

# → THE ESA EARTH OBSERVATION $\Phi$ -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

# Crisis Management – Acquiring Data/Information



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



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GeoVille



European Space Agency

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



# Crisis Management – Acquiring Data/Information



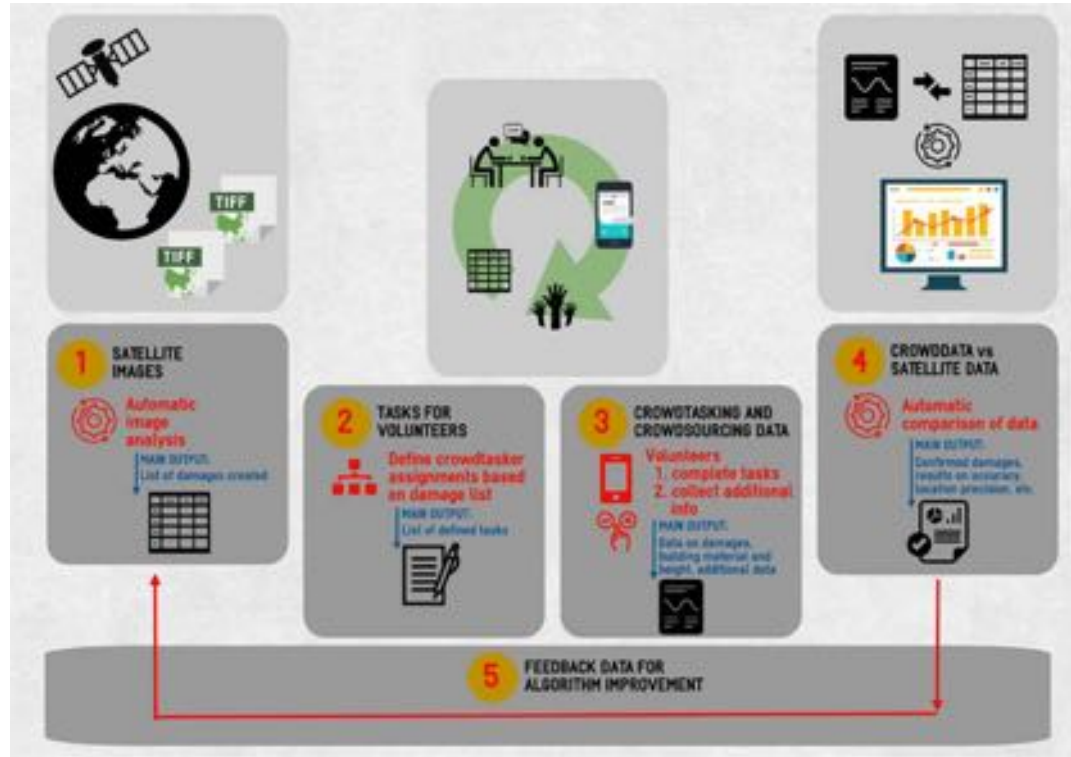
Telephone, fax, social media, e-mail  
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Add: semi-automatic processes, State of the art technologies (e.g., satellites)



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.

# QuinJunSAT Approach



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VERBANK

CONTRIBUTORS



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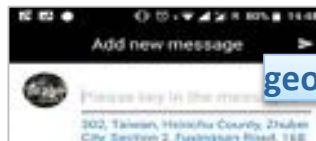




# The Way of Data & The Tools

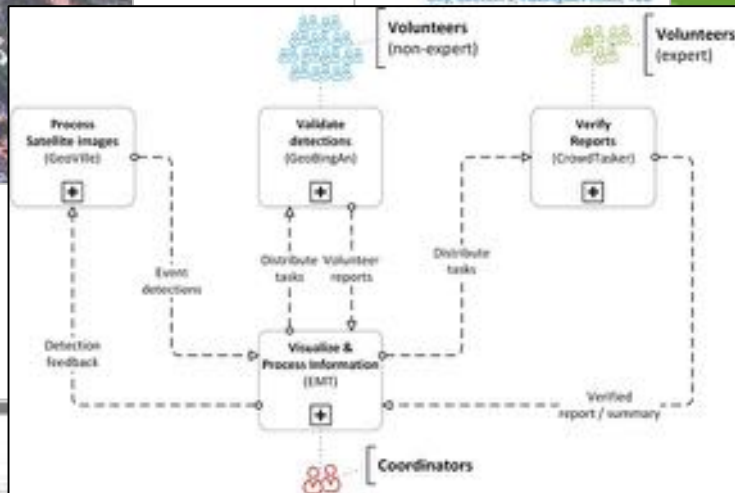


Rapid Assessment System



geoBingAn

CrowdTasker



Emergency Maps Tool



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# Taiwan Drill Day



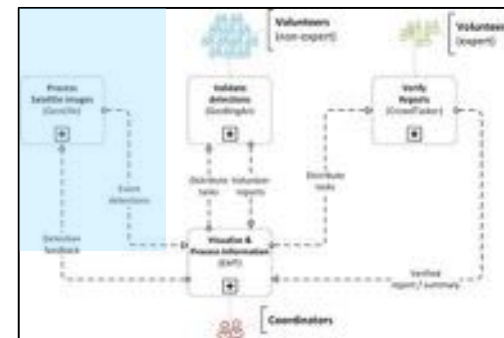
- “921 International Disaster Prevention Drill” is an annual set of events across the whole Taiwan, commemorating the devastating earthquake on 21st September, 1999.
- More than 2,000 lives were lost, damaging tens of thousands of buildings and destroying infrastructure.

