Emergency Mapping use case (ELF WP7)

Emergency Mapping and ELF
Main outcomes and findings

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the Competitiveness and Innovation framework Programme (CIP)
ICT Policy Support Programme (PSP) Call 6 Grant 325140

ITHACA

Non-profit association, ITALY, www.ithacaweb.org

Mission

Use of Geomatics techniques in support of emergency management, with a focus on disaster preparedness and response

10th Anniversary

Founders:

Istituto Superiore sui Sistemi Territoriali per l'Innovazione

POLITECNICO DI TORINO

Donors:

Compagnia di San Paolo

In cooperation with:

WFP World Food Programme wfp.org

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Why ITHACA in ELF?

Expertise relevant for ELF

Satellite-based Emergency Mapping since 2006, supporting UN WFP response activities

Member of the consortium acting as Service Provider for the **Copernicus Emergency Management Service** (© European Union, 2012-2016) - **Rapid Mapping** since 2012 (former GIO-EMS Rush)

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Why ITHACA in ELF?

A recent publication on Science journal:

A review of global trends of rapid mapping in 15 years (2000-2014)

http://science.sciencemag.org/content/353/6296/247

DOI: 10.1126/science.aad8728

EMERGENCY MAPPING USE CASE (part of ELF WP7)

Main Aim

The emergency mapping use case – in the framework of ELF WP7 - is primarily aimed at determining the **additional value when generating emergency mapping products/analyses exploiting the availability of the reference datasets served by the ELF platform** with a main focus on the benefits of the **ELF download services**.

Methodology

Definition of a **COMPARISON PROTOCOL** mainly focused on emergency mapping *procedures* and *products*, to be applied during planned emergency mapping exercises (based on **past real/simulated events**) carried out with/without ELF platform and data**, with the goal to identify specific emergency mapping steps which can potentially benefit from ELF**.

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EMERGENCY MAPPING EXERCISES

Industrial Accident in Vrbětice (Czech Republic)
Copernicus Emergency Management Service (© 2015 European Union), EMSR113

Flood in Lapua Centre (Finland)
Simulated event

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EMERGENCY MAPPING EXERCISE 1

Industrial Accident in Vrbětice (Czech Republic)
Copernicus Emergency Management Service (© 2015 European Union), EMSR113

On December 3rd, 2014**, a series of blasts took place in a munitions depot** at Vrbětice in south Moravia (Zlinsky Region), which was already affected in mid-October by a devastating explosion.

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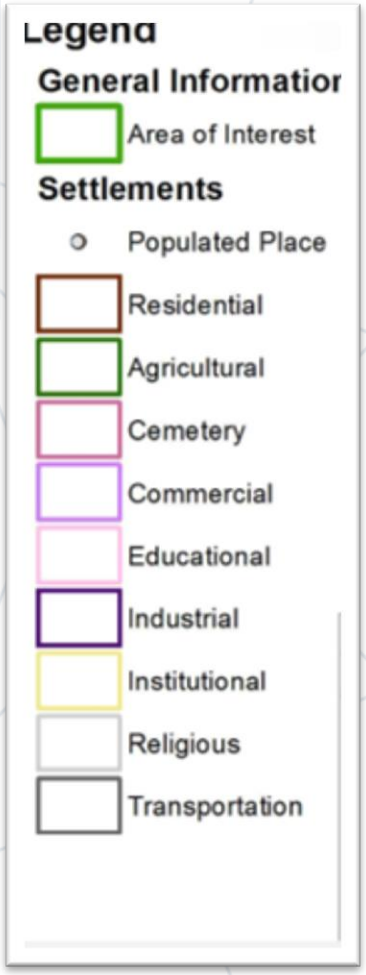
[EMSR113] Vrbětice: Reference Map (Detail)

Main input datasets: **open data** manually refined exploiting the NMCA orthoimagery



