

Aviation Risk Management

EAA 170 Young Eagles Ground School

Noelle Brunelle, MSHFS

San Luis Obispo, CA

A Little About Me.....

Learned to fly at SMX

First flight: Nov 87, First Solo: Feb 88
Instrument, Commercial ratings

USAF

ATC, Airfield Management, Command Post
Keesler MS, Nellis NV, Osan ROK
Osan Aero Club Safety Officer

Embry-Riddle

BS Management of Technical Operations
MS Human Factors and Systems
Internship: CAMI Cabin Safety Group
Thesis explored peer pressure in the cockpit

Transportation Safety institute - Aircraft Accident Investigator - Basic

Sikorsky Aircraft

Crew Stations: Digital Cockpit into Blackhawk, CMWS and Air Warrior integration

Aviation & Product Safety

Product Safety: Mature Models Team Lead (600+ H-53 and S-61 aircraft)

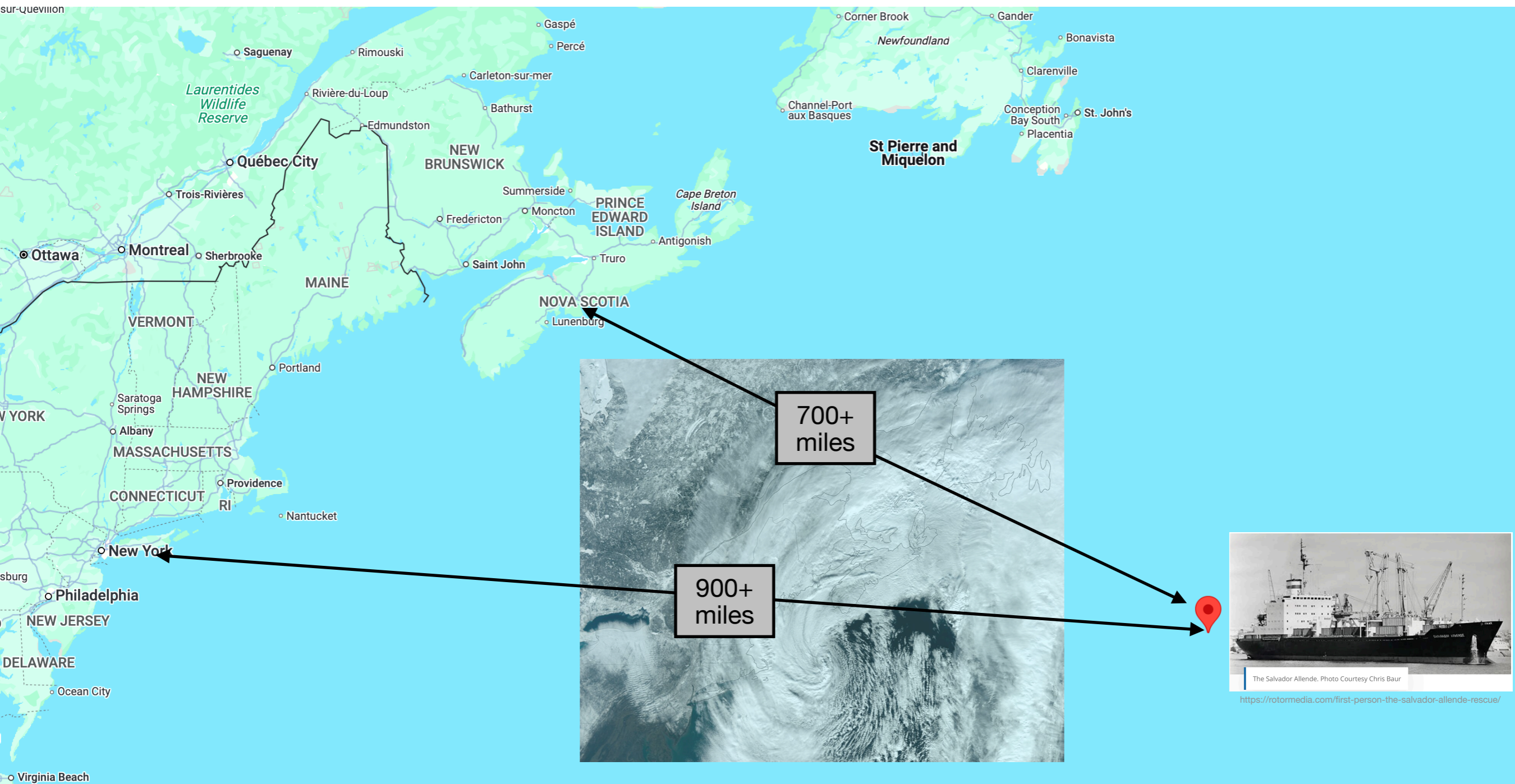
Development Safety: CH-53K Rotor and Drive System Analysis

