GICHD

Plenary 7

Innovations in Mine Action

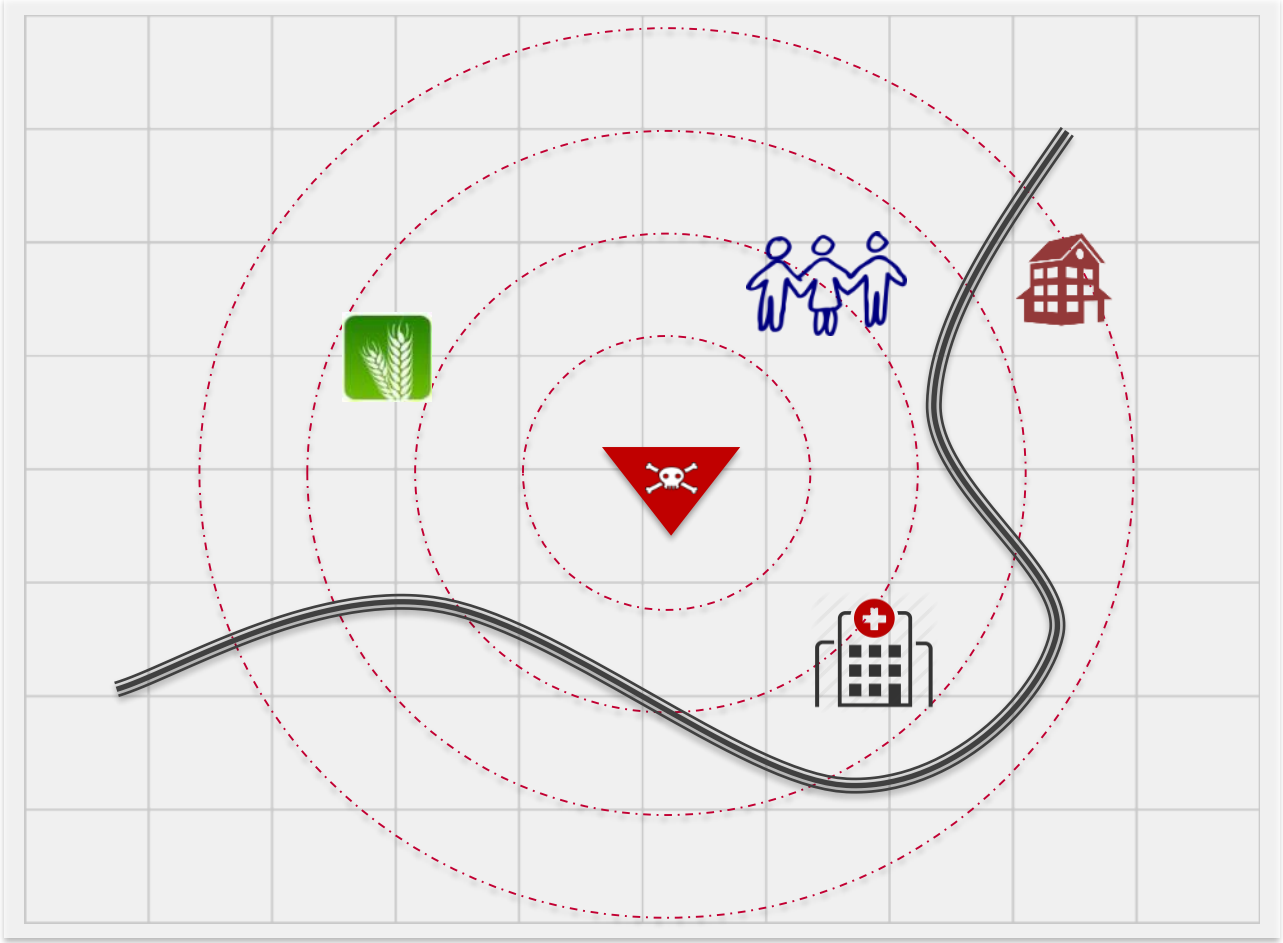
21st International Meeting of National Mine Action Programme Directors and United Nations Advisers

GICHD

IMSMA Core

The power of GIS at the service of mine action

1. ‘Mine Action is inherently geographic’



IMSMA Core is built with GIS

- Geo-enabled mobile data collection
- Map-based tools
- Geographic data logic
- Strategic partnership between GICHD and Esri

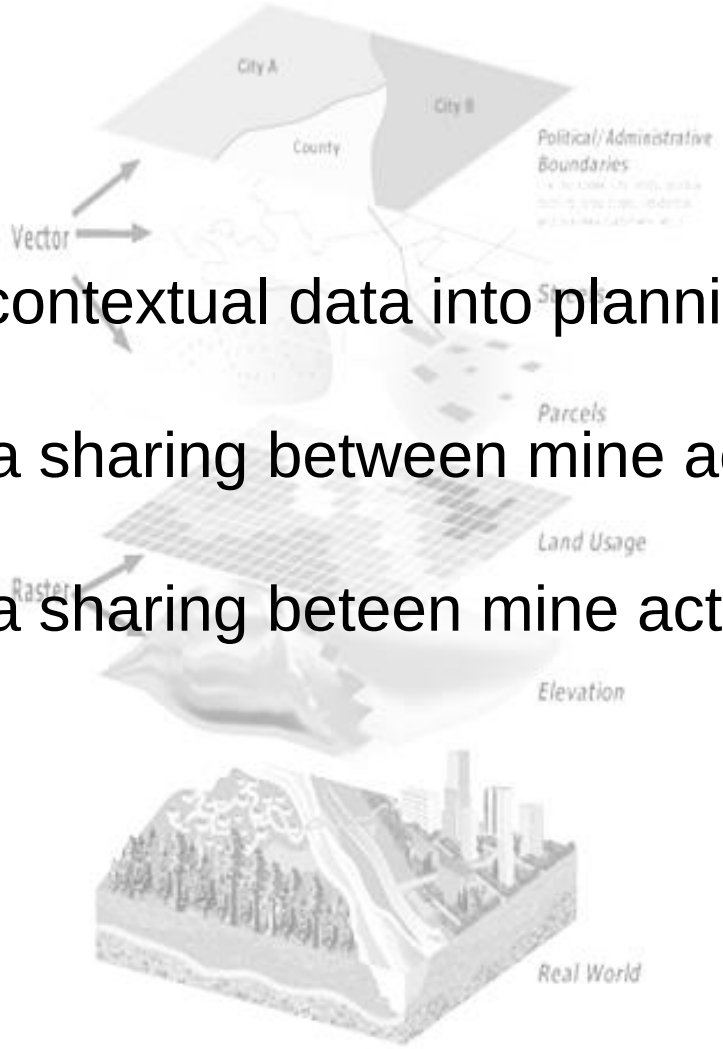
GICHD


Field Apps
Business Apps
Web Apps
GIS Apps
Social Media
Story Maps
Dashboards
esri

GICHD

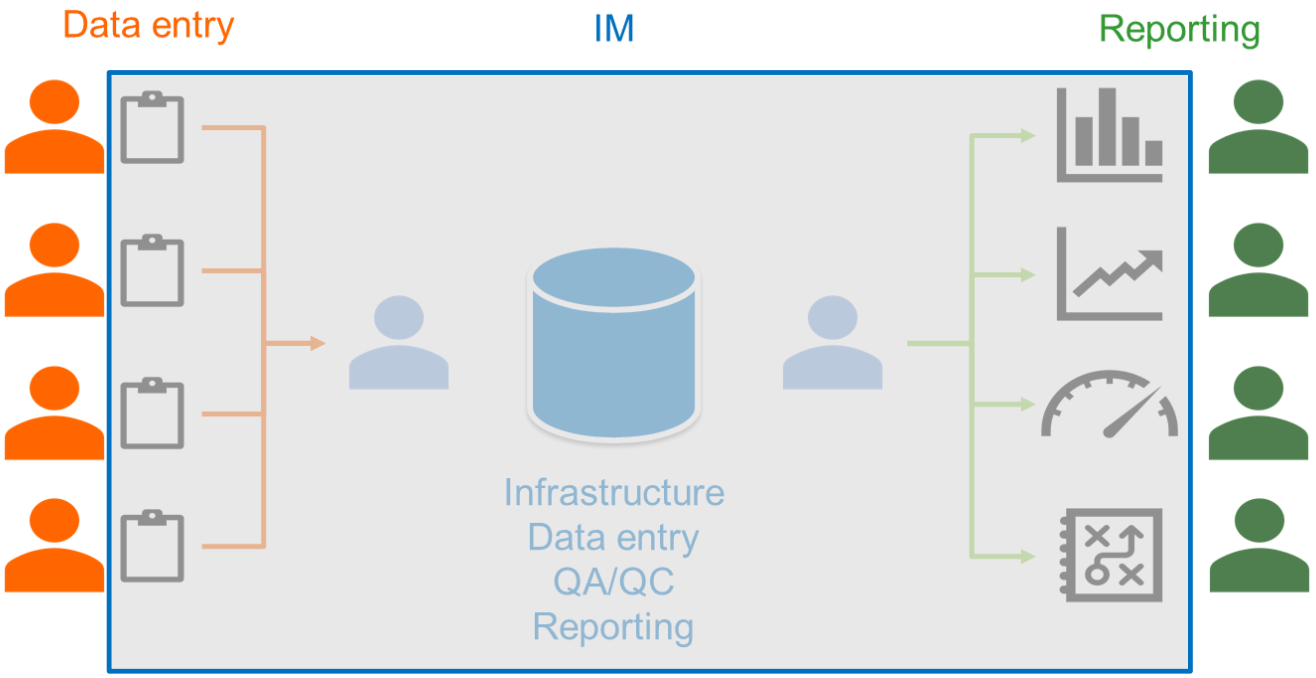
2. ‘Mine Action is driven by context’

IMSMA Core enables data integration

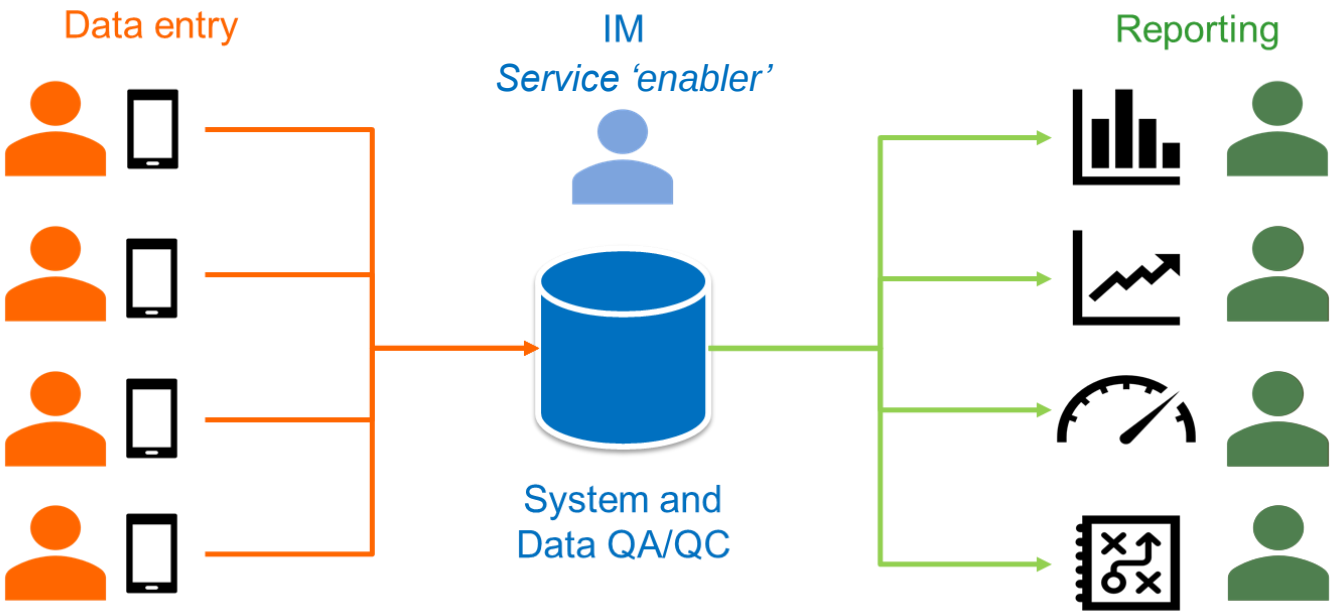


- Integrate contextual data into planning
- Better data sharing between mine action actors
- Better data sharing beteen mine action and other sectors

3. ‘Mine Action decisions-makers need accurate and timely information’

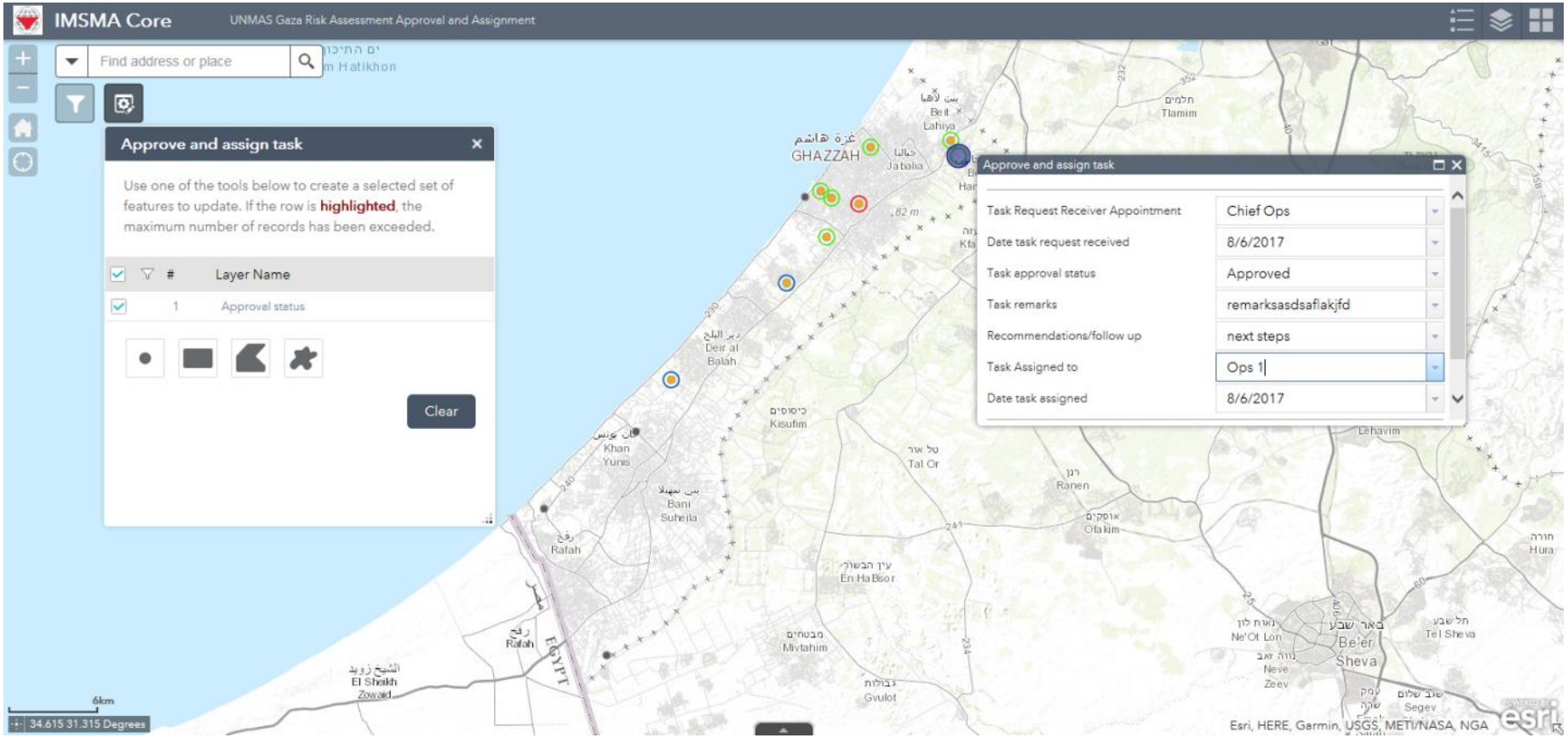


IMSMA Core puts IM in the hands of decision-makers



Role- and task-specific tools

GICHD


IMSMA Core
UNMAS Gaza Risk Assessment Approval and Assignment
Find address or place
Approve and assign task
Use one of the tools below to create a selected set of features to update. If the row is highlighted, the maximum number of records has been exceeded.
Layer Name
1 Approval status
Clear
Approve and assign task
Task Request Receiver Appointment
Chief Ops
Date task request received
8/6/2017
Task approval status
Approved
Task remarks
remarksasdsaflakjfd
Recommendations/follow up
next steps
Task Assigned to
Ops 1
Date task assigned
8/6/2017
GHAZZAH
Jabalia
Beit Lahiya
Deir al Balah
Khan Yunis
Rafah
Bani Suheila
Kisufim
Tal Or
Ranen
Ofakim
En HaBesor
Mivtahim
Gvulot
Be'er Sheva
Tel Sheva
Lehavim
Hura
Segev
Neve Zeev
Ne'Ot Lon
Tlamim
El Sheikh Zowaid
EGYPT
6km
34.615 31.315 Degrees
Esri, HERE, Garmin, USGS, METI/NASA, NGA

GICHD

Input type
Risk Assessment

▶ **Locate on map**

UNMAS reference number
ojco___1502178889668

Risk Assessment Methodolgy
○ Desktop map study only
○ Site visit/survey only
○ Combination

