Regional Cooperation in Search and Rescue (SAR) Operations

- An Australian Perspective

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Regional cooperation in SAR operations - Australian experience (30 min)

- Spectrum of regional SAR cooperation possibilities
- Global, regional and bilateral SAR arrangements
- Preparatory SAR technical cooperation:
- Operational SAR cooperation (in live incidents):
  - Small-scale cross boundary cooperation
  - Large-scale multi-national cooperation
    - Case study: MH 370 surface search phases (March-April 2014)

Discussion period (40 mins) to cover relevant issues, such as

- Identification & recognition of existing cooperation
- Potential paths for enhanced regional SAR cooperation
- Discuss scenarios for operational cooperation
Why regional SAR cooperation?

- Safety of Indian Ocean rim citizens
- Safety of international air traffic & merchant shipping
  - Tracking, safety assurance & intervention
  - Search & rescue responses
- Managing risks to tourism
- Managing risks from *blue economy* initiatives

Commitment to UN Conventions on SAR:

- Safety of Life at Sea (SOLAS) (Safety Convention)
- International Civil Aviation (Chicago Convention)
- Maritime SAR Convention
- Economic efficiency in provision of SAR services
What preparatory regional SAR cooperation?

- International Maritime Organization (IMO)
- Nav, Comms & SAR Sub-Committee (NCSR)
- International Civil Aviation Organization (ICAO)
- Air Nav Planning & Implementation Regional Groups
- ICAO-IMO Joint Working Group (JWG) on SAR
- Cospas-Sarsat distress beacon alerting system
- Capacity building & technical cooperation programs
  - Indonesian Transport Safety Assistance 2007-15
  - Maldives, Mauritius, Sri Lanka 2015-2018
- Bilateral agreements with neighbouring SRRs
What operational regional SAR cooperation?

- Assist each other across SRR boundaries
- Technical & operational advice
- Drift modelling, prediction & tracking
- Maritime communications with shipping
- GMDSS and Cospas-Sarsat alerting
- *Project* capabilities for others to access
  - Ship tracking picture for SAR purposes
  - Satellite maritime communications
- Assistance with search aircraft across SRR boundaries
- Multi-national mass rescue operations (e.g. MH 370)
Operational SAR cooperation - examples

- Wild Eyes 2012
- Divers Fiji 2004
- F-GJFJ 2010
- Akademik Shokalskiy 2013
- Rabaul Queen 2012
- MH 370 2014
- SV Moorings 2015
- PNG, Vanuatu air searches medivacs
B777-200ER 9M-MRO

Source: Seth Jaworski
Malaysia Airlines Flight MH370

INFORMATION KNOWN BY AIR TRAFFIC SERVICES AT THE TIME

- Boeing 777-200ER with 239 people aboard - Kuala Lumpur to Beijing
- 1641 UTC (8th March 2014 Malaysia) – departed KL
- 1707 UTC – Last automatically transmitted position from aircraft (ACARS)
- 1719 UTC - Last radio communication from crew
- 1722 UTC – Final ATC secondary radar fix

INFORMATION DERIVED AFTER THE EVENT

- 1725 UTC – Deviated from planned flight route
- 1822 UTC – Final primary radar fix well off planned route
- Satellite communications log indicated continued flight for further 6 hours.
- Satellite derived data used to re-create flight path into the Indian Ocean
- Debris at La Reunion confirmed MH 370 flight into the Indian Ocean (September 2015)

Source: ATSB website
Analysis of Flight Data

- International Joint Investigation Team (JIT) at Kuala Lumpur
  - Staffed from technical organisations with accident investigation focus
  - Expert multi-disciplinary international group
  - Radar
  - Satellite
  - Signal processing
  - Target motion analysis
  - Aircraft performance
  - Aircraft flight management

- Review and refinement of satellite, radar and aircraft performance data to determine most probable aircraft flight path

Source: ATSB
Flight Path derived from Primary and Secondary RADAR data.

Source: JIT/Google Earth, ATSB Report.
After the last recorded primary radar data, at 1822, the following were recorded at the ground station:

- 1st handshake initiated by the aircraft
- Unanswered ground to air telephone call
- 2nd handshake initiated by the ground station
- 3rd handshake initiated by the ground station
- 4th handshake initiated by the ground station
- 5th handshake initiated by the ground station
- Unanswered ground to air telephone call
- 6th handshake initiated by the ground station
- 7th handshake initiated by the aircraft
- Aircraft did not respond to log-on interrogation from the satellite earth ground station (failed handshake).

hhmm.ss

1825.27
1839.52
1941.00
2041.02
2141.24
2241.19
2313.58
0010.58
0019.29
0115.56

Source: ATSB
Initial Area of Interest

INCIDENT 2014/4175
SEARCH FOR MALAYSIAN AIRLINES FLIGHT MH370

Legend
- Yellow: Possible Route - National Transportation Safety Board (USA)
- Hatched: Planned Search Area (18 March 2014)

Map prepared: 18 March 2014
• Various possible splash points – progressive probability areas
• Extensive drift time
• Multiple bodies of water
• Unknown number of initial floating objects that may have escaped from fuselage or broken up on impact
• No firm data available on dispersion of drift targets over such a long drift period
• 2 x Tropical Cyclones affected drift
End of Search Phase – 28th April 2014

- 42 day search. 345 flight sorties. 3177 total flight hours.
- 4.7 million square km cumulative search area
- Search aircraft:
  - Civil – Australia and NZ (10)
  - Military – Australia (5), USA (2), China (2), New Zealand (2), Japan (3), Malaysia (2), Republic of Korea (2). Offer by India (2)
- Search vessels:
  - Civil – Merchant ships
  - Military – Australia, China, USA, UK, Malaysia
Operational Challenges

- Elapsed time – impact of oceanic drift and debris dispersal
- Distance offshore, vast & changing search areas
- Search aircraft – available endurance – “thin” search effort
- Time for ships to reach aircraft sightings
- Satellite imagery – latency and credibility – revisiting credibility
- Multi-national coordination and communications
- Civil – military coordination practices
International relations

• Chicago Convention Annex 12 - SAR arrangements
  - Malaysia overall coordinator (based on last known position)
  - Indonesia and Australia coordinated in their SAR Regions

• Chicago Convention Annex 13 creates rights & duties
  - Malaysia, USA, UK, Australia
  - China – large number of Chinese passengers

• Malaysia, China, Australia cooperation
  - Information exchange & clearance
  - Long term search planning and resourcing

• International help – most of it military

• Malaysian Government primarily dealt with families and with Malaysia Airlines:

• Australia dealt with Australian families
• Huge international and national demand
• AMSA provided press conferences, briefings, interviews, online media, etc.
• GIS capabilities for mapping
• Social Media – rapid updates, links to information.
• MH 370 lessons learned – applicable to other large scale incidents
  • *Black Swan* characteristics?
  • Government to Government coordination & messaging
  • International consistency with public information
  • Cooperative approach to response – neighbours & beyond
  • Civil-military coordination: Ops, media, security, logistics
  • Financial aspects of response
  • Next of kin and interested public expectations & engagement

• Not experienced – serving families & working with the company
Underwater search phase

- Led by Australian Transport Safety Bureau
- Consistent with ICAO Annex 13 Accident Investigation
- Ongoing refined analysis of flight and satellite data
- Priority area determined approximately 60,000 km$^2$
- This area subject of surface search Day 21-26.
- First task bathymetry (since mid-May 2014)
- Tender for specialist deep-water search
INDIAN OCEAN
Maritime Search and Rescue Regions (SRR)

Approximate radius of action for Australian-based long-range aircraft.

Australia SRR

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