Proactive Data Analysis: Developed methods to detect emerging safety issues using field data

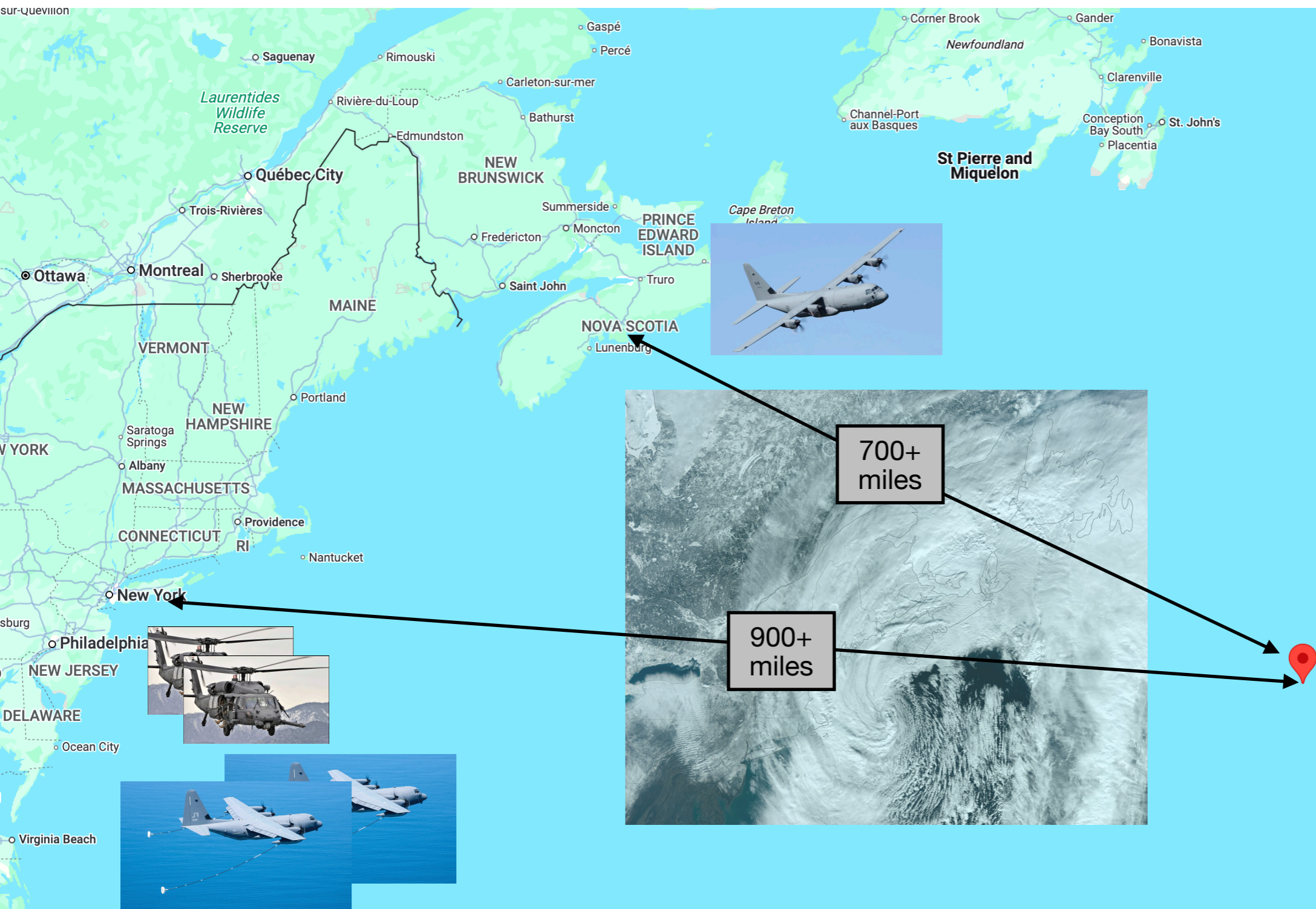


Human Factors in Aviation and Aerospace: Safety Culture chapter co-written with Peter Boyd

MV Salvadore Allende (Dec 1994)

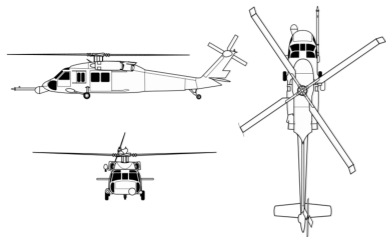


MV Salvadore Allende (Dec 1994)



You are the mission commander

Assets available include:



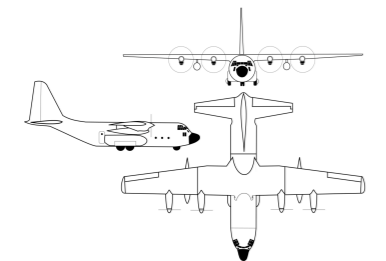
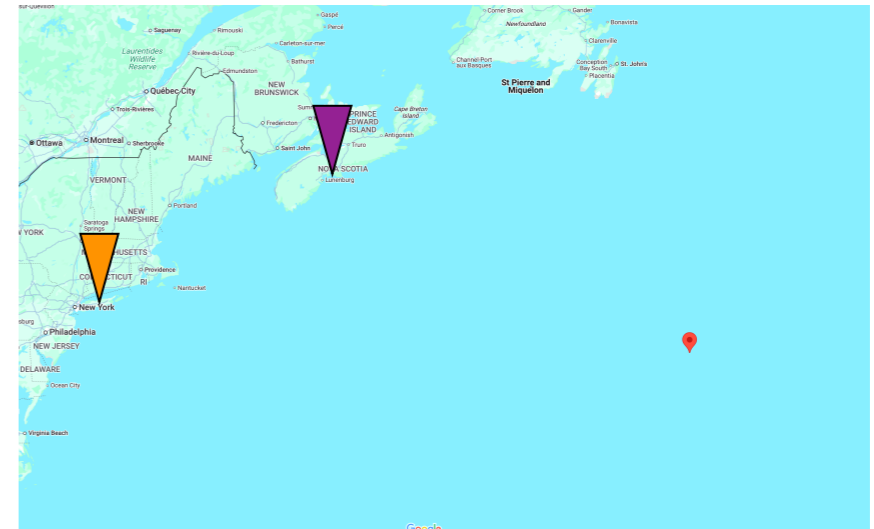
▼ HH-60G Pave Hawk

Crew: Pilot, Copilot, Flight Engineer, Pararescueman

Cruise: 155 kts

Range: 450 nm (4500 lbs ~3 hrs)

Aerial refueling capable (receive only)



▼ KC-130T AR Hercules

Crew: Pilot, Copilot, Navigator, Crew Chief, Boom Operators

Cruise: 295 kts

Refuel speed: 130 kts

Range: 12 hours

Payload: 30k lbs fuel



▼ RC-130 SAR Hercules

Crew: Pilot, Copilot, Navigator, Crew Chief, Rescue Swimmers

Cruise: 295 kts

Range: 12 hours

Aerial refueling capable (receive only)

You are the mission commander

Search area is at 39.22N, 49.54W

Weather:

