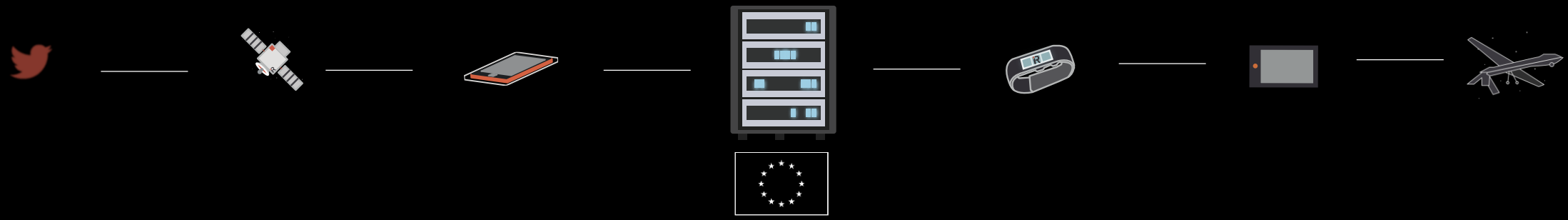
iREACT

Improving Resilience to Emergencies Through Advanced Cyber Technologies

Claudio Rossi
LINKS Foundation



FUNDED BY THE EUROPEAN COMMISSION.
SECURITY WORK PROGRAMME
(DRS-1-2015)

THE I-REACT PROJECT A TOOL FOR DISASTER RISK REDUCTION

Improving Resilience to Emergencies through Advanced Cyber Technologies

20 PARTNERS

5 YEARS

SME	12
Research Centers	3
Universities	2
Public Companies / Institutes	2
UN Body	1

2016

2017

2018

2019 May

I-REACT PROJECT BLUEPRINT

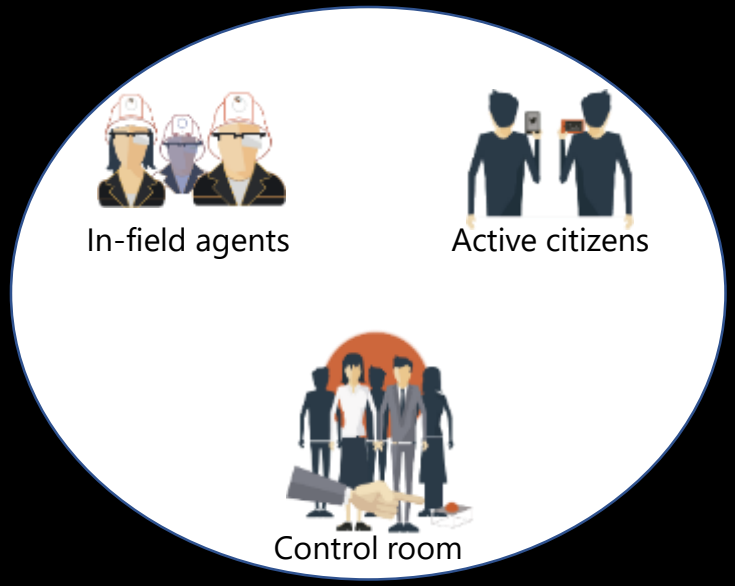
INCREASE RESILIENCE

*Help society in becoming more resilient to crises arising **before, during and after** emergency events.*

CYBER TECHNOLOGIES

Monitor the territory and support emergency organization in DRM

- HEARTH OBSERVATION
- WEARABLES
- AUGMENTED REALITY
- UAV
- SOCIAL MEDIA



CITIZEN ENGAGEMENT

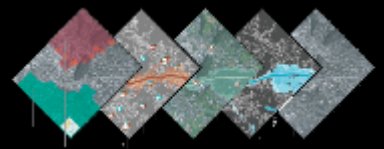
Raise awareness and promote a more capillary territory monitoring

