FLOODIS

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

Technical Feasibility Study

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1 INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

This Technical Feasibility Study has been prepared under WP 3 of the FLOODIS project – Integrating GMES Emergency Services with satellite navigation and communication for establishing a flood information service. It represents deliverable D3.1 under this Collaborative Project (no. 607220) awarded under the SPACE call SPA.2013.1.2-01.

The goal of this document is to analyse the requirements specified in D2.2 – Technical User Requirements [RD01] – and to define for each user requirement if the implementation of it is feasible as part of the technical design of FLOODIS. In addition the second major part of the document contains the full specification of all technical requirements based on the user input together with requirements based on the project proposal and the technical experience of the consortium.

1.2 STRUCTURE OF THE DOCUMENT

The document is organised as follows:

- **Chapter 1** is this introduction and description of the document itself;
- **Chapter 2** analyses the user requirements regarding their technical feasibility
- **Chapter 3** puts together all technical requirements as foundation for development activities

1.3 ACRONYMS LIST

CP	Civil Protection
DMC	Disaster Management Centre
EDAS	EGNOS Data Access Service
EFAS	European Flood Alert System
EGNOS	European Geostationary Navigation Overlay Service
EMS	Emergency Management Service
EO	Earth Observation
FR	Functional Requirement
GIS	Geographic Information System
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile Communications
NFR	Non-functional requirement
OGC	Open Geospatial Consortium
PR	Performance requirement
URL	Uniform resource locator
WMS	Web Map Service

1.4 REFERENCE AND APPLICABLE DOCUMENTS

ID	Title	Revision	Date
[RD01]	D2 Technical User Requirements	-	16/06/2014

2 FEASIBILITY ANALYSIS

Within the following feasibility analysis the requirements formulated based on conducted user meetings have been taken from the technical requirements document and are now analysed for their technical feasibility. The key difficulty in this task is to translate the requirements, which are written in user language, into technical language and to extract the requirements for the system on a technical level. The requirements have been grouped in different sections, so that similar requirements are listed after each other. For each requirement the original number and the description according to D2.2 are provided, followed by a brief technical analysis.

In addition the priority category according to D2.2 is given by using the color legend described in the following table.

	Required
	Recommended
	Nice-to-have

Table 2-1: Legend for priority categories

2.1 FUNCTIONAL REQUIREMENTS

In the following sections functional requirements identified from the technical requirements document are listed together with their technical feasibility analysis. Furthermore a column was added, which simply shows whether the requirement is currently evaluated to be fulfilled in the frame of the project ("Realisation"). To facilitate the overview of the 51 requirements, they have been grouped with regard to contents. As a result we have the following requirement groups:

- General functionality
- Input data
- Interface of mobile application
- Interface of desktop application
- Communication capabilities
- Additional requirements

2.1.1 GENERAL FUNCTIONALITY

Req.	Description of requirement	Technical feasibility - analysis	Realis.
1.	FLOODIS must develop a platform that runs GIS software to produce flood extent maps and flood forecasts	FLOODIS ingests flood extent maps from the Copernicus EMS and produces, when sufficient data is available, flood forecast maps. All these maps are provided on the web and to mobile apps with state-of-the-art web map technology.	yes
2.	FLOODIS must make flood maps and forecasts available on the Internet and the FLOODIS app	Traditional internet browsers and mobile apps are the two channels for disseminating flood maps with FLOODIS. Technology in this area is far developed and realisation is not critical.	yes
28.	FLOODIS must make flood maps and forecasts available to the FLOODIS app running on registered tablets and smartphones	Flood maps and forecasts shall be provided both to registered (professional) users and to normal users (citizens) of the mobile apps. The type and level of detail of the information provided will depend on the status of the user (registered, unknown, …).	yes
49.	FLOODIS must make FLOODIS app widely available for download	The app will be made available through the main App Stores (i.e. Google Play Store, Apple App Store and Windows Store)	yes
10.	On orange/red (TBD) alert (warning) [from EFAS], FLOODIS must activate its processes	The FLOODIS platform will be available all the time for the display of historical floods. The flood management services will be activated according to the necessity and under user supervision.	no
12.	FLOODIS must produce a flood map layer in GIS (scale to be determined by EMS flood maps received)	Based on the EMS products FLOODIS will deliver flood maps that can be viewed in browser or in a dedicated mobile app. The flood maps can also be loaded in a GIS as WMS.	yes
50.	FLOODIS can end 24/7 accessibility when end of alarm is called by DMC	For the display of historical floods it is suggested to make FLOODIS available all the time for post-disaster analysis purposes.	no

