San Diego Post

Society of SAME American Military Engineers

Welcome

Steaming to Assist:

USNS MERCY's COVID-19 Response

12 August 2020

http://www.same.org/San-Diego

Society of SAME American Military Engineers

- **Virtual Conference Rules of Engagement**
  - Please mute your microphones during the meeting
  - Please use the Zoom “Chat” function to ask questions during the event (Reply to Everyone)
  - It is best to use “Speaker View” during the Key Note Presentation
  - Questions from the Q&A will be answered:

    After Key Note Presentation

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Pledge of Allegiance

by President Kathy Stewart

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San Diego Post

2020-2021
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Society of SAME American Military Engineers

Captain William Scouten
Executive Officer,
USNS Mercy

BIO

- CAPT Scouten hails from Westfield, New Jersey
- Doctor of Medicine degree from Wake Forest University School of Medicine
- Established and led the NMCP Pediatric Subspecialty Group from 2006-2010
  - Pediatric Department Chairman - October 2010 to April 2011
- Chaired the Navy Bureau of Medicine's Diabetes Action Team
- Assistant Director of Medical Services & pediatrician: Haiti Earthquake Operation Unified Response
- Selected as U.S. Southern Forces Naval Command/FOURTH Fleet Surgeon in 2017
- Awards include:
  - Meritorious Service Medal with gold star
  - Navy Commendation Medal
  - Army Commendation Medal
  - Navy Achievement Medal
  - Army Achievement Medal

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Steaming to Assist:
USNS MERCY's COVID Response

The overall classification of this brief is
UNCLASSIFIED//FOR OFFICIAL USE ONLY

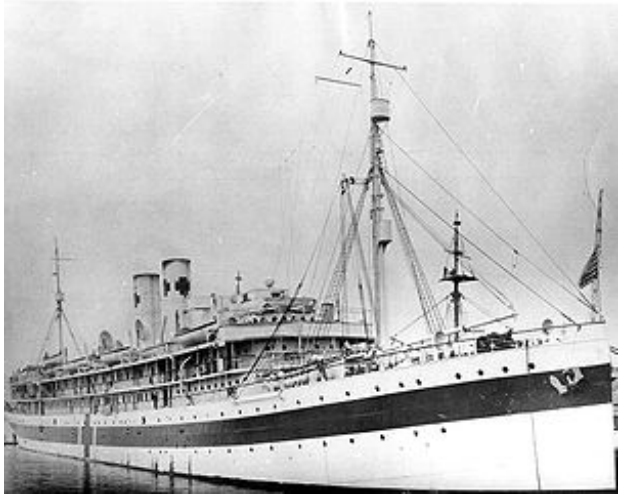
AGENDA

- HISTORY
- MISSION
- CAPABILITIES & PLANNING ASSUMPTIONS
- ENGINEERING CONSIDERATIONS
  - PATIENT MOVEMENT
  - WATER
  - VENTILATION
  - ACCESSIBILITY
  - INFORMATION TECHNOLOGY
  - DEGRADED COMMUNICATION

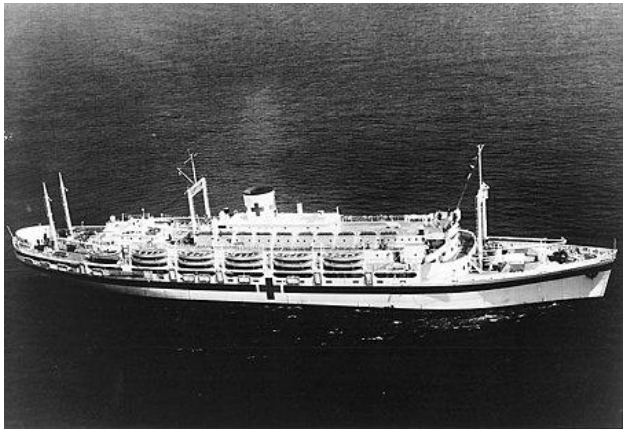
USNS MERCY (T-AH 19)

History

- First of two Mercy-class hospital ships
  - T-AH 20 is USNS COMFORT
- Converted San Clemente-class supertanker
  - SS Worth
- Commissioned 1986



AH-4 (1918-1934)



AH-8 (1944-1946)

USNS MERCY (T-AH 19)

History

Total cost, including purchase of 2 San Clemente Class oil tankers and retrofit into hospital ships = $560 million in 1984 ($1.4 billion in 2020)

USNS MERCY (T-AH 19)

Mission

- Provide health services in support of designated combatant command (COCOM) missions across the full range of military operations, including the support of medical stability operations (MSO) and diplomatic efforts.

