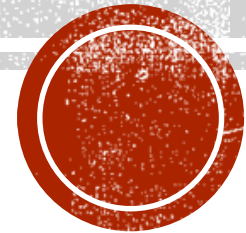


SARSAT ISSUES

EMERGING

CDR Erin Boyle



MEOSAR - EOC TO IOC

- Early Operating Capability (EOC) to Initial Operating Capability (IOC)
- IOC (**Was** Estimated November 2019)
 - Set specification – i.e. Resolution for moving beacon issues & Uncorroborated MEOSAR (Suspect) alerts
 - Compared to EOC, IOC is based, mostly, on an extended ground segment operating at full specifications. The MEOSAR system need not necessarily provide global coverage during the IOC phase
- Full Operating Capability (FOC)
 - System should be considered fully operational and have global coverage
 - Could be assumed that the MEOSAR system will become the primary alerting source for 406 MHz beacons. (U.S. LEOSAT will go away w/ MEOSAR is FOC)
- No official estimated IOC & FOC dates
 - Unofficial – IOC = 2021 & FOC 2023
- MEOSAR standards / accuracies / timeliness vs. LEOSAR
- Once MEOSAR is IOC – USCG Policy will be updated



SUSPECT ALERTS

- Definition – A single alert from a single MEOSAR satellite.
 - It can be real alert or it can be a system generated anomaly.
 - We have seen examples of real cases with only Suspect Alerts
- Name is changing to “**Uncorroborated MEOSAR Alert**”
 - Working to update this in SAROPS
- Note that the commissioning of all nodal MCCs is a prerequisite for MEOSAR Initial Operating Capability (IOC)
 - For IOC, Uncorroborated MEOSAR Alert rate must be $<10_x^{-4}$ level (.0001) (1 for every 10,000 alerts)
 - Several papers by countries trying to classify and analyze these alerts
- Unfortunately, these will never be 100% eliminated



ENCODED POSITION (E-SOLUTION) FROM INTERNAL GNSS

- GNSS is NOT required on beacons
 - However; IMO set GNSS (and AIS) requirement and 5 min refresh rate with in 3 years
 - U.S. SARTSAT attempted to mandate all beacons have 5 min refresh (if GNSS installed); compromised at 15; (was 30-60)
- First Generation Beacons (FGB)s
 - 100 meter accuracy
 - The internal navigation device shall make at least one attempt every 15 minutes to obtain an initial location; until an initial location is obtained. After an initial location is obtained or 2 hours has passed after beacon activation without obtaining an initial location, the navigation device shall attempt location updates according to the following regime:
 - First 6 hours - update every 30 minutes
 - After 6 hours – update every 60 minutes
 - If unable to obtain updated position, beacon will transmit last known GNSS position for up to 4 hours
 - Is why SAROPS currently says... “Beacon ID and/or position may be unreliable”
- Second Generation Beacons (SGB)s
 - Self-check feature
 - 30 meter accuracy
 - Transmission schedule
 - First 30 seconds – update every 5 seconds
 - 30 seconds to 30 minutes – update every 30 seconds
 - > 30 minutes ...now 15 min max
 - Whenever the beacon has fresh encoded location data at the start of a burst, this shall be indicated within the message by zeroing the “time from last encoded location” field



RETURN LINK SERVICE (RLS) – TYPE-1 ACKNOWLEDGEMENT



- Define
- Benefits of system / Risks
 - 'Signal has been received' vs 'Help is on the way'
 - Beacon listening schedule and position confirmation
 - Lack of redundancy
 - 2 satellite return signal
 - Delays in acknowledgement but not in RCC reception
 - No standards for beacon-to-beacon times only simulator-to-satellite transmission
 - Priority of GNSS position over RLS message
- Beacon operational testing with Auxiliary CG Vessel + Kayak
 - Results = Exposed cycling issues, various times, display -naive user(see videos) issues