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SAME MAP WITH ELF DATASETS

Main input datasets: **ELF download services (CZ-BU, CZ-HY)**

ELF dataset

Manually edited features

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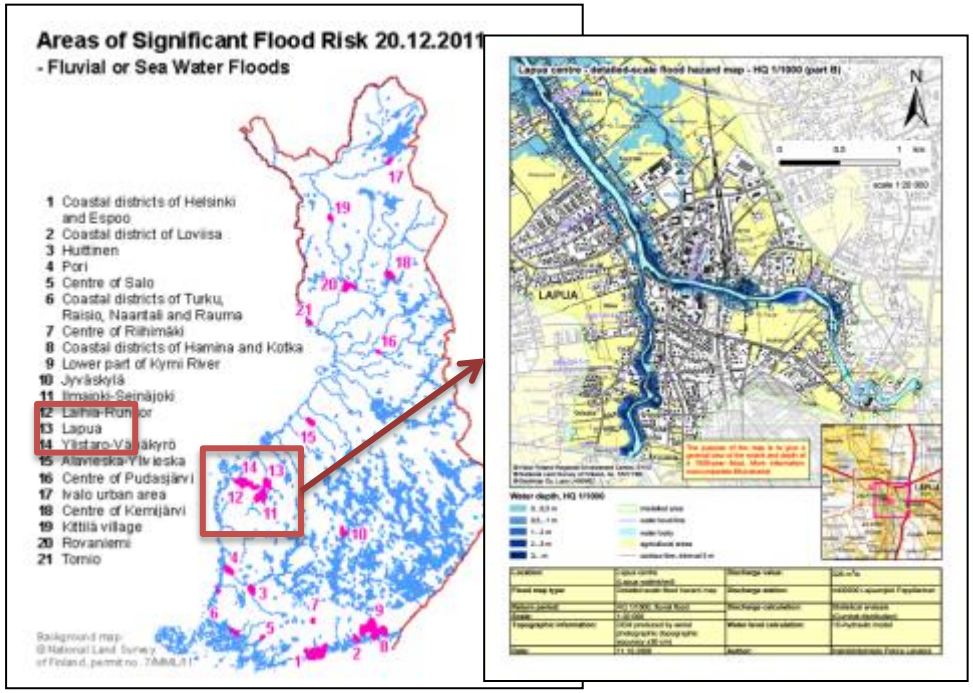
EMERGENCY MAPPING EXERCISE 2

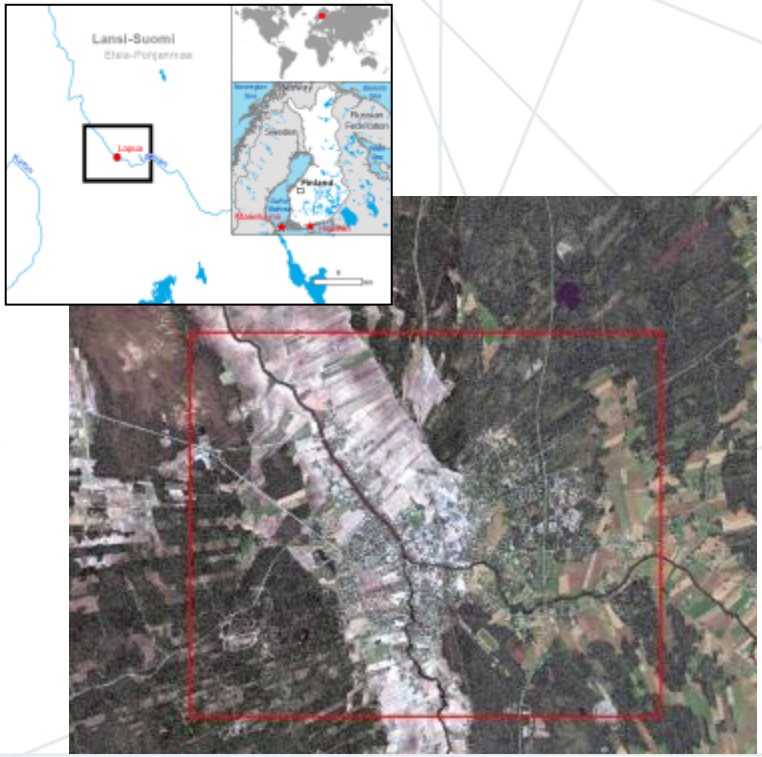
Flood in Lapua Centre (Finland)

