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COMMISSION. SECURITY WORK  
PROGRAMME  
DRS-1-2015

2018 International Tech4Dev Conference

# A PARTICIPATORY APPROACH TO DISASTER RISK MANAGEMENT

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# PARTICIPATION

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

2005



*Pope announcements  
in Vatican*

2013





# NATURAL HAZARDS AND DISASTERS IMPACT EVEN MORE PEOPLE

**4,443 events**

111,211 people killed

33,031,632 people affected

480,398,000,000€ economic loss



EUROPE  
(1980-2013)

**Urgent needs and spontaneous reaction**

Requests and offers of help and assistance

Real-time and geo-localized information

Reliable communication of warnings and advices

(Schulze et al., 2015)





## Improving Resilience to Emergencies Through Advanced Cyber Technologies

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# 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



EARTH OBSERVATION



WEARABLES



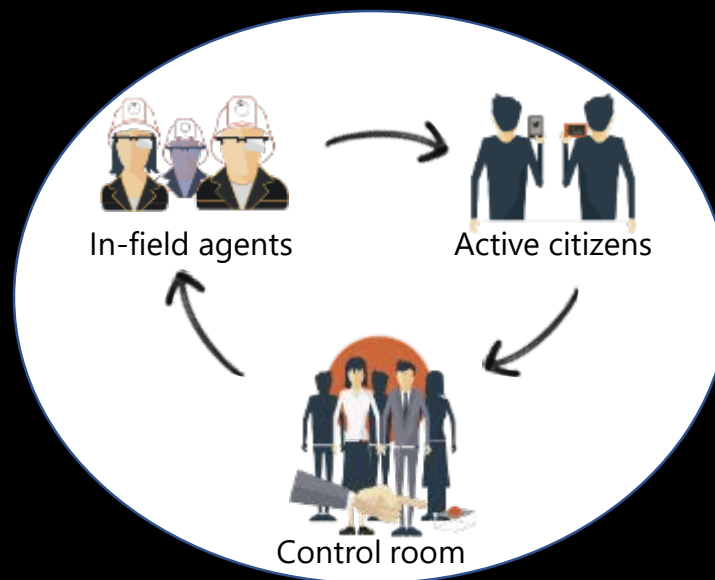
AUGMENTED REALITY



UAV



SOCIAL MEDIA

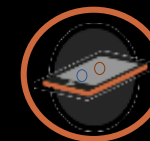


### CITIZEN ENGAGEMENT

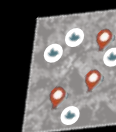
Raise awareness and promote a more capillary territory monitoring

INFORMATION and AWARENESS

GAMIFICATION



CROWDSOURCING

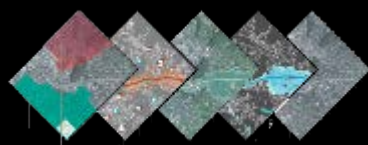


2 LEVELS of VALIDATION



### DATA FUSION

Enable data and information fusion to support situation awareness for Risk Management



## RISK FORECASTS & EARLY WARNING





# CO-DESIGN METHODOLOGY APPLIED

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.



## USER RESEARCH

USER NEED SURVEY

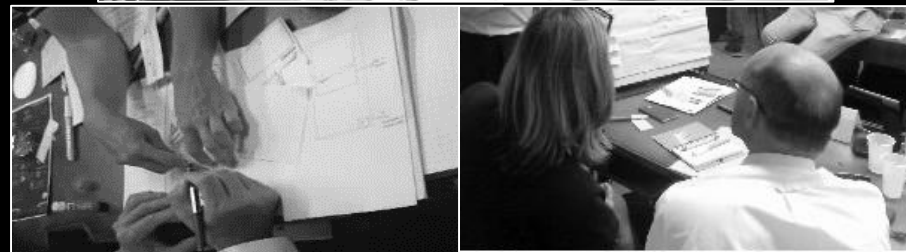
GAP ANALYSIS

USER FEEDBACK



## PARTICIPATORY ACTIVITY

CO DESIGN



## PROJECT DEVELOPMENT

SERVICE MODEL

PROTOTYPING

DEVELOPMENT



# CO-DESIGN A CROWDSOURCING MODULE FOR THE DRM

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



## PARTICIPATORY ACTIVITY

### CO DESIGN

#### 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

#### 3 RAPID PROTOTYPING

Sketching the touchpoint for specified users and hazard in specified DRM phase

SCENARIO DRIVEN DESIGN



#### 4 DISCUSSION & CONSOLIDATION

Showcase and Pitch to discuss divergences, priorities, obstacles.







