

→ THE ESA EARTH OBSERVATION Φ -WEEK

EO Open Science and FutureEO

12–16 November 2018 | ESA–ESRIN | Frascati (Rome), Italy

Improving Crisis Event Management through EO & Citizens' Voluntary Engagement

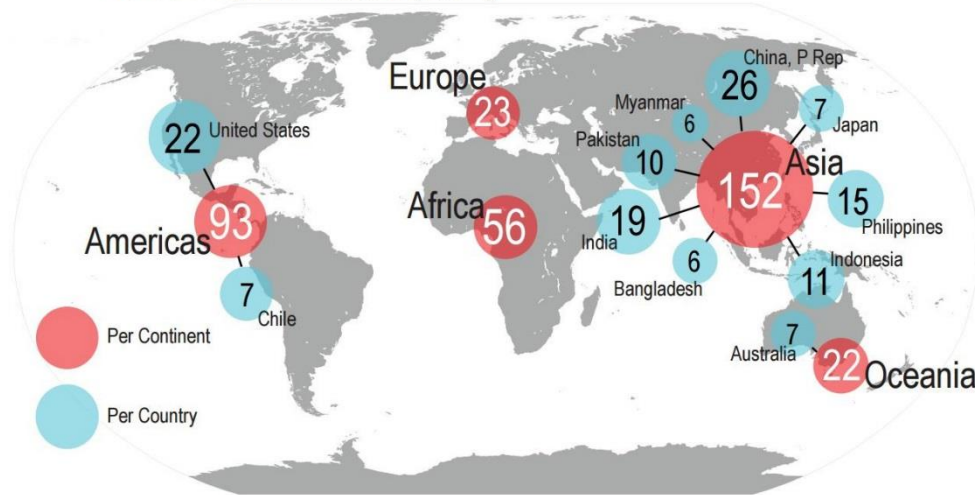
Refiz Duro

14/11/2018

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Crisis and Disasters – Numbers (2015)

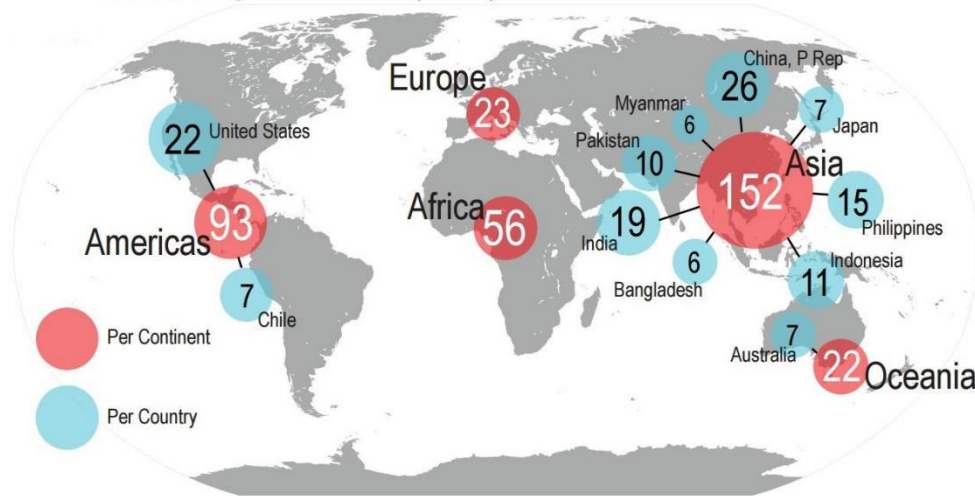
Number of **reported** disasters by country



(1): Natural disasters: Epidemic and insect infestations not included

Crisis and Disasters – Numbers (2015)

Number of **reported** disasters by country



- 346 reported disasters
- 22 773 people dead
- 100 million people affected
- \$66.5 billion economic damage

(1): Natural disasters: Epidemic and insect infestations not included

Crisis Management – Acquiring Data/Information



Telephone, fax, social media, e-mail

[slow, manual, prone to errors]