- INFORMATION and AWARENESS
- GAMIFICATION
- CROWDSOURCING

2 LEVELS of VALIDATION

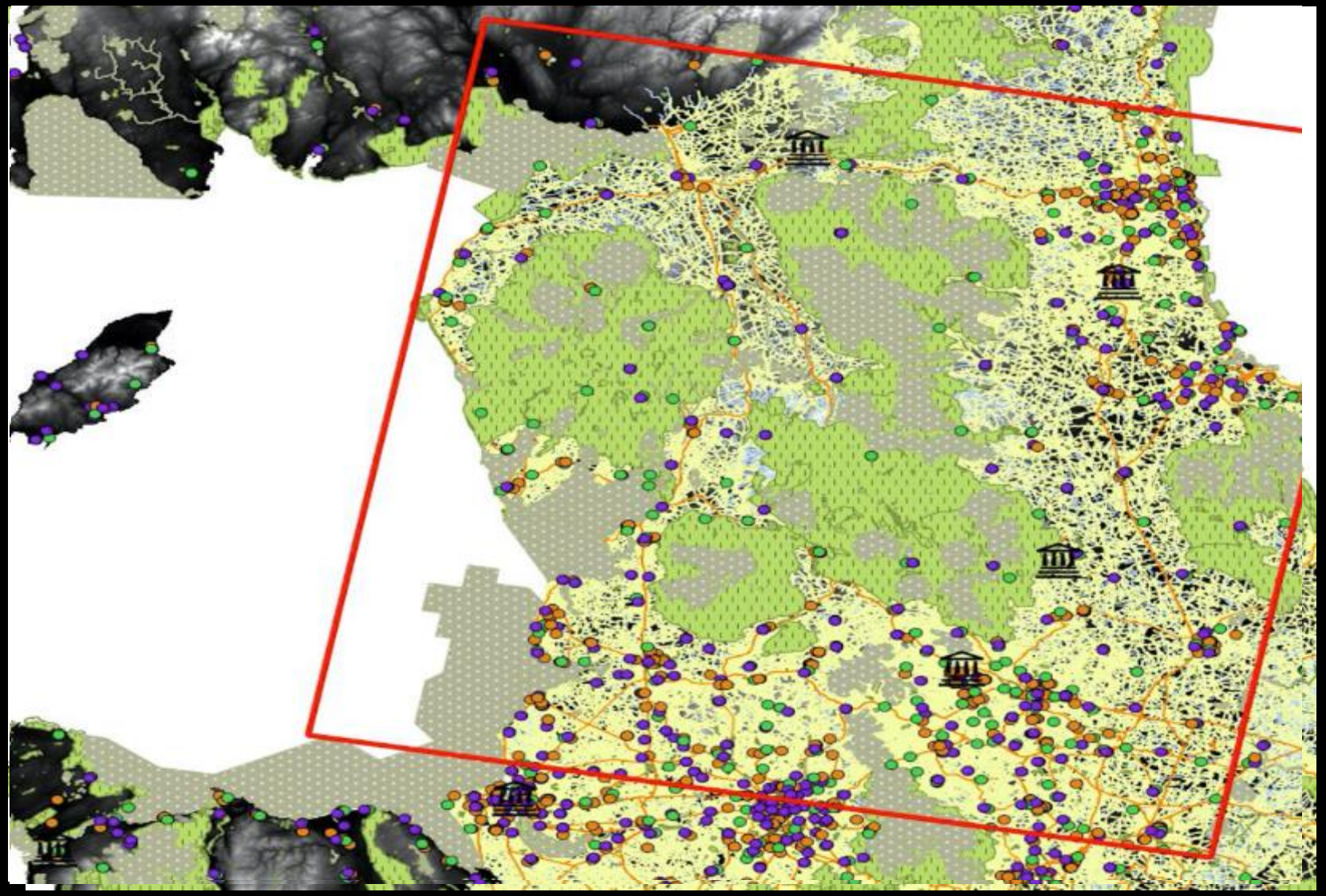
DATA FUSION

Enable data and information fusion to support situation awareness for Disaster Risk Management (DRM)



RISK FORECASTS & EARLY WARNINGS

BIG DATA INTEGRATION & MANAGEMENT



UNESCO World Heritage
Critical Infrastructure
N2K
CDDA
Roads
Railways
Rivers
Population
VHR DEM

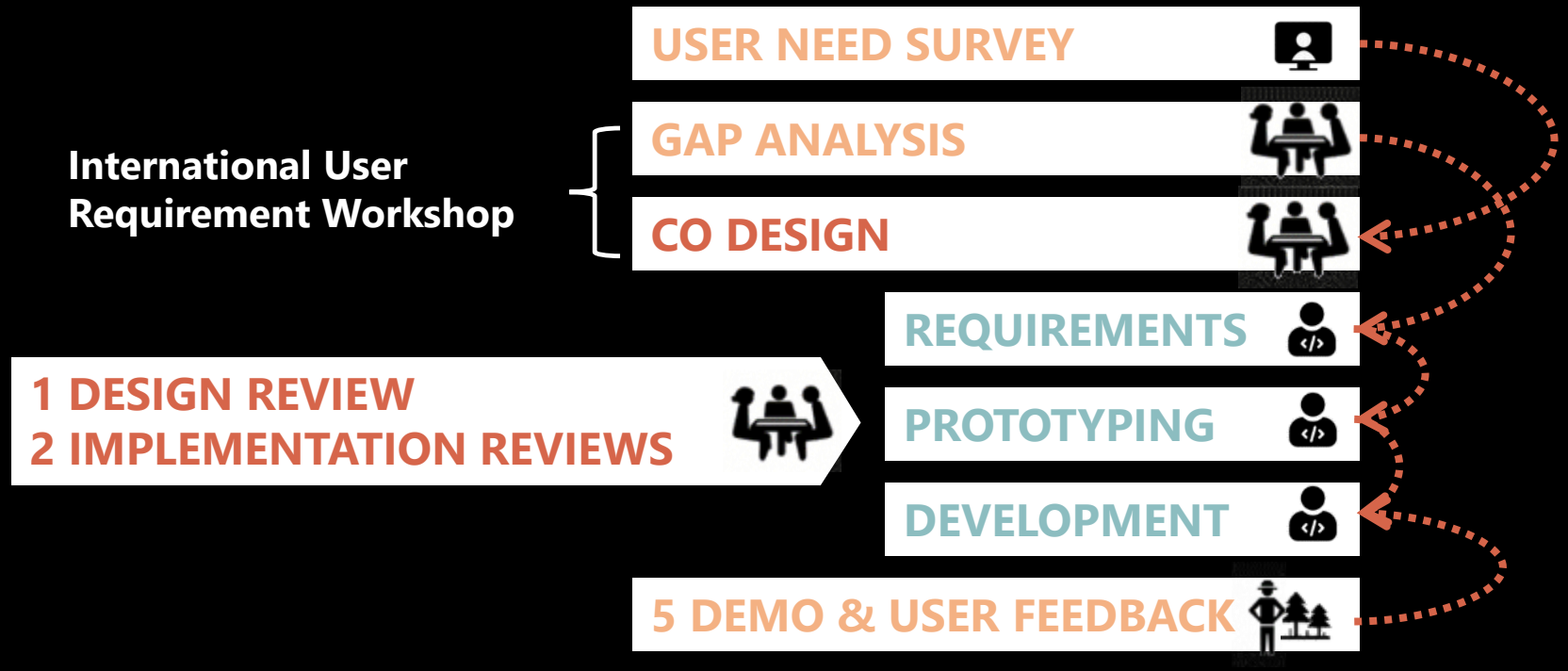
PARTICIPATION

7 billions of humans today are able to acquire, produce and share data.

2005

Pope announcements in Vatican

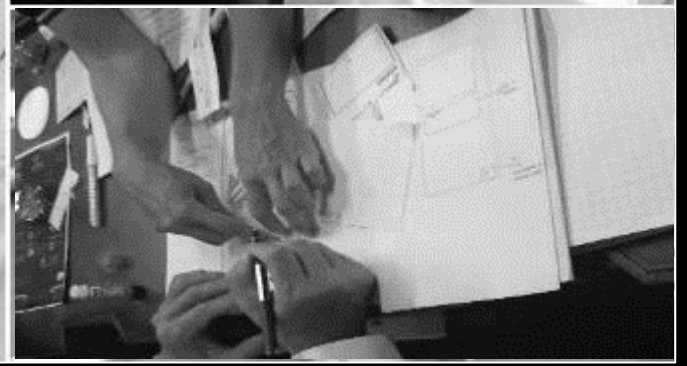
I-REACT METHODOLOGY TO DESIGN AND VALIDATE



USER RESEARCH | PARTICIPATORY ACTIVITY | PROJECT DEVELOPMENT

CO-DESIGN A CROWDSOURCING SOLUTION FOR

CO-DESIGN involves stakeholders, end users, domain experts – people not specifically trained in design – to work together with professional designers to ideate, develop and create new value.



