 41 km long river which flows through Montenegro and Albania on its way to the Adriatic Sea. Unlike the Bacchiglione river in Veneto, the Buna is a wide,

navigable river. It is an outflow of Lake Skhodra (or Lake Skadar), and after passing through the city of Shkodra, the river receives its most important tributary, the Great Drin. The Great Drin now brings ten times more water than the Bojana itself[1]. This combined Buna/ Bojana river ends in a delta that is among the most important natural or semi-natural wetlands in the Eastern Mediterranean. The size and extent of these rivers make them a better test case for the value-add of EO imagery.

ID #	Description	Comments/clarifications	Priority
1.	FLOODIS must supply an email address or phone number to GD CE for inclusion in the notification list for floods alerts		absolute
2.	FLOODIS must receive a simulated flood alert messages from GD CE via email or phone.		absolute
3.	On a simulated orange/red alert (warning), FLOODIS must activate its processes		absolute
4.	FLOODIS should facilitate MoU between IGEWE and EFAS enabling a possible data exchange		nice-to-have
5.	FLOODIS should set up connection with DEWETRA platform	To be verified if DEWETRA information is useful for FLOODIS or vice versa	recommended
6.	FLOODIS should investigate if the EFAS processes (including the hydrological LISFLOOD model) will improve flood alerting for the Shkodra province.		recommended

[1] http://en.wikipedia.org/wiki/Bojana_(river)

ID #	Description	Comments/clarifications	Priority
7.	FLOODIS should agree with GD CE Albania on the selection of a test site for FLOODIS	Proposed – the Buna and Great Drin rivers from the lake of Shkodra to the sea	recommended
8.	Duration of demonstration to be agreed with GD CE Albania		recommended
9.	FLOODIS to request EO images in advance from EMS in non-rush mode for the areas around the agreed test site.		absolute
10.	GD CE Albania to complete EMS product data sheet (with FLOODIS support) for an area at risk, and have the contact details for the AU in Albania		recommended
11.	FLOODIS must receive EO images from EMS and ingest this in a GIS system running on the FLOODIS platform	EO images possibly covering the agreed location of the demonstration	absolute
12.	FLOODIS must produce underlying map layer in a GIS (scale to be determined by EMS imagery)	Showing the agreed location of the demonstration	absolute
13.	FLOODIS must make interactive maps and simulated flood forecasts available on the Internet for visualisation at the national Operational Centre (OC) of CE Albania		absolute
14.	FLOODIS must demonstrate that the FLOODIS apps can be downloaded onto professional and mass market devices		recommended

ID #	Description	Comments/clarifications	Priority
15.	FLOODIS should identify which data from DEWETRA is useful for flood mapping and forecasting	For example, data from automatic hydromet stations	recommended
16.	FLOODIS should receive and ingest appropriate data from DEWETRA, if applicable		recommended
17.	FLOODIS should investigate the feasibility of including 'hotspots' within the visualisation of the FLOODIS flood map	Threatened infrastructure (such as bridges, houses, etc.) identified by Red Cross Albania for the selected test site	nice-to-have
18.	FLOODIS should display houses/housing density as a layer on the flood maps (size of area tbd)		recommended
19.	FLOODIS must include GSM communications for communication between the field officers and the OC CP (national OC or Shkodra OC)		absolute
20.	FLOODIS must run inundation model and predict flood extent on map of Buna river up to 9 days in advance		recommended
21.	FLOODIS must supply GD CE or Red Cross volunteers with a limited number of smartphones or tablets for testing purposes	OS to be decided	absolute
22.	FLOODIS must make flood maps and forecasts available to the FLOODIS app running on FLOODIS tablets and smartphones		absolute
23.	FLOODIS should investigate the value of the output from dynamic flood model for Buna river and its usefulness within the FLOODIS concept		nice-to-have

ID #	Description	Comments/clarifications	Priority
24.	FLOODIS should investigate if it can incorporate existing hydraulic models for flood forecasting	the Buna river between Shkodra and the sea	nice-to-have
25.	FLOODIS must enable the display flood maps on a monitor at the OC CE (national OC or Shkodra OC)		absolute
26.	FLOODIS platform must receive the geo-locations of the FLOODIS devices and visualise these on the flood map together with an identification tag		absolute
27.	FLOODIS app must communicate the tablet's/smartphone's GPS position to the OC Albania (national or Shkodra) at the touch of a button (on command) via GSM		recommended
28.	FLOODIS must demonstrate that the FLOODIS app that will link to the in-built camera		recommended
29.	FLOODIS app must demonstrate the 'send photo' capability to transfer the photo to the FLOODIS platform		absolute
30.	FLOODIS platform must receive geo-located photos from professional devices (via GSM network)		absolute
31.	FLOODIS app must demonstrate the specific input form for textual information to be filled in by professional users		recommended
32.	FLOODIS platform must receive geo-located textual information from professional devices (via GSM network)		recommended
33.	FLOODIS must display geo-located information (photos, textual information) in near-real time on flood map using pop-up windows		absolute

ID #	Description	Comments/clarifications	Priority
34.	FLOODIS must investigate how the flood extent map can be updated based on analysis of the photos		recommended
35.	FLOODIS must distinguish between location based information from registered devices and non-registered devices		recommended
36.	FLOODIS platform should receive location based information (photos and comments) from non-registered devices		recommended
37.	FLOODIS platform should collate and display information from non-registered devices on an electronic bulletin board		recommended
38.	FLOODIS makes a presentation on the advantages and limitations of social media in an emergency event.		recommended

Table 4-2: Table of FLOODIS technical requirements for the demonstration under WP7

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