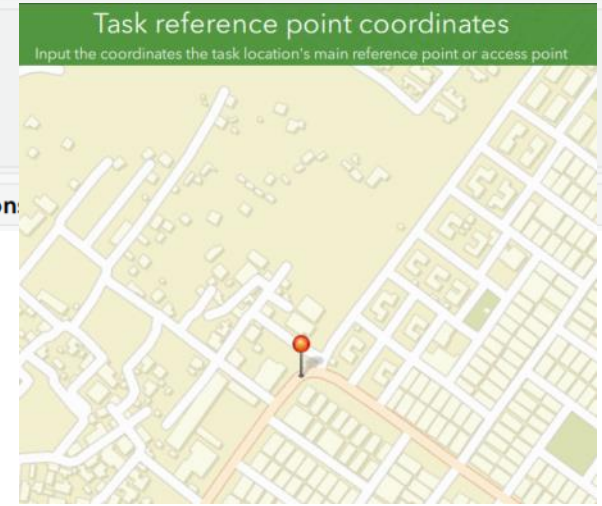
▶ **Threat Analysis**

▼ **ERW Risk Assessment Level - Initial**

▶ **Initial ERW Risk Assessment look-up reference**

ERW Risk Assessed (Initial)
○ No significant risk
○ Low risk
○ Medium risk
○ High risk

▶ **Mitigation recommendation**



GICHD

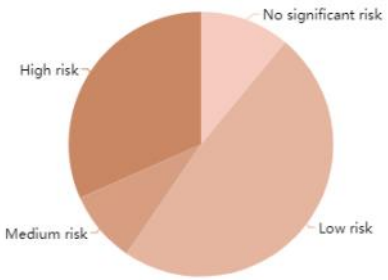
UNMAS Gaza IMSMA Core

Rubble Removal Risk Assessment

No issues detected × | Story not shared × | Edit × | Developed by Esri and the GICHD

Approve and Assign RA task | Approve RA records | Initial Risk Map | Post-mitigation risk map

Risk distribution



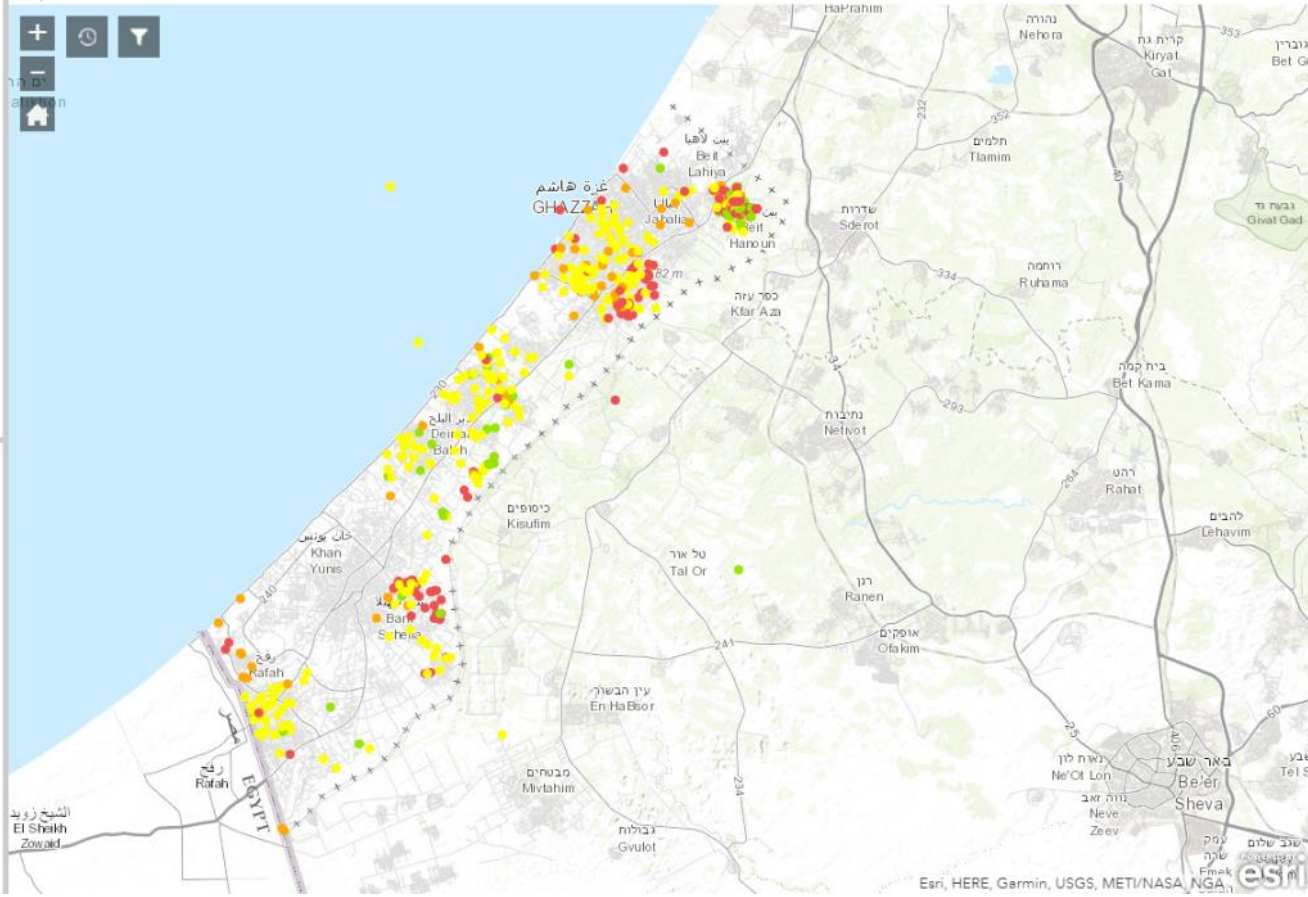
Initial ERW Risk levels

Number of assessements

Number RAs conducted in this area

638

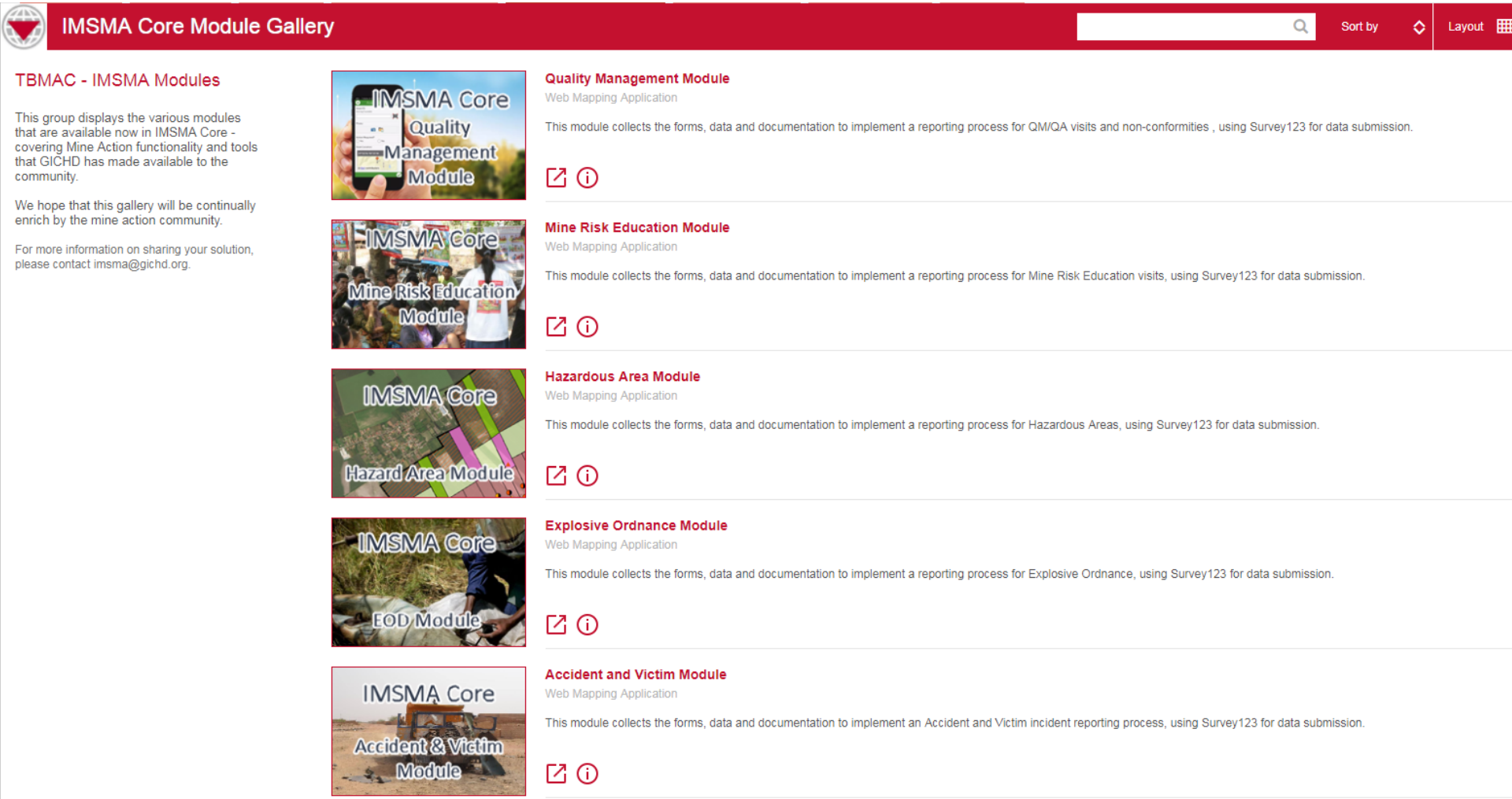
map



4. ‘Mine Action programmes are all the same but different’

GICHD

IMSMA is a knowledge-base of templates and tools



GICHD

imsma.gichd.org

URS ENDRESS
foundation.

FindMine – by Urs Endress Foundation

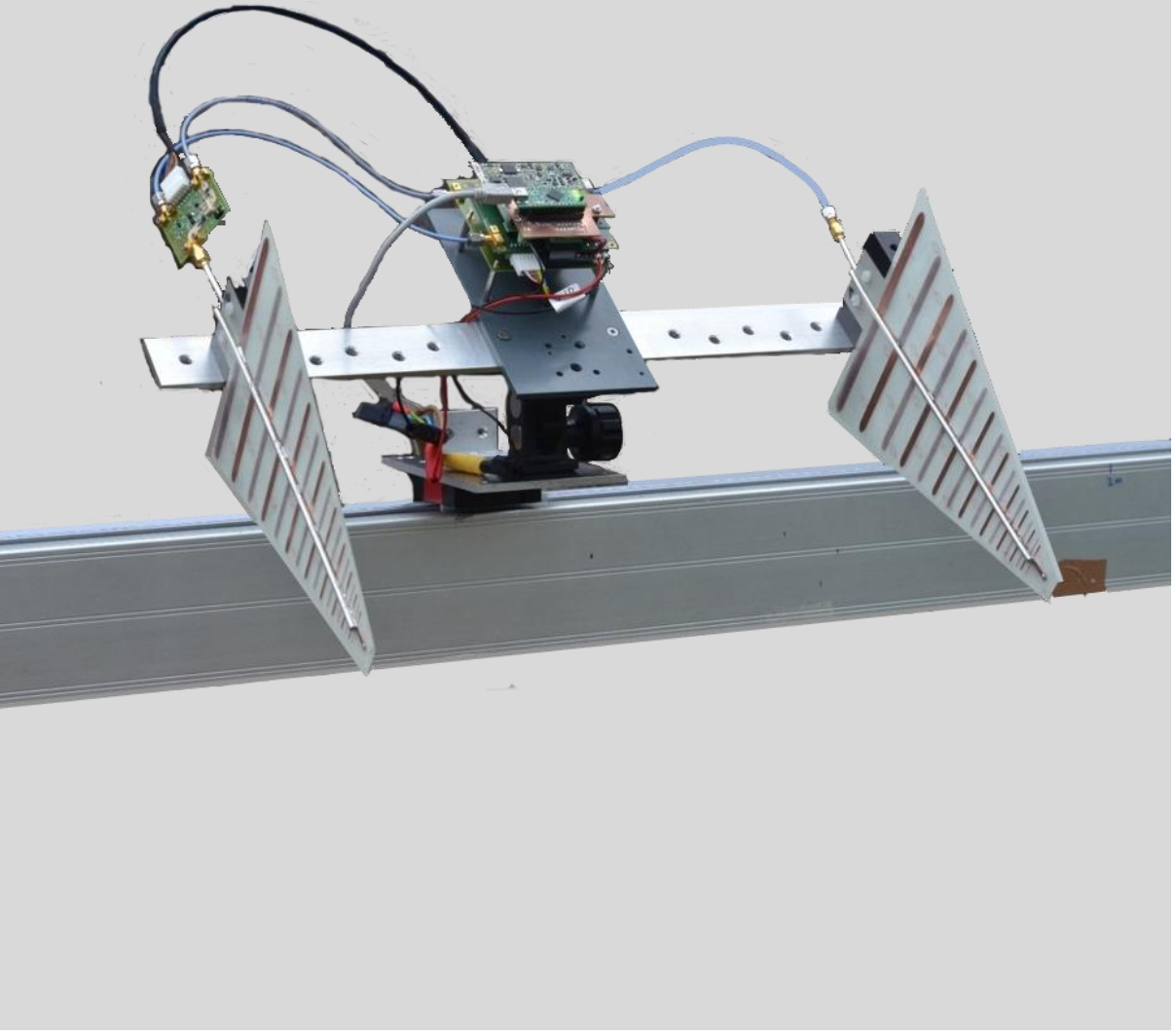
UAS-based mine detection

Jean-Gyl Capt, Foundation Board Member

Target of the Urs Endress Foundation:

- Reduce the number of injured and killed people and increase the speed for deminers to reach their goals

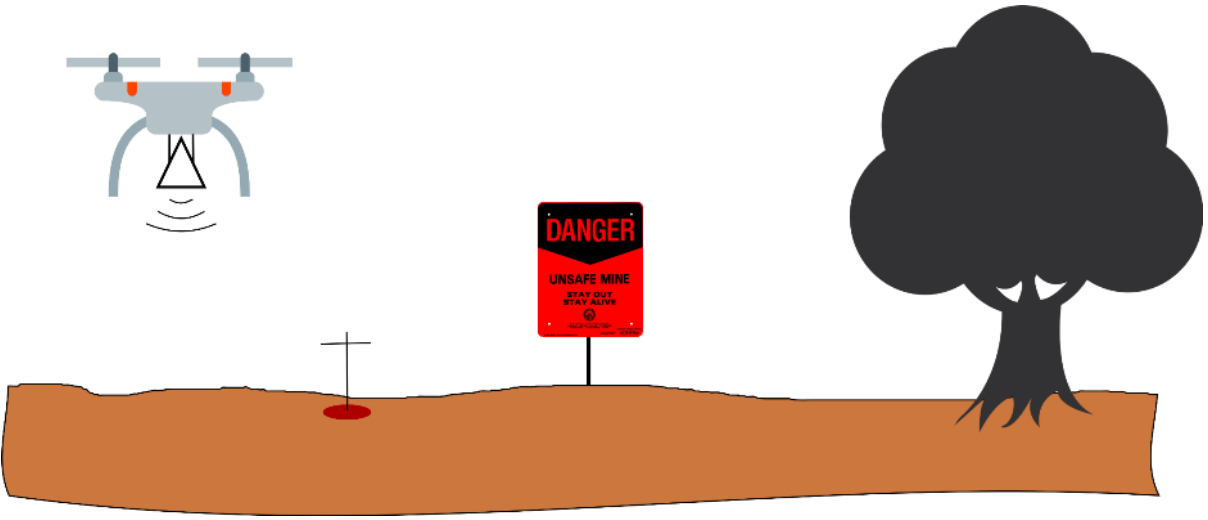
URS ENDRESS
foundation.



Basic idea:

Ground
Penetrating
Synthetic
Aperture **R**adar
(GPSAR) with low energy and light weight ...

URS ENDRESS
foundation.