52 participants

11 emergency organizations

12 domain experts

29 consortium members

↳ **8 facilitators**

11 countries represented

2 full days workshop
@ Paris UNESCO HQ
(Section on Earth Sciences and Geo-Hazards Risk Reduction)
15-15 September 2016

CO-DESIGN METHODOLOGY APPLIED

- USER NEED SURVEY
- GAP ANALYSIS
- **CO DESIGN**
- REQUIREMENTS
- PROTOTYPING
- DEVELOPMENT
- USER FEEDBACK

1 BRIEFING

How crowdsource relevant, reliable, and actionable data, to be integrated into current DRR processes?

2 DATA SCOUTING

Review of data used in the current DRR cycle, for different types of hazards

FREE LISTING, AFFINITY DIAGRAMS, PRIORITIZATION

DATA SOURCE

3 RAPID PROTOTYPING

Sketching th touchpoint for specified users and hazard in specifiied DRM phase

SCENARIO DRIVEN DESIGN

4 DISCUSSION & CONSOLIDATION

Showcase and Pitch to discuss divergences, share priorities, obstacles.

DATA ANALYSIS & RESULTS

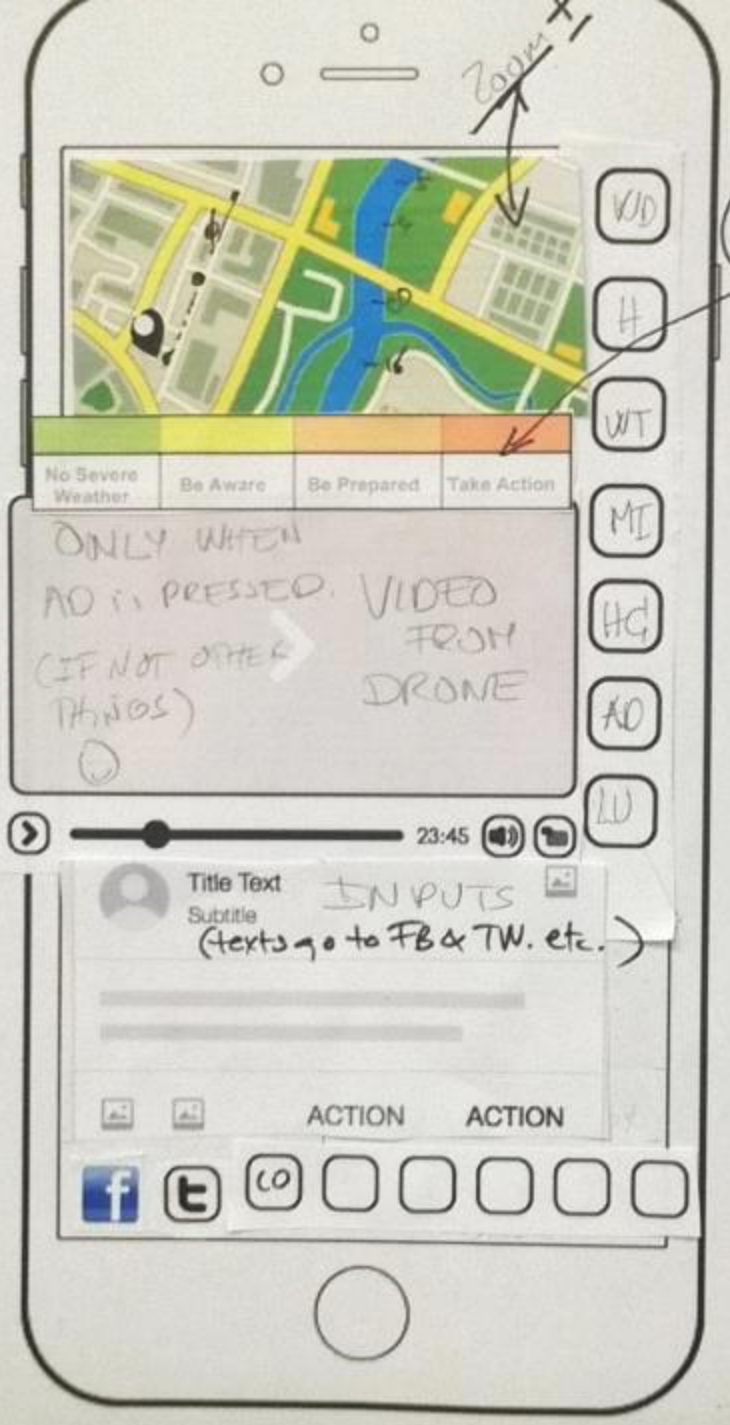
GROUP REPORT

Who sees
1 ST RESPONDER - CITIZEN

Hazard
FIRE - FLOOD - EXTREME WEATHER

Phase
PREPAR - RESPONSE - POST

GOAL
TO ASSESS A SITUATION (REPORTING)