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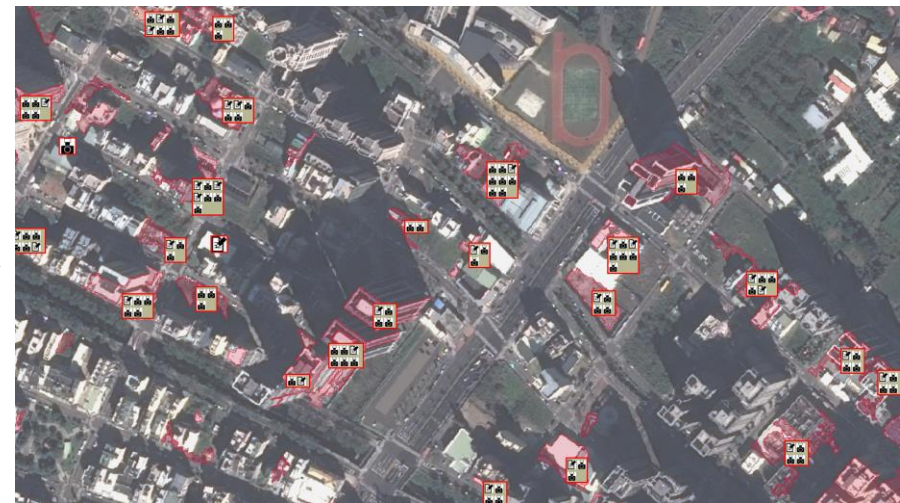
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Crisis Management – Acquiring Data/Information



Telephone, fax, social media, e-mail
[slow, manual, prone to errors]

Add: semi-automatic processes, State of the art
technologies (e.g., satellites)



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Crisis Management – Acquiring Data/Information



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[slow, manual, prone to errors]

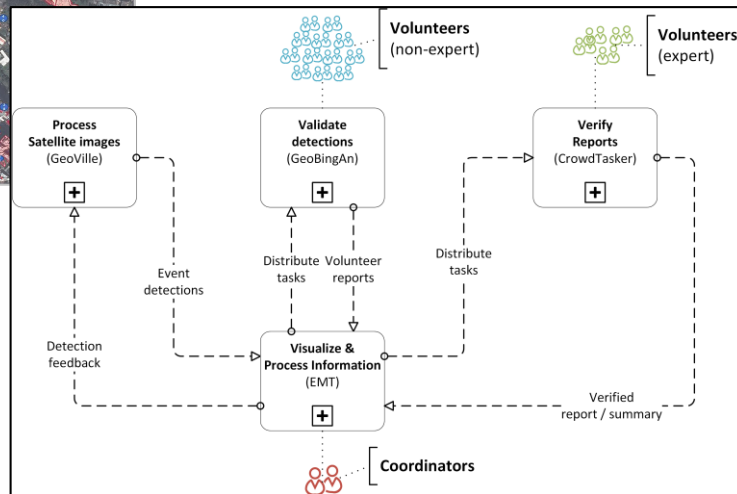
Add: semi-automatic processes, State of the art
technologies (e.g., satellites)



Near-real time situational awareness picture leading to: 1) smarter resource allocation and response actions, 2) shorter reaction times, 3) lower total costs for relief actions.



The Way of Data & The Tools



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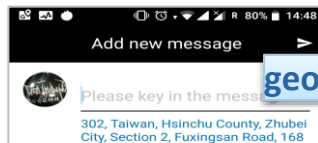


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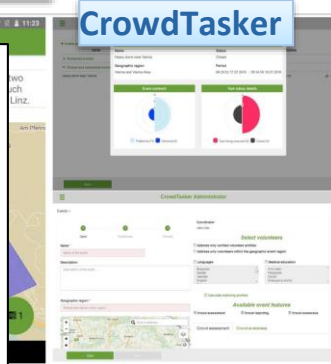
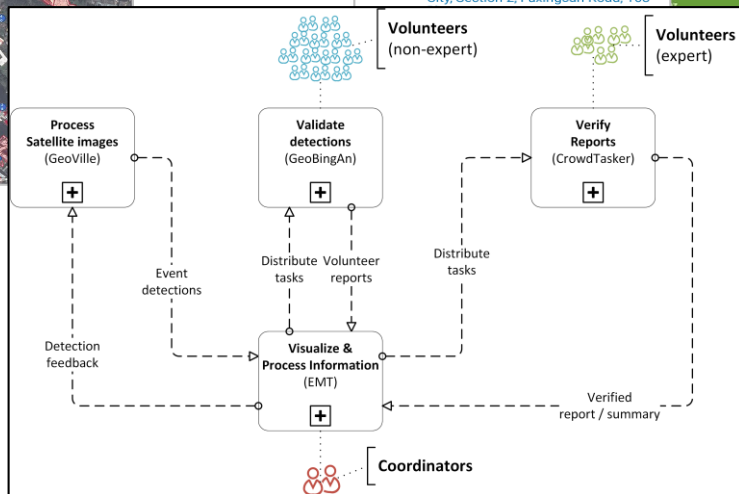
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The Way of Data & The Tools



geoBingAn

CrowdTasker



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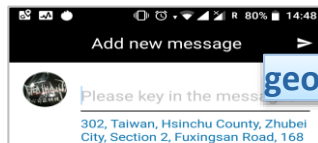