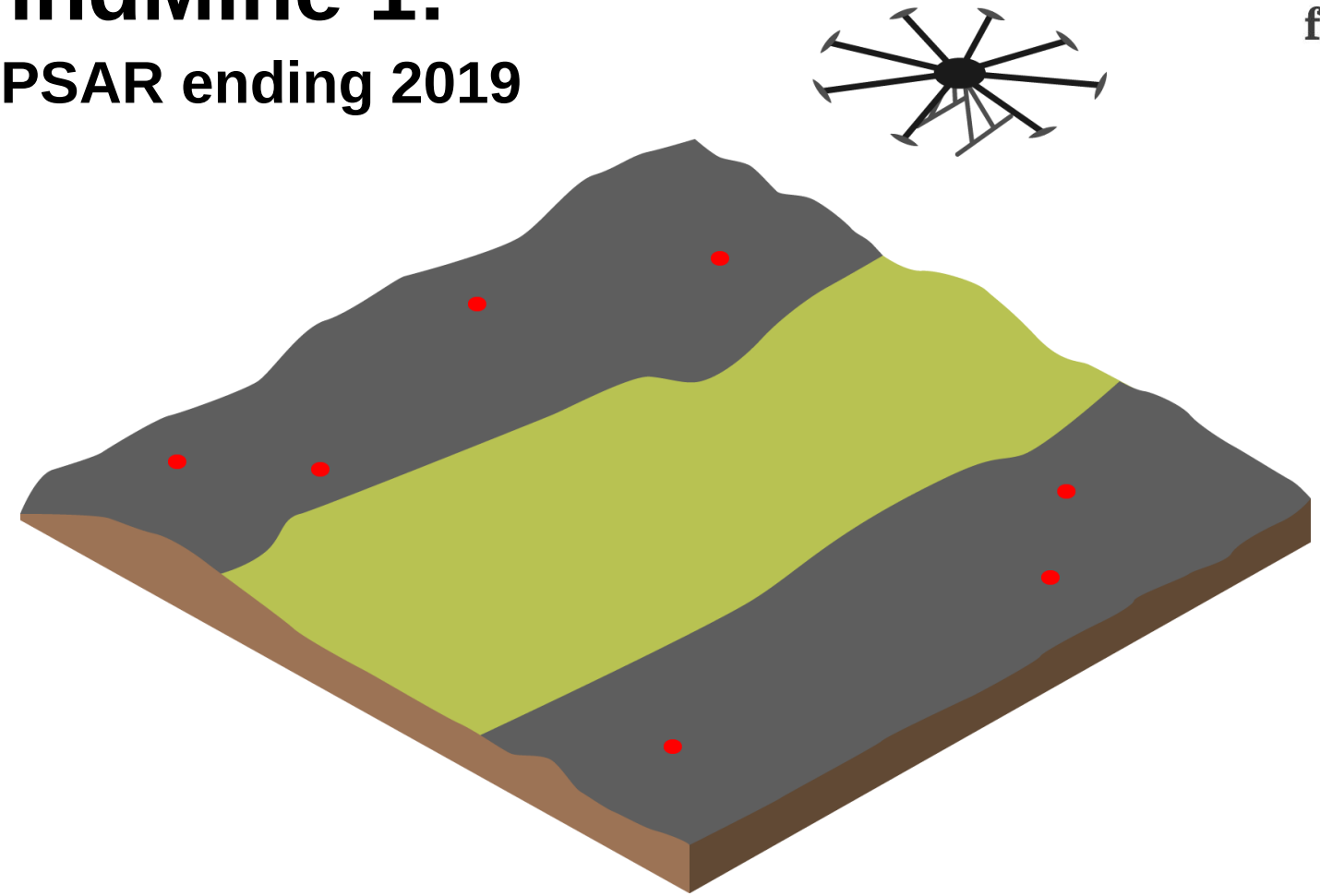
Basic idea:

… GPSAR as its prime sensor for mine localization mounted on an autonomously flying **U**nmanned **A**erial **S**ystem (UAS)

URS ENDRESS
foundation.

FindMine 1:

GPSAR ending 2019



Automatic mapping of the Suspect Hazard Area (SHA)-topography

- mines recognized by FindMine-**U**nmanned **A**erial **S**ystem (UAS)

FindMine 2:

URS ENDRESS foundation.

Integration of additional sensors ending 2022

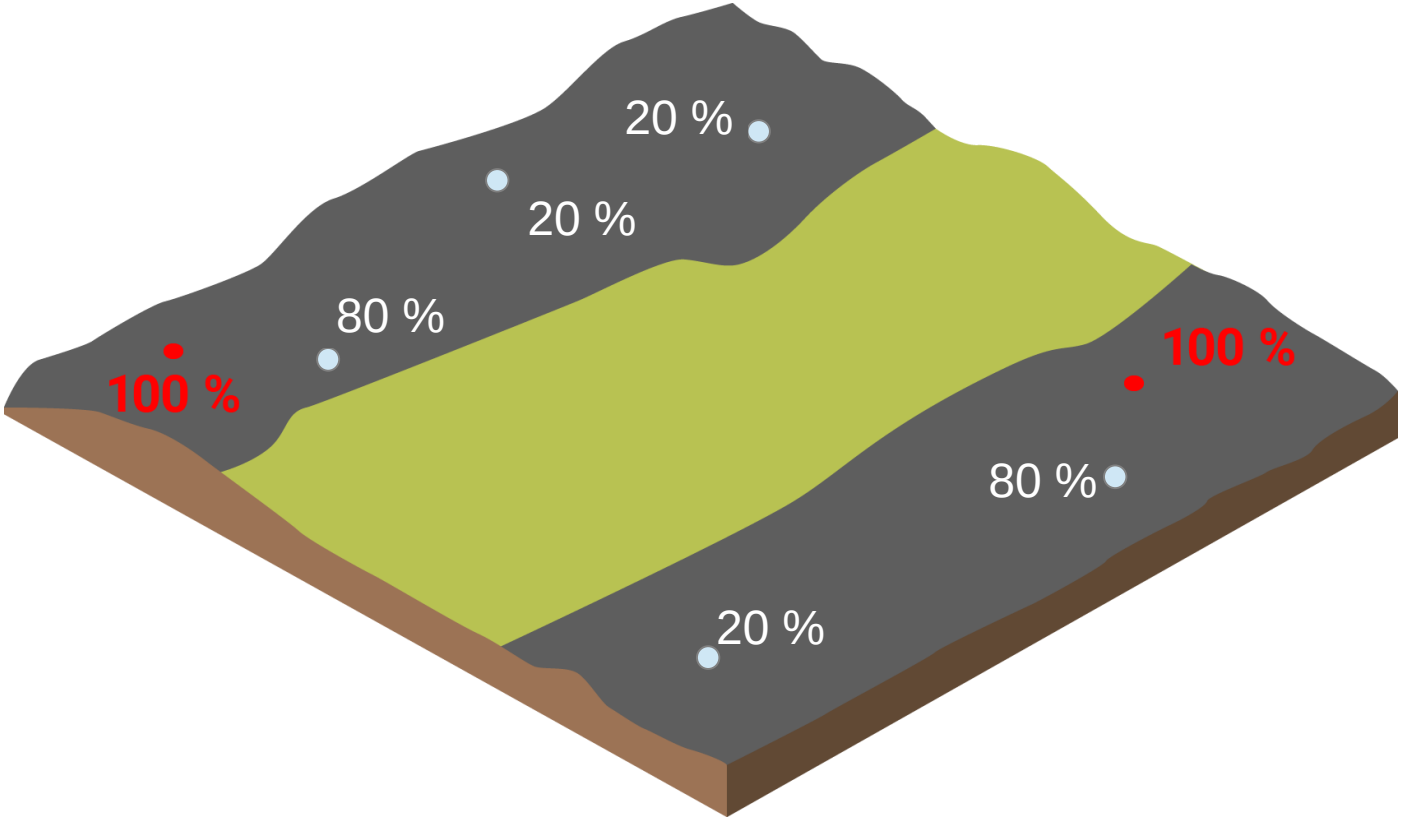
Additional Sensors:

- Gas detector
- Hyperspectral imaging
- Thermal imaging
- Evaluation of several sensing methods suitable for mine detection and as **U**nmanned **A**erial **S**ystem (UAS)-payload

FindMine 2:

URS ENDRESS foundation.

Integration of additional sensors ending 2022



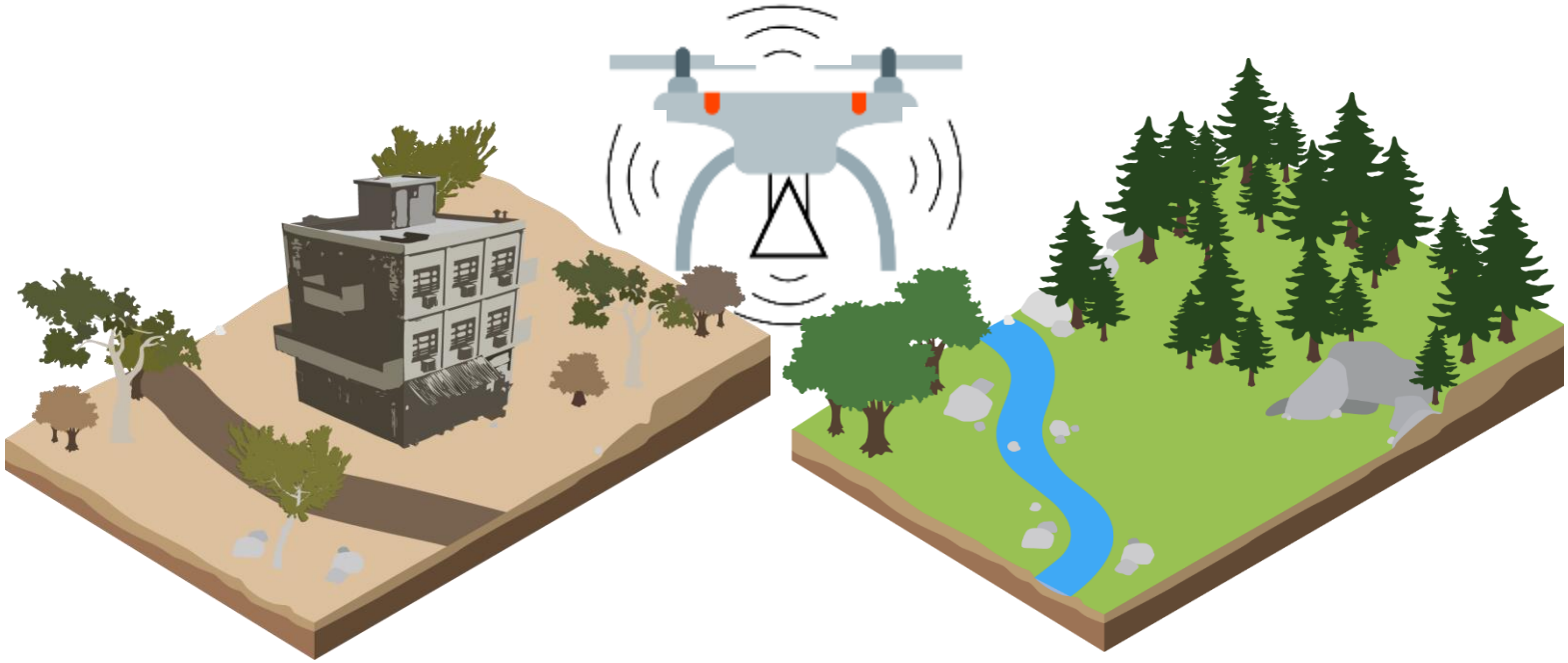
Evaluate found signals

- Determine % of likelihood of mines

→ Increase the probability up to 99,7%

FindMine 3:

Increase flying capabilities ending 2025



Building

Forest

Flying into suspected buildings and dense forest / jungle

FindMine's Vision

URS ENDRESS foundation.

Make the world safer by helping to get rid of mines and **U**ne**X**ploded **O**rdnances (UXO) with recent technologies
and to support:

Suspected **H**azardous **A**rea (SHA) Identification

Land Release

Completion and Mapping

Main **S**upply **R**oute (MSR) Verification

Camp Security

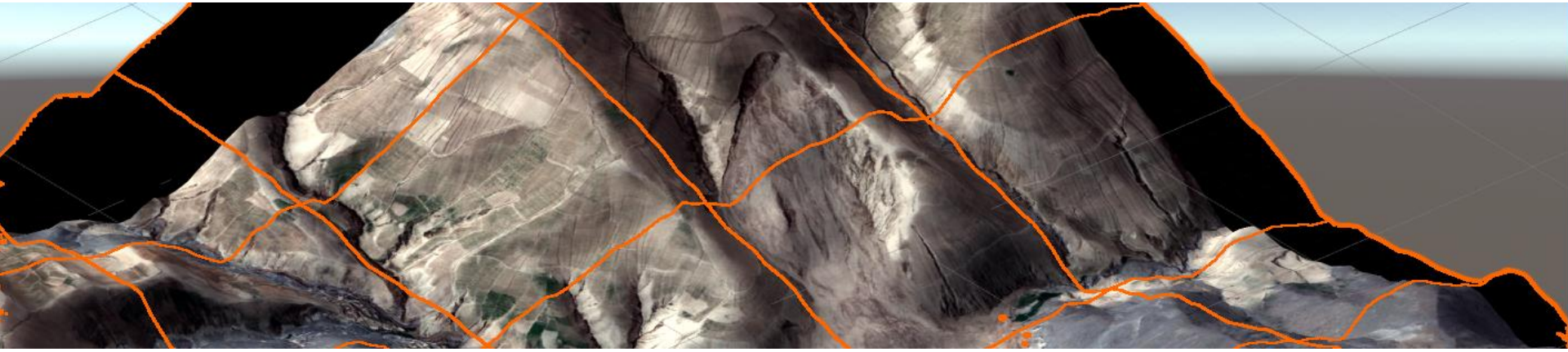
Jean-Gyl.Capt@findmine.org

Presentation: 21st International Meeting of National Mine Action Programme Directors
and United Nations Advisers (NDM-UN) - Innovations in Mine Action, Geneva, CH, Feb16, 2018

