



INSARAG
Preparedness Response

Using Esri Technology for International Disaster Coordination

INSARAG INFORMATION MANAGEMENT WORKING GROUP

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INSARAG is a global network of more than 90 countries and organisations under the United Nations umbrella.

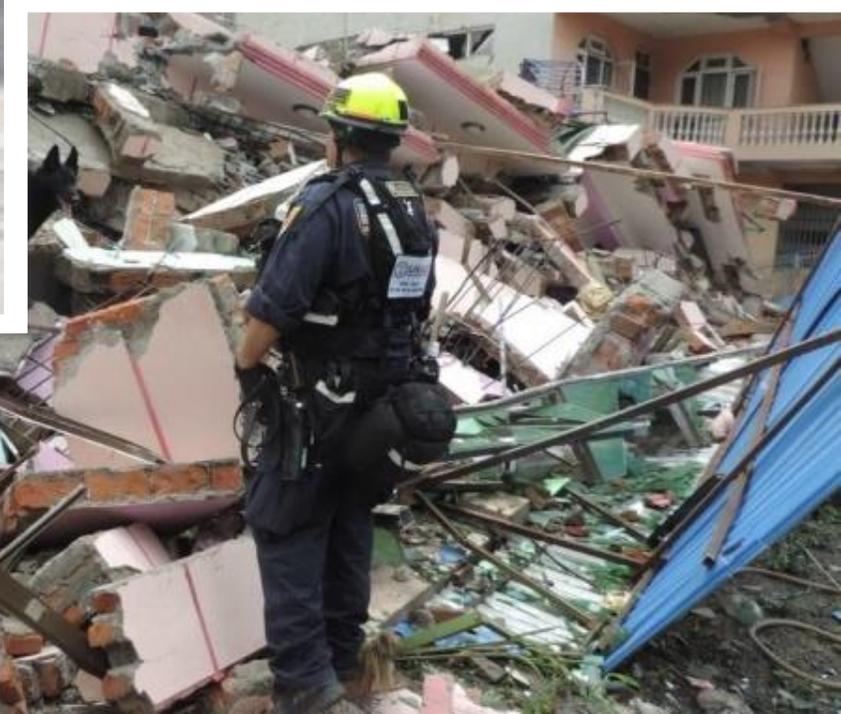
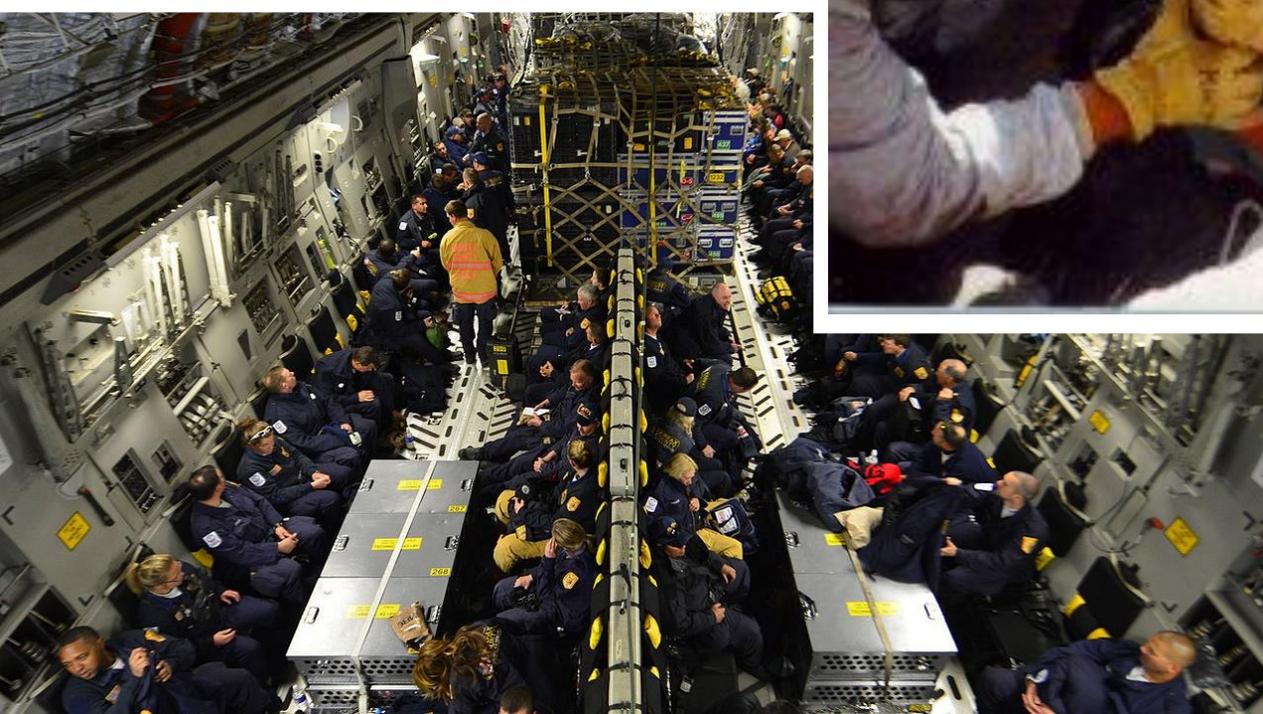
INSARAG deals with urban search and rescue (USAR) related issues, aiming to establish minimum international standards for USAR teams and methodology for international coordination in earthquake response based on the INSARAG Guidelines endorsed by the United Nations General.