# SCENARIO DRIVEN DESIGN TOOLS

**GROUP REPORT**

---

*Who sees*  
PRO - CITIZEN

---

*Hazard* EXTREME  
FIRE - FLOOD - WEATHER

---

*Phase*  
PREPAR - RESPONSE - POST

---

*Goal*  
REPOTING / VALIDATING

SCENARIO



SCREEN CANVAS

VALIDATION NOTES

**TEXT** Insert an example of message or info you want to re-use

**MAP LAYERS** Show them on map + legends

**PICTURE**

**RANKING & SLIDERS**

**TOOLTIP**

**MESSAGE**

OK

GUI PALETTE to CUT & PASTE

**GROUP REPORT**

Who sees

**1 ST RESPONDER - CITIZEN**

Hazard

**FIRE - FLOOD - WEATHER**

EXTREME

Phase

**PREPAR - RESPONSE - POST**

Goal  
**TO ASSESS A SITUATION (REPORTING)**



**VALIDATION NOTES**

~~The area - exact location~~ <sup>point</sup> GPS

~~The extent - limits - important~~

~~Was sent - from where~~

PHASES

~~Preparedness - large region~~ send a photo

**DYNAMIC LAYER/PHAS:**

- H = WATER POINT / HYDRANT
- WD = WATER DEPTH
- WT = WOOD TYPE
- MI = MINFO = METEO INFO
- HG = HYDRANT CAPACITY
- AD = ACTIVATE DRONE
- LU = GRASSLAND, ...

Important info  
 Toxic sites  
 Parking  
 Accessibility  
 Roads

CALCULATE FIREFRONT.

INFORMATION FROM CENTRAL POINTS

- WHERE GEOLOCATED
- EXTENT
- PEOPLE: SAFE / NOT WHO HOW MANY

co: ppm carbon oxyde

AUTOMATIC UPDATING RECEIVING SENDING INFORMATION

**DATA ANALYSIS & RESULTS**



# VISUAL ANALYSIS

**GROUP REPORT**

---

Who sees  
PRO - CITIZEN

---

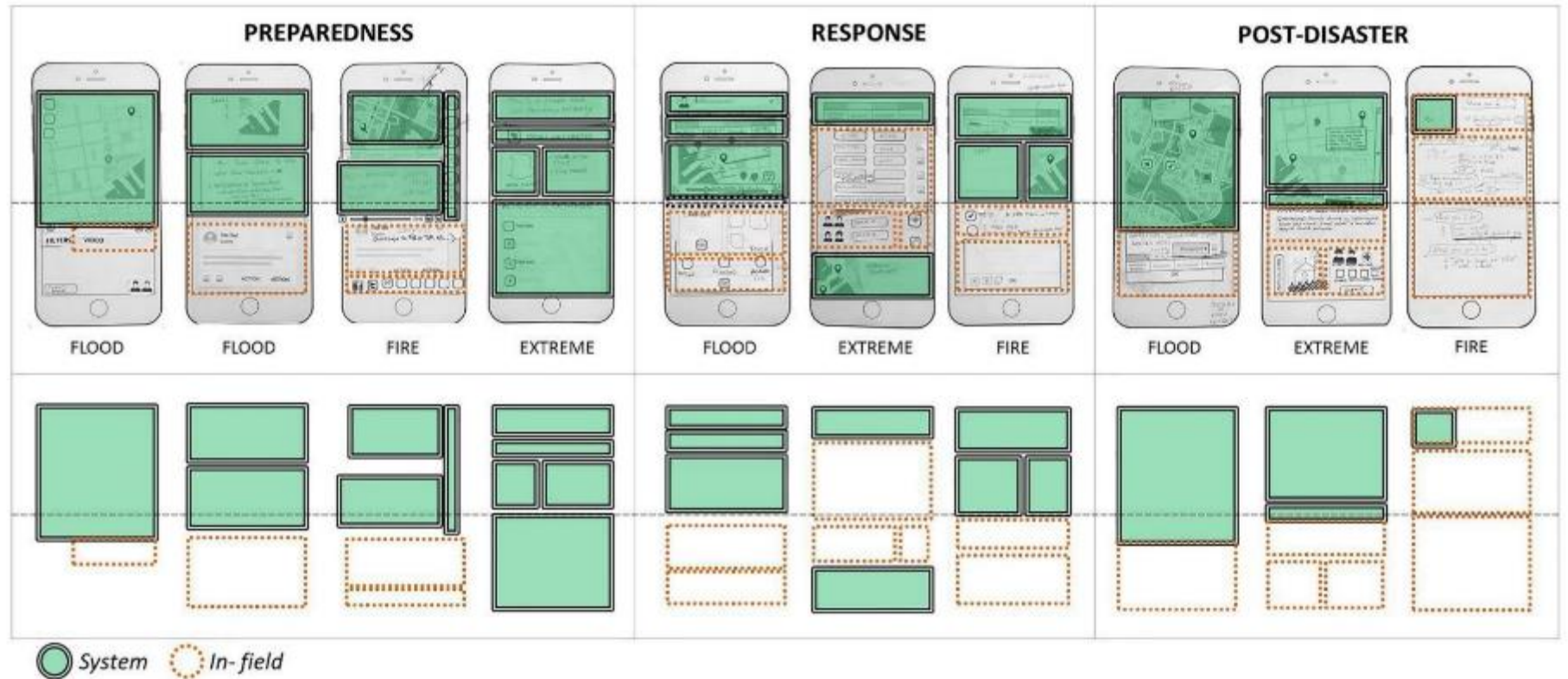
Hazard  
EXTREME  
FIRE - FLOOD - WEATHER