United Nations Institute for Training and Research

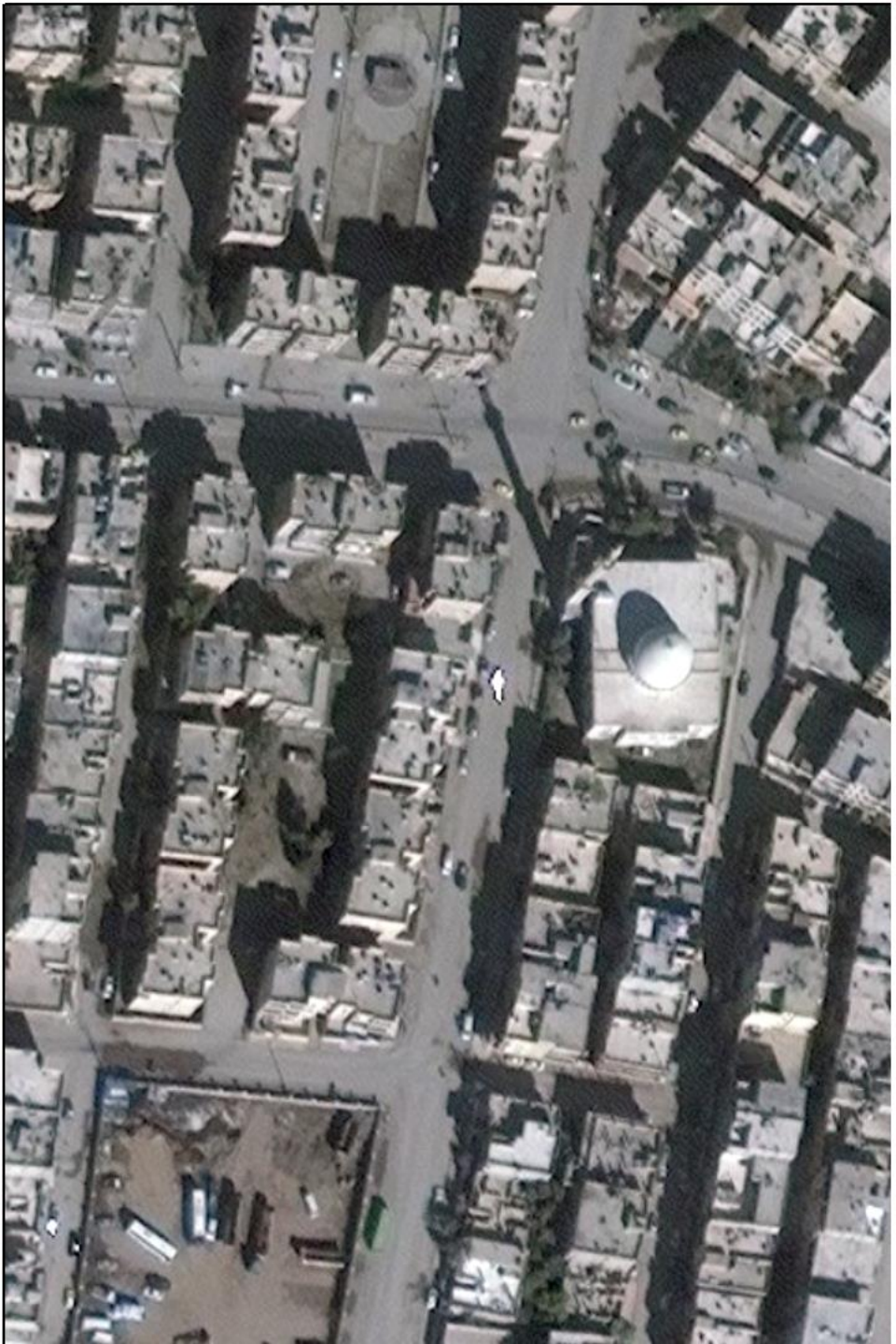
UNOSAT

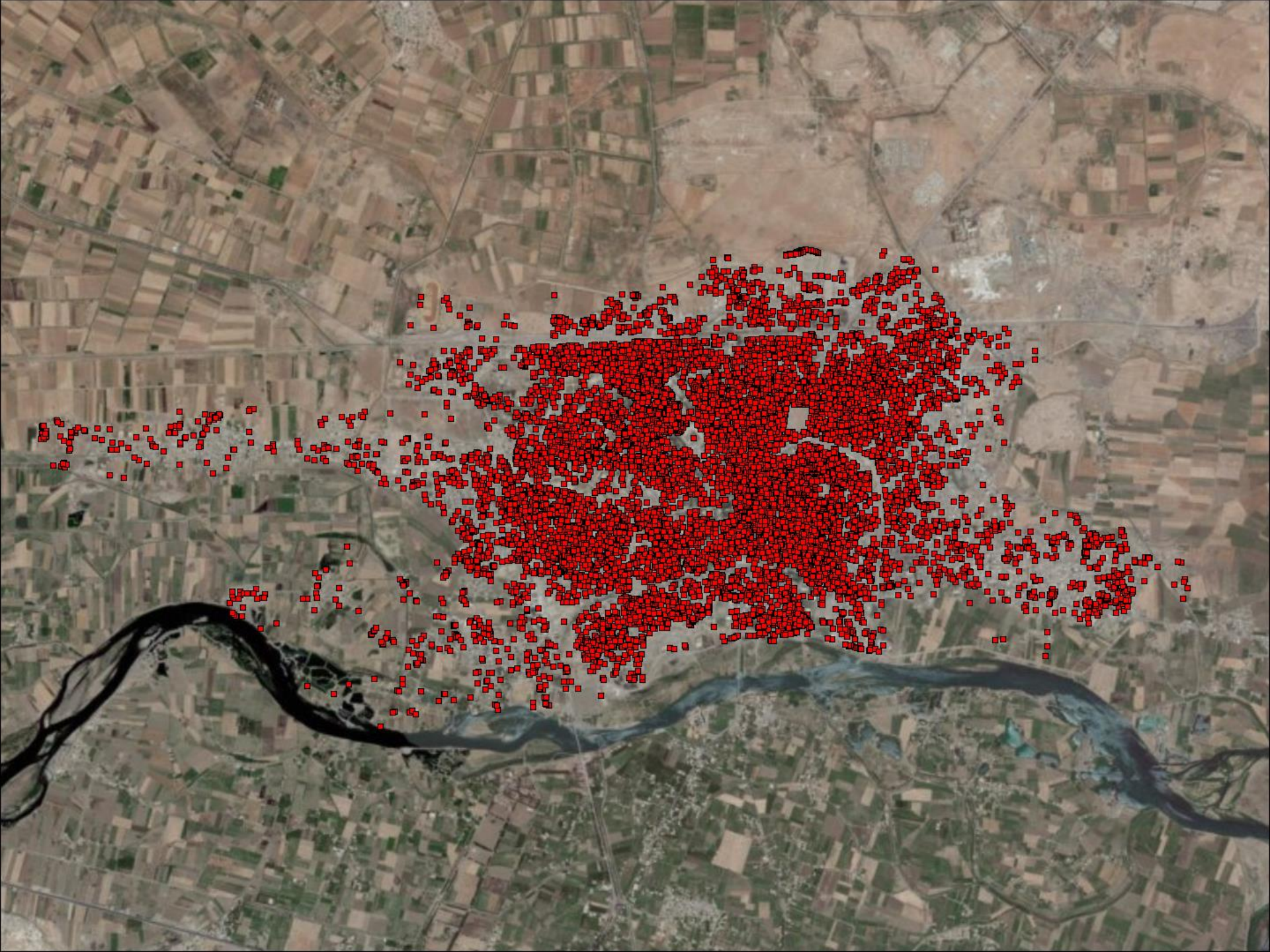
Distributed Satellite / Drone Imagery Analysis Systems

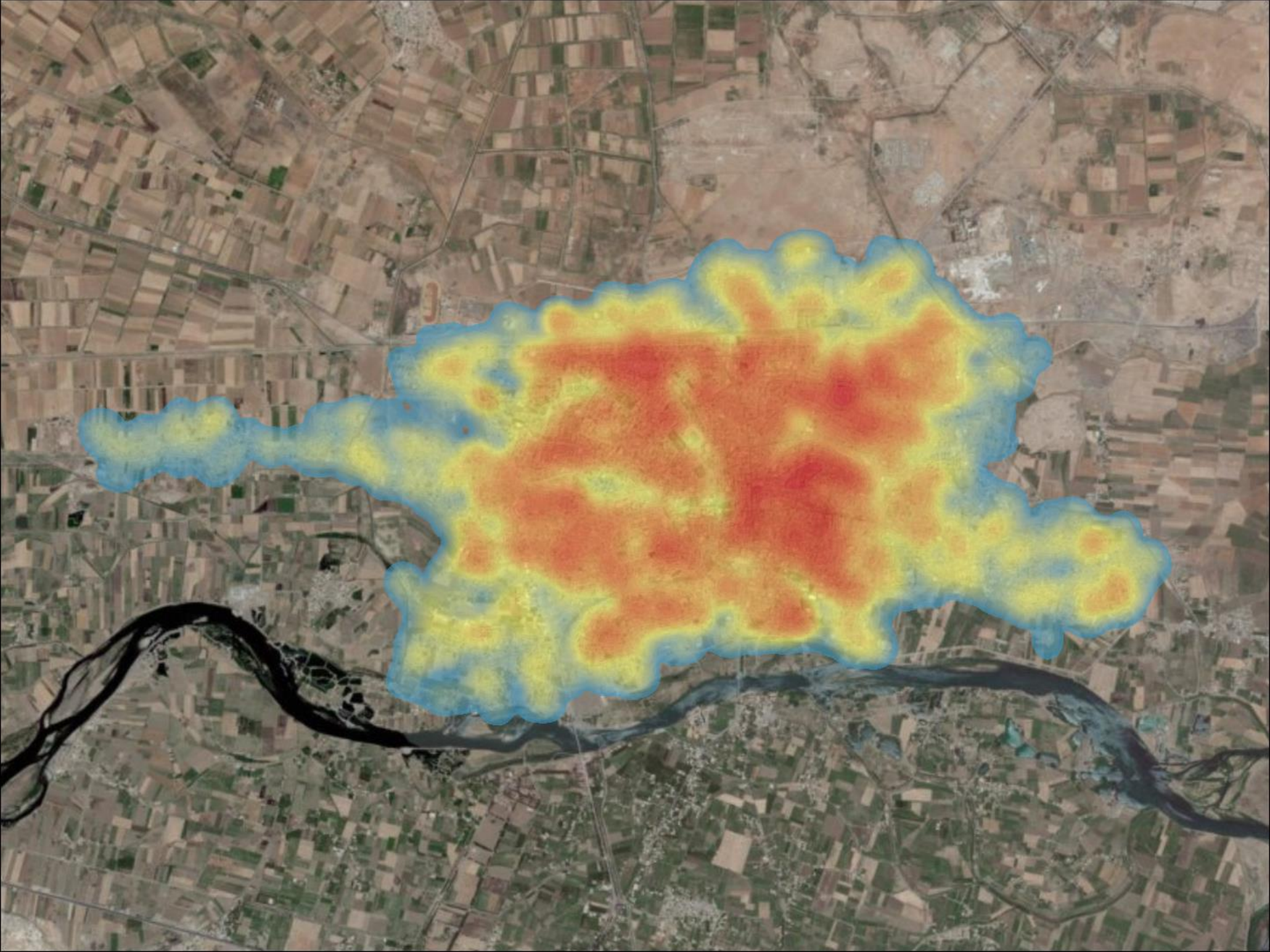


Introduction to UNOSAT

- A programme in the United Nations Institute for Training and Research (UNITAR)
- Fifteen years of operations, 30 people
- Fully dedicated to satellite imagery analysis and capacity development
- Based at the CERN supercomputing centre

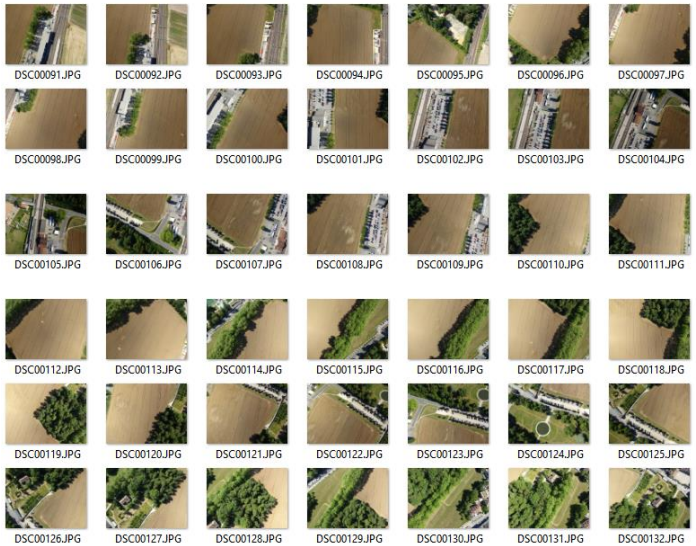






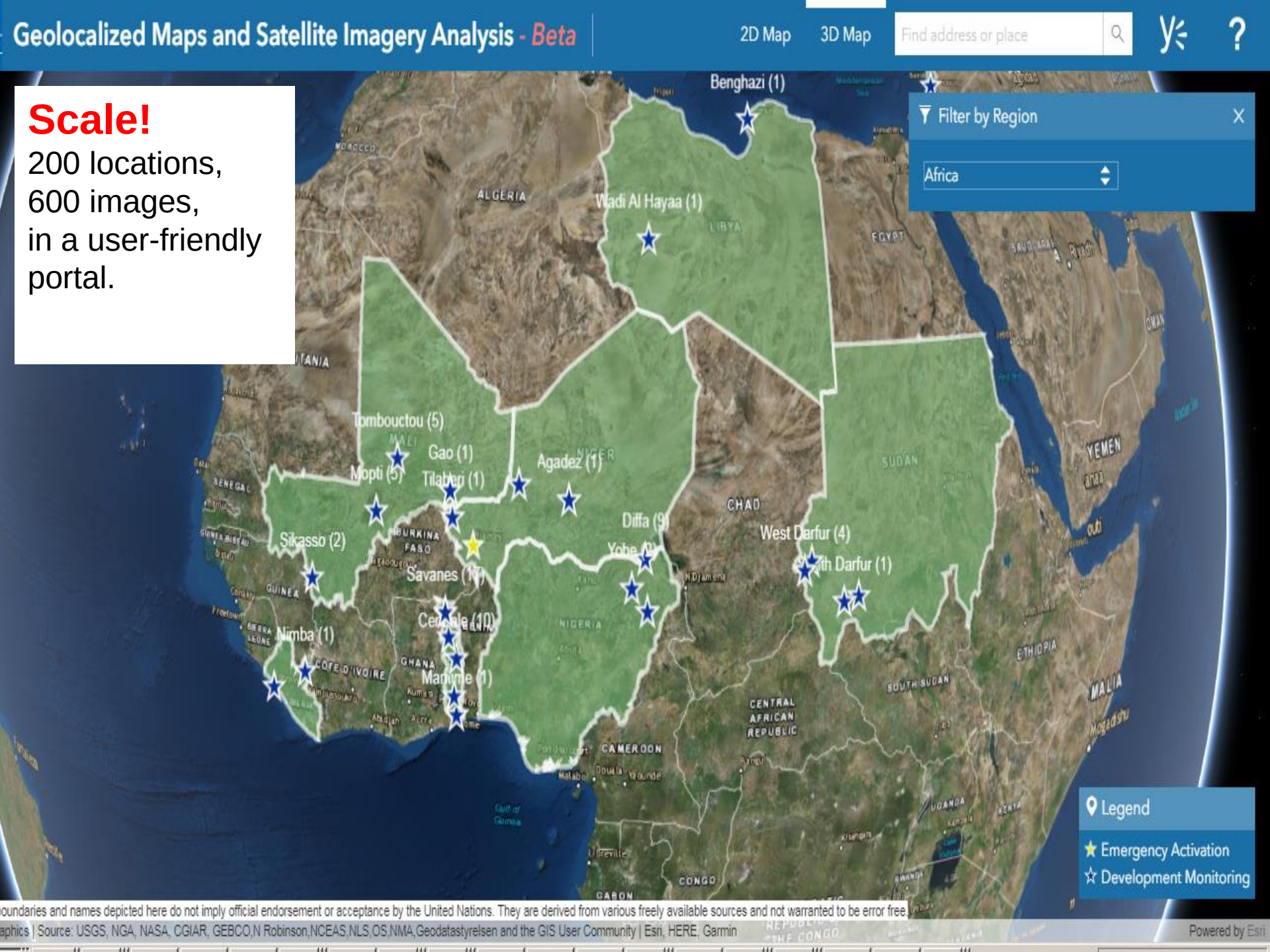
Drone flight, image processing, upload, internet service…

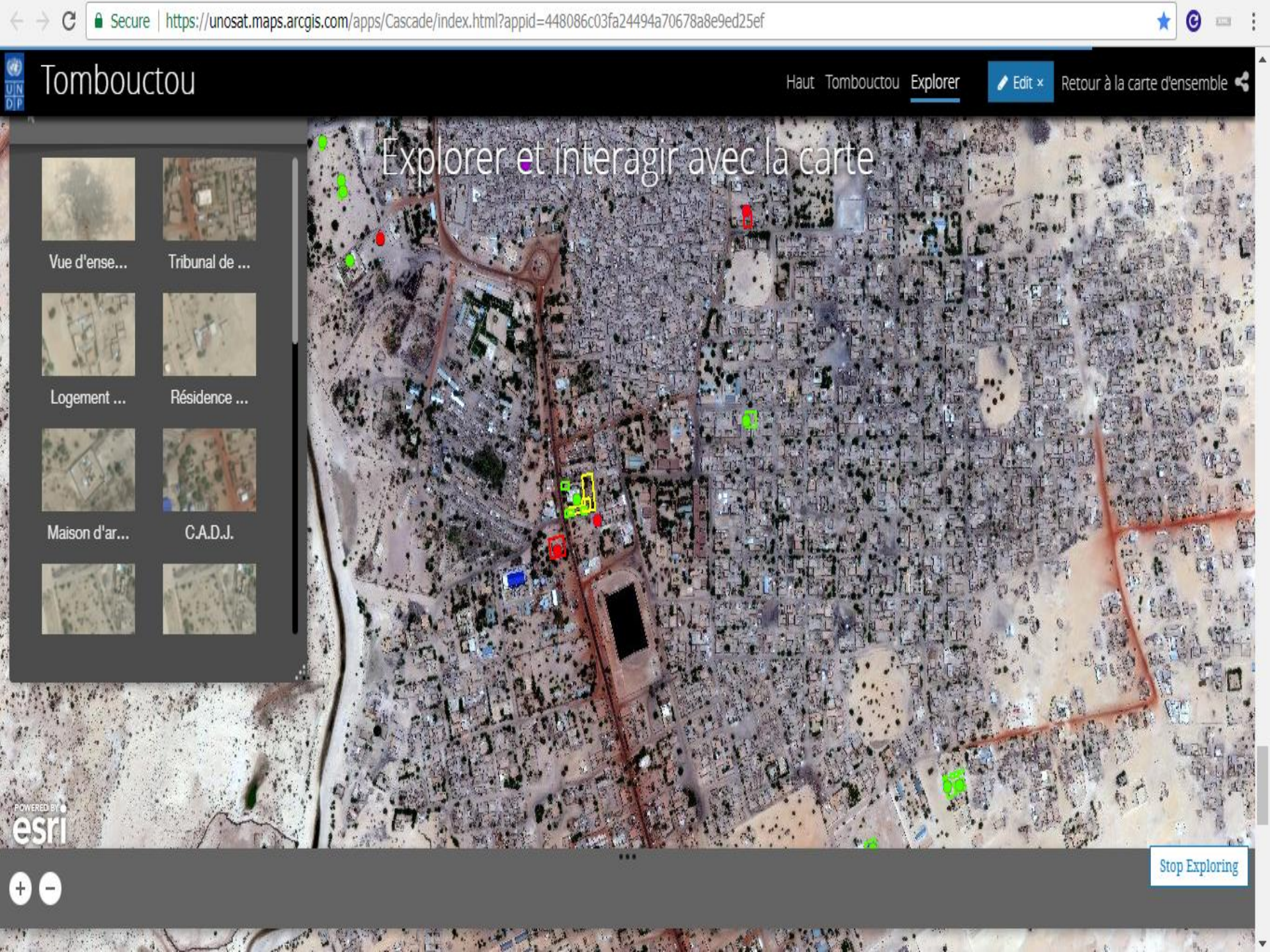
4 hours!