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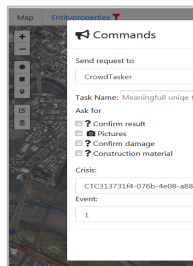
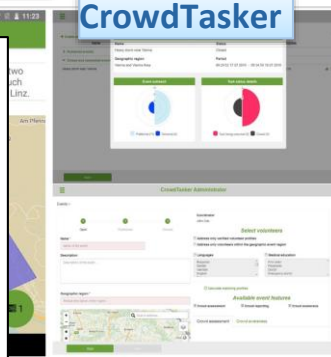
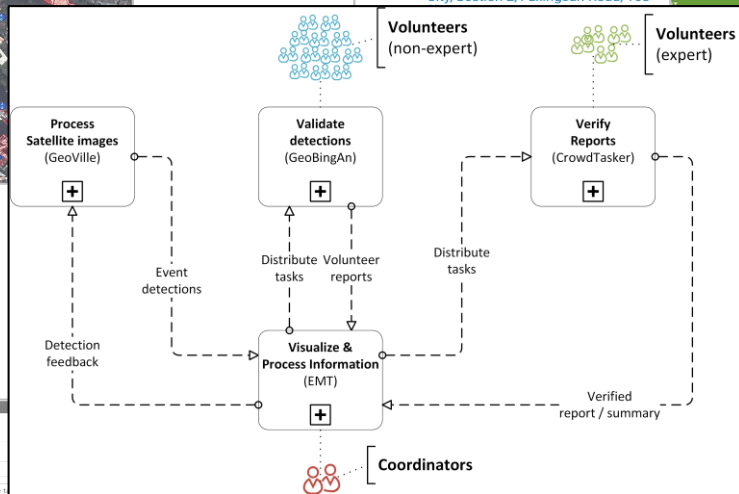
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The Way of Data & The Tools



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CrowdTasker



Emergency Maps Tool

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Taiwan Drill Day



- “921 International Disaster Prevention Drill” is an annual set of events across the whole Taiwan, commemorating the devastating earthquake on 21st September, 1999.
- More than 2,000 lives were lost, damaging tens of thousands of buildings and destroying infrastructure.

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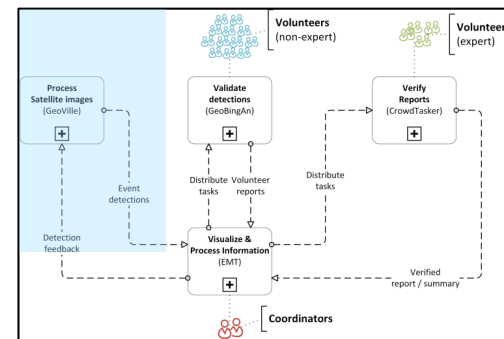
- “921 International Disaster Prevention Drill” is an annual set of events across the whole Taiwan, commemorating the devastating earthquake on 21st September, 1999.
- More than 2,000 lives were lost, damaging tens of thousands of buildings and destroying infrastructure.
- **Include technological advancements for the damage detection / data collection for rapid assessment & creation of a crisis picture:**
 - **Satellite Technologies (from above)**
 - *Very high resolution imagery (sub-meter)*
 - **Crowdsourcing Data (from the ground)**
 - *Smartphone Apps for crowdtasking (geoBingAn, CrowdTasker)*
 - **Crisis Mapping**
 - *Emergency Maps Tool for decision making support*



- Hsinchu County in Taiwan
- Disaster Prevention and Resilience Center
- Crisis responders & managers, volunteers



Taiwan Drill Day



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Taiwan Drill Day



Map Entityproperties

Commands

Send request to
CrowdTasker

Task Name: Meaningfull unique task name

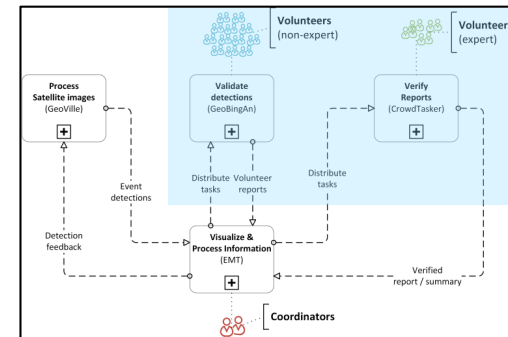
Ask for

- ☐ ? Confirm result
- ☐ ? Pictures
- ☐ ? Confirm damage
- ☐ ? Construction material