---

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**



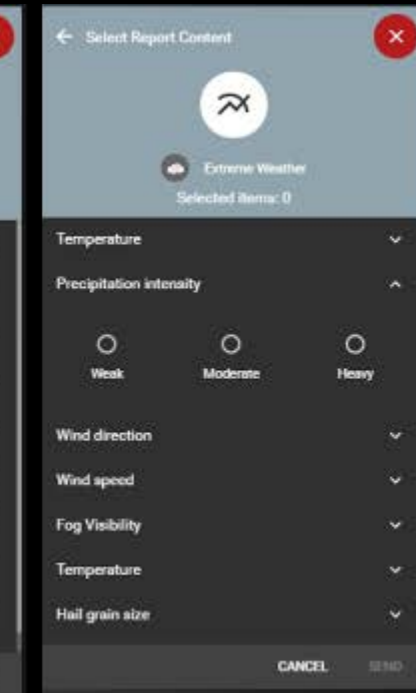
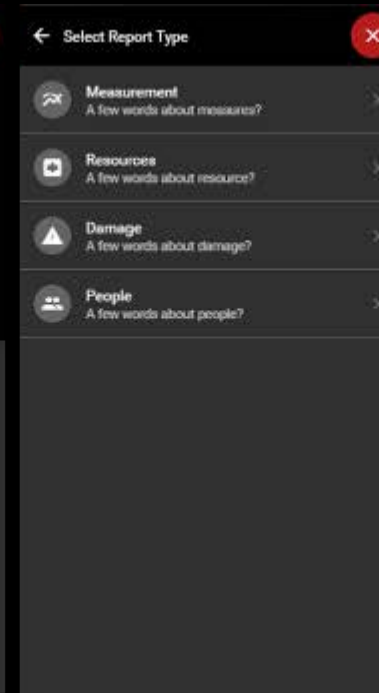
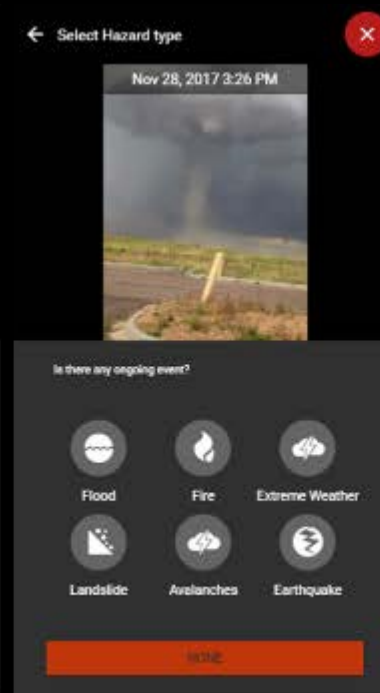
# RESULTS – ACTIONABLE INFORMATION ARCHITECTURE