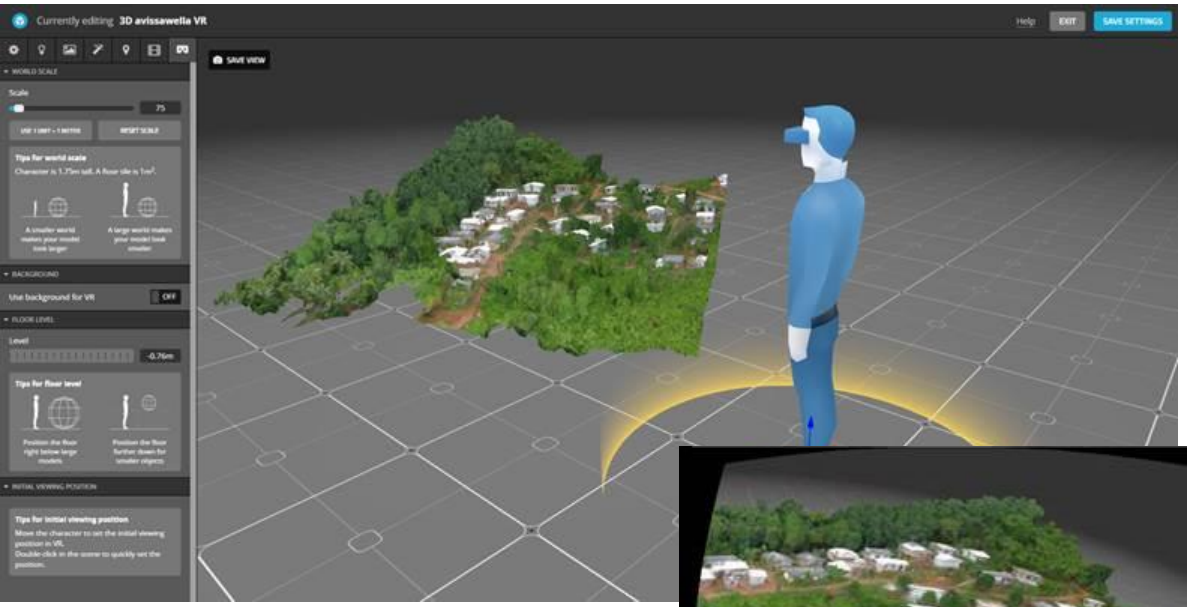
unitar
United Nations Institute for Training and Research

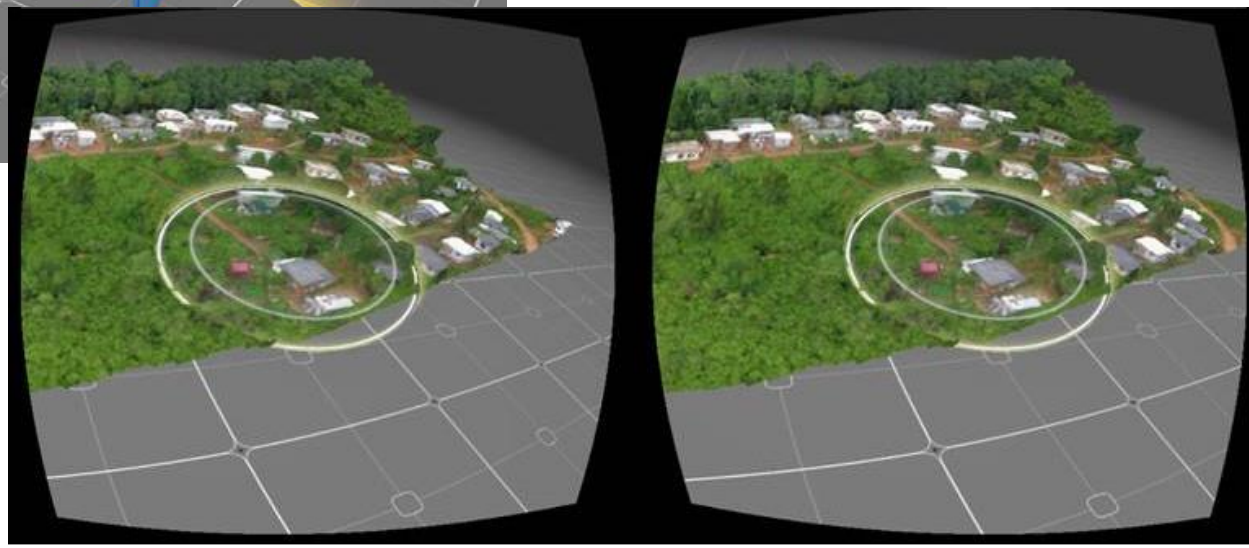
Connecting Imagery Service to IMSMA Core


Geolocalized Maps and Satellite Imagery Analysis - Beta
2D Map
3D Map
Find address or place
Scale!
200 locations,
600 images,
in a user-friendly
portal.
Filter by Region
Africa
Benghazi (1)
Wadi Al Hayaa (1)
Tombouctou (5)
Gao (1)
Mopti (5)
Tilaberi (1)
Agadez (1)
Diffa (9)
Sikasso (2)
Savanes (1)
Nimba (1)
Marahoue (1)
West Darfur (4)
Legend
Emergency Activation
Development Monitoring
Boundaries and names depicted here do not imply official endorsement or acceptance by the United Nations. They are derived from various freely available sources and not warranted to be error free.
Source: USGS, NGA, NASA, CGIAR, GEBCO,N Robinson,NCEAS,NLS,OS,NMA,Geodatastyrelsen and the GIS User Community | Esri, HERE, Garmin
Powered by Esri


Secure
https://unosat.maps.arcgis.com/apps/Cascade/index.html?appid=448086c03fa24494a70678a8e9ed25ef
Tombouctou
Haut
Tombouctou
Explorer
Edit ×
Retour à la carte d'ensemble
Explorer et interagir avec la carte
Vue d'ense...
Tribunal de ...
Logement ...
Résidence ...
Maison d'ar...
C.A.D.J.
POWERED BY esri
Stop Exploring

UAV Survey to Virtual Reality





https://skfb.ly/6qJSM

UNITAR Operational Satellite Application Programme (UNOSAT)
Contact information:
Lars Bromley - Lars.BROMLEY@unitar.org

UNOSAT

unitar
United Nations Institute for Training and Research

United Nations Institute for Training and Research
Institut des Nations Unies pour la Formation et la Recherche
Instituto de las Naciones Unidas para Formación Profesional e Investigaciones
Учебный и научно-исследовательский институт
Организации Объединенных Наций
معهد الأمم المتحدة للتدريب والبحث
联合国训练研究所

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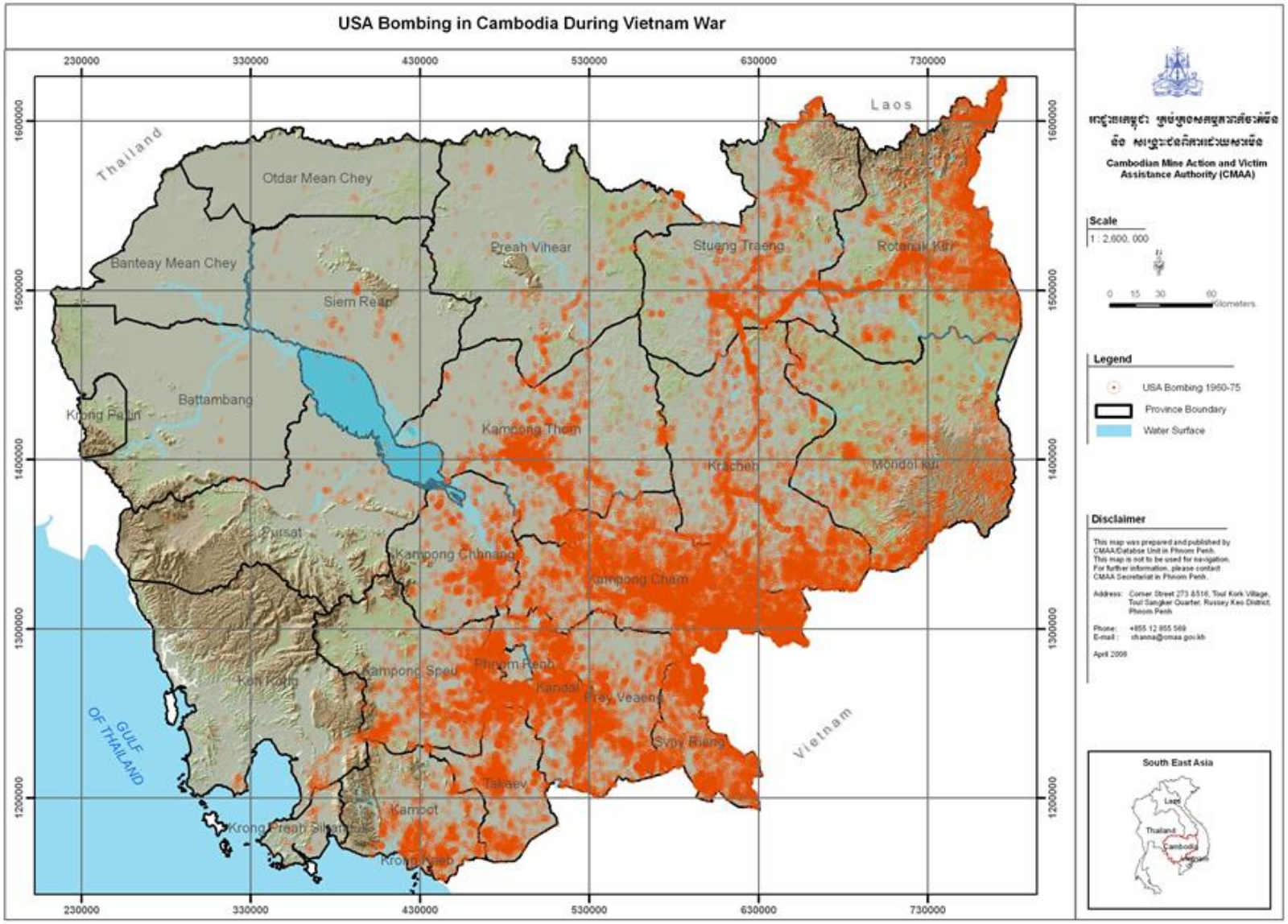
www.unitar.org

ADVANCED DETECTION SYSTEMS FOR SUBMUNITION CLEARANCE

Presented by: Alistair Moir, MAG Country Director

Date: 16 February, 2018

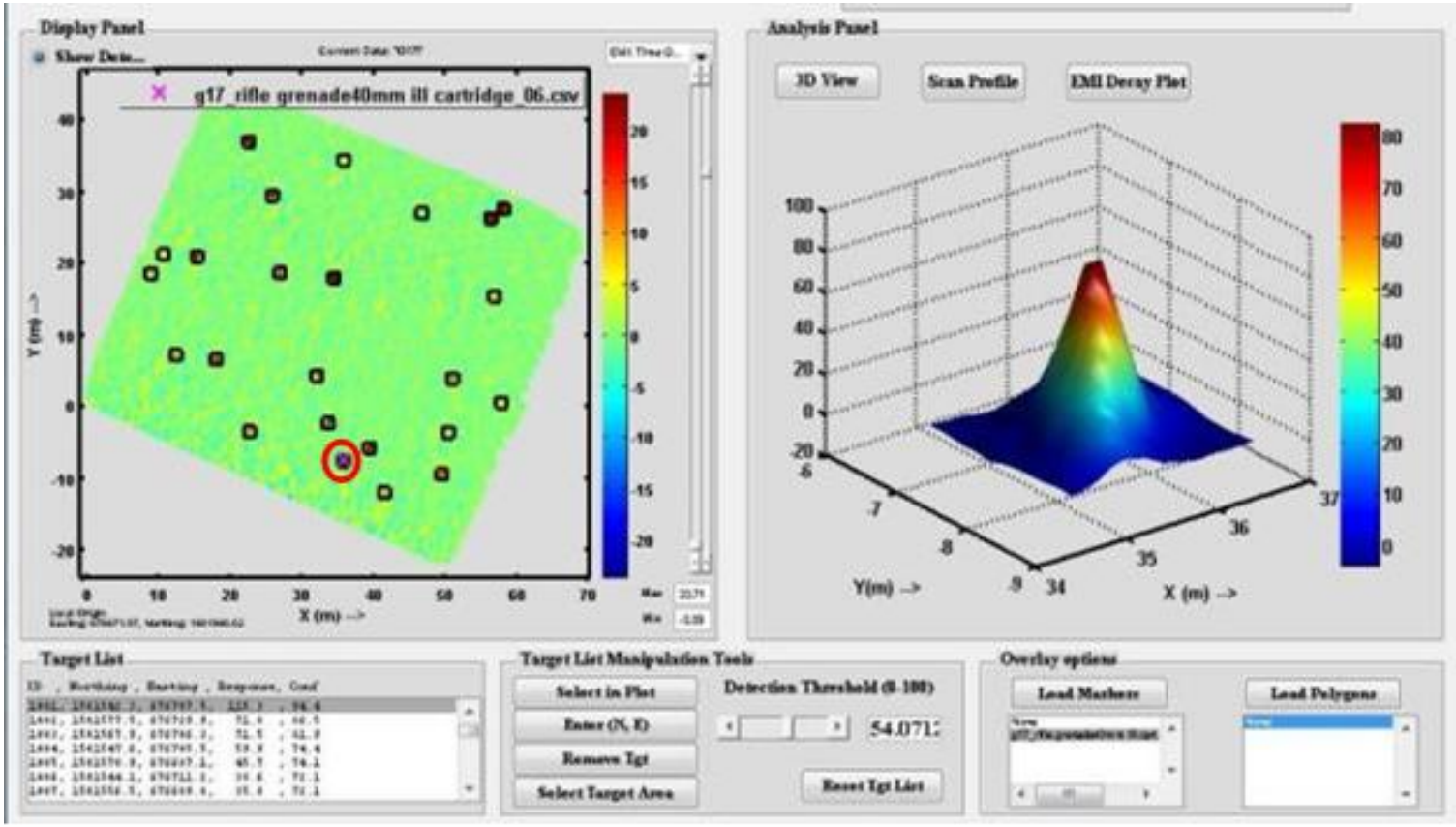
Event: 21st International Meeting of National Mine Action Programme Directors and United Nations Advisers (Plenary Session 7: Innovation in Mine Action)



Challenges

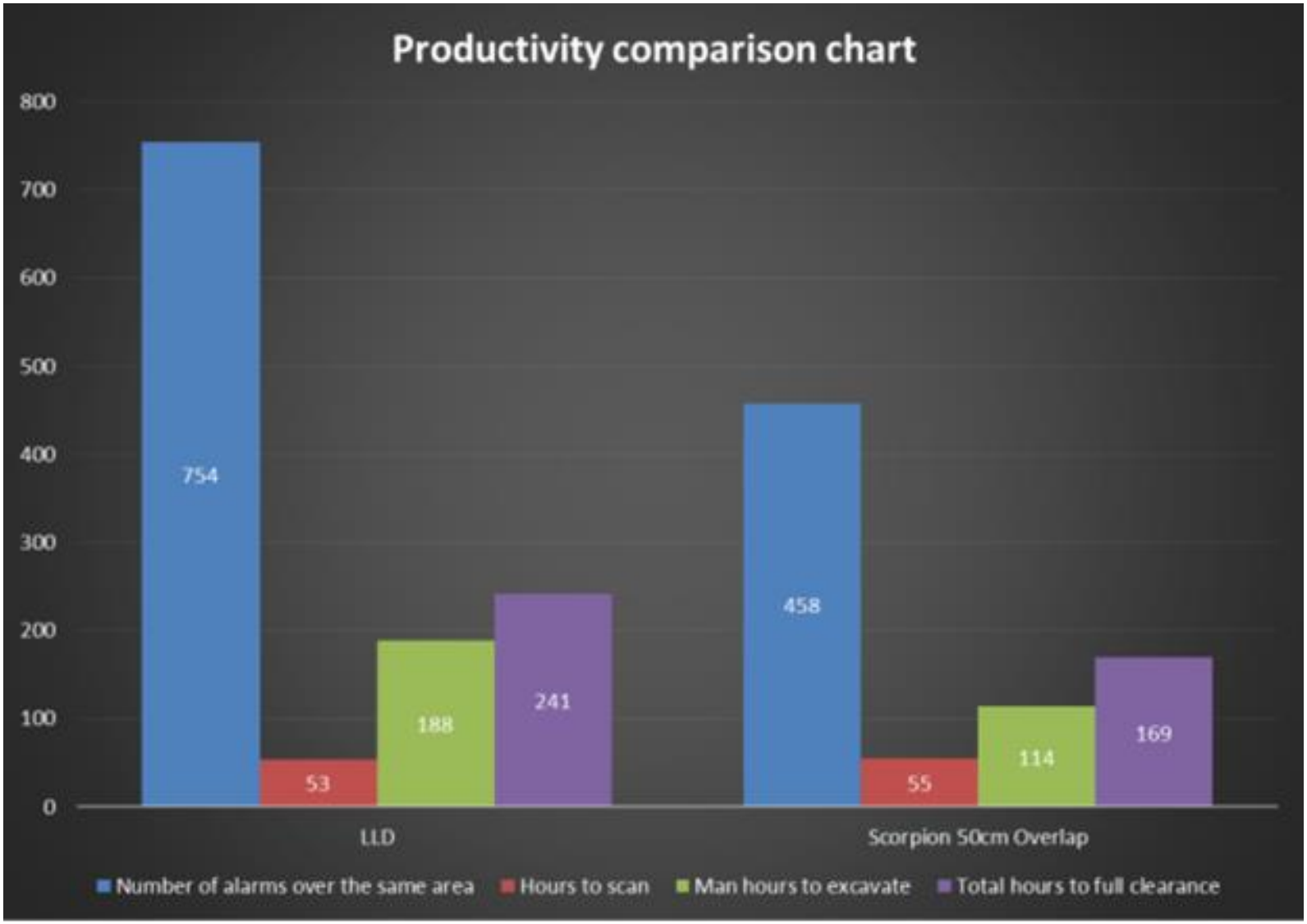
- Very high levels of cluster munition contamination
- Reliance on relatively old detection technology for shallow buried UXO
- Majority of current detection systems faced significant problems with mineralized soil and high levels of metal clutter

Scorpion Phone Screen



Above is a screen shot of Grid G17 Scorpion data processed in Boris, showing (circled in red) the 40mm Rifle Grenade Illumination Cartridge detected by Scorpion and a 3D view of its data to the right side of the screenshot

Picture above showing the 40mm Rifle Grenade Illumination Cartridge in the excavation hole marked by a Scorpion white chip