STORM

971 MB (Standard = 1013.25)

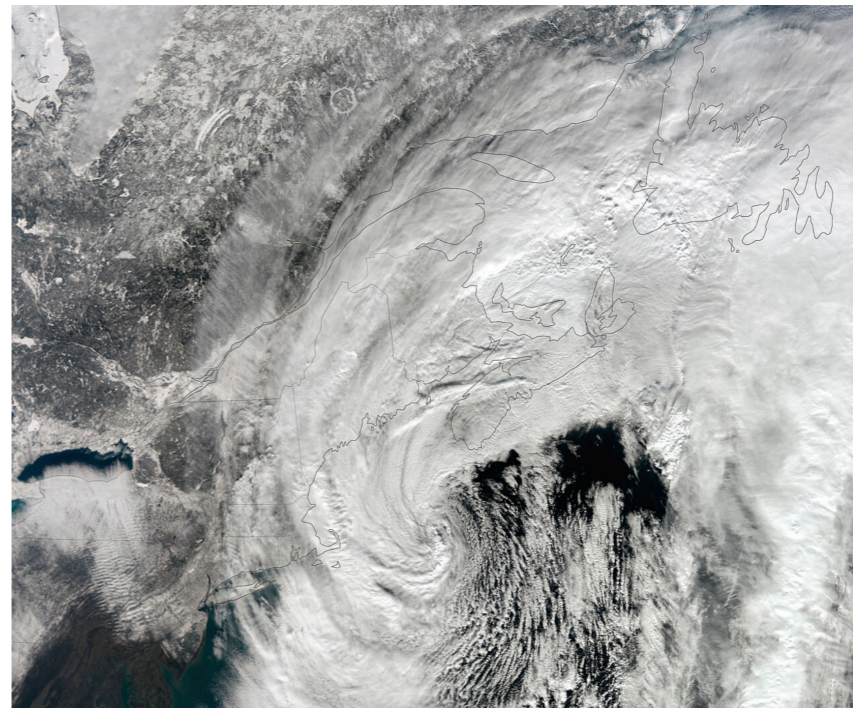
Centered 46N 52W

Moving SE at 20 knots

Winds 45 to 75 knots

Seas 18 to 36 feet within

480 miles over SW quadrant



https://en.wikipedia.org/wiki/February_2013_North_American_blizzard

CF SAR C130 reports severe storm conditions: Lightning, rain sleet and hail, gut-wrenching turbulence, ceilings are 1K feet or less. The co-pilot, navigator, and CBC news crew (onboard to document events) are all violently airsick.

They have spotted survivors and dropped them supplies

What would you consider when planning this mission?