INSARAG
Preparedness Response



Why? Because coordination saves lives.



History



Pre-2010 – Information kept by each team

2010 – Standardized paper forms

2015 – Data collection using open-source products

2017 – INSARAG Information Management Working Group established

2020 – ArcGIS for collection, analysis and reporting

KoBo Project

Introduced mobility solutions

Limited capability

Not able to extend to meet needs

Potential for adverse reaction from users as it didn't meet needs

Did enhance the acceptance of ICMS in its AGOL format



KoBo Toolbox



INSARAG
Preparedness Response

Where does Esri come in?

Through the INSARAG Information Management Working Group, we sourced the best solution available

Started from an implementation by Fire and Emergency New Zealand

The result is the INSARAG Coordination and Management System (ICMS)

ICMS is set up as a unique instance for each USAR team throughout the world (60+) for training purposes and for each disaster



ArcGIS



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Preparedness Response

Information Management Working Group - 2017

Formed to develop and deploy the IM concept.

International group of USAR people

Move from Open Source (KoBo) to Esri based system

Finalised ICMS development

Developed process to test and QA system for operational use

Deployed to INSARAG environment



OCHA



What is ICMS built with?

5 Dashboards

38 Feature Layers

14 Forms (Survey 123)

2 Hub pages

12 Microsoft Word Templates

10 Web Maps

5 Web Mapping Applications

All created by 1 Jupyter notebook

ArcGIS Survey 123



ArcGIS Explorer



Jupyter Notebook



ArcGIS | Master ICMS Build Scripts 1.1 2020 Forms (unsaved changes) John Morrison
IMWG_Morrison

Add Analysis Files Share Info Save ▾ Samp

File Edit View Insert Cell Kernel Help Python 3

⊕ ⏪ ⏩ ↶ ↷ ↵ ↶ ↷ ⏪ ⏩ Run ↶ ↷ ↵ ↶ ↷ ⏪ ⏩ Markdown

Step 1: import modules (required)

Import required modules and establish a GIS connection to ArcGIS Online. The User must have permission to access all items used in the template dashboard.

```
In [ ]: icmsVersion = "1.0.0"
insaragTypeKeywordPrefix = "insarag"
eventName = "IMWG 2020 Forms"

from arcgis import gis
from arcgis.mapping import WebMap
import arcgis_impl.common_clone as clone
from IPython.display import display
import json, re, os, zipfile, csv, time
from getpass import getpass
from multiprocessing import Pool

# Connect to the GIS
target = gis.GIS("home")

REMOVE_TAGS = ['deploy.solutions', 'ds.*', 'deploy.version.*', 'deploy.commonid.*', 'deploy.datasources.*', 'deploy.enterprise-only', 'copy-only', 'target-must-exist', 'maintain-spatial-ref']
```

Step 2: set target folder (required)

Set the target folder created under the target users context. This folder is used to store all items related to the new copy of the Dashboard solution. A new folder will be created if it does not already exist.

eventName is a required field.
insaragTypeKeywordPrefix is used to reference items related to this specific dashboard later in the script, default is "insarag" and should not be changed

Estimated running time: a few seconds

```
In [ ]: print('target folder: {0}-{1}'.format(insaragTypeKeywordPrefix, eventName))
folder = target.content.create_folder(eventName)
if folder:
    print('Folder created successfully')
```

Step 3: set the template item id's (required)

The next section defines the item dictionaries that will be cloned.