43.	FLOODIS must update the flood extent map based on textual information from professional devices	There are no suitable procedures in place to “correct” flood extent maps using textual information, which could in addition be undependable or imprecise. FLOODIS will consider though using user-generated measurements on the field to improve flood modelling.	no
4.	FLOODIS must distinguish between information received from registered and subscribed devices (smartphones/tablets)	According to the authorization model, FLOODIS is going to distinguish information input between registered and subscribed users. Information of registered users (professionals) is seen as more reliable and so it makes sense to have two groups of users. It is not suggested to subscribe or register devices, but rather users.	yes
44.	FLOODIS platform must distinguish between location based information from registered devices and non-registered devices (subscribed users)	See requirement 4.	yes
45.	FLOODIS platform should receive location based information (photos and comments) via the FLOODIS app from subscribed users	The FLOODIS app will make it possible to send location based information (photos and text messages) through the mobile apps to users who have registered to the platform	yes
29.	FLOODIS should investigate the value of the output from dynamic flood model for river/s and its usefulness within the FLOODIS concept	This will be investigated.	yes
33.	FLOODIS should investigate if speed of water can be visualised in a GIS layer on the flood extent map	This is technically not feasible with the data we will have available in this project. We would need that information from gauging stations. This requirement is seen as out of scope of this project.	no
42.	FLOODIS must update the flood extent map based on analysis of the location based photos from professional devices	There are no suitable procedures in place to “correct” flood extent maps using photos, which could in addition be undependable or imprecise.	no

Table 2-2: General functionality of FLOODIS

2.1.2 INPUT DATA

Req.	Description of requirement	Technical feasibility	Realis.
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	The detection of the current location of users and to locate it on a map is possible.	yes
11.	FLOODIS must be capable to ingest EO images (at various resolutions) from EMS as soon as they have been received	EMS maps will be ingested from the EMS website and stored in a geospatial database. It is important for subsequent applications that all maps are stored together with relevant metadata.	yes
9.	FLOODIS must receive FLOODIS alert messages from EFAS or regional DMC via email	FLOODIS will also look for more advanced alerting, e.g. for GeoRSS.	yes
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 relevant Operational Centres	This will be investigated and documented. No technical consequence for FLOODIS is derived from this requirement.	yes
14.	FLOODIS should investigate if data from regional automatic hydromet monitoring systems (in-situ data) is useful for flood mapping and forecasting	This will be investigated and documented. No technical consequence for FLOODIS is derived from this requirement.	yes
15.	FLOODIS should investigate which data and/or maps from the DEWETRA platform are useful for FLOODIS	This will be investigated as soon as we get access to DEWETRA.	yes
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	Copernicus EMS derives certain standard layers for reference maps (pre-event maps). There are various layers (buildings etc) available. It could be an option to ingest such datasets in a demonstration case and to check with users, which datasets are useful for them.	yes
16.	FLOODIS should advise the CIMA Foundation on how the FLOODIS EO-based maps could be used by the DEWETRA platform	This refers mainly to flood forecast maps, since EMS maps are not changed by FLOODIS. The provision of EMS extent maps as WMS could be in conflict with JRC. This is not seen as technical issue.	yes
17.	FLOODIS should investigate the feasibility of including provincial and municipal 'hotspots' within a GIS layer of the flood map	In case hot-spots are defined by users and this information is provided as GIS layer, it could be integrated.	not decided yet

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.	This is technically possible, but needs concrete population statistics. It is seen as a rather advanced topic, whereas the project team needs to focus on the core topics.	no

Table 2-3: Input data.

