Establishing Operational Readiness Levels for Data

All Hazards Consortium
[SISE Use Case Template Advisory Committee]
ESIP Federation [Disaster Lifecycle Cluster]

Effort Under
Data Driven Decision Making Initiative (3DM)
**Operational Readiness Levels (Focusing on Quality & Availability)**

**ORL 1**
- Data available NOW
- Immediate Situational Awareness (SA) & Decision Making (DM)
- Person available to contact

**ORL 2**
- Data available sporadically
- Event-driven, may be delayed due to acquisition and processing time required
- Could be very useful for SA & DM
- Person available to contact

**ORL 3**
- Data nearly operational, testing phase
- Not guaranteed
- Could improve SA and DM
- Target operations in 6-12 months

**ORL 4**
- Data Discovery, collection, processing, testing phase
- Being evaluated for accuracy, validated
- Target for operations 12+ months
- Not likely to be immediately useful for operations
Example Data Sets - ORL Mapping
Operational Readiness Levels (Focusing on Quality & Availability)

EXAMPLES

Product – Data Layer
NWS Watches, Warnings & Advisories
Updated: Every minute
Source: NWS Integrated Dissemination Program (operational)
Servers: College Park, MD
Backup: Boulder, CO
Data Availability 24/7/265
TRL to ORL Mapping
Operational Readiness Levels (Focusing on Quality & Availability)

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OPERATIONAL READINESS LEVEL

- Data in collection, processing and/or testing phase
- Being evaluated for accuracy, validated
- Target for operations 12+ months
- Not likely to be immediately useful for operations

Product – Data Layer

Power Outages for Fuel, Food, Pharmacies
Type of Layer: CRITICAL INFRASTRUCTURE STATUS
Q/A Frequency: Annually/Every 3 years? TBD
Updated: Frequent updates from provider/hourly

3DM Applications:
Who is out of power, Where to get fuel,

Source: Hughes Corp
Servers: Hughes Corp
Backup: TBD

Data Availability: Subscription service could be developed to leverage 24/7 data availability within GeoCollaborate®. Currently data avail via All Hazard Consortium separate map location.

% Coverage of Data Provider: 60% of Point of Sale terminals covered. 80% Fuel coverage [Map of coverage from Hughes? CAP One?]?

Data Sensitivity/Permission Levels on use of data: Data Sensitive/Confidential Need credentials?
Operational Readiness Levels (Focusing on Quality & Availability)

- Data in collection, processing and/or testing phase
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Product – Data Layer

NASA Satellite Image Analytics of Tornado /Severe Storm Tracks showing damage paths.

Type of Layer: Damage Assessment

Q/A Frequency: Annually/Every 3 years? TBD

Updated: When imagery is available, possibly hours to days after event-TBD

3DM Applications: Damage Assessment, Initial look at regions impacted

Source: NASA, NASA SPoRT (Huntsville, AL)

Servers: NASA Huntsville, GSFC
Backup: TBD

Data Availability: Sporadic depending on event and satellite data availability. Data analytics performed by NASA SPoRT, a non-operational entity to accelerate research data into operations.

Description: Major tornado tracks can help with damage assessment

% Coverage of Data Provider: Global

Data Sensitivity/Permission Levels on use of data: Data Sensitive/Confidential Need credentials?
ORL to ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

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Product – Data Layer

NOAA GOES-16 Lightning Imagery – Detecting Cloud to Cloud lightning from Geosynchronous Orbit

Type of Layer: Severe Weather SA

Q/A Frequency: Annually/Every 3 years? TBD This will be an operational product from NOAA and they will Q/A frequently

Updated: When operational, streaming data stream updated every 20 seconds

3DM Applications: Detecting rapidly intensifying thundertorms, potential indicator of developing severe weather/tornadoes

Source: NOAA NESDIS [Operational satellite division of NOAA]

Servers: NOAA
Backup: TBD

Data Availability: The lightning mapper will be observing the western hemisphere continuously. The value of the data will evolve as further research progresses

Description: GOES-16 advanced environmental satellite launched November 19, 2016. Expected to become operational over the summer.