Digitising a Paper-Based Process



Worksite Triage Form									
Used during assessment to identify worksites with rescue opportunities									
E1. Worksite ID		E2. GPS Coordinates <i>Decimal format</i>		+ddd.dddd*		+ddd.dddd*			
		E2. GPS Coordinates <i>other format</i>							
E3. Address									
E4. Worksite boundary description:									
F1. Team ID	AAA	00	F2. Date	DD	MMM	F3. Time	hh	mm	
F4. Building Use									



The tablet screen shows the 'Worksite Triage' application. At the top, it says 'Worksite Triage Form' and 'Used during assessment to identify worksites with rescue opportunities'. Below this is the INSARAG logo. The form is divided into sections: 'Location Information' with a 'note' field, 'E1. Worksite ID' (with a sub-note: 'The Worksite Sector, Worksite Number and Suffix letter combined'), 'Worksite Sector *' (dropdown), 'Worksite Number *' (text input), 'Suffix letter (optional)' (with a sub-note: 'Use only if a large building has been segmented into smaller elements.'), 'E2. GPS Coordinates' (with a sub-note: 'GPS coordinates of the Worksite, taken at the Worksite marking: Set automatically from the map'), and 'Location *' (with a location icon).



The smartphone screen shows a map application with a location marker for 'Worksite: D10' at '8701 Lukens Ln, Alexandria, Virginia'. Below the map, there are buttons for 'Details' and 'Attached'. The details section includes the address and boundary description. At the bottom, there are links for 'Launch Survey123 Forms', 'Complete Worksite Report', 'Complete Victim Extrication', and 'Resource Request Form'. There is also a section for 'Assigned team:' and 'Directions'.