2.1.3 INTERFACE OF MOBILE APPLICATIONS

Req.	Description of requirement	Technical feasibility	Realis.
3.	FLOODIS must develop a smartphone/tablet application that is able to display the flood maps	For the mobile app map services like (WMTS, Web Map Tiling Services) are foreseen to cope with the special requirements of mobile devices and to enhance the performance.	yes
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)	While it is technically feasible, it is seen critical from a data protection point of view. Especially the collection of citizens' locations is regarded as not appropriate. The use of such a feature is not clear to the technical team, since photos and messages are anyway geo-tagged.	no
35.	FLOODIS app must include a simple button that will link to/call up the in-built camera (for both professional and mass market devices)	A button to all the in-built camera will be integrated in the mobile apps.	yes
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)	FLOODIS user will be able to send photos with such an option. It will also include the location of the camera when the photo was taken.	yes
38.	FLOODIS app must include a specific input form for textual information to be filled in by professional users	This will be a text box to be filled by the user. This feature can also be provided to the public users registered on the platform.	yes
6.	The FLOODIS app should have the pan and zoom features similar to Google maps (for mobile devices) to ensure ease-of-use	Through modern mobile and web mapping technologies this feature is available.	yes

Table 2-4: Frontend functionality.

2.1.4 INTERFACE OF DESKTOP APPLICATION

Req.	Description of requirement	Technical feasibility	Realis.
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.)	Modern web mapping technology enables map controls such as pan, zoom and layer toggling. The website is planned to be only available to professional users (i.e. customers of FLOODIS) and not the public, since it is also an administration tool for filtering the information (photos, messages) provided by users.	yes
37.	FLOODIS platform must receive geo-located photos from professional devices (via GSM network)	Photos should include location information in metadata (EXIF header) that can be extracted and fed into the database. Due to the high data amount of a photo, resolution limitations in the app are important to be implemented.	yes
39.	FLOODIS platform must receive geo-located textual information from professional and public (registered) devices (via GSM network)	Text messages must include location information in metadata that can be extracted and fed into the database together with the message itself. A certain limitation of the text message is useful to avoid any problems in the database.	yes
40.	FLOODIS must display geo-located information (photos, textual information) from professional devices on flood map using pop-up windows	Georeferenced photos and textboxes can be linked to symbols on map and opened with one click or tapping on the touchscreen.	yes

Table 2-5: Administration interface.

2.1.5 COMMUNICATION CAPABILITIES

Req.	Description of requirement	Technical feasibility	Realis.
21.	FLOODIS must enable GSM (GPRS or 3G) communications between the professional devices and the FLOODIS platform	This is seen as the main way of communicating information by the apps. FLOODIS has to consider that GSM connections might be slow in remote locations.	yes
24.	FLOODIS must investigate the requirement for the inclusion of satellite communications within the FLOODIS concept	This will be investigated and documented. FLOODIS aims at making the platform as universal as possible in terms of hardware requirements.	yes
20.	FLOODIS must respond to users' question on whether FLOODIS devices (tablets and smartphones) can communicate information back to the DMC via VHF radio	See requirement 24. The use of radio channel though could seriously limit the functionalities due to the low data rates.	yes
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	See requirement 24.	yes
25.	FLOODIS must investigate the option of using WIFI for the last-mile communications with satellite communications from the field-officers	See requirement 24.	
22.	FLOODIS should investigate the use of TETRA (digital radio) for transmission of information for FLOODIS between DMC and field-officers	See requirement 24.	

Table 2-6: Communication capabilities.

2.1.6 ADDITIONAL REQUIREMENTS

Req.	Description of requirement	Technical feasibility	Realis.
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.	This is not seen as a technical requirement, but rather as a necessity of the project. There is a dedicated work package for these activities.	yes
46.	FLOODIS should collate and display the location based information from non-registered devices on a separate electronic bulletin board	This is not regarded as practical and deviates from the Description of Work. Instead DMCs shall have the possibility to filter the location based information in order to remove inappropriate photos and messages. This will be possible with the desktop application.	yes
47.	FLOODIS to carry out trend analysis on information from non-registered devices	This requirement is rather unspecific and needs to be clarified.	no
48.	FLOODIS must monitor social media sites (FB, Twitter, etc.) for flood trend confirmation	There is a feasibility study about the use of social media in flood situations. No implementation is foreseen.	no

Table 2-7: Additional functionality.

2.2 NON-FUNCTIONAL REQUIREMENTS

5.	The user interface of the FLOODIS app must be designed and implemented to ensure ease-of-use by all	FLOODIS will integrate user-friendly state-of-the-art web and mobile technologies.	yes

Table 2-8: Non-functional requirements.