- Ensure activation of the ship to a FOS Echelon III Medical Treatment Facility within the prescribed 5-day time frame

OPNAVINST 3501.161D, Required Operational Capabilities and Projected Operational Environment (ROC/POE) for T-AH 19 (Mercy Class) Hospital Ships

DESIGN CHARACTERISTICS

Length overall	894 feet
Beam	105 feet 9 inches
Designed draft	32 feet 9 inches
Scantling draft	38 feet
Displacement	69,360 long tons
Diesel fuel tankage (DFM/F76)	42,000 barrels 1,779,624 gallons
Fuel consumption (at anchor/in port)	260 barrels/day
Fuel consumption (underway: 13 knots (kts))	600 barrels/day 1.7 barrels/mile
Fuel consumption (underway: 17 kts)	975 barrels/day 2.1 barrels/mile
Fuel endurance: economical (9 kts)	95 days
Fuel endurance: maximum	44 days
Range (JP5/F44 tankage)	13,420 nautical miles (760 barrels/31,080 gallons)
Fresh water storage	460,000 gallons
Main propulsion: single screw	Steam turbine
Shaft horsepower	24,500
Sustained speed	17 knots
Electric generators (diesel): for MTF (3)	2,000 kilowatt (kW)

8 days to Pearl Harbor

DESIGN CHARACTERISTICS

Wards	
Casualty receiving (CASREC) beds	50 (not included in total bed count)
Intensive care unit beds	68
Post-surgical recovery beds	20
Respiratory isolation beds	11
Intermediate care beds	400
Minimal care/convalescence beds	500
Total	999

Accommodations:	
CIVMAR	
Master	1
Officer	17
Senior unlicensed	13
Junior unlicensed	40
Total	71
Military personnel (MTF)	
Officer	272
CPO	50
Enlisted	893
Total	1,215

1286 TOTAL RACKS

CASUALTY RECEIVING (CASREC)

50 BEDS

SURGICAL CAPABILITIES

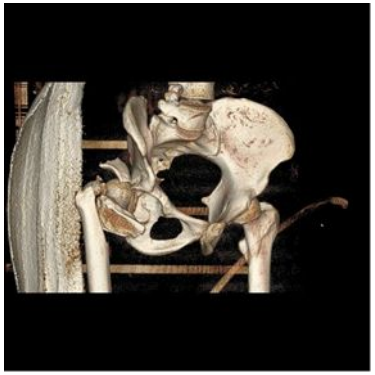
- Nine Main Operating Rooms
  - Trauma
  - Orthopedic
  - Spine
  - Neurosurgery
  - General
  - Urology
  - ENT/OMFS
  - GYN
  - Pediatric

- One angiography suite
- Two dental operatories

SUPPORT CAPABILITIES

- Radiology
  - CT Scan: Contrast, Non-Contrast
  - Angiography suite
- Pharmacy
  - TPN (Premix)
  - IV Admixture
- Physical Therapy
- Inpatient Dietician

- Lab
  - Blood Bank (5,566 units max)
  - Chemistry
  - Immunochemistry
  - Urinalysis
  - Hematology
  - Histology
  - Microbiology