% Coverage of Data Provider: Western Hemisphere
Date sensitivity: Public domain, open
TRL to ORL Mapping
Operational Readiness Levels (Focusing on Quality & Availability)

ORL 3
OPERATIONAL READINESS LEVEL

• Data nearly operational, testing phase
• Not guaranteed
• Could improve SA and DM
• Target operations in 6-12 months

Data Description

Univ. Alabama Huntsville-Event Catalog [ED3-Event Driven Subscription Application] – Not just a data layer

Type of Layer: Event-Driven Data produced on the fly through subscription service

Q/A Frequency: Annually/Every 3 years? TBD

Updated: When operational, event driven

3DM Applications: Identifying information that is relevant to a particular event/disaster, social media mining, reports

Source: Univ of Alabama, Data producers

Servers: Univ of Alabama Huntsville

Data Availability: Event-driven automated data delivery and processing of disaster events

Description: Event-driven data delivery (ED3) is being used to automate the access and processing of data for decision support as the result of disaster events. For example: Using the output of a flood modeling system to define a flood potential as an event that would trigger data access and additional processing to make more rapid decisions about possible flood conditions, which could help mitigate the effects of the eventual flood itself.

%Coverage: National
Data sensitivity: Potentially sensitive, TBD
**Data Description**

- **Type of Layer:** High-resolution flood modeling
- **Q/A Frequency:** Annually/Every 3 years? TBD
- **Updated:** TBD – Research environment, possible operational
- **3DM Applications:** Identifying flooded roads, substations, critical infrastructure, communities
- **Source:** George Mason Univ / NWS NWS
- **Servers:** TBD, currently research
- **Data Availability:** Currently post-event processing
- **Description:** Event-driven data delivery (ED3) is being used to automate the access and processing of data for decision support as the result of disaster events. For example: Using the output of a flood modeling system to define a flood potential as an event that would trigger data access and additional processing to make more rapid decisions about possible flood conditions, which could help mitigate the effects of the eventual flood itself.
- **%Coverage:** National
- **Data Sensitivity:** Potentially sensitive, TBD
TRL to ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

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ORL 2
OPERATIONAL READINESS LEVEL

Data Description

NOAA SNPP VIIRS Day/Night Imagery – From NOAA Satellite orbiting above the Earth

Type of Layer: Imagery from satellite showing night lights/power outages derived based on comparison to ‘normal’ day

Q/A Frequency: Frequently/ TBD

Updated: Daily

3DM Applications: Identifying where large scale power outages are occurring after a particular event/disaster

Source: NOAA NESDIS (U of Wisconsin/Trusted Source)

Servers: Univ of Wisconsin, NOAA, Trusted Source (Lab)

Data Availability: Imagery acquired daily during polar orbiting satellite passes. Additional satellite ‘channels’ available

Description: Night lights/fires/fishing boats/Power Outage imagery from space. Red highlighted areas are where power is out after a storm impacted the area.

%coverage: Global

Data sensitivity: public/open
TRL to ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

ORL 2

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Data Description

Digital Globe High Resolution Satellite Imagery

Type of Layer: High resolution imagery

Q/A Frequency: Frequently/ Digital Globe is a private company

Updated: Daily, Gallery or Tasked Satellite

3DM Applications: Responding to disasters, surveillance, damage assessment, vegetation assessments along roadways, policy monitoring, easement monitoring/right of way violations, etc.

Source: Digital Globe satellite constellation

Servers: Digital Globe

Data Availability: Subscription Service or Imagery available via treaty during disasters to agencies/partners

Description: Private sector satellite operators can acquire imagery anywhere in the world, for a price. Federal Government gets imagery when a disaster hits across the globe under a treaty to help with response and assessment.

%coverage: Global

Data sensitivity: public/open/subscription based/purchase
TRL to ORL Mapping
Operational Readiness Levels (Focusing on Quality & Availability)

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Data Description

NOAA Wildfire / Smoke Detection Algorithm applied to satellite imagery

Type of Layer: Satellite identification of smoke/wildfires
Q/A Frequency: Frequently internally at NOAA/TBD
Updated: Daily

3DM Applications: Finding locations for wildfires and potential threats to power lines, houses, buildings. Early detection of wildfires in wilderness/low populated areas, Alaskan bush, etc.

Source: NOAA NESDIS/Univ of Wisc

Servers: Univ of Wisc

Data Availability: Daily algorithms run on imagery to pull out hot spots and smoke plumes

Description: NOAA satellite-SNPP has a sensor on it that can detect hot spots which most of the time correlate to wildfires. Smoke algorithms identify plumes and convert those layers into GIS files that can be used within any GIS application (including GeoCollaborate® Dashboard). This can be very helpful in locations where naked eye detection is not possible. Also helps assess the size of a wildfire and the threats to urban locations.