2.3 PERFORMANCE REQUIREMENTS

Req.	Description of requirement	Technical feasibility	Realis.
26.	FLOODIS must run the inundation model to produce a possible flood extent map for up to 9 days in advance (tbc)	FLOODIS as a Copernicus downstream service of EFAS will use its output for model input. The inundation model cannot be run if this data is not available from EFAS.	yes

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	This applies especially for the first time a flood in a certain area occurs. As soon as an area was affected for the first time, it is suggested to keep data accessible all the time, because users shall also have the option to view historic floods (flood events that happened in the past) for analysis purposes as well.	yes
7.	FLOODIS professional registered devices must be capable of reporting positioning to within 2-5 m accuracy (EGNOS positioning).	The use of EGNOS/EDAS services in the FLOODIS platform will allow for a nominal horizontal accuracy in the required range, depending in any case on the type of receiver, number of satellites used and the local multipath effects.	yes
32.	FLOODIS must update flood extent maps every 3 hours (to be agreed) for DMC	FLOODIS can only provide flood extent maps as soon as JRC provides them on their website, which is usually in intervals of days.	no
31.	FLOODIS platform should receive regular updates (timing to be discussed) from the automatic monitoring systems to improve the flood forecasting	To be investigated. The effective connection with third party automated monitoring systems is currently out of the scope of the project.	no
41.	FLOODIS must update flood forecast maps – twice daily	The long-term EFAS flood forecasts for Europe are provided twice daily (00h, 12h) and these updates will be made available through FLOODIS.	yes

Table 2-9: Performance requirements.

3 TECHNICAL REQUIREMENTS SPECIFICATION

In the previous chapter user requirements were analysed regarding their technical feasibility. As next step it is necessary to specify in detail the functionality of FLOODIS based on the user requirements, but also on technical necessities and the concept of the system as outlined in the Description of Work. While the name of D2.2 is “technical user requirements” it is not written in a technical language. Now this needs to be translated into technical terms for realisation. The following sections therefore contain the technical requirements, which are grouped based on different building blocks of the system:

- Backend
- Desktop application
- Mobile application

Each of the user requirements defined in chapter 2 of this document has a technical impact in at least one of these three building blocks. So the specified technical requirements can be regarded as a kind of to-do-list for the engineering of FLOODIS.

The following sections cover all functional, non-functional and performance requirements defined for FLOODIS. The requirements are targeted towards the operational system and not only for the ongoing project. Limitations to the fulfilment of requirements are provided in a special column of the requirements table.

The process for definition of these requirements can be summarised as follows:

1. Derive the requirements from the end users (see [RD-01]). These are documented in chapter 2. For these kinds of requirements the column “Driver” is set to “End User”
2. Analyse the requirements regarding their feasibility.
3. Translate the user requirements in technical language and group them according to the three building blocks (backend, desktop, mobile).
4. Add to the identified requirements also requirements expected from the system side or e.g. demand looking on the future operational usage of FLOODIS. For these kind of requirements the column “Driver” is set to e.g. “System”
5. Add also the limitations to each technical requirement.

The columns in the respective tables of the requirements are defined as follows:

ID	Unique identifier of the requirement which consists of [Type]_[Number] Type ○ **FR** for functional requirements ○ **NFR** for non-functional requirements ○ **PR** for performance requirements Number starting from the beginning of each level and type
Name	Short name of the requirement
Description	Description of the requirement, specifying it in more detail
Limitation FLOODIS	Limitations which have to be considered in the project
Driver	End user: Requirements that have either been explicitly stated by end user or have a direct impact on the end user experience System: Requirements that have been derived from end user requirements or need to be provided by the system from a holistic point of view

Table 3-1: Description of requirements

3.1 BUILDING BLOCK – BACKEND

The following requirements are defined the FLOODIS building block “backend”

Legend: *“FR_xxx”* *Functional Requirement*
“NFR_xxx” *Non Functional Requirement*
“PR_xxx” *Performance Requirement*