Timeline of an Incident



Incident occurs

Team Fact Sheet

Recon Phase

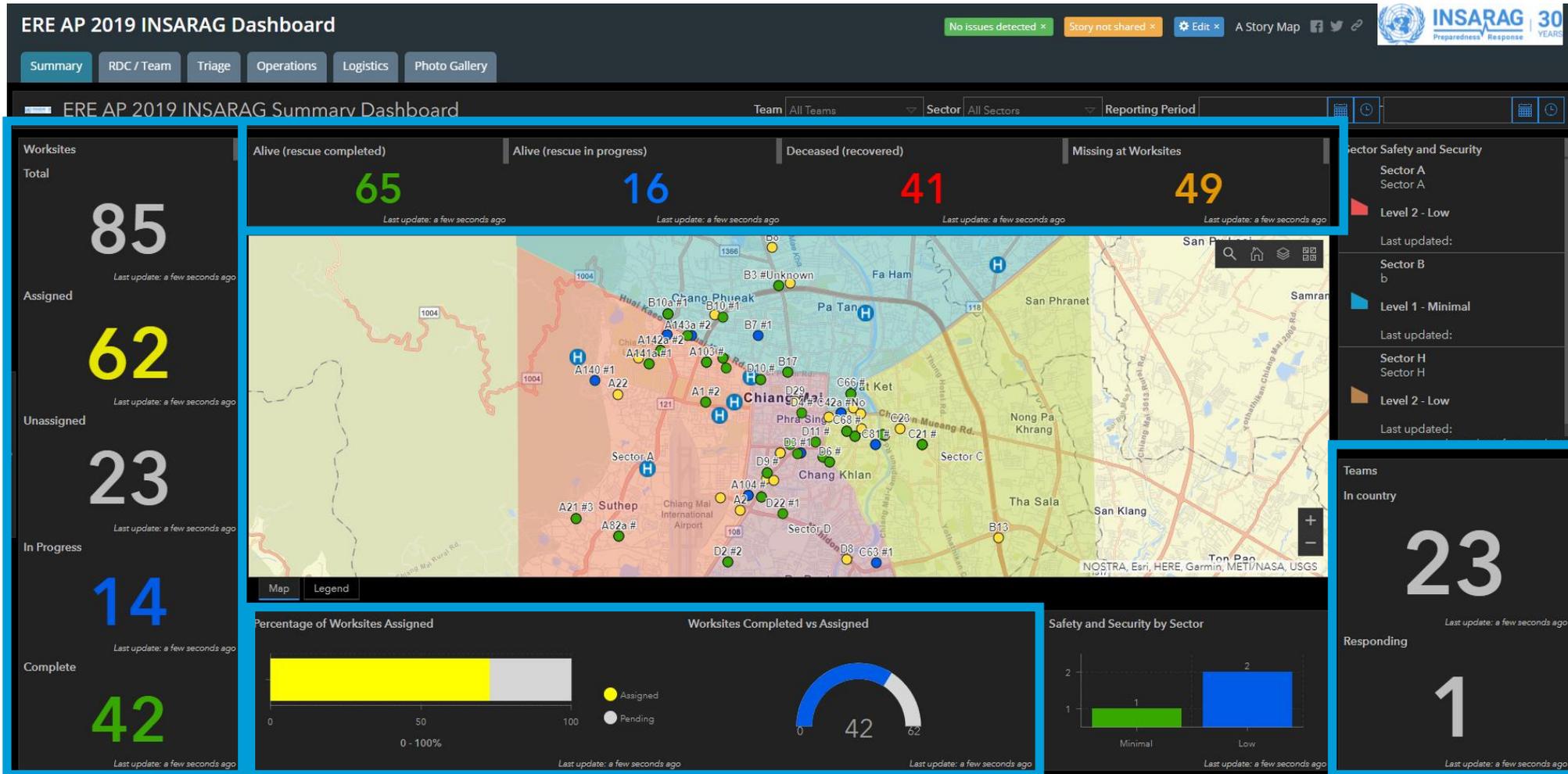
Worksite Triage Form

Operations Phase

Worksite Report Form

Victim Extrication Form

Dashboard – Overview



Dashboard – Team Management



ERE AP 2019 INSARAG Dashboard
No issues detected
Story not shared
Edit
A Story Map

Summary
RDC / Team
Triage
Operations
Logistics
Photo Gallery

INSARAG RDC / Team Dashboard
Team: Show All Teams
Arrival or Departure

Team List

THA1
Demobilised
TSAR1
Country: THAILAND

Classification:
INSARAG Classified: No
Expected Arrival: 14/12/2019, 7:03 PM

BoO:
Lat: Lon:

Update Team

THA2
In Country
TSAR2
Country: THAILAND

Classification:
INSARAG Classified: No
Expected Arrival: 15/12/2019, 1:30 AM

BoO:
Lat: 18.8177 Lon: 98.7712

Update Team

RDC Support

Last update: a few seconds ago

RDC Support
UCC/OSSOC Support
Medical

Team Demobilisation List

THA3
Departs: 20/12/2019, 8:21 PM
Point of departure:
Flight , 40 PAX

THA2
Departs: 21/12/2019, 6:00 AM
Point of departure: Ching Rai airport
Flight c-130, 40 PAX

THA1
Departs: 21/12/2019, 6:00 AM
Point of departure: Ching Rai airport
Flight C-130, 40 PAX

NZL1
Departs: 26/12/2019, 8:00 AM

Last update: a few seconds ago

Demob List
Demob Details

Mobilising / Enroute

In country

1 23

Last update: a few seconds ago

Expected Arrival Timeline

Last update: a few seconds ago

Arrival Timeline
Demob Timeline

Team Classification

Last update: a few seconds ago

Dashboard – Triage



ERE AP 2019 INSARAG Dashboard
No issues detected
Story not shared
Edit
A Story Map

Summary
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INSARAG Triage Dashboard
Team Show All Teams
Sector Show All Sectors
Assignment Status Pending
Reporting Period

Total Worksite Triage assessments

85

Last update: a few seconds ago

Total Worksites to be assigned

23

Last update: a few seconds ago

Waiting for Team QA

0

Last update: a few seconds ago

Total waiting: 0

Triage Total / Pending Total Alive / Missing

Total number of Worksite Assignments by UCC

62

Of the total number requiring ASR

Last update: a few seconds ago

Worksite Assignments Triage Category Type of Collapse

Worksites to be assigned by UCC

Worksite A1a
Triage Team: ALG1
Report Date: 11/3/2021, 6:14 AM

Triage Category
B (Level 4 Full SAR Needed Confirmed Live Victims)
Brick / concrete ceiling
Inclined layers