VALIDATION NOTES

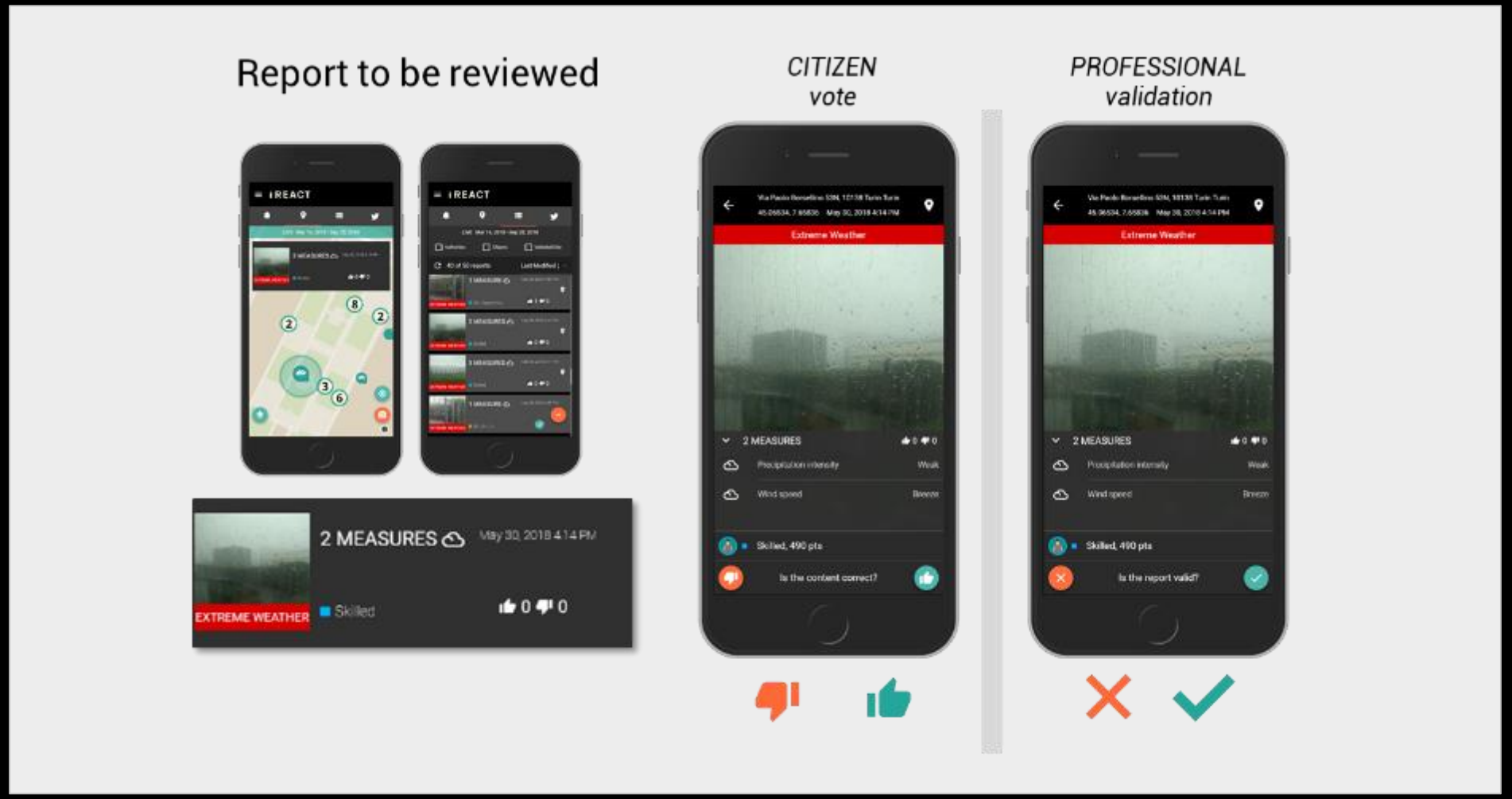
DYNAMIC LAYER/MAPS:
H = WATERPOINT / HYDRANT
WD = WATER DEPTH
WT = WOOD TYPE
MI = MINFO = METEO INFO → CALCULATE FIREFRONT.
HG = HYDRANT CAPACITY
AD = ACTIVATE DRONE ⇒ PICTURE WOOD
LU = RECREATION, FORESTRY, CAMPING, GRASSLAND, ...

INFORMATION FROM CENTRAL POINT
→ WHERE GEOLOCATED
- EXTENT
- PEOPLE: SAFE / NOT
  WHO
  HOW MANY

CO: ppm carbon oxyde

AUTOMATIC { UPDATING / RECEIVING / SENDING } INFORMATION

DESIGN OF THE I-REACT MOBILE APP (i)



DOWNLOAD THE APP

ANDROID iOS

DESIGN OF THE I-REACT MOBILE APP (ii)

DOWNLOAD THE APP

ANDROID iOS

DESIGN OF THE DSS FOR CONTROL ROOMS

MAP

REPORTS
First responders and other qualified users can review and validate reports submitted by citizens.

Report | Validated Report | Rejected Report

REPORT & MAP REQUESTS
First responders can request reports and maps in a certain area to acquire crucial information that is still needed to make decissions.

Report Request | Map Request

EVENTS
First responders can create events to inform about a hazzard that is affecting an area.

Past Event | Event

ALERTS/WARNINGS
First responders can send two type of communications: alert and warning.

Alert | Warning

MISSIONS & TASKS
To coordinate teams of first responders, the I-React allows professional users to set up missions, where specific tasks can be scheduled.

