Mine Action IM of the Future
Discussion Points

- Where are we today?
- The futuristic data point
- Embrace Inter-connectivity
- The role for fuzziness
- The Principles of Doing
- Critical Mass
Where are we today?

- Where are we in the HMA IM timeline?
- Stone Age? Bronze Age? Information Age?
- When is the future? Next year or next decade?
Where are we today?

- Paper-based data collection, disparate IM systems, language & cultural barriers, outdated IM systems, fast-changing technological environment, increased access to Internet at ever-decreasing costs.

- HMA IMS evolution: spreadsheet -> database -> spatial component -> client/server -> global

- Challenges -> data integrity, accessibility, information silos, reinventing of the IM wheel.
Where are we today?

- Current fixes -> IMSMA Core (ArcGIS Enterprise / ArcGIS Online + app suite), but lacks a workflow-based methodology. Geocortex Essentials (SMART for UNMAS Iraq, OTMS for DMA Iraq).

- Future fixes -> data lifecycle tracking, pooling of data, accountability, accessibility. Access trusted data/information when and where needed in a suitable format.
The futuristic data point

- Isolation is our happy place
- More data means more work?
- Analysis paralysis
The futuristic data point

- Data is becoming more complex, higher in detail and arriving in larger volumes. Seagate predicts global data creation in 2025 growing to 163 zettabytes (163,000,000,000 TB).

- Big data volumes – Iraq HMA dataset of 220,272 reports with 115,793 attachments, increase in spatial data quality/resolution and remote sensing platforms.

- Minimum Data Requirements for HMA. Enough? Review cycle?

- Internet access cost

- Graph databases – model metadata
Embrace Inter-connectivity

- We Are Not Alone
- We only share what we think we should share
- Inter-connectivity fights corruption?
Embrace Inter-connectivity

- HMA data is inherently spatial, i.e. tied to a location and point in time. Spatial data is defined by its location and relationship to surrounding data points.

- Data is related to domains. Describing a feature in one domain, also describes features in other domains, e.g. the stop sign located at a cross-road.

- There is a spatial relationship between data points. The spatial component of data means it occupies a location in the world and thus has many different characteristics – temperature, precipitation, slope, soil type, cultural, religious, language, etc.

- Data points cross-cutting several domains: roads -> transportation, medical support, economy (goods transport to market), education (access to facilities). Explosive Ordnance affects education, medical, legal, housing, gender equality and more sectors.
Embrace Inter-connectivity

• Geo enrich your data by incorporating other domains.

• Solve spatial problems - Capabilities exist for analyzing patterns, enriching data, finding locations, summarizing data, discovering proximity, and analyzing elevation.

• Ambassador Toscano in 2016 said that inter-connectivity is future of HMA data

• GIS Analysis tools (Desktop and Online)

• Sharing data in a more transparent way can help build trust. How should we include communities in the design of IM systems for which they are key stakeholders?
Disaster Risk Reduction

Population Impacted (Flood Risk)
- Direct: ~65,000
- Indirect: ~154,000
The role for fuzziness

- Black & white TV's
- Yes/No – 0/1 – Up/Down
- Simplified atom model versus quantum mechanics (I like strange quarks. Do you?)
The role for fuzziness

- The role for fuzziness: “Maybe”, “some of it” are valid statuses in a dynamic environment. Although more complex to use, decision-making is based closer to real-world conditions.

- Fuzzy data: where does it fit in and how do we analyze it? “Partial truth”, imprecise and non-numerical data. “Sometimes”, “often”, etc.

- How do we model the relationships between data points across domains? Difficult with current MA IM systems. Need to review our data classification and storage approach to incorporate newer data types, relationships and meta data on data reliability (which allows us to share all our data and classify reliability of the data)
The role for fuzziness

• AI & ML need to be incorporated as valuable decision-making / analysis tools (automated classification and acceptance – model reliability is NB)

• New systems should look to harness Machine Learning but noting that care must be used here due to the comparably low volume of Mine Action data available to generate training datasets. GICHD is working with ETH Zurich on some early research to consider this.

• Risk Management Approaches / Prioritization
The Principles of Doing

- Email and Dropbox are not data sharing tools
- The concept does not exist in our minds
- The tools exist but budget lines do not
- Who decides?
- Blockchain for die?
The Principles of Doing

• The Principles of Doing: To reap the benefit of the data-point of the future capabilities, action plans must be developed to integrate systems on a common platform and subsequent analysis should be amended to make use of the embedded data matrix.

• It is not about the data, it is about the commitment to collaborate to find a solution and use it.

• How does this solution look? The non-functional requirements need to dictate the functional requirements. Accountability, reliability, transparency, accessibility, etc.

• Increase access to HMA data – collaborate with internal & external stakeholders, push and pull data products and integrate external data

• Distribute over different channels to increase audience coverage
The Principles of Doing

• Could blockchain help fix the problem of “data sharing”?

• Centralized and distributed register of HMA objects and activities

• Increases technical complexity of data access and management, more difficult for smaller humanitarian actors to access and participate

• Who will look after the smaller organizations to ensure access to reputable information as a right for humanitarian organizations?
Critical Mass

- Going into the woods on your own? I've seen that movie before....
- Do we need an IM unit everywhere?
- What is the value of IM R&D?
Critical Mass

- Critical Mass: Collaborating for collective benefit, leveraging skills and assets where and when possible for the good of the greater humanitarian (mine action) community.

- HMA projects do not lend themselves to consistent and continued R&D initiatives

- New technology is disruptive

- Access to technology is dictated by asset availability (money, staff, time, facilities)
Critical Mass

- HMA is conducted in widely varying environments (physical, cultural and political), further straining resources and taxing flexibility.

- Obtain critical mass by using and expanding formal and informal IM networks, retain, formalize and share institutional knowledge.

- The time is ripe for an Experts Working Group culture.

- Where to from here?