ID	Name	Description	Limitation FLOODIS	Driver
FR_101	Messaging	Listen to notifications about new data including the following information: • unique id • URL of current image location • date / time of map production date or satellite image acquisition • Now free of floods		System
FR_102	Data retrieval	Retrieve map data from the Copernicus EMS website and save it to the FLOODIS backend server		System
FR_103	Database storage	Store every retrieved map in the geospatial database		System
FR_104	Registration	Every retrieved map to be registered as layer for the mapserver		System

ID	Name	Description	Limitation FLOODIS	Driver
FR_105	Integration	Every registered layer to be integrated in a Layer Group (which is named according to the area flooded)		System
FR_106	Tiles processing	Create map tiles from data	Map tiles are created for specified zoom levels	System
FR_107	Replication	Map tiles to be replicated from the Mobile Data Store to the Desktop Data Store (which includes all historic data)		System
FR_108	Delete	If area is now free of floods, deletion of all tiles depicting flooded areas shall be done in the Mobile Data Store		System
NFR_101	Reliable	Always produce the same result when getting the same input		System
PR_101	Fast retrieval	Retrieval of maps for 100 km² from data storage component within 10 minutes	Hardware dependent	System
PR_102	Fast tile processing	Generation of one tile at Cartographic Map Processor does not take more than 0.1 seconds	Hardware dependent	System
PR_103	Fast replication	Replication of one tile from Cartographic Map Processor to Cartographic API does not take longer than 0.1 seconds	Hardware dependent	System

Table 3-2: Technical requirements of the backend

3.2 BUILDING BLOCK – DESKTOP APPLICATION

The following requirements are defined the FLOODIS building block “desktop application”

Legend: *“FR_xxx”* *Functional Requirement*
“NFR_xxx” *Non Functional Requirement*
“PR_xxx” *Performance Requirement*

ID	Name	Description	Limitation FLOODIS	Driver
FR_201	Web map service	Provide OGC map service (WMS) to desktop application (PC)		System
FR_202	Show flood extent maps	Show flood extent maps with a different signature for - flooded areas - flood free areas		System
FR_203	Show flood forecast maps	Show flood forecast maps with different map symbols for - flooded areas - unflooded areas		System
FR_204	Show local information	Make user provided photos and messages viewable in the area of interest by using markers and pop-ups	Only photos and messages selected by the FLOODIS administrator are shown	End user
FR_205	Filtering	FLOODIS administrator can select which photos and messages are made public through a special user interface		End user

ID	Name	Description	Limitation FLOODIS	Driver
FR_204	Show background map	Show background maps (e.g. Google Maps) for orientation		System
FR_205	Hide flood map	The user has the option to activate / deactivate the visibility or define a certain degree of transparency of the flood map (so that the background map is partially visible)		System
FR_206	WMS	Provide WMS to GIS		System
FR_207	Authentication	Ask for credentials before desktop application can be accessed		System
FR_208	Authentication	Ask for credentials before WMS can be accessed via GIS		System
FR_209	Historic data	Users can make a query using a time period to get calendar days for which historic data are available		End user
FR_210	Errors	Display of error message when web map service is not operational		System
FR_211	Zooming	Zooming in / out is possible	Predefined zoom levels	End user
FR_212	Date and time stamp	Each tile of a flood extent map shall be shown together with date and time of map production (if possible acquisition date of used satellite images)		System
FR_213	Input location	User can input location (coordinates or address) for centering the map	Only geographic coordinates	End user
FR_214	Geolocate	HTML geolocation functionality can be used to show own location		System

ID	Name	Description	Limitation FLOODIS	Driver
		of user on map (if the user agrees to do so)		
NFR_201	OS desktop	Works on various desktop operating systems	Windows XP, Windows 7, Windows 8, Linux	End user
NFR_202	Browser	Map window can be visualised in various browsers	Firefox, Internet Explorer, Chrome (current versions)	End user
NFR_203	GIS	OGC service (e.g. WMS) can be ingested in various GIS	QGIS, ArcGIS, ...	End user
PR_201	Fast map display	Map display on GIS: - full screen display within 10 seconds (network with at least 20 Mbit/sec) Map display for desktop application: - full screen display within 5 seconds (network with at least 100 Mbit/sec) - full screen display within 10 seconds (network with at least 20 Mbit/sec)		End user
PR_202	Traffic	50 concurrent users are possible on desktop and GIS (altogether)		System
PR_203	Precise localisation	Own location is shown precisely on map of browser		End user

