Adding real-time mapping to WebEOC to better inform emergency response planning

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Real time mapping informing SASES response

• Brief introduction to SA State Emergency Service (SASES)
• Overview of SESIIMS – incident management solution
• Building and integrating spatial capability to inform and improve response planning and operational decisions
• Future plans
SA State Emergency Service

- Volunteer based organisation (originally known as Civil Defence) supporting community since the early 1960s
- Responding 24/7/365 to around 10,000 calls per year
- Control agency for Extreme Weather (including storm, flood and heatwave)
- Urban Search & Rescue (with MFS)
- Marine Rescue, through Volunteer Marine Rescue
- Support/surge capacity (CFS: basecamps, logistics, staging, SAPOL: evidence search)
- SES: 2 Regions, 10 Districts, 67 Units
- 50 staff and 1700 Volunteers
- VMR: 14 flotillas and 550 volunteers
SESIMS – The SES Incident and Information Management System

• In 2012 SASES began a project to find a single replacement for a number of separate incident management and reporting systems

• Comprehensive RFI/Q process 2012/13

• Review of options -> WebEOC

• Purchased WebEOC licence June 2013

• Phase 1 (internal boards) live on 1st July 2014

• Phase 2 - live to volunteers 1st July 2015
Why WebEOC?

- WebEOC platform: a COTS Critical Incident Management System
- Functionality, flexibility and licensing options
- Extensive and supportive user community:
  - Used extensively in USA: NASA, EPA, Nuclear Regulatory Commission, Senate, Dept. of Homeland Security …
  - Worldwide/corporate users include: International Airlines (Quantas, BA, AirNZ etc), AT&T – Network Disaster Recovery, Maritime NZ, Auckland City Council …
  - And extensively in Australia

Australian WebEOC network
As at 31 August 2017

Airline Customers
Air New Zealand
Qantas

NZ Customers
 Fonterra
Maritime NZ
SESIIIMS – in summary

• A system to share and manage information and provide incident intelligence – all in near real time

• Browser based: no client installation required

• Login via portal: SSO credentials for all SASES systems

• Designed to scale from BAU to significant event/incidents

• Integrated with a number of systems including SACAD, Whispir, TAS, AlertSA and GIS

• Supported by online (Moodle) training

• External agency access as needed – e.g. Extreme Heat, Major Event
Information flow

SACAD
SAPOL

SACAD
SES/CFS/MFS

SACAD
SAAS

Reporting:
Internal
State
National

GIS

Membership
management

Whispir

View and report

Users:
Browser

2 mins

2 mins

Daily
# Daily Incidents – landing page

<table>
<thead>
<tr>
<th>SESIIMS No.</th>
<th>DIN</th>
<th>PIL</th>
<th>Date/Time of call</th>
<th>Incident type</th>
<th>Location</th>
<th>Status</th>
<th>Agency</th>
<th>Primary Unit</th>
<th>Last info update</th>
<th># Manual Entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>108465</td>
<td>4</td>
<td>1</td>
<td>04/07/16 08:39hrs</td>
<td>TREE DOWN</td>
<td>HOUGTON</td>
<td>Going</td>
<td>SES</td>
<td>Tree Down</td>
<td>04/07/16 08:39hrs</td>
<td>0</td>
</tr>
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<td>108466</td>
<td>21</td>
<td>1</td>
<td>04/07/16 08:49hrs</td>
<td>TREE DOWN</td>
<td>HOUGTON</td>
<td>Going</td>
<td>CFS R2</td>
<td>Paramedic</td>
<td>04/07/16 08:49hrs</td>
<td>0</td>
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<tr>
<td>108468</td>
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<td>2</td>
<td>04/07/16 08:53hrs</td>
<td>TREE DOWN</td>
<td>PROSPER</td>
<td>Going</td>
<td>SES</td>
<td>Prospect</td>
<td>04/07/16 08:53hrs</td>
<td>0</td>
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<tr>
<td>108461</td>
<td>18</td>
<td>2</td>
<td>04/07/16 08:42hrs</td>
<td>FIRE ALARM</td>
<td>PARADISE</td>
<td>Going</td>
<td>MFS</td>
<td>St Marys</td>
<td>04/07/16 08:42hrs</td>
<td>0</td>
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<td>108479</td>
<td>16</td>
<td>1</td>
<td>04/07/16 09:20hrs</td>
<td>PRIVATE ALARM</td>
<td>DUDLEY</td>
<td>Completed</td>
<td>MFS</td>
<td>Prospect</td>
<td>04/07/16 09:20hrs</td>
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<td>15</td>
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<td>RUBBISH OR WASTE</td>
<td>NEWTON</td>
<td>Completed</td>
<td>MFS</td>
<td>Paradise</td>
<td>04/07/16 09:30hrs</td>
<td>0</td>
</tr>
<tr>
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<td>1</td>
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<td>FLOODING SALVAGE</td>
<td>PARALOWIE</td>
<td>Going</td>
<td>MFS</td>
<td>Salisbury</td>
<td>04/07/16 07:30hrs</td>
<td>0</td>
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<tr>
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<td>1</td>
<td>04/07/16 07:30hrs</td>
<td>FLOODING SALVAGE</td>
<td>PARALOWIE</td>
<td>Awaiting Report</td>
<td>SES</td>
<td>Edinburgh</td>
<td>04/07/16 07:30hrs</td>
<td>0</td>
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<tr>
<td>108470</td>
<td>8</td>
<td>2</td>
<td>04/07/16 08:05hrs</td>
<td>MINOR CLEARUP</td>
<td>COMPTON</td>
<td>Going</td>
<td>CFS R5</td>
<td>Compton</td>
<td>04/07/16 08:05hrs</td>
<td>0</td>
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<td>1</td>
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<td>TREE DOWN</td>
<td>CADGEE</td>
<td>Awaiting Report</td>
<td>OGA</td>
<td>South East</td>
<td>04/07/16 08:05hrs</td>
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<td>1</td>
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<td>TREE DOWN</td>
<td>CADGEE</td>
<td>Completed</td>
<td>CFS R5</td>
<td>Lochaber</td>
<td>04/07/16 06:03hrs</td>
<td>0</td>
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</tbody>
</table>
Compendium Boards
Automated Reporting