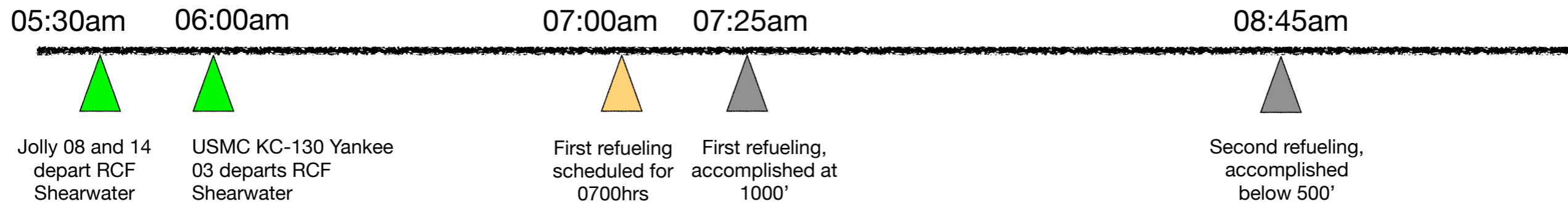
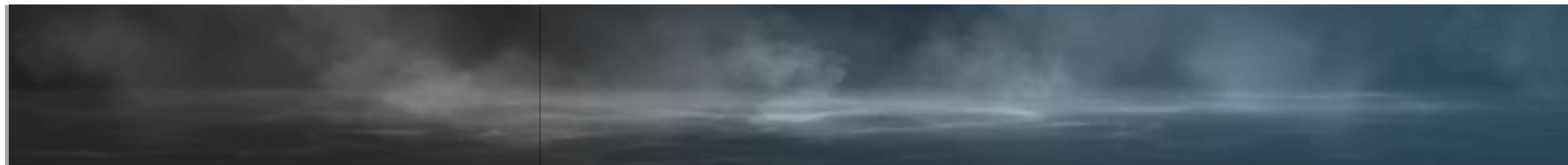
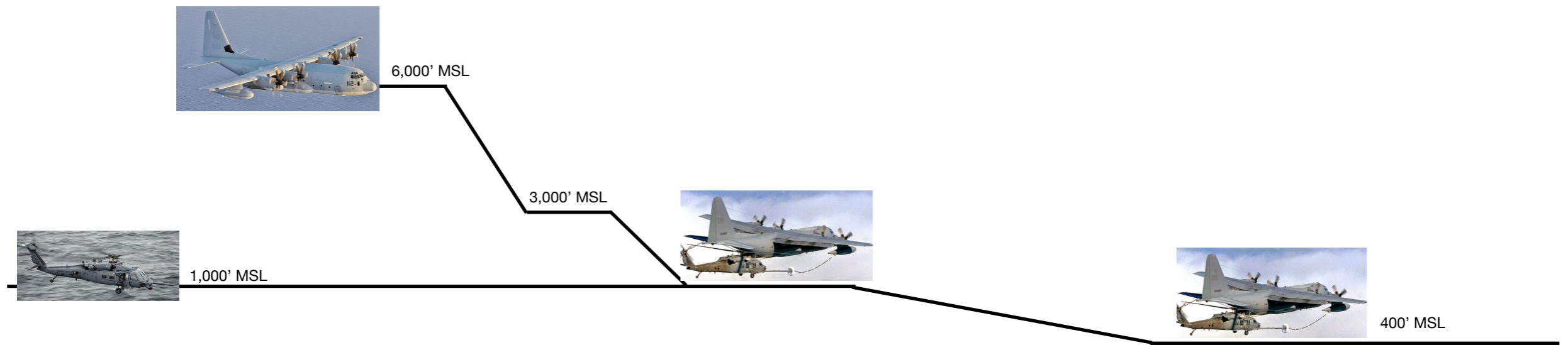
Aircrew