Table 3-3: Technical requirements of the desktop application

3.3 BUILDING BLOCK – MOBILE APPLICATION

The following requirements are defined the FLOODIS building block “mobile application”

Legend: *“FR_xxx”* *Functional Requirement*
“NFR_xxx” *Non Functional Requirement*
“PR_xxx” *Performance Requirement*

ID	Name	Description	Limitation FLOODIS	Driver
FR_301	Tiled web map service	Provide OGC map service (WMTS) to mobile devices		System
FR_302	Show flood extent maps	Show flood extent maps with a different signature for - flooded areas - flood free areas		End user
FR_303	Show flood forecast maps	Show flood forecast maps with a different signature for - flooded areas - flood free areas		End user
FR_304	Show local information	Make user provided photos and messages viewable in the area of interest by using markers and pop-ups	Only photos and messages selected by the FLOODIS administrator are shown	End user
FR_304	Show background map	Show background maps (e.g. Google Maps) for orientation		End user

ID	Name	Description	Limitation FLOODIS	Driver
FR_305	Hide flood map	The user has the option to activate / deactivate the visibility of the flood map (so that only the background map is shown)		End user
FR_306	Authentication	Provide a screen for subscribing to FLOODIS in order to elevate access rights and provide more functionality		End user
FR_307	Errors	Display of error message when tiled web map service is not operational		System
FR_308	Zooming	Zooming in / out is possible	predefined zoom levels	End user
FR_309	Date and time stamp	Each tile of a flood extent map shall be shown together with date and time of map production (if possible acquisition date of used satellite images)		End user
FR_310	Input location	User can input location (coordinates or address) for centering the map	only geographic coordinates	End user
FR_311	Geolocate	GPS signal of mobile device can be used to show own location on map (if the user agrees to do so)	automatic refresh is not useful, because user might want to have a look in other regions	End user
FR_312	Cache	During user interaction in the mobile application, map data is stored in the cache while Internet is available. Cached map data can be retrieved when Internet is interrupted.	only zoom levels and locations where the user browsed in online situation are available in offline situation	System

ID	Name	Description	Limitation FLOODIS	Driver
FR_313	Send text messages	The user can send text messages (using UMTS) to the central FLOODIS platform to inform about floods through the dedicated mobile application (pre-programmed messages can also be chosen)	the number of characters will be limited	End user
FR_314	Send photos	The user can send photos to the central FLOODIS platform to inform about floods	the resolution of the photo will be limited	End user
FR_315	Emergency information	The app shall provide helpful information for the users in case he or she gets into an emergency situation (i.e local emergency numbers)		End user
NFR_301	OS mobile	Works on various mobile operating systems	Android, IOS, Windows Phone	End user
NFR_302	Download	The mobile application is available for download in the main mobile app stores (Play Store, Apple Store, Windows Store)		End user
NFR_303	Compatibility	The app works at least on the newest versions of the operating systems, but compatibility to older, but widespread versions desirable	Not all older OS versions can be supported	End user
PR_301	Fast map display	Map display on mobile application: - full screen display within 10 seconds (H+ network)		End user

ID	Name	Description	Limitation FLOODIS	Driver
		- full screen display within 60 seconds (weak radio network, e.g. 3G)		
PR_302	Precise localisation	Own location is shown precisely on map of mobile device		End user

Table 3-4: Technical requirements of the mobile application

4 CONCLUSIONS

Within this document the user requirements were analysed regarding their feasibility. This task is of high relevance for the project as the requirements basically define a system that would be of the highest value for the user. However users are often not aware of the technical feasibility of their “wishes”. Therefore all of their requirements were analysed in this respect, but also in terms of economical feasibility. Sometimes requirements like for example the provision of satellite images as information layer in the map interface would be a nice-to-have for a user, but of extreme complexity in terms of realisation for the technical team. After this “reality check” user requirements were translated in technical requirements for the system. Within the third chapter of this document requirements are listed for the three identified building blocks (backend, desktop application and mobile application). They are written in a technical language and do not only consider the user requirements but also the requirements given by system capabilities as well as requirements not mentioned by users, but still important based on technicians’ experience.

END OF THE DOCUMENT