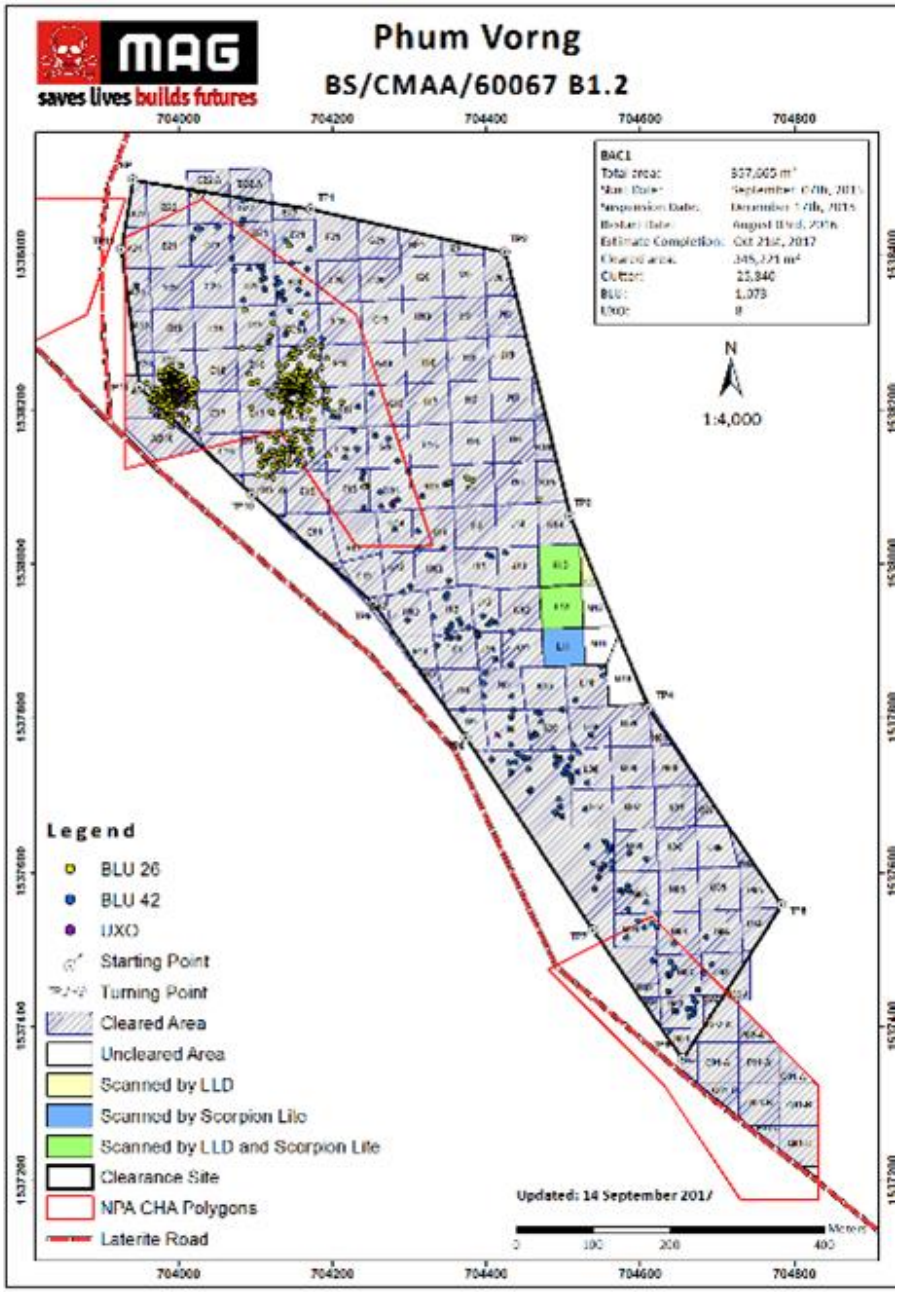
The above is a comparison chart between Scorpion and LLD.
The Scorpion was more productive this month where the overall time needed to full clearance for Scorpion was 72 hours less than the one of the LLD

Scorpion Lite

Scorpion Lite functions on an identical platform as Scorpion but utilizes a shorter center boom that eliminates the magnetometer. Ideal for areas without high-threat for very deep targets

- Smaller footprint, reduced weight
- Improved obstacle avoidance
- Reduced operator fatigue
- Reduced equipment stress
- Improved scanning efficiency
- No quantifiable degradation of detection performance over sub-munitions

Additional ballast added for even weight distribution

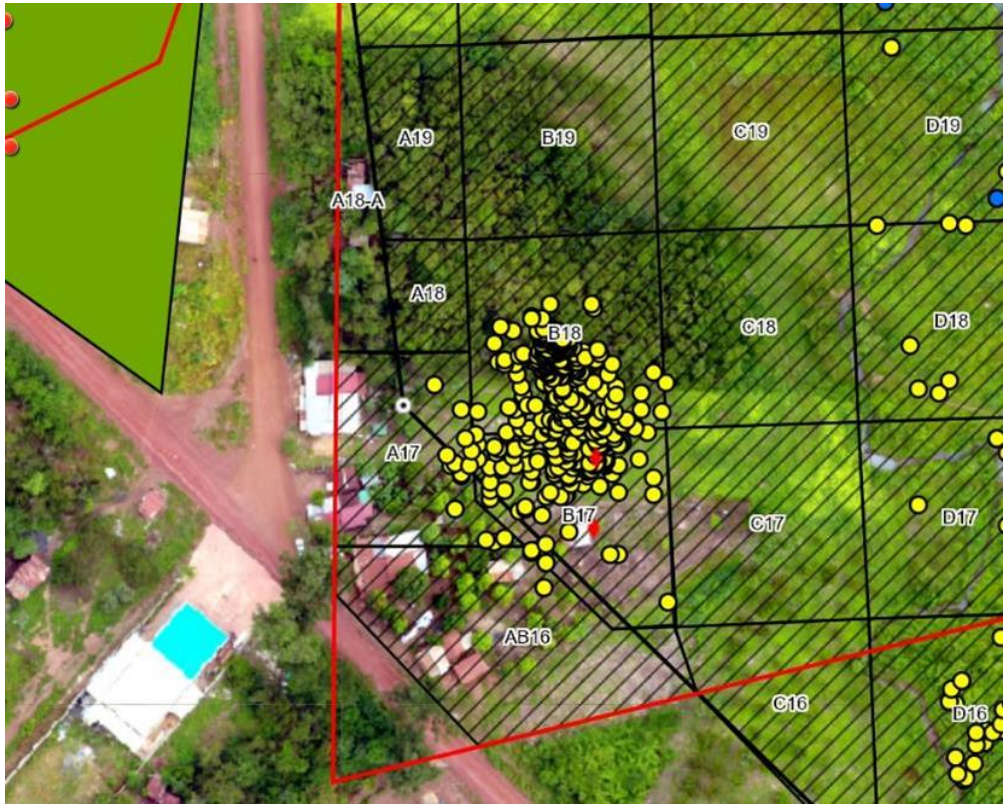


Phum Vorng Site Characeteristics:

- 357,000m2 of suspect land captured by NTS
- Extremely high levels of CM contamination
- Close proximity to residential area
- Very high levels of mineralized soil
- Extremely high scrap metal contamination

www.maginternational.org

MAG
saves lives builds futures



In the most contaminated area there were over 1.5 cluster munitions found per m2.

No one detector could clear the site efficiently without facing obstacles (clutter, poor GPS, mineralization)

Box ID	LLD Scan	Scorpion Scan	VMX10 Scan
AB16	Obstacle	Yes	Obstacle
A17	Obstacle	Yes	Obstacle
A18	Obstacle	Obstacle	Yes
B18	Obstacle	Yes	Yes
A19	Yes	Obstacle	Yes

Observations & Lessons Learned

1. Innovation works best when its focussed on a clearly defined problem

2. The trial and development process has been improved through having taken place in a live operational environment over several years

3. The process has worked through effective partnership and cooperation between HDR&D and MAG

4. There is no single solution - new detection technology has performed best in combination with proven equipment

UNMAS Innovation Case Study
Risk factor South Sudan

National Director's Meeting 2018

16 February 2018

21ST INTERNATIONAL MEETING OF
MINE ACTION
NATIONAL PROGRAMME DIRECTORS
AND UNITED NATIONS ADVISERS

UNMAS


“Innovate? No—we already tried that once. It didn't work out”
TimoElliott.com

Innovation in South Sudan

1. The Problem
2. The Concept
3. The Model
4. X Factor to Risk Factor
5. Stakeholder Collaboration
6. Implementation
7. Impact

what's the Problem?

- How to deliver compelling MRE messaging to South Sudanese population via mass media given the limited access to beneficiaries due to insecurity.

THE CONCEPT

- A live newsworthy event (a traditional Mine Action Day approach) that results in a multi-media product to be promoted via traditional and social media over time.

UNMAS

The Model

- The X Factor is a hugely popular and replicated TV talent competition.
- The winner of The X Factor is awarded a £1 million recording contract.
- The various acts often go viral on YouTube and other Social Media.
- This generates even larger viewership online long after the live show has concluded.

X Factor to Risk Factor

- **Live Talent Show:** Children in ten schools to write and perform a song about the impact of landmines and ERW during a live talent competition covered by traditional media.
- **The Recording Contract:** the winner to record and film a video with one of the hottest local hip-hop group, Jay Family'
- **Social-media Follow-up**: photos and videos from the competition to be promoted by UNMAS, UNMISS, UN agencies and Jay Family.

UNMAS

Collaboration

- ✓ Donors
- ✓ Government
- ✓ Civil Society
- ✓ NGO/INGO
- ✓ Mission
- ✓ Media

From the People of Japan

DANISH DEMINING GROUP

UNMISS

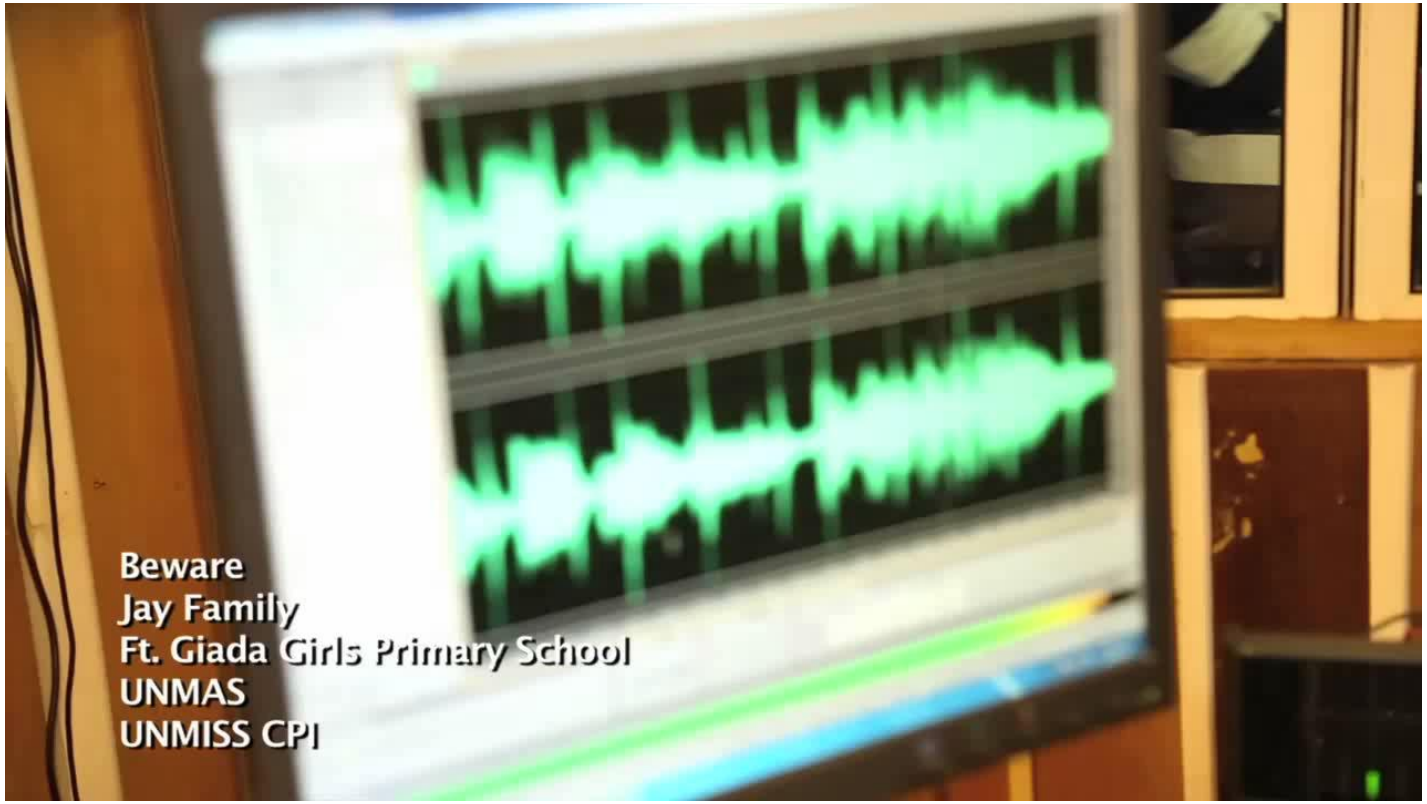
RADIO MIRAYA 101fm

UNMAS

Implementation

The Music Video

https://www.youtube.com/watch?v=e52wOEVIgXE&feature=youtu.be



UNMAS

Impact

- **Event**: covered by traditional media including the South Sudan Broadcasting Corporation, Radio Miraya, Eye Radio, Citizen and Juba Post and The Citizen.
- **Radio**: "Beware" – the winning song – played on national radio stations reaching audiences across the country.
- **Social Media**: the music video uploaded to YouTube and heavily promoted by all collaborators including Jay Family reaching young people all over the country.
- **Social influencers**: Jay Family become social influencers on mine action and continue to perform the song at various events.
- **Increased media interest**: BBC approached UNMAS to include MRE messaging into radio dramas.
- **SG Award**: 2017 SG Award for innovation and creativity.

Thank You


UNMAS
UN
SECRETARY-GENERAL
AWARDS
UNMAS team recieved Secretary-general's award staff
UNMAS
centred

From GIS to UAVs to Artificial Intelligence – Innovation and Technology Disruption @ #NDMUN21

- ***Friday February 16th 2018 - 21st International Meeting of***
- ***National Mine Action Programme Directors and United Nations Advisers***

#NDMUN21 ADVANCING PROTECTION, PEACE AND DEVELOPMENT

Joel Myhre

Global Lead, Europe, Middle-East, Africa

Joel K. Myhre - Nordic Geospatial Consulting

WHO Advisory Group for Mass Gatherings

& former One Concern Global Engagement EMEA,

IMMAP, UNOSAT & NetHope Ebola GIS Manager

UNOSAT

UNIVERSITY OF AGDER

CIEM CENTRE FOR INTEGRATED EMERGENCY MANAGEMENT

iMMAP

Better DATA Better DECISIONS Better OUTCOMES

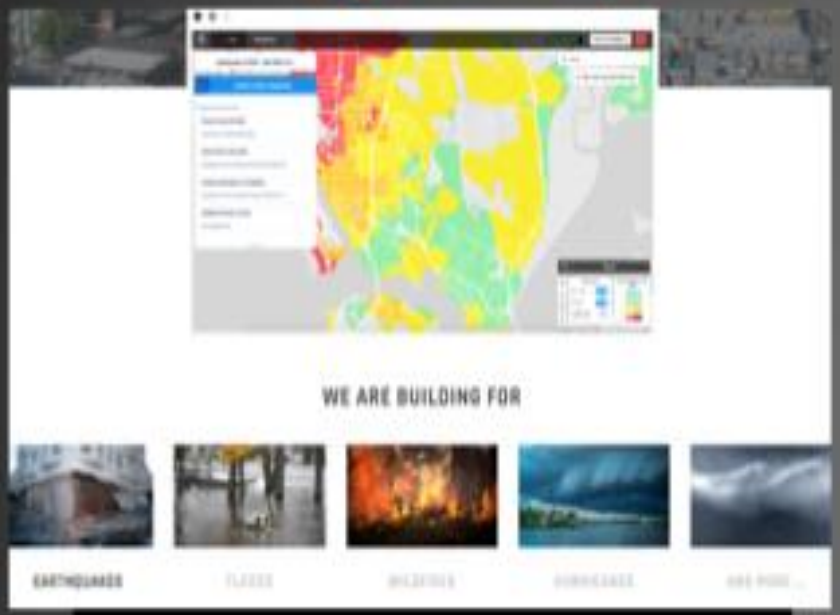
1concern

Hope Crisis Informatics Home Vanuatu Cyclone Pam West Africa Ebola Response

Information Saves Lives.

World Health Organization

History of Humanitarian Technology Disruption



#NDMUN21

Via these Forums, it is important to understand from whence we come and what were the *'what if we could'* dreams of the past..

1970 – ? What if we could have digital maps, vivid cartography, and query-able geospatial data? - Modern GIS Invented in California

1972 - ? What if civil society could have global satellite data to monitor humanitarian events and environmental changes? – US LANDSAT launched

2010 - ? What if we could leverage Social Media, Volunteer Digital Responders globally, and sub-meter Satellite Images for Disaster Response – modern CrisisMapping spawned via Haiti EQ via Harvard Humanitarian Initiative, UNOSAT, etc.