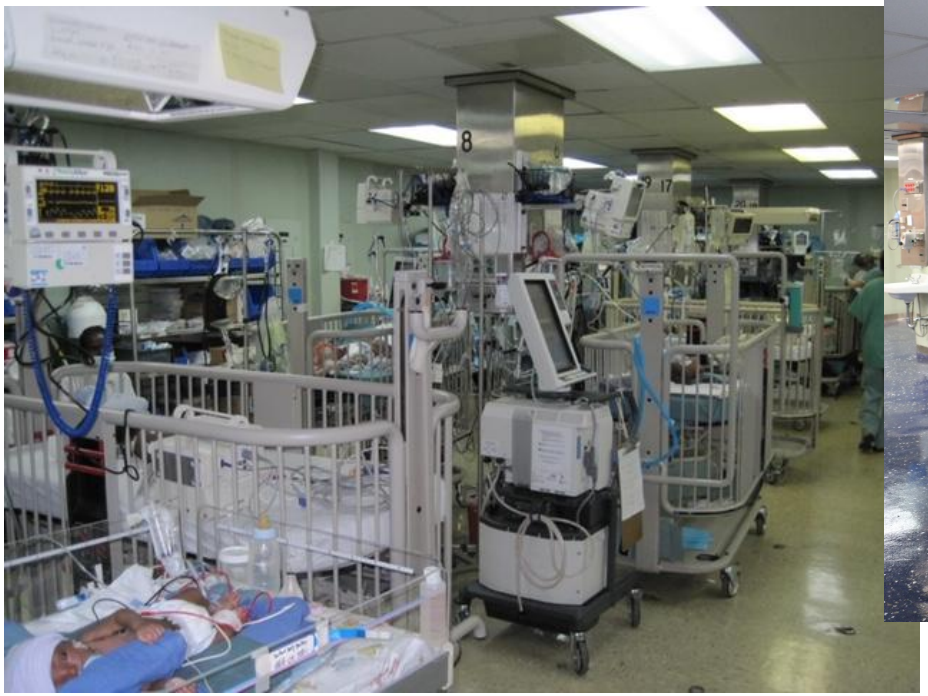
MEDICAL/SURGICAL WARD

- Open Bay
- 400 intermediate care beds

- 500 minimal care or convalescence beds

INTENSIVE CARE UNIT

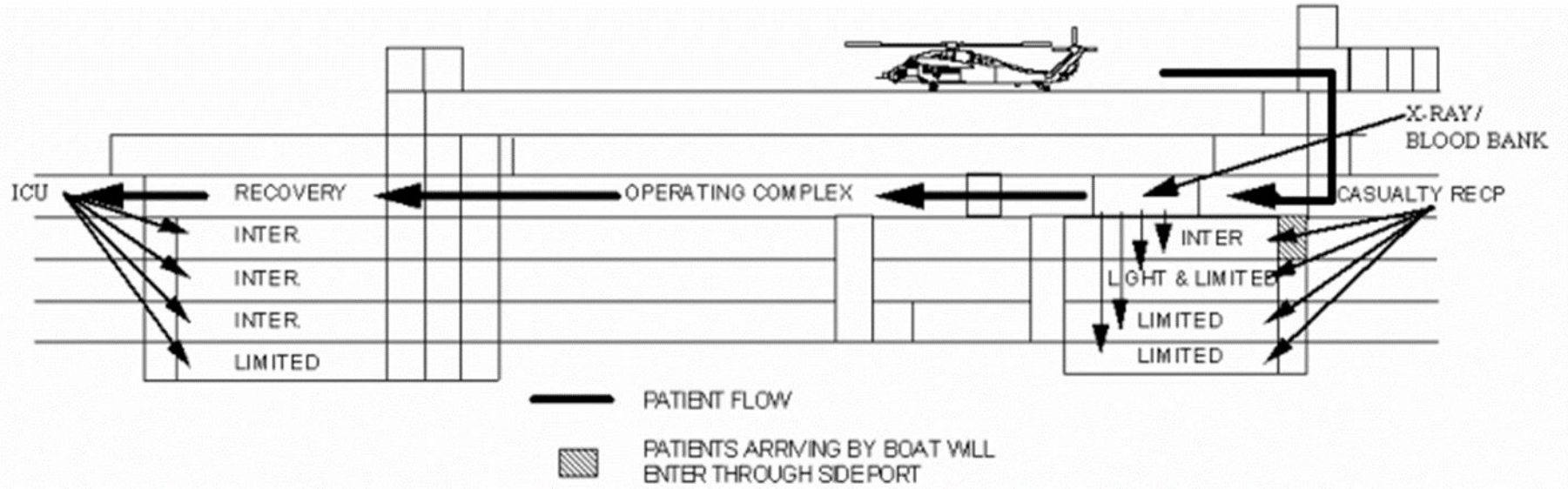
68 beds distributed in 3 spaces



20 post-surgical recovery beds

PLANNING ASSUMPTIONS

- Receive Patients
  - 300 patients per day for 1 day
  - 200 patients per day for 3 days
  - 100 patients per day sustained