Aircraft

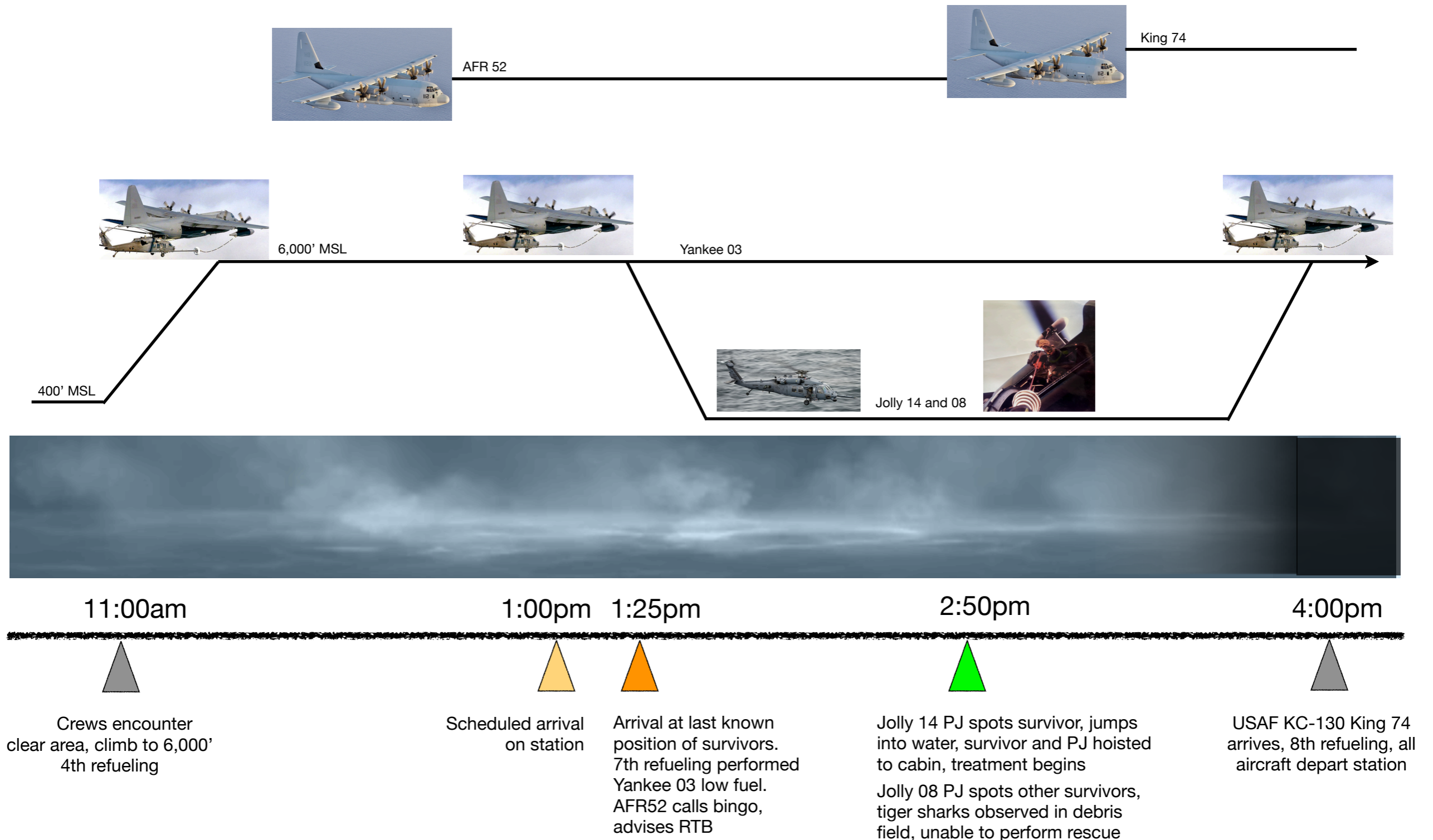
Weather and Overwater Environment

External and Internal Pressures

MV Salvadore Allende Rescue (Dec 1994)



MV Salvadore Allende Rescue (Dec 1994)



MV Salvadore Allende Rescue (Dec 1994)



Yankee 03



Jolly 14 and 08, King 74



Survivor transported to hospital, makes full recovery
Retrained as ships mechanic, never returned to sea

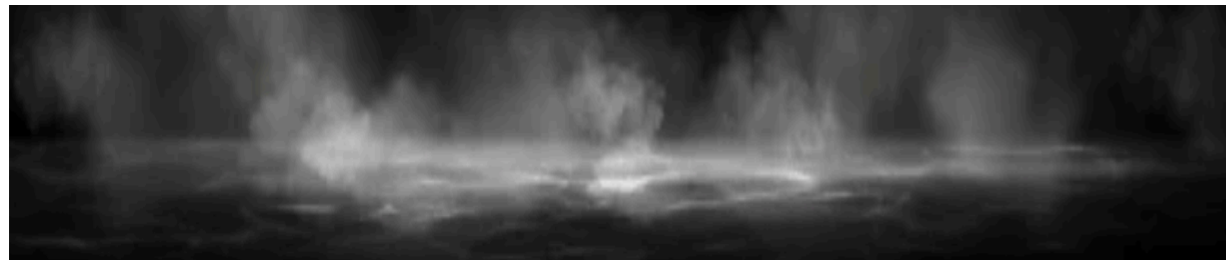
Yankee 03 pilot who refused to leave station retired 'to spend more time with his family'

Jolly crews recognized:

Setting HH-60 distance and endurance records

Sikorsky Rescue Award

Crew awarded New York State Medal of Valor



5:45 pm



King 74, Jolly 14 and 08 enter 'wall of black clouds'

8:40 pm



Rescuers arrive RCF Shearwater
Helicopters surrounded by news media
Survivor taken to local hospital
Crew members attend psychological debriefing

Aviation Risk Management

Principles:

- Accept no unnecessary risk
- Make risk decisions at the appropriate level
- Accept risks when benefits outweigh the costs
- Integrate risk management into planning at all levels

Process:

- Identify the Hazard
- Assess the Risk
- Mitigate the Risk

Tools: PAVE, IMSAFE, 3P, DECIDE processes

PAVE Checklist

FAA-H-8083-25C: Pilot's handbook of aeronautical knowledge, 2023

Four components to guide plan development and generate alternatives:

Pilot in Command

- IMSAFE checklist
- Ratings and currency
- Personal minimums

Aircraft Performance and Equipage

- Is this correct aircraft with correct equipment for mission
Fuel, payload, altitudes, oxygen/pressurization, TOaL distance?