2015 - ? What if we could have Humanitarian Robots and UAVs to help fight fires, conduct Search & Rescue, and rapidly map crises? – UAViators and WeRobotics founded

The holy grail of Humanitarian Response, Preparedness, Resiliency and Sustainability has always been the following 'What if's ..?

- What if we could 'shine the digital flashlight' of all-hazards, multi-jurisdictional situational awareness further down the preparedness path?

- What if EOC administrators, Public Health analysts, First Responders and International/NGO/UN partners could train together and simulate real-world response scenarios BEFORE they happen and accurately replay the events with digital After Action Reporting and Exercises?

- What if we could leverage a resilient global network of millions of cloud-based servers to have actionable Search & Rescue, EMS, Fire, etc. plans not in Days or Hours but in 15 Minutes?

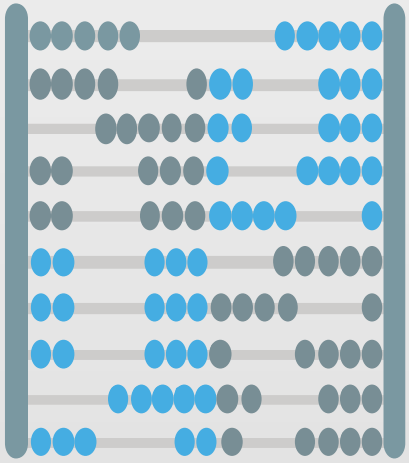
Existing Issues in Natural Phenomena Modeling

#NDMUN21

Data Constraints

Antiquated data is used in all the models, thereby giving unreliable estimates of damage.

Computational Constraints

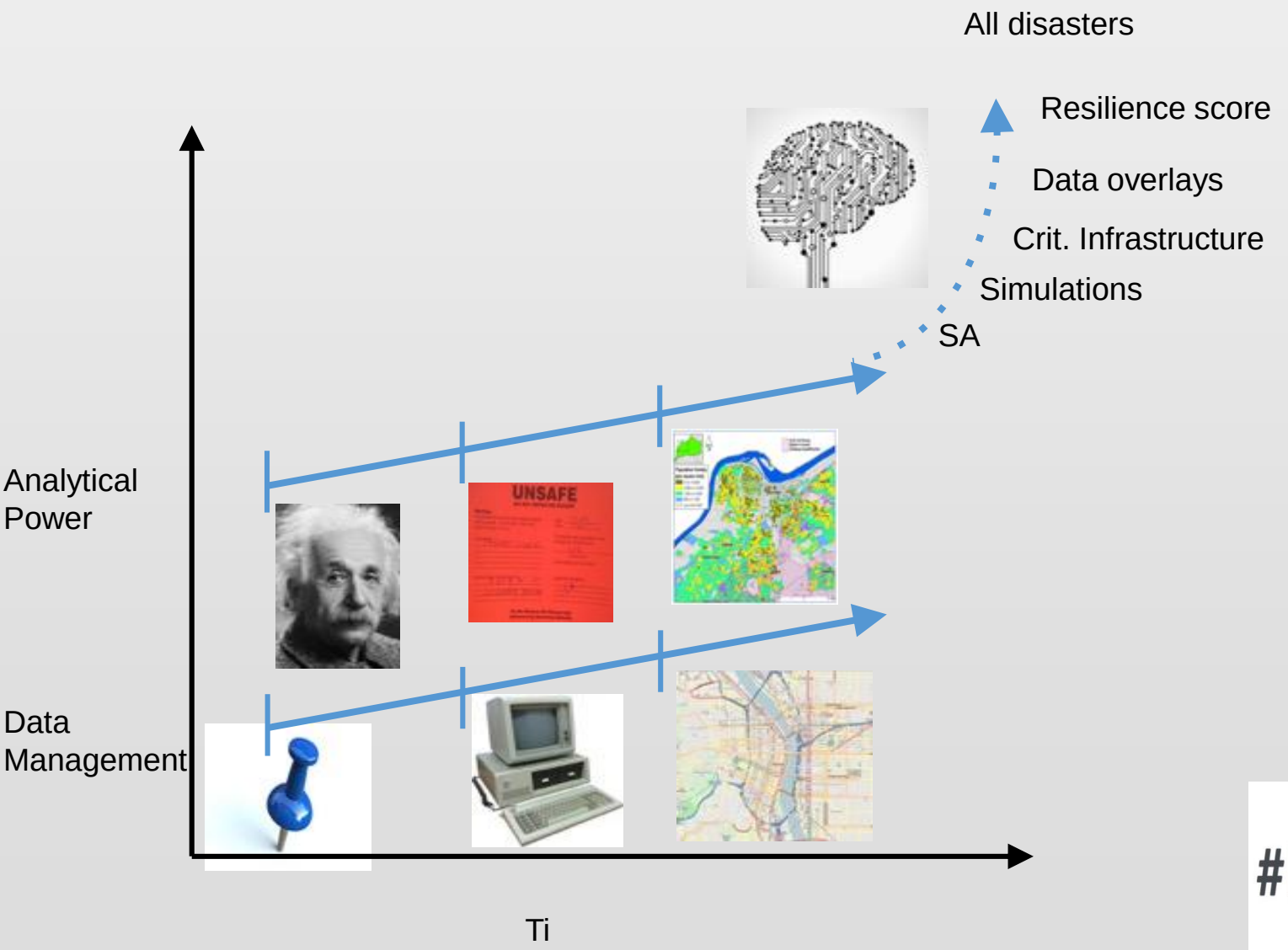


The high resolution models for each structure **take days, sometimes, weeks** to run to predict the response.

Methodological Constraints

2-dimensional statistical methods are used to quantify vulnerability and risk, thereby limiting the scope and extent of their estimates.

Evolution of Humanitarian Information Management



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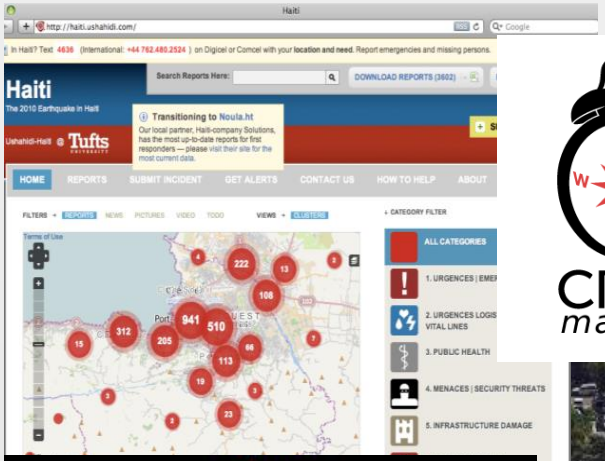
Imagine If …

From Crisis Mapping In Haiti to #AIforGood

- Jan 12th 2010 EQ - UN, NGOs, academia and civ-mil entities collaborated via Web 2.0 mobile and portal technologies. CrisisMappers network leveraged the Free and Open Sourced Ushahidi application
- What if today we could leverage 1 million servers @ Amazon to predict down to the building level which structures would fail, allowing for accurate Search and Rescue planning and UN/NGO Logistics? Well, we can….



CRISIS mappers

Harvard Humanitarian Initiative

Estimates of the number of lives lost range from 100,000 to upwards of 360,000. Think about that for a second… This was such a catastrophic disaster that we don't even have a good sense of how many people died. Even at the low end, the scope of loss is staggering. To put it in perspective, losing 100,000 people in a country of 10 million is the equivalent of losing the combined populations of San Francisco, Oakland, San Jose and many of the surrounding communities in one horrible moment.

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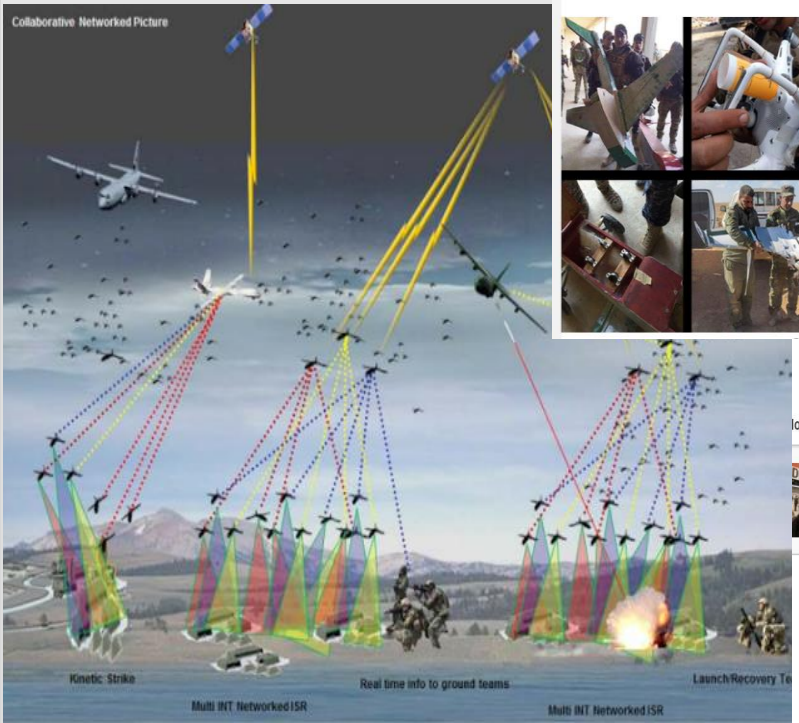
Imagining is a Two Way Street…

#AIforGood requires Ethical Governance to Counter #AIforBad Realities Across the Asymmetric Warfare / UXO / ERW Domain

- Future armed conflicts and insurgencies will leverage #AI, cyber warfare, and #DronesForBad
- UN, ITU (AI for Good Global Summit) and NGOs can Help



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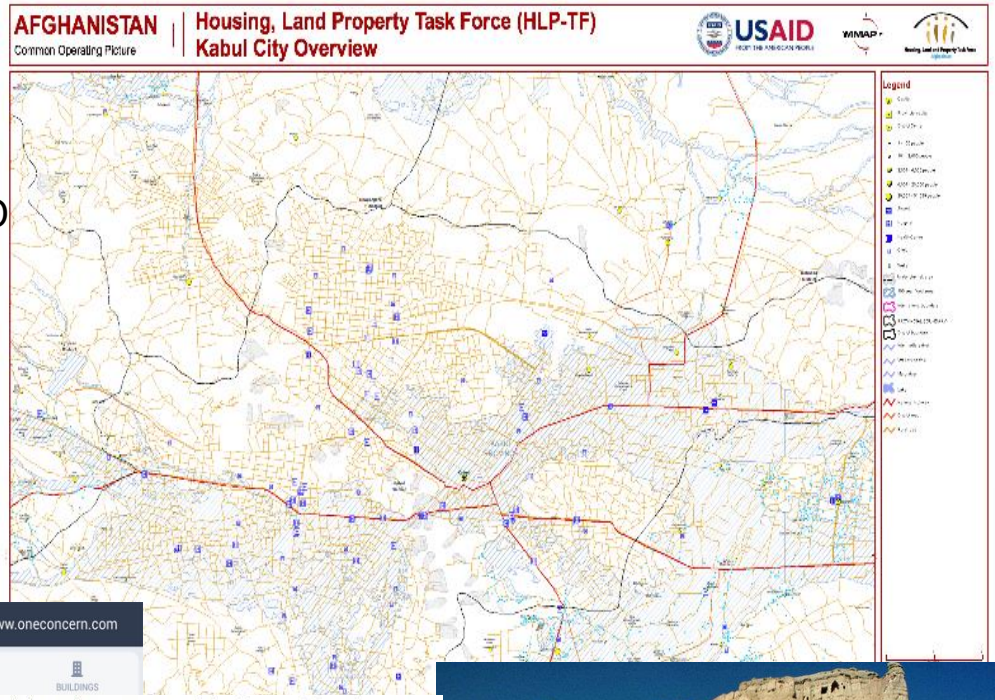
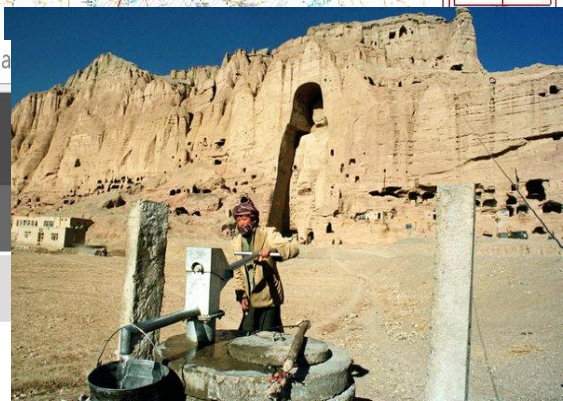
Imagine If …

An Example from Afghanistan and UN-HABITAT

- Building upon Enterprise GIS data and Remotely Sensed Imagery, #AIforGood and Machine Learning could…
  - Help Model Refugee Shelter Locales
  - Predict Future Floods and Earthquakes
  - Analyze Climate Change Effects
  - Understand how Floods may Migrate UXO
  - Help Inform Disaster Exercises
  - Help Protect Cultural Heritage





Lessons Learned & Conclusions

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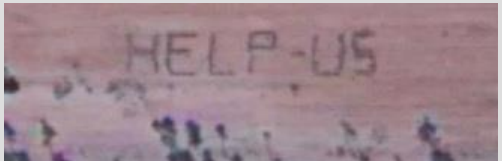
- **#AiforGood, Earth Observation (Satellite, Orthophoto & UAV) data combined with Mobile & Crowd-sourced** tools can give a rich geo-temporal picture to Humanitarian Response and Mine Action stakeholders;
- **Data-sharing, Coordination** and **Interoperability** are vital before, after, and during Complex Crises;
- In an era of lean budgets across the government, private, and NGO spectrum, collaborative **Public-Private Partnerships** are instructive;
- **Artificial Intelligence will require both innovative applications AND global governance** to ensure that its use is equitable, humanitarian, and helps augment and enhance humanitarian demining efforts globally.

RESPONSIBLE ROBOTICS



#NDMUN21 ADVANCING PROTECTION, PEACE AND DEVELOPMENT

Geneva International Centre for Humanitarian Demining
Centre International de Déminage Humanitaire - Genève

UNMAS

Thank You

Joel K Myhre

Principal and Founder – Nordic Geospatial Consulting
Geneva SWITZ

+1.503.310.3595 - joel@nordicgeospatial.com

Colaborative **ORD**nance Data Repository

What is CORD?

- ORDATA → CORD
  - CISR
  - GICHD
- Ordnance identification system
- Sustainable collaborative resource
- Easy user interface
- Expanding

What is new?

- Ontology → 2D DB
- Ordnance type modifications
- Text search
- Name search
- New improved imagery
- Associated evidence
- Useful links

Search Show all results What's new

- Ordnance Type +
- Geographic Reference +
- Name Search +
- Text Search +
- Physical Properties +
- Ordnance Shape +

Select a category to begin your search

The Collaborative ORDnance data repository (CORD) enables web-based search of landmine and other unexploded ordnance data to assist humanitarian demining and ordnance disposal operations.

Managed by the Geneva International Centre for Humanitarian Demining (GICHD).