PATIENT THROUGHPUT

PLANNING ASSUMPTIONS

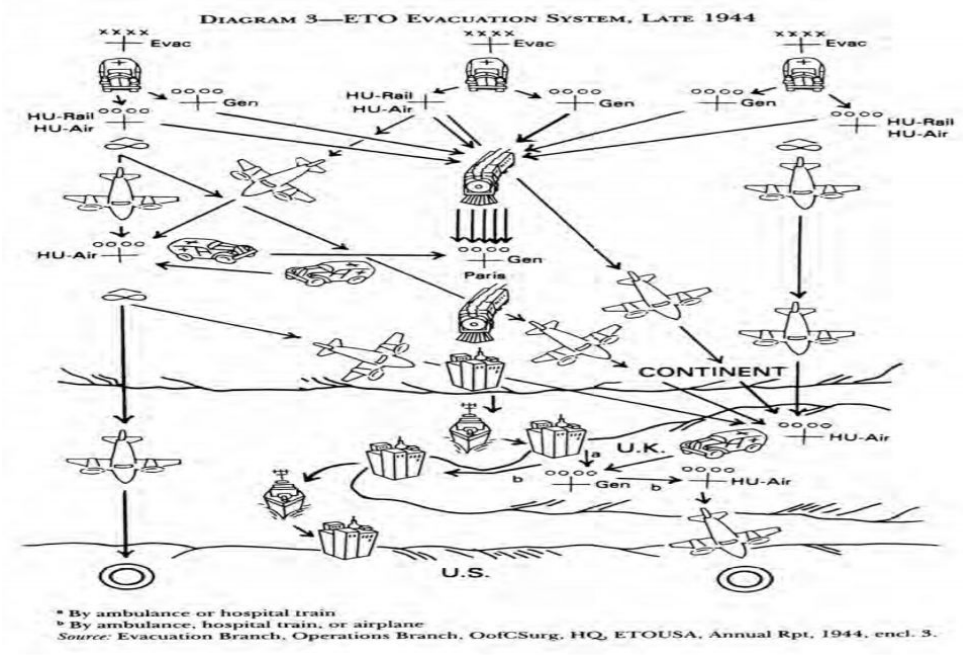
- Hospital ships are designed for sustained operations varying from 30 days without major resupply, to 60 days or longer with resupply.

- Provide all ancillary and support services required to meet maximum patient workload
  - Laundry up to 56 tons per week
  - Galley up to 7,500 meals per day

- Produce O_2 to supply piping system at maximum patient demand and provide ongoing refill for all depleted ward O_2 cylinders.

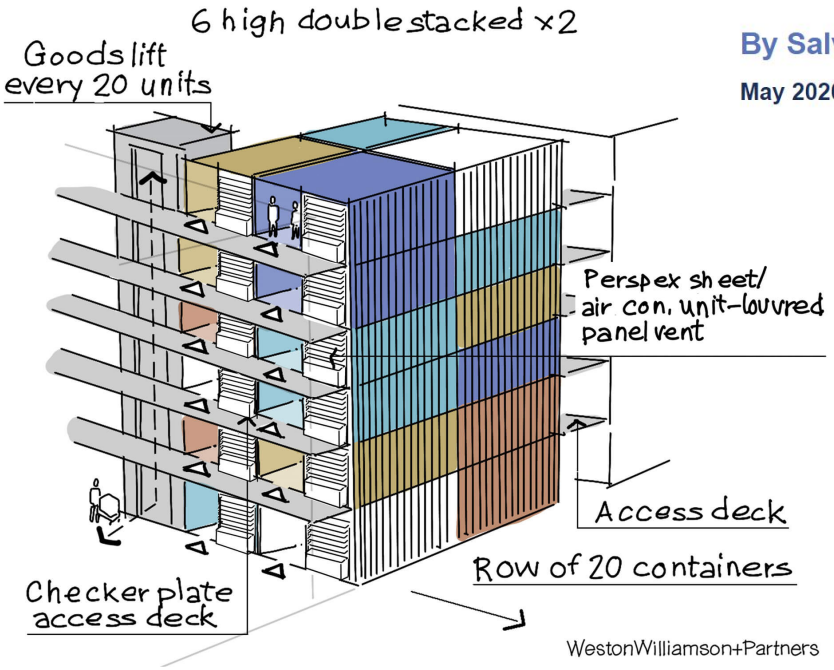
PATIENT MOVEMENT

Average length of stay will be 5 to 7 days



In disaster relief, the average length of stay may be longer for host-nation or foreign-national patients when evacuation to a shore-based hospital maybe not be readily available.