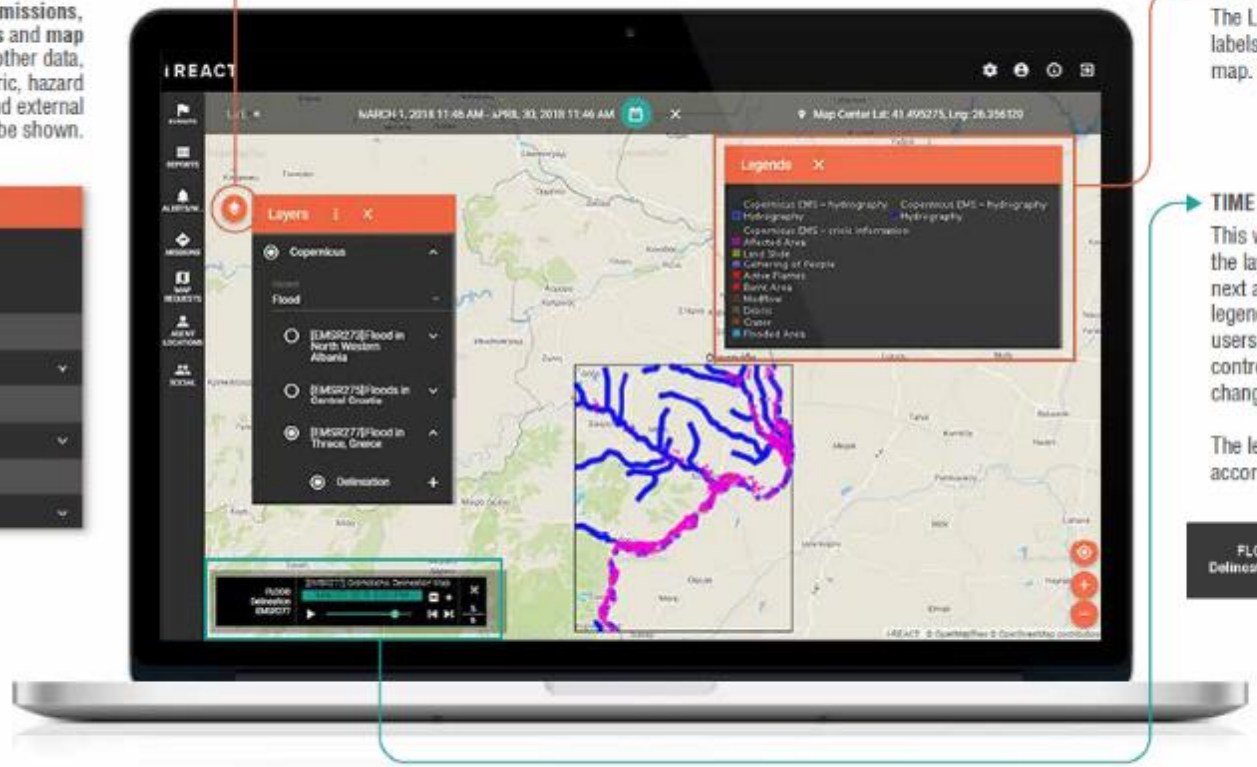
Mission | Task

The icons that appear on the map are the events geolocalised that are located in the period between the dates shown in the status bar.

DESIGN OF THE DSS FOR CONTROL ROOMS

LAYERS

From the **layer widget**, users can choose to display **reports, report requests, communications, missions, agent locations** and **map requests**. Also other data, such as atmospheric, hazard and risk, and external services can be shown.



LEGEND WIDGET

The Legend widget displays the colour code, labels and symbols for the top layer on the map. Only one legend is allowed at a time.

TIME SLIDER WIDGET

This widget shows the name of the hazard, the layer type, toggle icons, date, quantity, next and previous maps, and buttons to show legend and metadata. This widget enables users to view temporal layers on the map, and control the animation to see how the data changes over time by playing and pausing it.

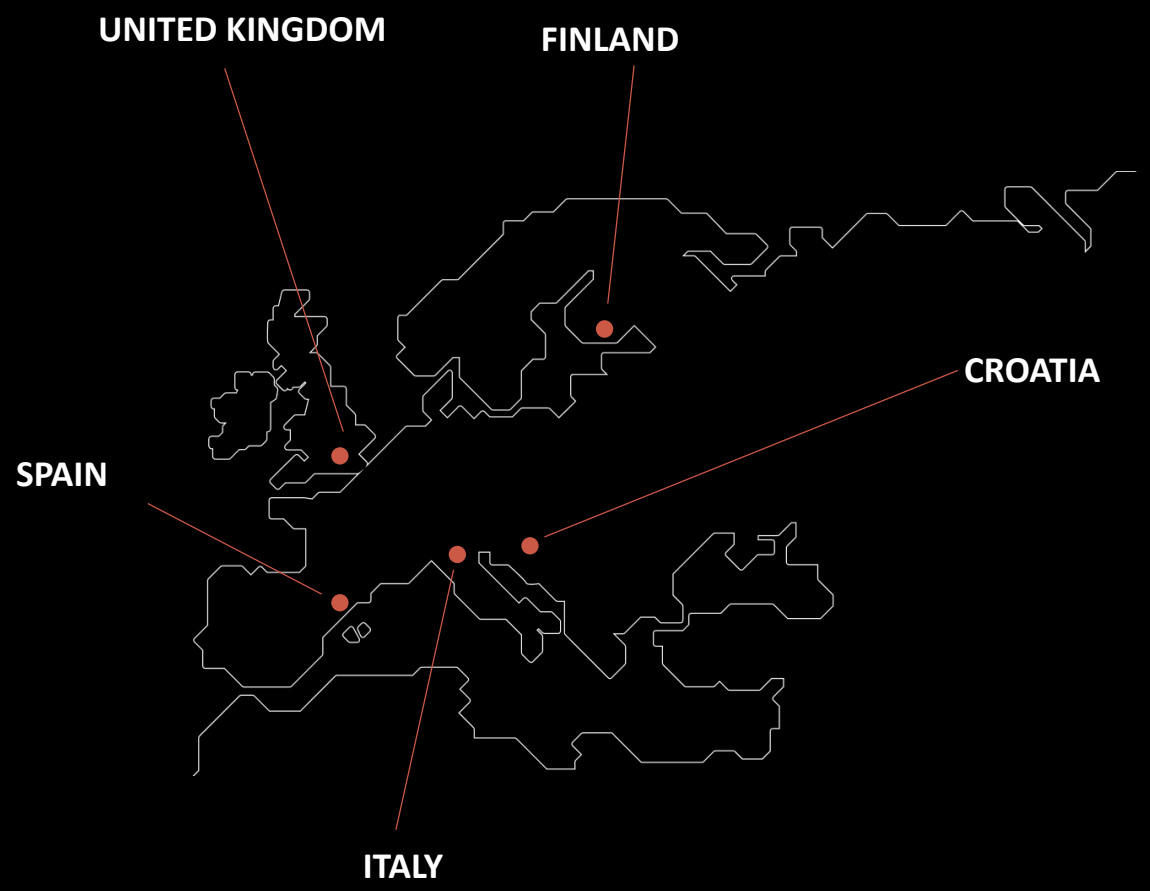
The legend and metadata also change according to the animation.