Incident Type Counts
Incidents counted by incident type. Both chart and table display a breakdown of each total by priority level. Data source: SACAD feed.

Incidents per primary unit
Incidents counted by primary unit. Both chart and table display a breakdown of each total by priority level. Data source: SACAD feed.

Unit Member Attendance
N/A
Integrating spatial information

• Initial solution utilised WebEOC Mapper Pro
  o Licence and MATS in addition to WebEOC
  o Originally a third party plug-in solution
  o Adopted and integrated with WebEOC
  o Integration was via XML interface
• Successfully added mapping to a number of boards ...
  ... but then we encountered problems
Challenges with Mapper

- Worked fine for around 6 months, then performance deteriorated, couldn’t cope after 9 months
- Designed to work with WebEOC in more typical EOC usage scenario 100’s of entries in an incident
  - our ‘incident’ is a financial year ‘bucket’: ~ 40000 entries
- Other issue for us is that almost all input is via API – symbology is based around lists (manual data entry) so we could not symbolise as we wanted.
- Geocoder configuration didn’t match Location SA requirements
- Really liked some tools and functionality, but forced eventually to abandon this solution
4 options considered

1. Special/duplicate view to use with Mapper
   - Didn’t address symbology issues
   - Dual commit doesn’t work with API so would have had to load up SACAD feed to double insert everything – storage

2. Google maps
   - Used in NT very successfully
   - Google licencing challenges
   - No in house expertise

3. ArcGIS Java script API
   - Limited in house expertise
   - Limited developer expertise
   - Need to write into each view that needs a map

All of these only serviced SESIIMS, not the bigger picture
Fourth alternative adopted

Working with Esri Adelaide Office:

• Developed a Python service which interrogates WebEOC DB and adds new/changed entries to GDB on ArcGIS server
• Create map service(s) – internal and now on AGOL too
• Create WebMap ->WebApp and embed in boards or open in separate window as required
Why this option?

• In house expertise to create and publish map services and maps/apps so we can create/edit/maintain these ourselves

• Easy to use definition queries and ArcMap settings to fine tune visible content in each map service

• Full control of symbology

• Quickly produce maps/apps tailored to specific requirements

• Can add parameters to app call to set extent, centre point, additional markers etc., so can use same app for different requirements

• One change to app is propagated through all uses – no need to edit in several views

• All SESIIMS data is now available in GDB – spatial analysis on historical data without impact on SESIIMS DB performance

• Can use data to produce maps/apps outside of SESIIMS – SASES GIS Portal and AGOL
Example: WebApp all agencies
Example: WebApp SES only
Example: Daily Incidents
Individual incident view
State Overview Dashboard

State and Regions

Districts

Units
SA SES WebEOC - ArcGIS Integration

- SESIIMS
- Data to feature class in GDB
- ArcMAP
- Map service
- Web Map
- Web App

Improved emergency management through the use of spatial information
Spatial Analysis

In addition to the operational applications, having the response data in a stand alone GDB allows us to:

• analyse it for patterns, coverage gaps etc.
• combine it with other data to inform decisions

All without any impact to the live Incident Management system
Example: coverage gap analysis
Example: response planning
Example: post event impact analysis
What next?

- Integration of content of two portals (internal and AGOL) into one portal leveraging WofG ELA and Location SA services
- Upgrade of Python scripts to support new symbology
- Public incident and warning maps for SASES website
Summary

• Integration of spatial data into operational boards was vital to intelligence based operational decision making

• Additionally, enabling historical spatial data analysis facilitates organisational data driven decision making

*Note: Mapper Pro has now been superseded by an WebEOC/Esri alternative comprising three separate components:
  - Maps (included in WebEOC licence) – limited configuration options
  - Maps + and ArcGIS - two separately licenced plugins