MODULAR HOSPITAL SHIP



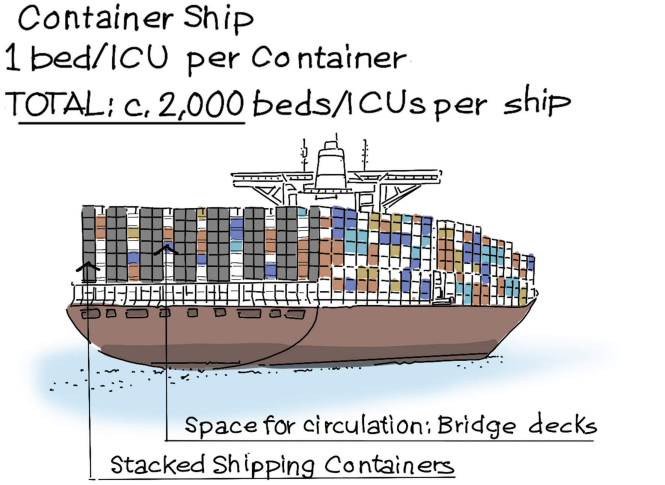
New Hospital Ships are Needed

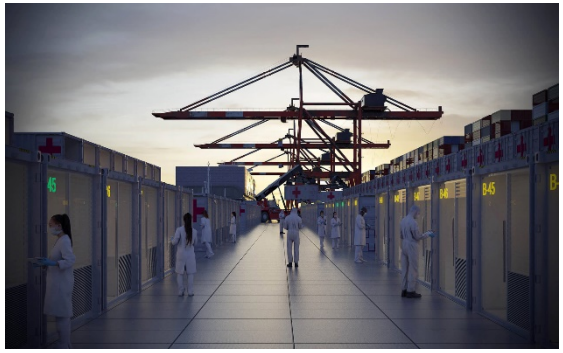
By Salvatore R. Mercogliano

May 2020 | Proceedings

Ready to sail to emergency: Container ship hospitals by Weston Williamson + Partners

The UK-based firm has transformed modular shipping containers to be retrofitted as floating hospitals that can be deployed to treat coronavirus patients across countries.





WATER

- 300,000 gallons/day produced
  - 75,000 gallons/day/distiller
- 75,000 gallons/day stored (pipe size limiting)
- ≈100,000 gallons/day can be made available for distribution ashore to affected populations
- 460,000 gallon water storage tanks
- 60,000 gallons/day consumed
- Naval Ships Technical Manual 533-2.4.2
- Advanced water testing

VENTILATION

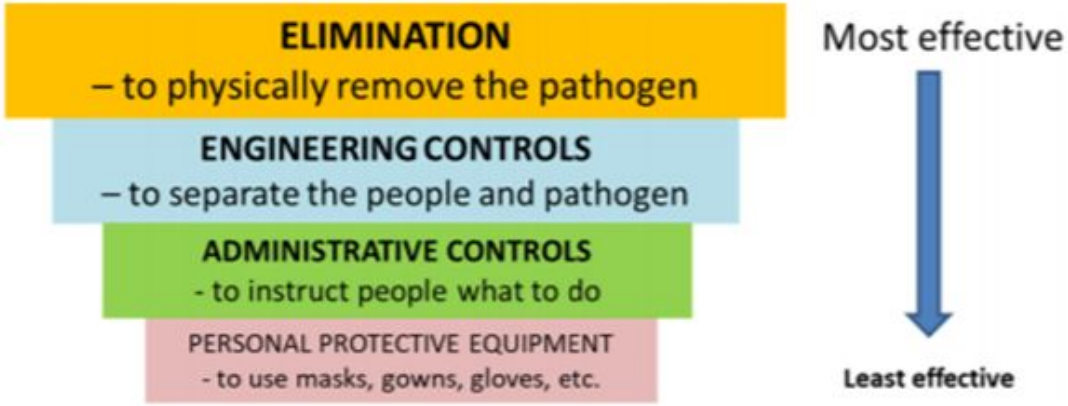


Fig. 1. Traditional infection control pyramid adapted from the US Centers for Disease Control (CDC, 2015).