DESIGN OF THE DSS FOR CONTROL ROOMS

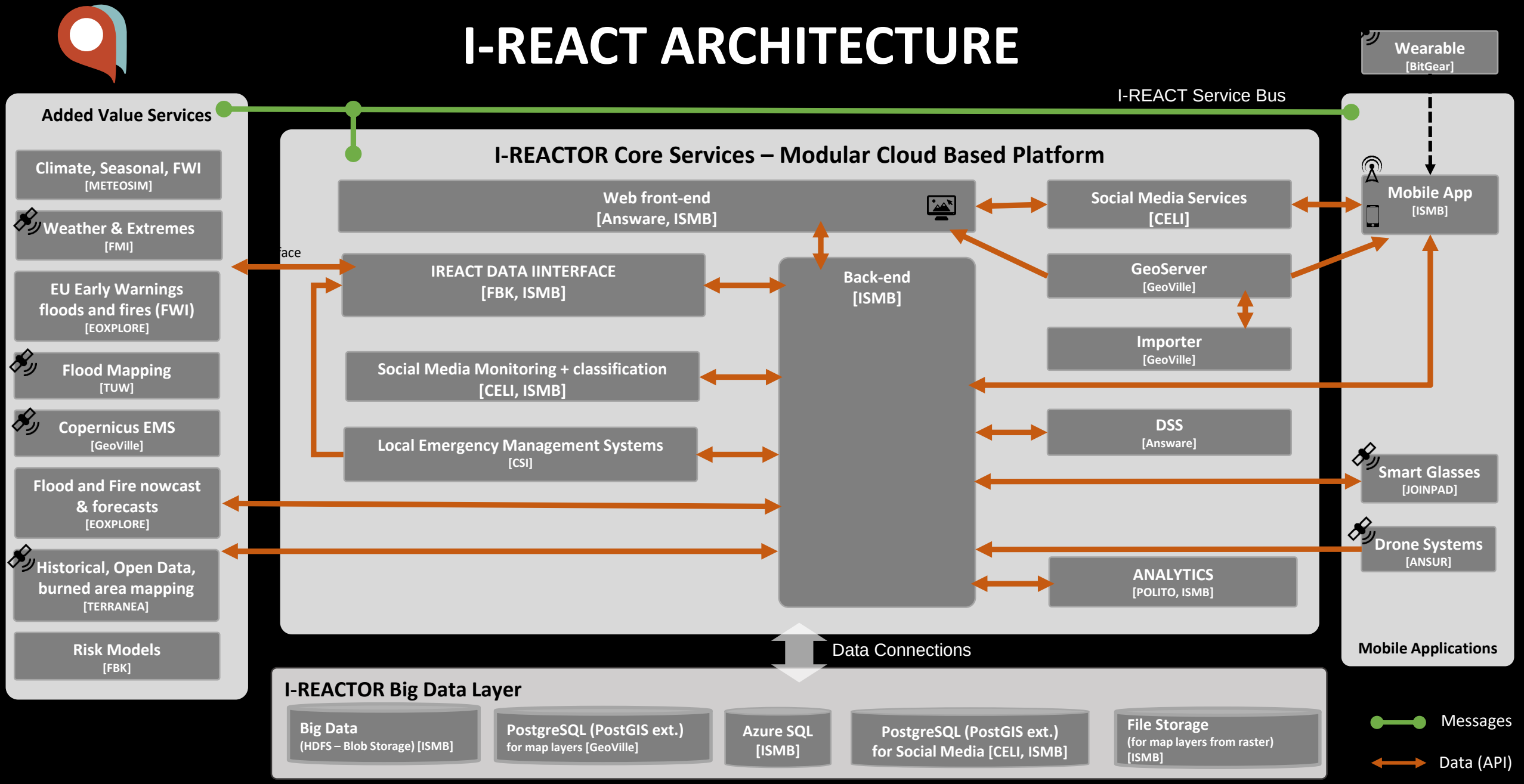
SOCIAL

IN FIELD DEMONSTRATIONS

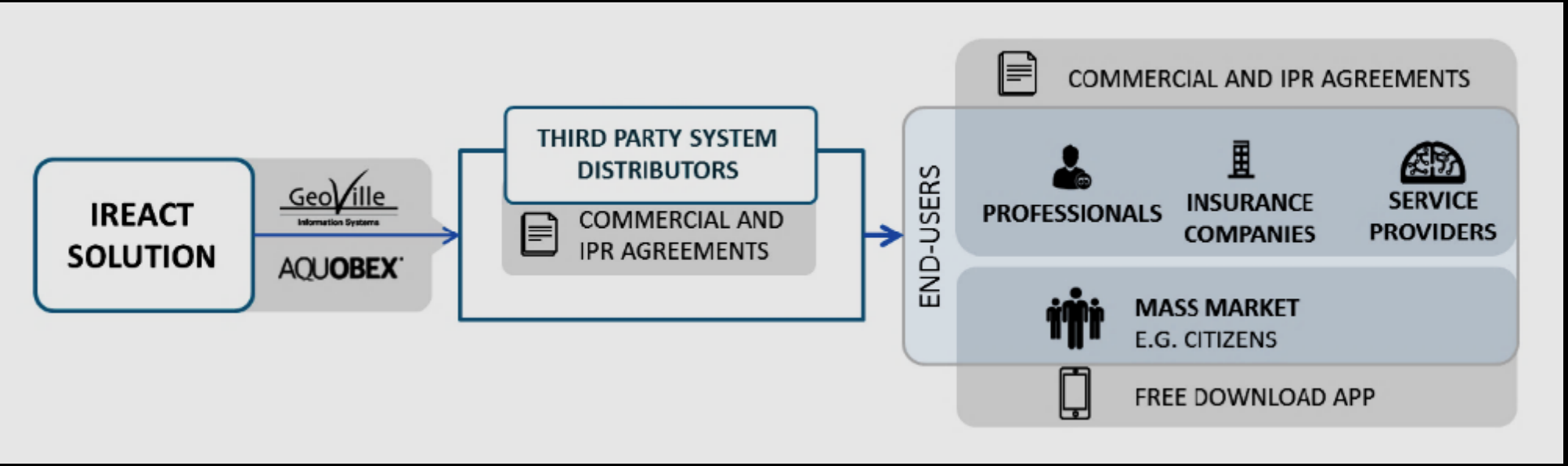
- From the end of 2017, **5 in-field demonstrations** have been carried out with the participation of end-users, decision makers and first responders.
- Each demonstration included a user feedback workshop and a session specifically devoted on cost benefit analysis and exploitation (pricing)
- A final pilot period will start from March 2019, where end-users will be freely allowed to use the tool for 3 months.