Confirmed Alive: 2
Missing at worksite: 23

Security situation:
Level 2 - Low

[Assign Worksite](#)

Worksite D26
Triage Team: THA12
Report Date: 17/12/2019, 1:00 AM

Triage Category
B (Level 4 Full SAR Needed Confirmed Live Victims)
Brick / concrete ceiling

Sorted by ASR Level, confirmed alive, total missing

Last update: a few seconds ago

Pending Assigned to a Team Team QA Cancelled

Map Legend

Confirmed Alive by Sector

Sector	Confirmed Alive
A	2
C	0
D	7

Last update: a few seconds ago

Confirmed Alive by Sector People Missing by Sector

Triage Category by Sector

Sector	A (Level 3 Rapid SAR Needed Confirmed Live Victims)	B (Level 4 Full SAR Needed Confirmed Live Victims)	C (Level 3 Rapid SAR Needed Unknown Victims)
A	1	1	3
C	2	3	1
D	4	2	1

Last update: a few seconds ago

Dashboard – Operations



ERE AP 2019 INSARAG Dashboard
No issues detected
Story not shared
Edit
A Story Map

Summary
RDC / Team
Triage
Operations
Logistics
Photo Gallery

INSARAG Operations Dashboard
Team All Teams
Sector All Sectors
Reporting Period

Worksites Assigned by UCC **Worksites In Progress** **Reports waiting for Team QA**

62
 An increase of 0 assignment(s) in the past 12 hours
Last update: a few seconds ago

14
 Completed in the past 24 hours: 0
Last update: a few seconds ago

0
Total waiting: 0
Last update: a few seconds ago

List of assigned Worksites

Worksite A15a Completed

Assignment details
 Assigned Team: AUS2
 Assignment Date: 17/1/2020, 1:45 AM
 Reporting frequency: 01:00,06:00

Triage details
 Triage Category: B (Level 4 Full SAR Needed)
Confirmed Live Victims
 Triage Date: 17/1/2020, 1:11 AM

Reinforced / concrete walls
 Overtum collapse

Confirmed Alive: 30
 Missing at worksite: 50

Security situation:
 Level 1 - Minimal

Lat: 35.676, Lon: 139.7504

Worksite B10a Completed

Assignment details
 Assigned Team: THA4
 Assignment Date: 25/12/2019, 11:30 PM
 Reporting frequency: 06:00

Triage details
 Triage Category: E (Level 4 Full SAR Needed)
Unknown Victims and Big Voids

Worksite Report List

Worksite: B3 Completed

Team: AUS1
 Second Team: AUS1
 Report Period End: 12/23/2019, 9:31 AM
 Report Number: Unknown

People found this reporting period:
 Alive: 0
 Dead: 3

Progress:
 Still Missing: 0
 Live Rescues in progress:
 Estimated Completion:

Resources:
 ASR Level: 4
 Resources able to be released: 35
 Plan of action:

Worksite: C66 Completed

Team: SGP1
 Second Team:
 Report Period End: 12/22/2019, 10:08 PM
 Report Number:

People found this reporting period:

Worksites Completed vs Total Tasked

42
Last update: a few seconds ago

Total number of Rescues

Rescue Status	Count
Live	65
Deceased	41

Total Victim Extractions **Victim forms waiting for Team QA**

118
Last update: a few seconds ago

5
Total waiting: 5
Last update: a few seconds ago

Victim Extractions

Ref A1-2
Worksite : A1
 Team: CHN1
 Date of Extrication: 16/12/2019, 4:46 AM

Floor level: 1
 Position in Structure:
 ASR3
 Condition: Live , Injuries: None

Handed over to:
 Locals/family
 Hkaok

Ref A1-3
Worksite : A1
 Team: CHN1
 Date of Extrication: 16/12/2019, 3:21 AM

Floor level: 0
 Position in Structure:
 ASR3
 Condition: Live , Injuries: Stable

Handed over to:
 Hospital
 hgiu

Ref A1-2
Worksite : A1

Dashboard – Logistics



ERE AP 2019 INSARAG Dashboard No issues detected × Story not shared × Edit × A Story Map