- Air in operating theatres is kept at a higher pressure than in corridors and adjacent areas
- HEPA filters used to reduce risk of surgical site infections
- Air recirculation systems in the MTF serve multiple compartments

Morawska, Lidia, et al. "How can airborne transmission of COVID-19 indoors be minimised?." (2020).

VENTILATION

- To isolate COVID-19 patients from the rest of the ship
  - Area with an airtight boundary
  - Negative pressure
  - Served solely by its own supply, exhaust, recirculation system

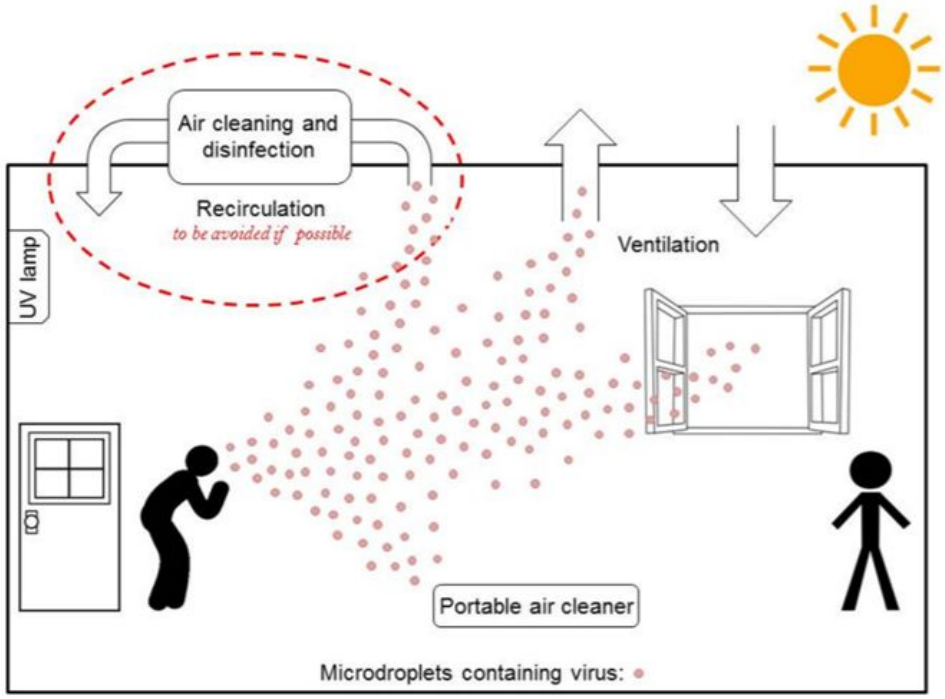


Fig. 2. Engineering level controls to reduce the environmental risks for airborne transmission.

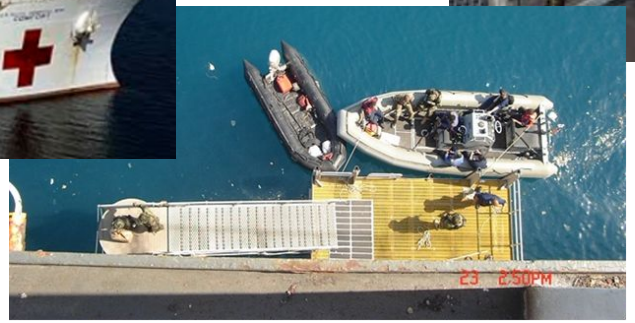
Morawska, Lidia, et al. "How can airborne transmission of COVID-19 indoors be minimised?." (2020).