%coverage: Global
Data sensitivity: public/open
TRL to ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

ORL 2
Operational Readiness Level

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%coverage: Western Hemispheric
Data sensitivity: public/open
Revised March 10, 2017

TRL to ORL Mapping
Operational Readiness Levels (Focusing on Quality & Availability)

• Data available NOW
• Immediate Situational Awareness (SA) & Decision Making (DM)
• Person available to contact

Data Description

NWS Watches, Warnings & Advisories-Operational

Type of Layer: Real-Time Watches, Warnings, Advisories
Q/A Frequency: TBD
Updated: Every minute
3DM Applications: Real-time situational awareness (SA) on status of hazardous or extreme weather events forecasted by NWS
Source: NWS Integrated Dissemination Program (operational)
Servers: College Park, MD
Backup: Boulder, CO
Data Availability 24/7/265
Description: Latest NWS issued watches and warnings, including flood warnings, river flood warnings, hurricane warnings, watches and many others.
%coverage: National (US)
Data sensitivity: public/open
TRL to ORL Mapping
Operational Readiness Levels (Focusing on Quality & Availability)

ORL
OPERATIONAL READINESS LEVEL

1

Data available NOW
• Immediate Situational Awareness (SA) & Decision Making (DM)
• Person available to contact

Data Description

NWS National Weather Radar Mosaic/Composite
Type of Layer: Real-Time Precipitation/Weather
Q/A Frequency: TBD
Updated: Every 6-11 minutes
3DM Applications: Real-time situational awareness (SA) on status of rain/snow/thunderstorms.
Source: NWS Integrated Dissemination Program (operational)
Servers: College Park, MD
Backup: Boulder, CO
Data Availability 24/7/265
Description: Latest status of rain, snow and severe weather direct from 122+ NWS forecast offices. This product combines the radars together for a single national and regional view of current precipitation
%coverage: National (US)
Data sensitivity: public/open
Data Description

- **NOAA NDBC – National Data Buoy Center**
- **Type of Layer:** Real-Time Precipitation/Weather
- **Q/A Frequency:** TBD
- **Updated:** Every 30-60 minutes
- **3DM Applications:** Real-time situational awareness (SA) on status of ocean observations.
- **Source:** NOAA Marine Observations/IOOS (Integrated Ocean Observing System)
- **Servers:** NOAA
- **Backup:** TBD
- **Data Availability:** 24/7/265
- **Description:** LIVE data from NOAA and other IOOS Association buoys that report wave heights, wind speeds, pressure, temperature and weather observations.
- **%coverage:** Global, non-contiguous
- **Data sensitivity:** public/open
**Operational Readiness Levels (Focusing on Quality & Availability)**

- Data available NOW
- Immediate Situational Awareness (SA) & Decision Making (DM)
- Person available to contact

**Data Description**

- **Department of Energy Processed Petroleum Pipelines**
- **Type of Layer:** Critical infrastructure/Highways
- **Q/A Frequency:** TBD
- **Updated:** Annually / TBD
- **3DM Applications:** Overlaying critical infrastructure data with prediction of path of totality and real-time weather can assist state transportation officials, federal transportation officials at the same time.
- **Source:** DOT, NOAA, Great American Eclipse
- **Servers:** DOT, NOAA, Private Sector
- **Backup:** TBD
- **Data Availability:** 24/7/365
- **Description:** This dataset combines real-time NOAA satellite data with predicted path of totality and major highways leading to the path of totality.
- **%coverage:** National (US)
- **Data sensitivity:** sensitive/TBD
How many people will go to see the Great American Eclipse in South Carolina?

A total solar eclipse crosses the United States on August 21, 2017. This is easily the most spectacular celestial sight you will ever see. Try to arrive at least the day before to avoid bad traffic and pick a less congested area.

We’ve applied an analytic method to compute high and low estimates on how many people will actually travel to the path of totality. We’ve also computed the total population that is closest to this state. This analysis was done with ArcGIS Pro and based on the 2010 Census enumeration and the national road network. Details at GreatAmericanEclipse.com/Statistics

Low estimate of visitors to the path: 547,000
High estimate of visitors to the path: 2,188,000
Total population closest to this state: 94,808,000

GreatAmericanEclipse.com
TRL to ORL Mapping – Technology/System Operational Readiness Levels (Focusing on Quality & Availability)

4

- Data in collection, processing and/or testing phase
- Being evaluated for accuracy, validated
- Target for operations 12+ months
- Not likely to be immediately useful for operations

Product – Data Layer

Real-Time Exercise Capability
Type of Layer: SYSTEM FOR ACCESS TO DATA ARCHIVES
Q/A Frequency: Evolving at JPL
Updated: With every Hurricane
3DM Applications:
Data Driven Exercises using real archived data
Source: NASA/JPL
Servers: NASA JPL/Various Trusted Sources
Backup: TBD
Data Availability:
% Coverage of Data Provider:
Data Sensitivity/Permission Levels on use of data:
Need credentials to access