EnVironment

- Weather: Ceiling, visibility, winds, icing, deterioration
- Terrain: Mountainous, overwater, arctic
- Experience with similar conditions

External Pressures

- Business appointment/person waiting at destination
- Desire to impress someone in the aircraft or on the ground
- Personal motivation and goal orientation

Operational Risk Management

3P Model (FAA)

- Perceive - Perceive the set of given circumstances for the flight
- Process - Process (evaluate) their impact on flight safety
- Perform - Perform (implement) the best course of action



OODA Loop (US Military)

Observe, Orient, Decide, Act

DECIDE Model (FAA)

- Detect (the problem)
- Estimate (the urgency to react)
- Choose (a course of action)
- Identify (solutions)
- Do (the necessary actions)
- Evaluate (the effect of the actions)

Captain Bill: Always be two decisions ahead of the aircraft

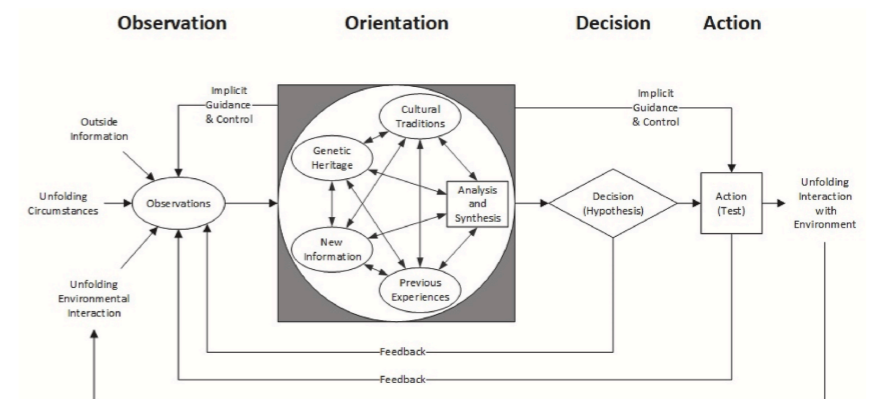
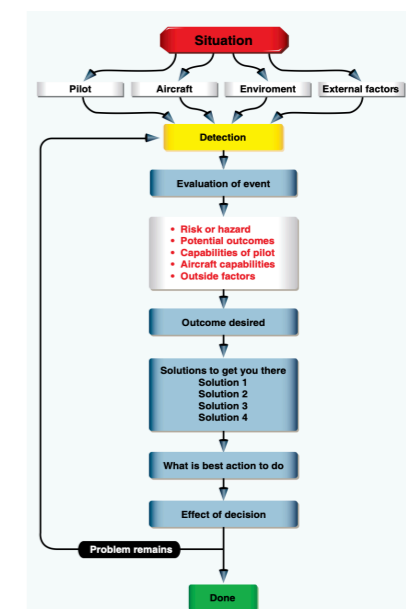


Fig. 1. John Boyd's OODA loop. Based on Boyd's sketch in 'The Essence of Winning and Losing', a briefing made to members of the military in 1995 and 1996. The layout used here mirrors that used in Bousquet's *The Scientific Way of War* (2009, pp. 187-188).