Summary | RDC / Team | Triage | Operations | **Logistics** | Photo Gallery

ERE AP 2019 INSARAG Logistics Dashboard Request Status: All Sectors Reporting Period: [Calendar Icon]

Processing

B0b
B0
A0

Last update: a few seconds ago

Ordered

C102
C21
C66
C68

Last update: a few seconds ago

Delivered

A143a

Last update: a few seconds ago

Overdue (3 hours+)

B0b - Status: Processing
15/12/2019, 10:31 PM

B0 - Status: New
15/12/2019, 10:52 PM

B0 - Status:
Last update: a few seconds ago

New Resource Requests

Worksite A142a
Requested at: 16/12/2019, 9:25 PM
[Update Request](#)

Worksite A142a
Requested at: 16/12/2019, 9:25 PM
[Update Request](#)

Worksite A3
Requested at: 16/12/2019, 5:11 AM
[Update Request](#)

Worksite B0
Requested at: 15/12/2019, 10:52 PM
[Update Request](#)

Worksite B0
Requested at: 15/12/2019, 10:52 PM
[Update Request](#)

Worksite B0
Requested at: 15/12/2019, 10:52 PM
[Update Request](#)

Processing Resource Requests

Worksite C21
Requested at: 21/12/2019, 9:49 PM
Status: Ordered

Fuel
Diesel @ 200 litres
2 Stroke @ 100 litres

Lumber
150 x 50 @ 500m
100 x 100 @ 500m
19mm Plywood (1200 x 2400) @ 20 sheets

Cutting Gas
1 x CutGasAcetylene

Consumables
1000 x 100mm Flat head nails
100 x Nailgun Gas
100 x Thermal Lance Rod
100 x Grinder blades
300 x Dust Masks
100 x Safety Glasses

UCC
Estimated Delivery: 16/12/2019, 8:45 PM
[Update Request](#)

Worksite C66
Requested at: 20/12/2019, 9:07 PM
Status: Ordered

Lumber
150 x 50 @ 50m
100 x 100 @ 30m
100 x 50 @ 30m
19mm Plywood (1200 x 2400) @ 20 sheets
Request for timber ASAP

Cranes and Diggers
2 x Crane - 500 tonne
Concrete slab 30m away from building

Cutting Gas
Last update: a few seconds ago

Amount of Lumber

Crane/Digger

Fuel (Liters)

Complete Resource Requests

Worksite A143a
Requested at: 16/12/2019, 9:40 PM
Status: Delivered

UCC
Estimated Delivery: 17/12/2019, 12:30 /
[Update Request](#)

Worksite D20
Requested at: 16/12/2019, 5:38 AM
Status: Complete

Fuel
Diesel @ 200 litres
200 litres/day

Cranes and Diggers
1 x Crane - 50 tonne
1 x Digger - 30 tonne
Mobile Crane (stand by up on request)

UCC
Estimated Delivery:
[Update Request](#)