Crisis:
CTC313731f4-076b-4e08-a88a-c199bfa14907

Event:
1

Send Cancel



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Taiwan Drill Day



Map Entityproperties

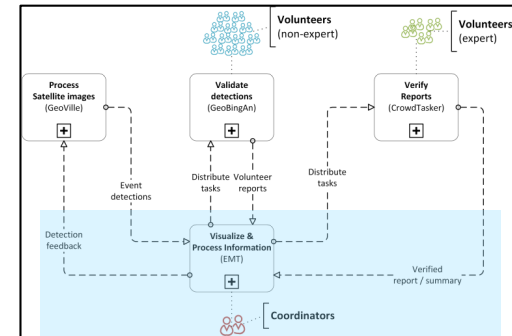
Details

geoBingAn Result

Crisis-ID	"PUC TW 2013-2017"
Event-ID	1
Timestamp	"2018-09-21 03:42:35+00:00"
Address	"No. 35, Shengli 10th Street, Zhubei City, Hsinchu County, Taiwan 302"
Category	"建築物災損回報"
Content	"not damaged"
調查方法/Survey Method	"現地調查/Survey"
災害類型/Type of this event	"地震/Earthquake"
災損狀況/Damaged condition	"無/none"
調查類型/Assessment type	"第一次/Initial"

geoBingAn Result

Crisis-ID	"PUC TW 2013-2017"
Event-ID	1
Timestamp	"2018-10-11 10:57:47+00:00"
Address	"Zhuangjing 6th Street, Hsinchu County, Zhubei City, Taiwan, Hsinchu City, Taiwan, 302"
Category	"建築物災損回報"
Content	



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Taiwan Drill Day



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MIT ASTROPHYSICAL OBSERVATORY TOMORROW TODAY



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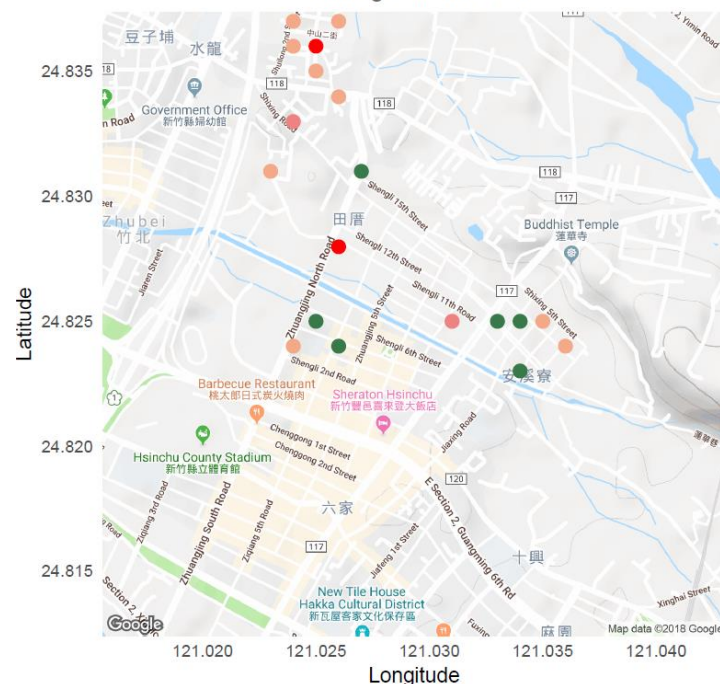
Taiwan Drill Day - Results



Response distribution



Damage distribution



Damage categories

- destroyed
- major
- minor
- none

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Satellite data:

- Temporal resolution is currently too sparse as they are not meeting the crisis & disaster criteria
 - Much better temporal resolution in near future (daily coverage to multiple images per day) + tasking capabilities -> *integrate it in the pipeline for near-real time view*
- Difficult to apply the same damage detection algorithm to different types of cities/places (e.g., Katmandu vs Taipei) -> *combine with crowdsourcing and state of the art (detection) algorithms*

Crowdsourcing/crowdtasking:

- Getting sufficient number of volunteers is critical
- Different types of data can be gathered depending on the disaster (e.g., building height, material, flood water color, smell, etc.) -> *flex the Apps for all crisis event types*

Combination of EO, Crowdsourcing, Volunteers & Crisis Managers give you near-real time situational awareness picture potentially leading to:

- smarter resource allocation and response actions
- shorter reaction times
- lower total costs for relief actions.

Thank you!



quinjunsat.info

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¹ AIT Austrian Institute of Technology GmbH

² GeoVille Information Systems and Data Processing GmbH

³ GeoThings Inc.

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