Hazardous Attitudes

Not validated with research; is still a good self-check tool

Anti-Authority

“Don’t tell me” Resent rules, regs, procedures, someone telling them what to do
Mom (or ATC) gives you an instruction and you do something different

Impulsivity

“Do it quickly” Act immediately with first thing that comes to mind
Dropping a knife and reaching to catch it on the way down

Invulnerability

“It can’t happen to me” Take chances and tolerate increased risk
Tipping your chair back thinking it wont fall

Macho / Marinisma

“I can do it” Take risks to impress others. (“Hold my beer”)
Taking risks during sports

Resignation

“What’s the use? Leave action to others, go along with unreasonable requests
Project seems to big to even begin

Also fight-flight-freeze response

The Dirty Dozen (from maintenance)



Federal Aviation Administration

Put Safety First and Minimize the 12 Common Causes of Mistakes in the Aviation Workplace



1 Lack of Communication

Failure to transmit, receive, or provide enough information to complete a task. Never assume anything.

Only 30% of verbal communication is received and understood by either side in a conversation. Others usually remember the first and last part of what you say.

Improve your communication—

- Say the most important things in the beginning and repeat them at the end.
- Use checklists.

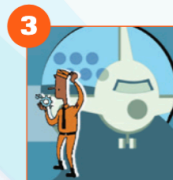


2 Complacency

Overconfidence from repeated experience performing a task.

Avoid the tendency to see what you expect to see—

- Expect to find errors.
- Don't sign it if you didn't do it.
- Use checklists.
- Learn from the mistakes of others.



3 Lack of Knowledge

Shortage of the training, information, and/or ability to successfully perform.

Don't guess, know—

- Use current manuals.
- Ask when you don't know.
- Participate in training.

Avoid These Common Causes of Mistakes in the Aviation Workplace



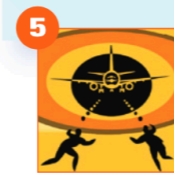
4 Distractions

Anything that draws your attention away from the task at hand.

Distractions are the #1 cause of forgetting things, including what has or has not been done in a maintenance task.

Get back in the groove after a distraction—

- Use checklists.
- Go back 3 steps when restarting the work.



5 Lack of Teamwork

Failure to work together to complete a shared goal.

Build solid teamwork—

- Discuss how a task should be done.
- Make sure everyone understands and agrees.
- Trust your teammates.



6 Fatigue

Physical or mental exhaustion threatening work performance.

Eliminate fatigue-related performance issues—

- Watch for symptoms of fatigue in yourself and others.
- Have others check your work.

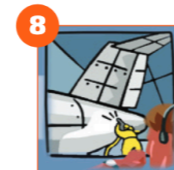


7 Lack of Resources

Not having enough people, equipment, documentation, time, parts, etc., to complete a task.

Improve supply and support—

- Order parts before they are required.
- Have a plan for pooling or loaning parts.



8 Pressure

Real or perceived forces demanding high-level job performance.

Reduce the burden of physical or mental distress—

- Communicate concerns.
- Ask for extra help.
- Put safety first.



9 Lack of Assertiveness

Failure to speak up or document concerns about instructions, orders, or the actions of others.

Express your feelings, opinions, beliefs, and needs in a positive, productive manner—

- Express concerns but offer positive solutions.
- Resolve one issue before addressing another.

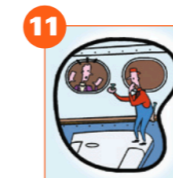


10 Stress

A physical, chemical, or emotional factor that causes physical or mental tension.

Manage stress before it affects your work—

- Take a rational approach to problem solving.
- Take a short break when needed.
- Discuss the problem with someone who can help.



11 Lack of Awareness

Failure to recognize a situation, understand what it is, and predict the possible results.

See the whole picture—

- Make sure there are no conflicts with an existing repair or modifications.
- Fully understand the procedures needed to complete a task.



12 Norms

Expected, yet unwritten, rules of behavior.

Help maintain a positive environment with your good attitude and work habits—

- Existing norms don't make procedures right.
- Follow good safety procedures.
- Identify and eliminate negative norms.

Visit us at:
www.FAASafety.gov
Your Aviation Safety Web Site

Questions?

IMSAFE

IMSAFE

Illness

Medication - prescription and over-the-counter

Stress - are you overly worried/angry/happy about anything?

Alcohol - legal limit in cockpit is within 8 hours and 0.04

Fatigue - sufficient sleep, adequate nutrition/hydration

Emotion - recent extremely upsetting events