Last update: a few seconds ago

Dashboard – Photo Gallery



ERE AP 2019 INSARAG Dashboard

No issues detected × Story not shared × Edit × A Story Map

Summary RDC / Team Triage Operations Logistics **Photo Gallery**

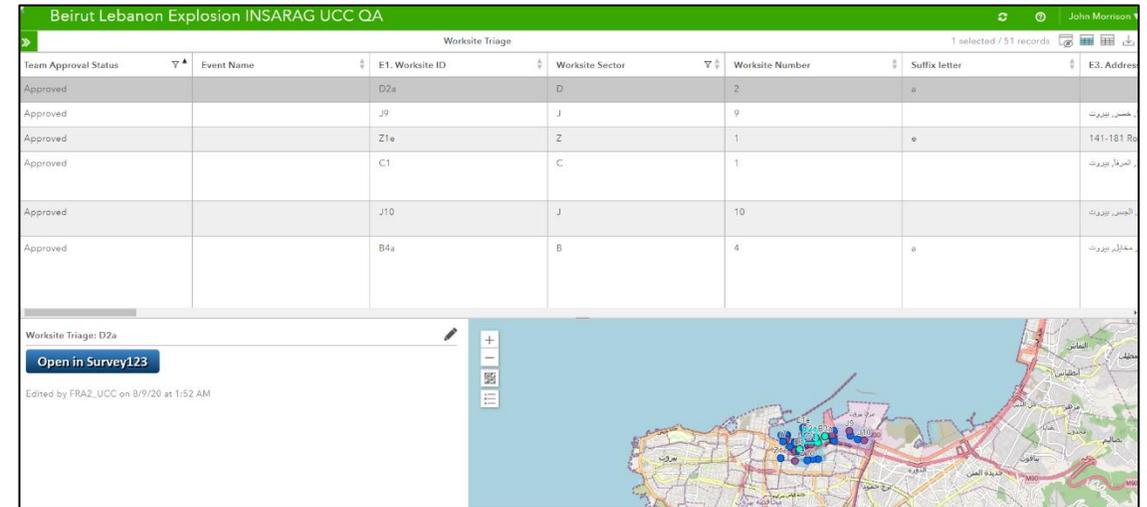
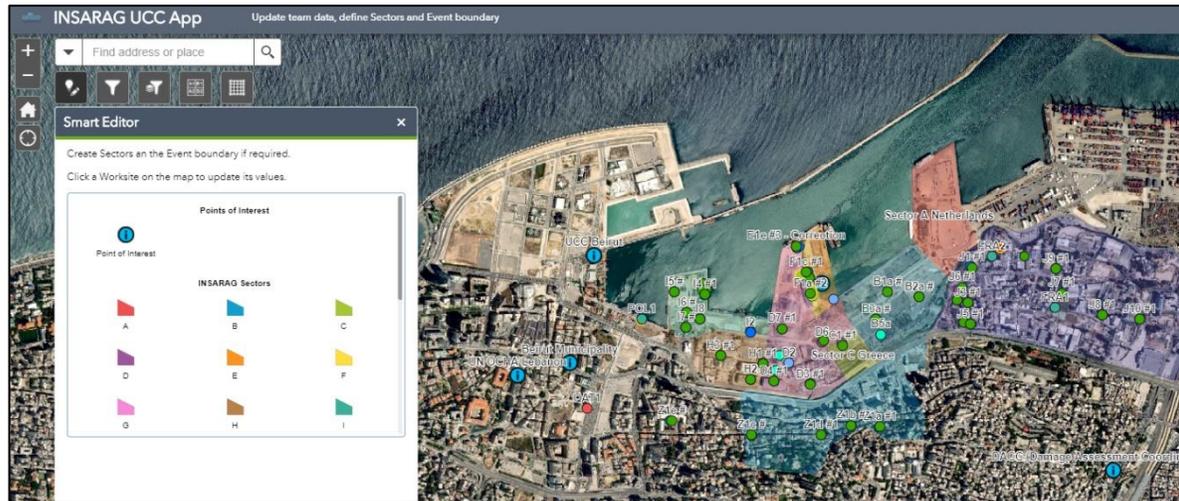
INSARAG Worksite Photos ⓘ

Worksite Triage

Worksite ID

Powered by Esri

Tools and Quality Assurance





Quality Assurance

“Don’t make bad decisions faster”

Approved and ready for UCC 

Team Approval Status*
Set to Pending unless approved by your CP

Pending Team Review 

Pending Team Review

Approved

Rejected

bmit

Waiting for Team QA 

3 hours+

2

Total waiting: 3

Iterative Design





Operationalised

Tested within IMWG group teams

Tested at full scale exercise (Tinglev, Denmark – NED1 IER)

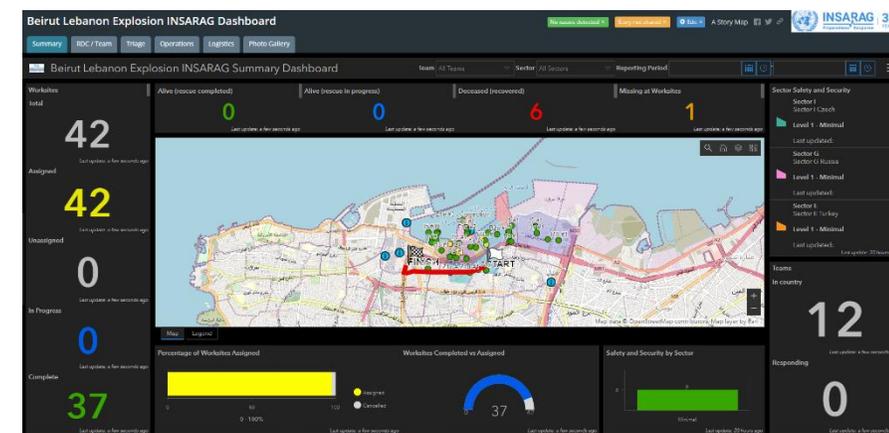
Presented to Team Leaders meeting Santiago 2019.