Virtual Event – AOI defined according to Flood Map Service data

EU Floods Directive (2007/60/EC), areas of potential significant flood risk (preliminary flood risk assessment - PFRA).

In Finland, the Ministry of Agriculture and Forestry has assessed significant flood risk in 21 areas (Dec 2011). **Flood hazard and flood risk maps** (source: Flood Map Service www.ymparisto.fi/tulvakartat).





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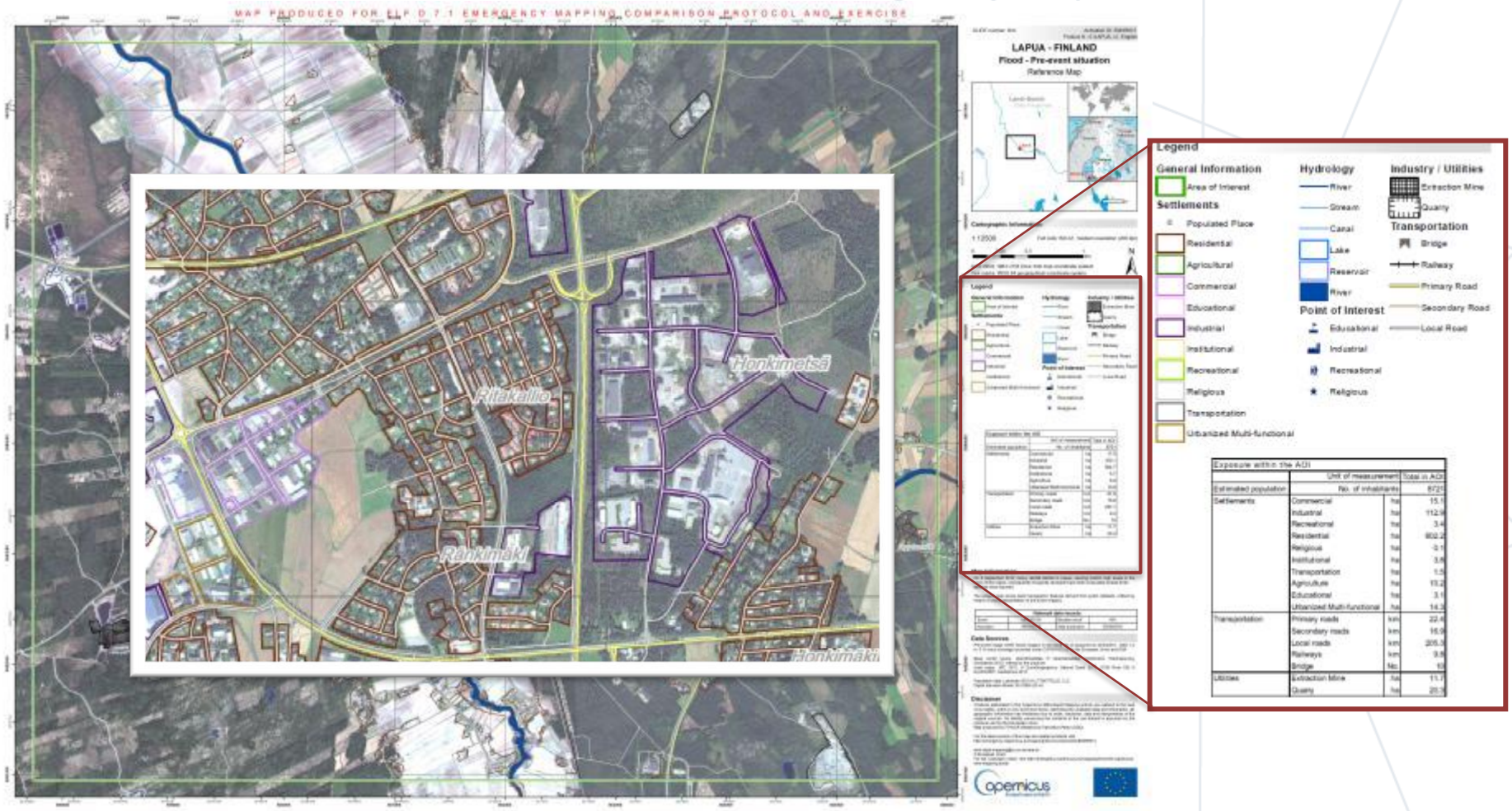
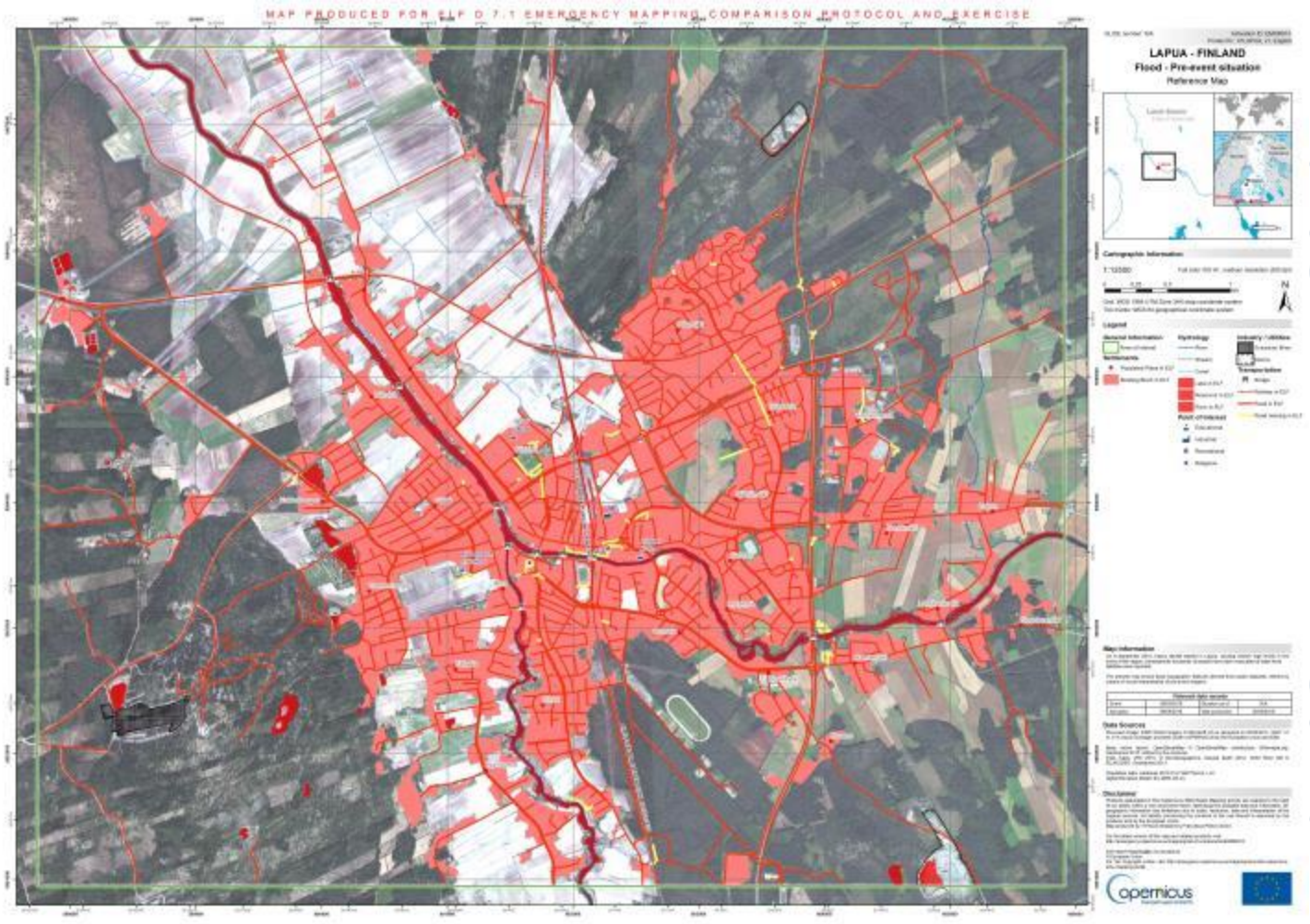
Simulated Flood in Lapua Centre Reference Map