I-REACT ARCHITECTURE



I-REACT EXPLOITATION STRATEGY



Wholesale product | Sell the full system to a distributor and manage customisation

B2B products | Directly sell sub-systems and services

The consortium is focusing on the B2B approach, thus avoiding the involvement of a third party system distributor

I-REACT COMMERCIAL PACKAGES

3 Core Services
I-REACT Social
I-REACT Reporting
I-REACT Emergency Management **(enabler for added value services)**

- Business Plan Drafted
  - Pricing and revenues of Core services done
  - Added value services ongoing

10 Added Value Services
Seasonal and Climate Prediction
Weather Forecasts and Extreme Event Detection
Hazard and Risk Maps
Advanced Analytics
Drones
Smart Glasses
Wearable
Nowcast, forecast, flood delineation, burned area
Local Emergency Management System
Copernicus EMS Integration

POLICY RECCOMENDATIONS

(ongoing)

Key Topics

1. **Common alert** content with styling guides for the different media (e.g TV, radio, SMS, social app, siren)

2. Common **color coded risk index** that can be linked with standardized preventive and actions

3. **Disaster Risk Reduction** as **educational subject in primary schools** to foster self protection behavior and active participation

4. Common **operational procedures** to guarantee interoperability of EU teams within the Civil Protection Mechanism

5. Offer a **common EMS as EU service**, **extending** the capabilities of the current **Copernicus EMS**. I-REACT can become an EU service.

6. Reduction of emergency management costs by using adapted **cyber technologies**

THANK YOU FOR YOUR ATTENTION

PROJECT COORDINATION

ISMB

FABRIZIO DOMINICI

dominici@ismb.it

CLAUDIO ROSSI

rossi@ismb.it

COMMUNICATIONS OFFICE

SCIENSEED

GENERAL INFORMATION

communication@i-react.eu

MEDIA

press@i-react.eu

BUSINESS DEPARTMENT

ALPHA-AQUOBEX

CLAUDIA MALTONI

cm@alphacons.eu

JOHN ALEXANDER

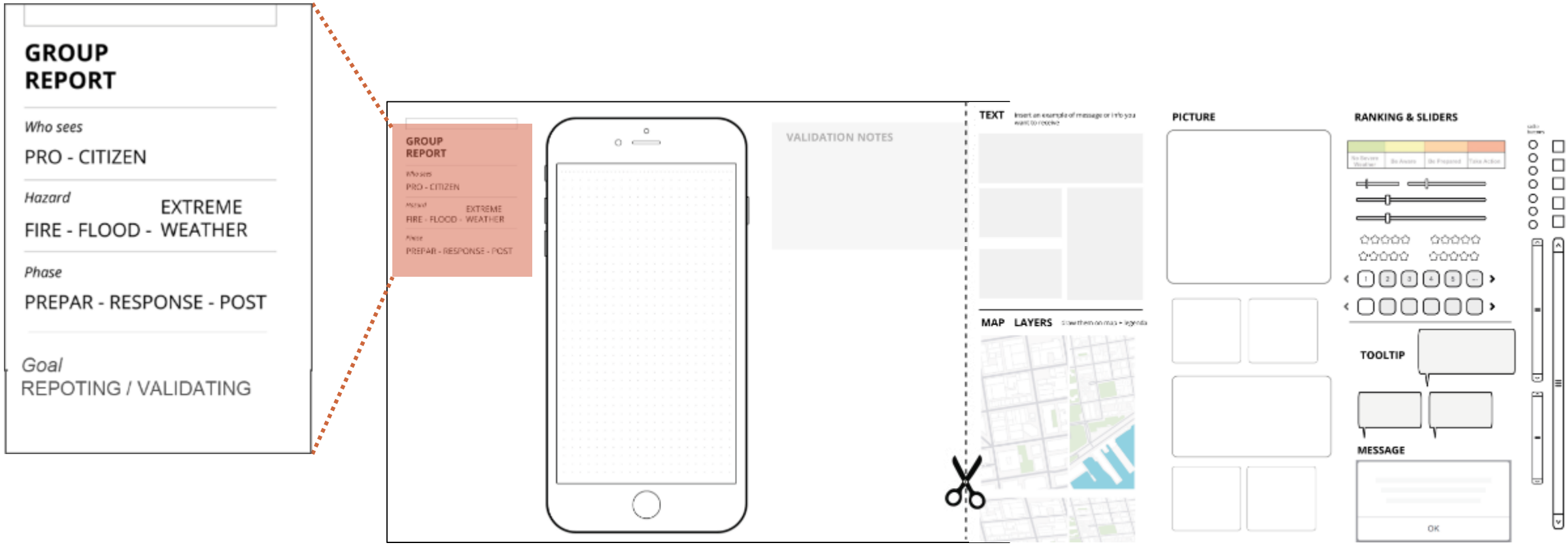
john.alexander@aquobex.com

www.facebook.com/ireactEU

twitter.com/IREACT_EU

twitter.com/IREACT_EU

BACK-UP


GROUP
REPORT
Who sees
PRO - CITIZEN
Hazard
FIRE - FLOOD - EXTREME WEATHER
Phase
PREPAR - RESPONSE - POST
Goal
REPOTING / VALIDATING
GROUP
REPORT
PRO - CITIZEN
FIRE - FLOOD - EXTREME WEATHER
PREPAR - RESPONSE - POST
VALIDATION NOTES
TEXT
MAP LAYERS
PICTURE
RANKING & SLIDERS
TOOLTIP
MESSAGE
OK