# DESIGN AND DEVELOPMENT OF A REPORT FROM THE FIELD







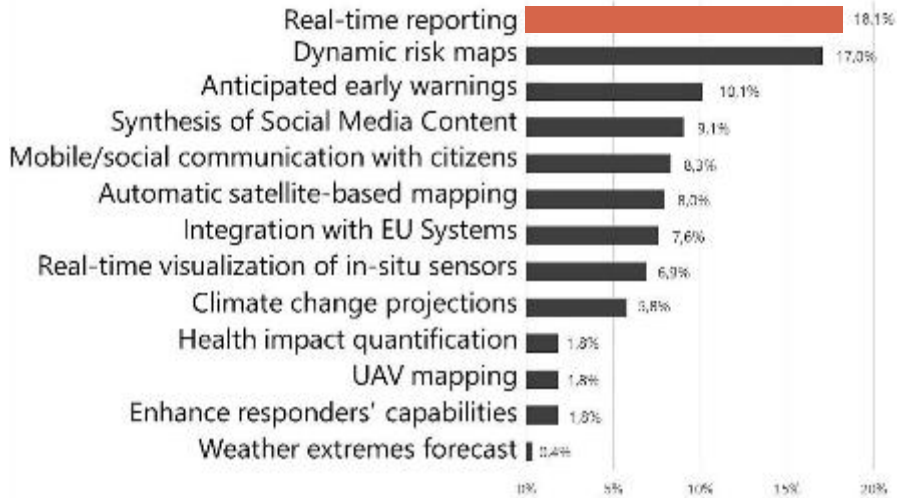
# WE'RE TESTING I-REACT INTO THE WILD

9 field demo and test with real users

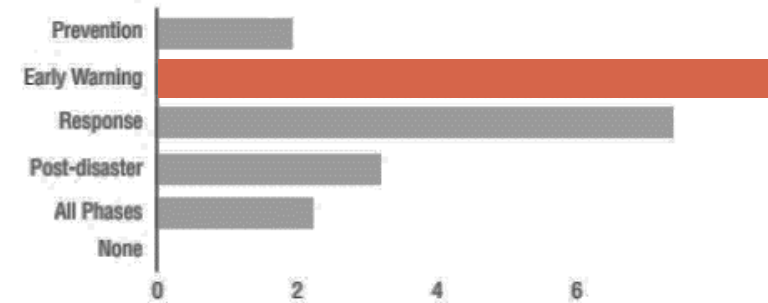


# NEEDS, REQUIREMENTS, ATTITUDES

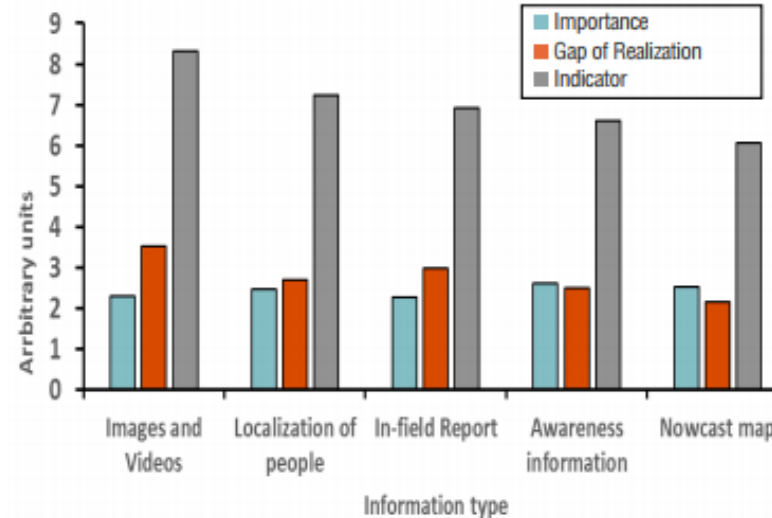
**Real time reporting**  
the most urgent need of stakeholders



**Crowdsourcing** is a valid method  
for obtaining emergency data



**Images and videos** are the most valued  
**information** during emergencies





# CONCLUSIONS

## BENEFITS OF THE CO-DESIGN FOR DRM

- ↳ COLLECT DEEP AND PRIORITIZED DATA IN SHORT TIME
- ↳ INSPIRE A REAL WORLD FITTING SYSTEM DESIGN:
  - ↳ AUTHORITIES ARE NEEDED TO DESIGN WORKING SOLUTION, WE HAVE TO REFER TO THEIR PRIORITIES
- ↳ ENGAGE A LONG TERM ALLIANCE WITH REAL USERS

## I-REACT SPECIFIC ADVANTAGES

- ↳ Mobile app design:
  - ↳ Reorganization of Events
  - ↳ Simplified functionalities for non-professional/trained users (citizens)
- ↳ Focus on Early warning and reporting from the field
- ↳ Wider testing opportunities
- ↳ Innovation acceptance



# THANK YOU FOR YOUR ATTENTION

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Improving Resilience to Emergencies  
Through Advanced Cyber Technologies



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