Main input datasets: **open data** manually refined exploiting ESRI World Imagery (acquired on 22/04/2011)



SAME MAP WITH ELF DATASETS

Main input datasets: **ELF download services (FI-BU, FI-HY, FI-TN, FI-GN)**



ELF dataset

Manually edited features

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PROCESS EVALUATION SUMMARY

Processing steps that mainly benefitted from ELF:

- Pre-event imagery: **~5 h → ~0 h**
  - **NMCA orthoimagery ELF pilot service** avallabile as WMS
  - Better **update** wrt global imagery services

- Reference dataset editing: **~20 h → ~2.5 h (Exercise 1)**
  ~16 h → ~7.0 h (Exercise 2)
  - Using the ELF services, this step could be potentially reduced to **0 h depending on the completeness and update of the NMCA data** (and generalisation at different scales)
  - **Authoritative** datasets

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ELF WFS 2.0 access

- Both OS and commercial GIS Desktop clients have issues in accessing ELF WFS2.0 Cascading services:
  - QGIS WFS2.0 extension is a beta version with **very limited customization possibilities**
  - ESRI Arcgis 10.4.x + Data Interoperability extension: **ad-hoc setting** required to overcome some issues on the server side (maximum number of features, SRS, application schemas)
  - **Complex application schemas** (crucial geometry attributes are lost, e.g. land cover class, functional road class)
- ELF cascading service **stability** and **consistency**

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MAIN ISSUES

Dataset completeness (both geometries and attributes)

★ **Few omission errors** (mainly related to the update and/or level of detail)

★ **Voidable fields** (required for emergency mapping), e.g.:

- ★ All → «beginLifeSpanVersion» (update)
- ★ Building → Current Use
- ★ Hydrography → Hydrography Name

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Main outcomes - Foreword

The results are based on **ELF download services as of September 2016**, and the **main focus** of the exercise is **on evaluating the benefits deriving from the ELF project** and not on the quality of NMCA datasets.

Limited availability of themes and countries covered by the download services at M42 → emergency mapping exercises finalised, but with **some limitations**.

The conclusions are those of ITHACA and do not necessarily reflect the official position of the Copernicus EMS - Mapping actors (e.g. entrusted entities, service provider)

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Main outcomes

Possible improvements produced by the exploitation of ELF NMCA dataset and web services mainly classified in terms of:

- **reduction of time** required for the execution of the expected activities
- **reduction of operational steps** to be carried out
- **streamlined workflow**

Therefore → **reduction of time required to produce reference cartographic products**, allowing then a **faster delivery of final products to the users**

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Main outcomes

The **actual significance** of the benefits of the ELF services on specific emergency mapping activities **heavily depends on the completeness (as well as on their level of detail and update) of NMCA datasets/themes** available as ELF download services for the country of interest

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