VISUAL ANALYSIS

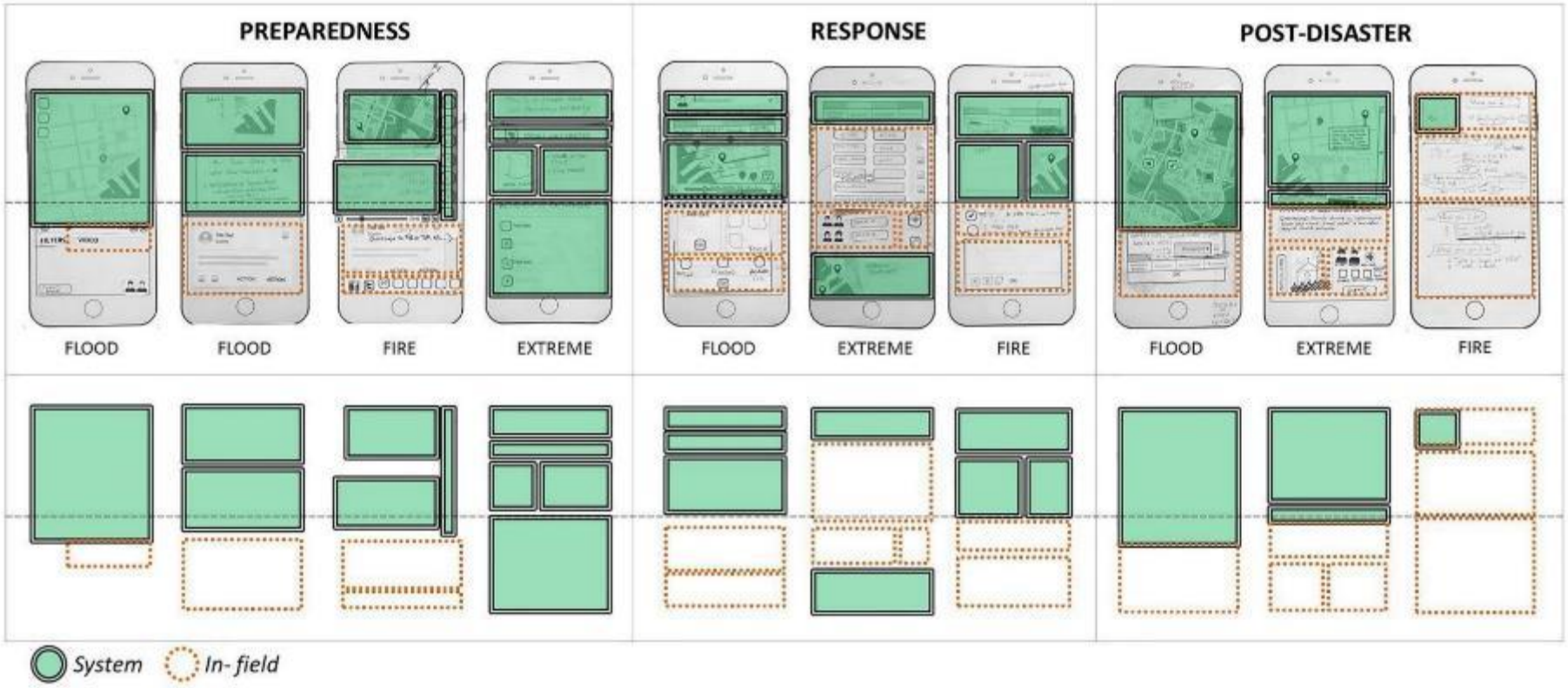
GROUP REPORT

Who sees
PRO - CITIZEN

Hazard
FIRE - FLOOD - EXTREME WEATHER

Phase
PREPAR - RESPONSE - POST

Goal
REPOTING / VALIDATING



48 participants

10 groups with mixed roles and skill
10 scenarios
- ↳ 4 on preparedness, 3 on response, 3 on post-disaster
- ↳ 4 on flood 3 on fire, 3 on extreme whether events

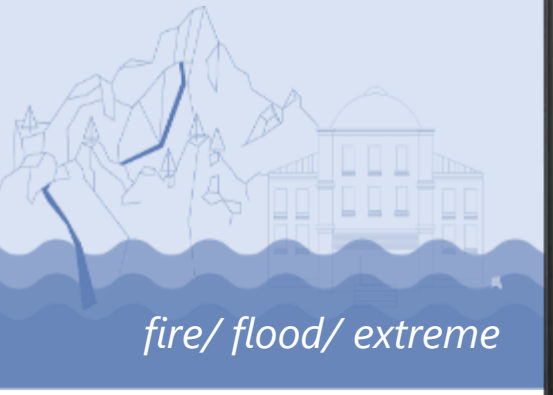
120 unique data-types

45% marked as **priority**
15% may be given **by citizens**

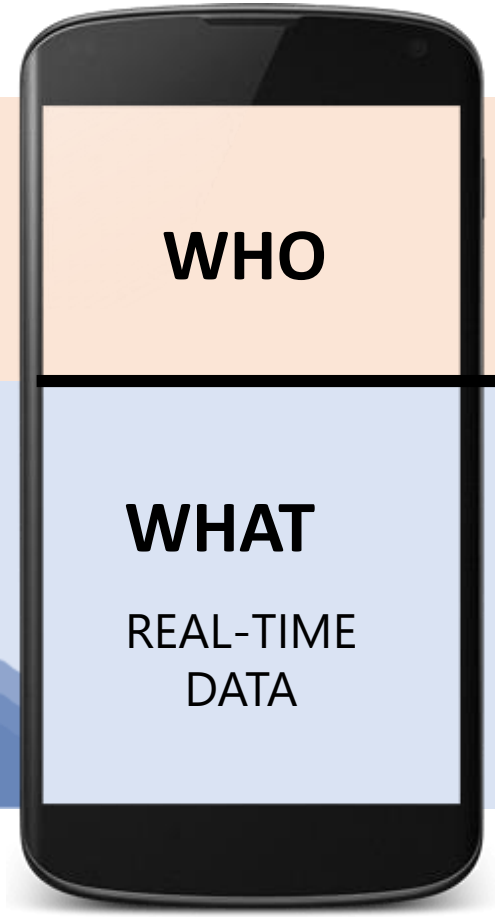
RESULTS – ACTIONABLE INFORMATION ARCHITECTURE

citizen

1str



fire/ flood/ extreme



REPORTER

IDENTIFIER

STATUS

SAFETY

EVENT

HAZARD RELATED

MEASURE

CONTEXT FIELD

DAMAGE INFRASTRUCTURE

RESOURCES AVAILABILITY

ELABORATION

DYNAMIC MAPS

Eg.nowcast, forecast map

EVOLUTION MONITORING