Help Us Make CORD Better

Search | Show all results | What's new

Ordnance Type

AP Mine	370
AV Mine	428
Aircraft Bomb	781
Cluster or Dispenser	194
Demolition Stores	5
Firing Device or Switch	4
Fuze	8
Grenade	751
Guided Missile	72
Locally Manufactured Munition	1
Miscellaneous Explosive Device	62
Mortar Round	342
Naval Ordnance	11
Projectile	1308
Pyrotechnic or Flare	213
Recoilless Ammunition	4
Rocket	444
SAA	1
Submunition	46

Geographic Reference

Name Search

Text Search

Physical Properties

Ordnance Shape

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Search | Show all results | What's new

Ordnance Type +

Geographic Reference -

Country Of Origin

Search

Afghanistan	1
Argentina	13
Australia	11
Austria	67
Belgium	135
Brazil	12

Countries Used In (Suspected)

Search

Afghanistan	54
Albania	2
Algeria	3
Angola	84
Argentina	5
Azerbaijan	5

Name Search +

Text Search +

Physical Properties +

Ordnance Shape +

Select a category to begin your search

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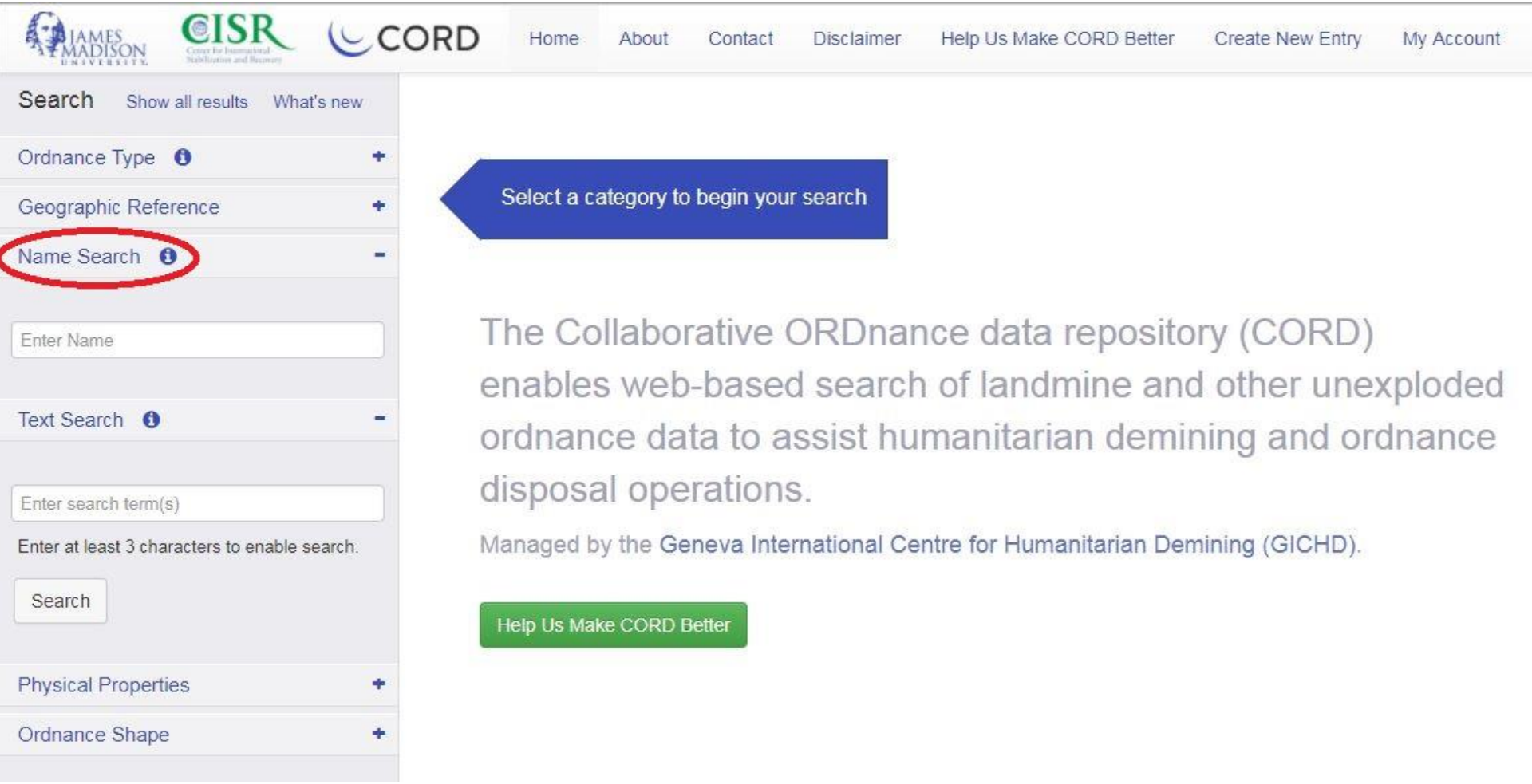
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Enter Name
Text Search
Enter search term(s)
Enter at least 3 characters to enable search.
Search
Physical Properties
Ordnance Shape
Select a category to begin your search
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Search | Show all results | What's new

Ordnance Type +

Geographic Reference +

Name Search +

Text Search +

Physical Properties -

Width/Diameter (2.75 to 20000 mm)

min mm to max mm

Height/Length (1.3 to 874000 mm)

min mm to max mm

Weight (1.8 to 1.04495e+007 g)

min g to max g

Case Materials

Search

Aluminum	459
Aluminum & Magnesium	1
Aluminum & Steel	29
Asphalt-Impregnated Fiber Body	1
Bakelite	14
Brass	3

Type of Explosive

Search

A-1X-1 Explosive	5
A-4/RDX/wax	3
A-IX-2	1
ANFO	1
Adamsite, Potassium nitrate and Starch, diatomite	1

Explosive Weight (0 to 5.715e+006 g)

min g to max g

Select a category to begin your search

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Search | Show all results | What's new

- Ordnance Type +
- Geographic Reference +
- Name Search +
- Text Search +
- Physical Properties +
- Ordnance Shape -

Select a category to begin your search

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Search Summary Return to search

Ordnance Type

Submunition

Geographic Reference

Country of Origin

← Return to search results

U.S. BOMB UNIT, FRAG, BLU-26/B, BLU-36/B, BLU-59/B, & BLU-36(T-1)/B

Type:
Submunition

Country of Origin:
United States

Countries Used In (Suspected):
Laos
Vietnam
Cambodia

Descriptions

Description:
These are all small, aerial dispensed, centrifugal armed, high-explosive fragmentation bombs. The bombs all consist of two hemispheres held together by a crimp ring. The BLU-26/B bombs are impact-fired and the BLU-36/B and BLU-59/B bombs are time-delay-fired. The BLU-26(T-1)/B and BLU-36(T-1)/B are training versions of the BLU-26/B and BLU-36/B, respectively. These training bombs contain a live fuze but no main charge, and are used for fuze reliability testing and establishing delivery tactics. The outer wall has a weakened area which ruptures when the fuze functions.

Method of Operation:
No data

Markings:
These bombs are olive drab with a small yellow dot on one hemisphere. Designation and loading data may be stenciled in yellow on all the bombs. The BLU-26(T-1)/B and BLU-36(T-1)/B are painted blue with white markings.

Specifications

Width/Diameter (mm):	64
Height/Length (mm):	No data
Weight (g):	454
Explosive Weight (g):	85

Component Materials:
The bodies of the BLU-26/B, BLU-36/B, and BLU-59/B are aluminum, embedded with steel fragmentation balls.

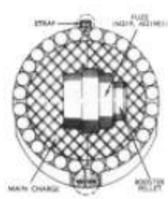
Case Materials:
Aluminum

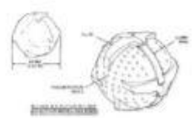
Explosive:
Cyclotol

Hazard:
Explosive (HE)
Fire
Frag

Images

A BLU-26 submunition showing typical weathering after decades in a tropical environment. Image©Roly Evans





Associated Evidence

BLU-26 fragmentation heavily weathered after decades in a tropical environment.. The three items at the top are parts of an M219 fuze. The five items below are parts of the ball bearing fragmentation jacket. Image©Roly Evans

Useful Links

http://ordata.gichd.org/Munition/457/1
http://www.designation-systems.net/usmilav/aseids/u-b.html#_BLU26
https://www.gichd.org/resources/publications/detail/publication/a-guide-to-cluster-munitions/#.Wb_5gE197mE

Associated Evidence

BLU-26 fragmentation heavily weathered after decades in a tropical environment.. The three items at the top are parts of an M219 fuze. The five items below are parts of the ball bearing fragmentation jacket. Image©Roly Evans

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http://www.designation-systems.net/usmilav/asetds/u-b.html#_BLU26
https://www.gichd.org/resources/publications/detail/publication/a-guide-to-cluster-munitions/#.Wb_6gE197mE

What is new?

- Quality checked by a qualified experienced operator
- Promotion of the tool

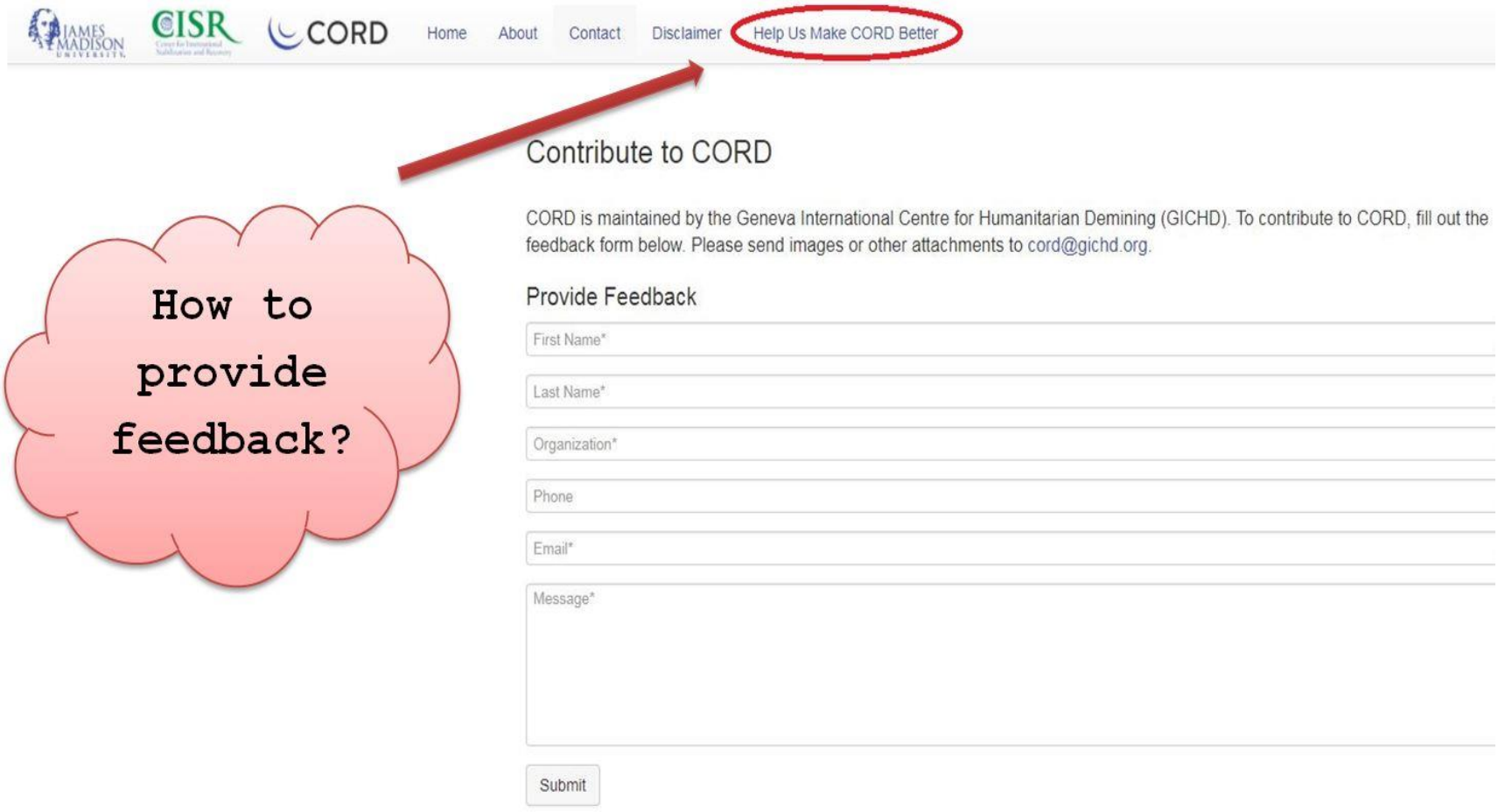
- Social media
  - T: @therealCORD_ID
  - FB: @therealcord.id
  - IG: @cord.id

What can you do?

- Technical improvements
- Field photos
- Usage in country

- To better serve MA, humanitarian disarmament and other sectors with YOUR help

Help us make CORD better



ordata.info

cord@gichd.org

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-- By invitation/nomination --

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-- By invitation/nomination --

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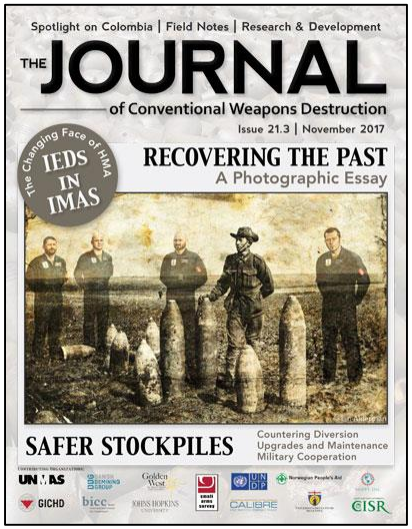

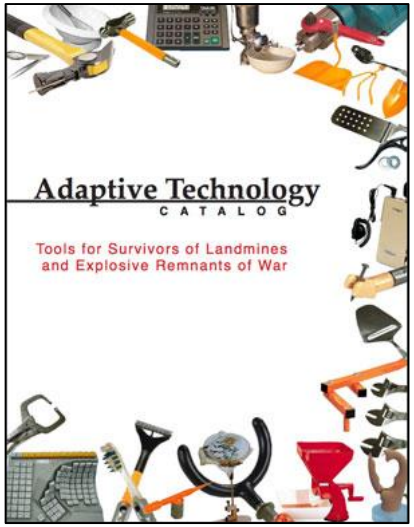

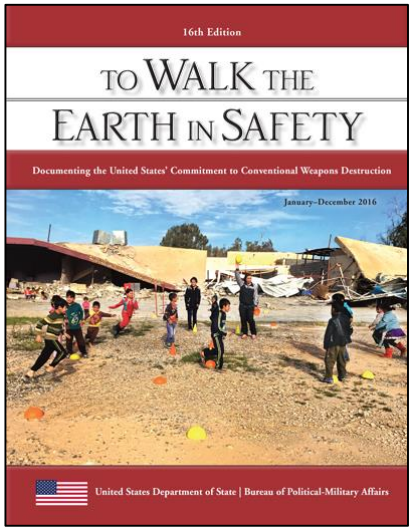

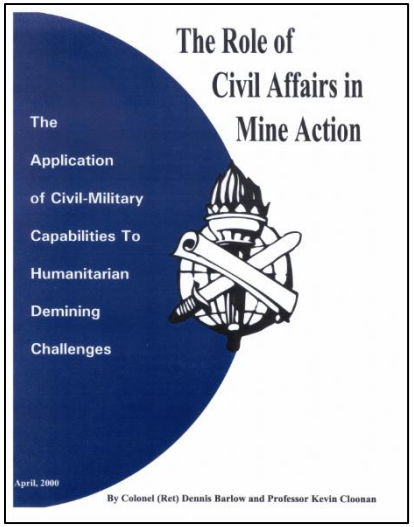

21st International Meeting of Mine Action Programme Directors and UN Advisors

Geneva, February 13–16, 2018

Dr. Kenneth R. Rutherford, Director

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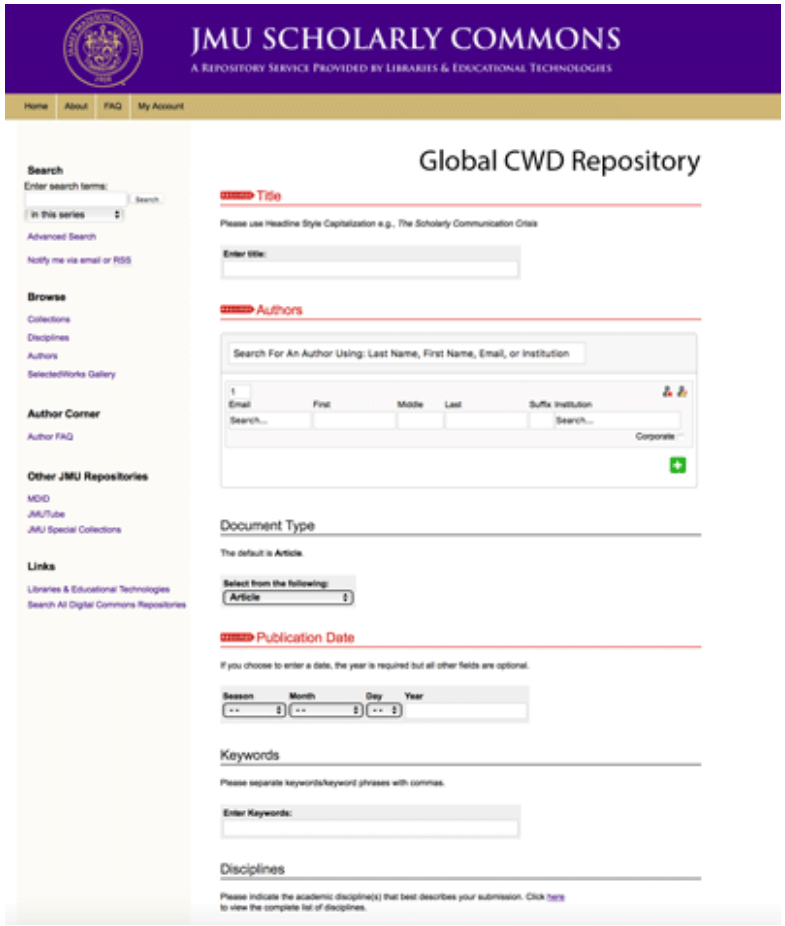

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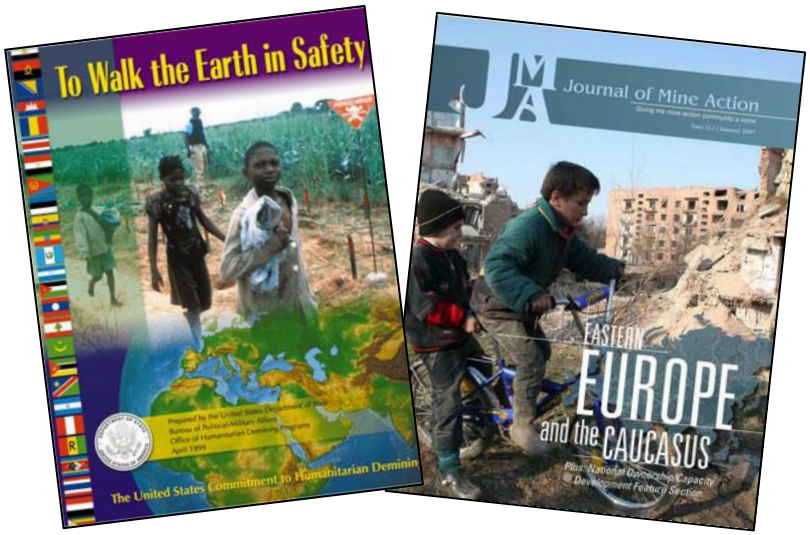

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