ACCESSIBILITY

- Scene safety
  - Submerged objects in harbor
  - Piers

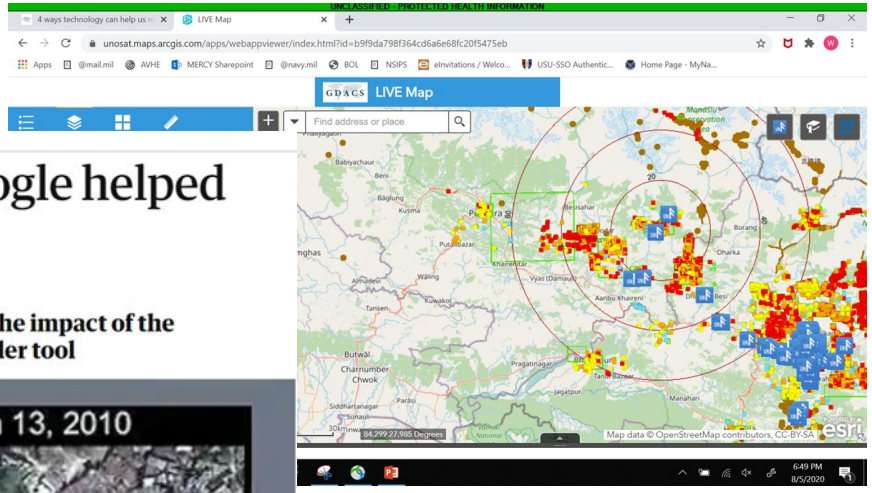
- Flight deck
- Port brow
- Starboard side port
- 9 Elevators
- Ramps

ACCESSIBILITY



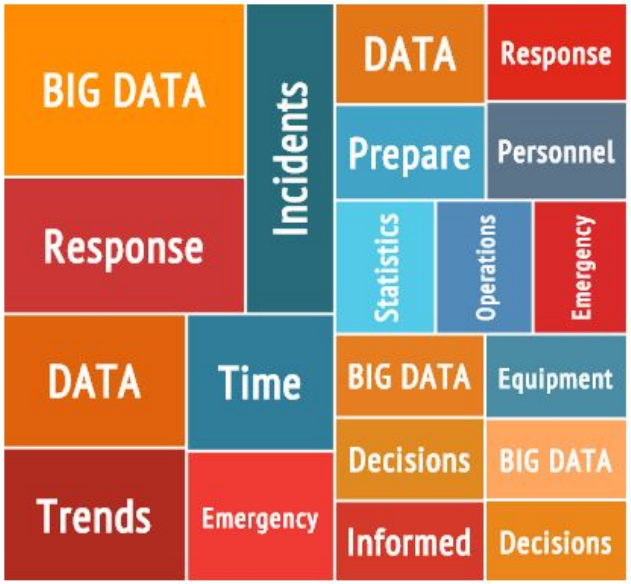
SITUATIONAL AWARENESS

- GPS
- Geographic information system (GIS)
- Remote sensing technology to create maps of the disaster areas



USING TECHNOLOGY

- Data mining of social media
- Information transferred from mobile phone apps, smart watches or connected medical devices



How Big Data Can Help in Disaster Response

Technology is enabling better management of risks and crises

By Amir Elichai on December 13, 2018

DEGRADED COMMUNICATION

Capability

- MERCY has three (3) full time Amateur Radio Operators.
- The Amateur Radio Shack on MERCY operates on all civilian and military frequency ranges.
- Capabilities are not limited to voice communication (i.e. data, email etc.)
- MERCY can serve as information relay and send radio calls plus data to units around the world.

Execution

- **RIMPAC 2014**: USNS MERCY HAM radio participates.
- **Pacific Partnership 2015**: MERCY HAM radio operators trained local radio users on Emergency Radio Operations.
- **Pacific Partnership 2018**: MERCY used HF and WSPR (Weak Signal Propagation Reporting), to reach every continent in the world!
- **RIMPAC 2018**: MERCY was the primary coordination platform for the final HADR event.

Discussion

- Amateur radio operators can provide a vital communication platform during HADR efforts.
- MERCY participates in local Southern California Healthcare Network drills, simulating how our Hospital Ship could be used as a coordination platform for MIL/CIV communication partnership.
- "Radio MERCY" has been loaded into the Department of Homeland Security SHARES (Shared Resources) Disaster Response Network.
- Continue local SoCal and regional drill/exercise participation with state and local government.

QUESTIONS?

Announcements

by President Kathy Stewart

- **August 19th**
  Young Member Virtual Happy Hour
- **September 9th**
  5G, the Internet of Things (IoT), and Facility Life Cycle Management (LCM)
- **October 14th**
  SAME SD Small Business Conference

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