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- 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)*
  - **Crowdsourced 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



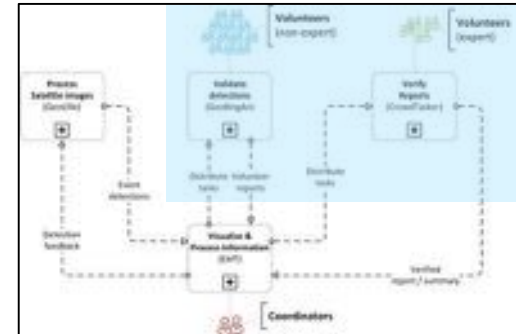
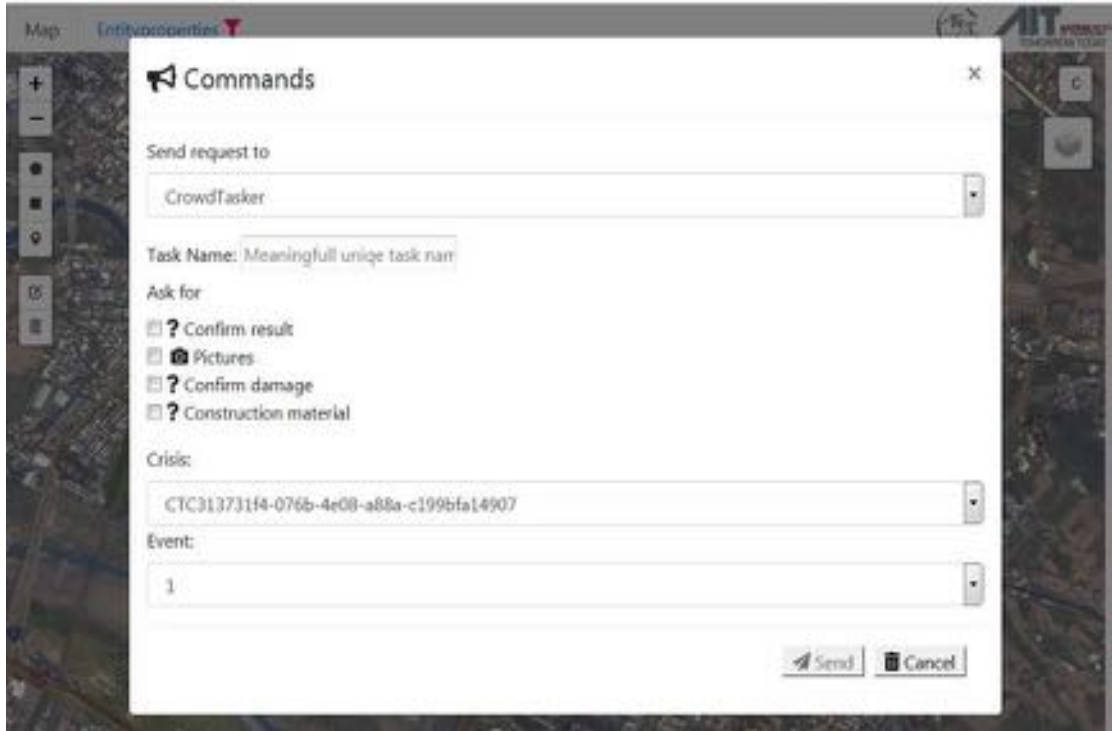
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# Taiwan Drill Day



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**geoVille Result**

Event ID: "PUC TW 2013-2017"

Event ID: 1

Timestamp: "2018-09-21 09:42:05+0800"

Address: "No. 21, Shengli 1st Street, Zhushui City, Hainchi County, Taiwan 602"

Category: "地震防災訓練"

Content: "not damaged"

調查方法 (Survey Method): "巡迴調查 (Survey)"

活動類型 (Type of this event): "巡迴 (Itinerant)"

災情狀況 (Damaged condition): "無 (None)"

調查類型 (Assessment type): "第一 (Initial)"

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**geoVille Result**

Event ID: "PUC TW 2013-2017"

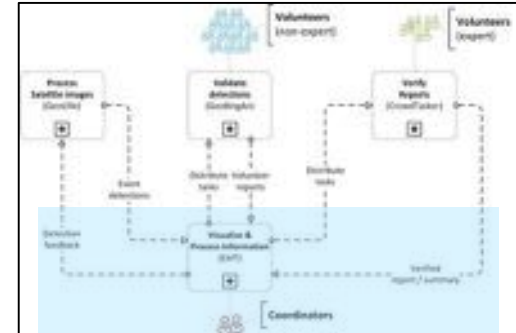
Event ID: 2

Timestamp: "2018-10-11 10:17:47+0800"

Address: "Zhuangling 8th Street, Hainchi County, Zhushui City, Taiwan, Hainchi City, Taiwan, 602"

Category: "地震防災訓練"

Content:





# Taiwan Drill Day



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# Taiwan Drill Day - Results



Response distribution



Damage distribution



Damage categories

- destroyed
- major
- minor
- none

## 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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