RETURN LINK SERVICE (RLS) — TYPE-1 ACKNOWLEDGEMENT

- Cospas-Sarsat Council approved IOC for RLS Type-1
 - Lack of global MEOSAR coverage; (406 MHz & RLS still global, but acknowledgment can be delayed)
 - Only authorized for sale in countries that have approved (not in U.S.)
 - If allowed, must account for distribution issues
 - NOCR country notification; delayed notification to responsible RCC/SPOC
 - To correct for - If MCC not RLS or MEO capable – must transmit via manual means to ensure near real-time notification to RCC/SPOC
 - Skeptic; so important to know – until FOC, **ensure** you are coordinating if receive NOCR notification





RETURN LINK SERVICE (RLS)

- Type-2 remote activation
 - Define
 - Most likely no longer being pursued
- Remote activation/deactivation
 - Define & w/ ELT(DT) only
 - European Commission is working hard
 - There is a chance of remote activation before contact from Air Traffic Control / aircraft operator activation
 - Security concerns
- Advice
 - Stay engaged with informal AND formal feedback
 - JWG (ICAO +IMO)
 - European Commission is working with Cospas-Sarsat, State Department, NAVCEN, FAA



THE FUTURE

- **L Band satellite payloads**
 - Decreased interference/suspect alerts
 - GPS III, Galileo, BDS schedule, Glonass
- **Second Generation Beacons (SGB)**
 - Timeline
 - L band; all GNSS encoded; no moving beacon issue; greater accuracy
 - Hope is economics will drive purchases
- **Polar Scout (Rest In Peace)**
 - Cube Satellites
 - Ground station locations
 - Proof of concept to aid aging LEOSAR system
 - Hawkeye (DHS) still running



MISC

- Attempt to change “Confirmed Position” for some other name. i.e. “Composite Position” = Non-starter
- Canadian – Beacon Registration Verifier
 - Describe
 - Verdict
- iPads for vessel examiners
- SRR update
 - For USMCC vs for all Cospas-Sarsat
- SARSAT program transition
- CG aircraft are detecting reference beacons
- Automatic Dependent Surveillance – Broadcast (ADS-B)
 - You can use this info from Air Traffic Control to help with SAR planning



LET'S EDUCATE THE ENGINEERS ON THE "REAL" WORLD

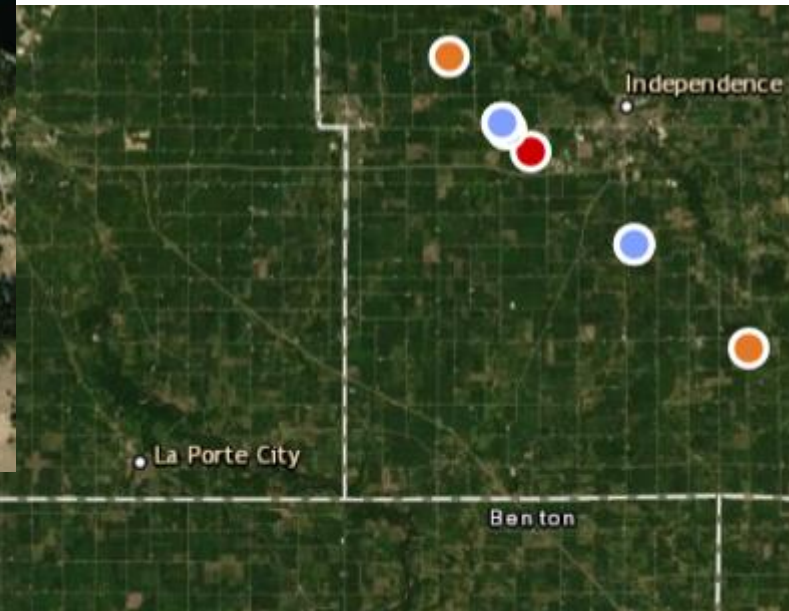


- All know 5km accuracy @ 95% but assume well less than 1km alert error/grouping
- But we all know this is our reality; help me educate
- *Note low power and obstructions will affect accuracies

Stuck in Snow



Helicopter Crash



Sunken Vessel