Deployed March 2020

Training (Virtual) 2020-2021

First deployment into Beirut Port Explosion Aug 2020

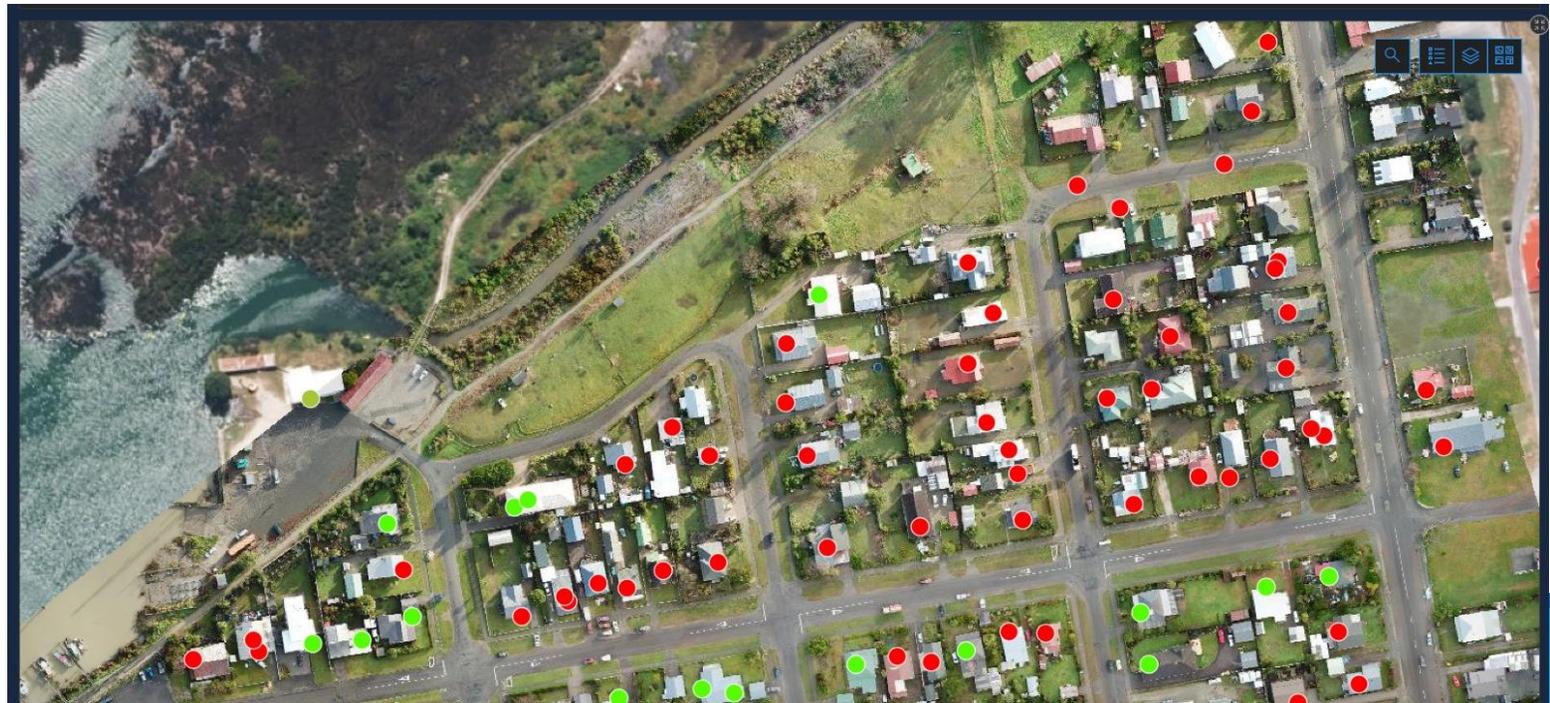
Change management and future enhancements



Island Responses

Hurricane Dorian

Pacific Cyclones





UAS Integration



Team-based squad
management



Data sharing
across platforms

Where do we
go next?



INSARAG
Preparedness Response

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