Risk Management Lessons from the Aviation Industry

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Disclaimer

- I am not an aviation risk management expert (sad but true)
- I did not come up with all of this information myself
- Most of this can be found in the FAA's Risk Management Handbook : FAA-H-8083-2

Tenerife, Canary Islands

- 1977 -Two 747s
- Deadliest aviation accident in history
- 583 dead 61 survivors
- Breakdown in communication and an attitude of invincibility

CRM

Crew Resource Management

- Human Resources
- Hardware
- Information

Aeronautical Decision Making

- Is a systematic approach to the mental process used by airplane pilots to consistently determine the best course of action in response to a given set of circumstances.

Decision Making Process

- define the problem
- choose a course of action
- implement the decision
- evaluate the outcome

"Say … what's a mountain goat doing way up here in a cloud bank?"

DECIDE

Detect a change (or lack there of)

Estimate the need to counteract the change

Choose a desirable outcome

Identify actions that would result in successful results

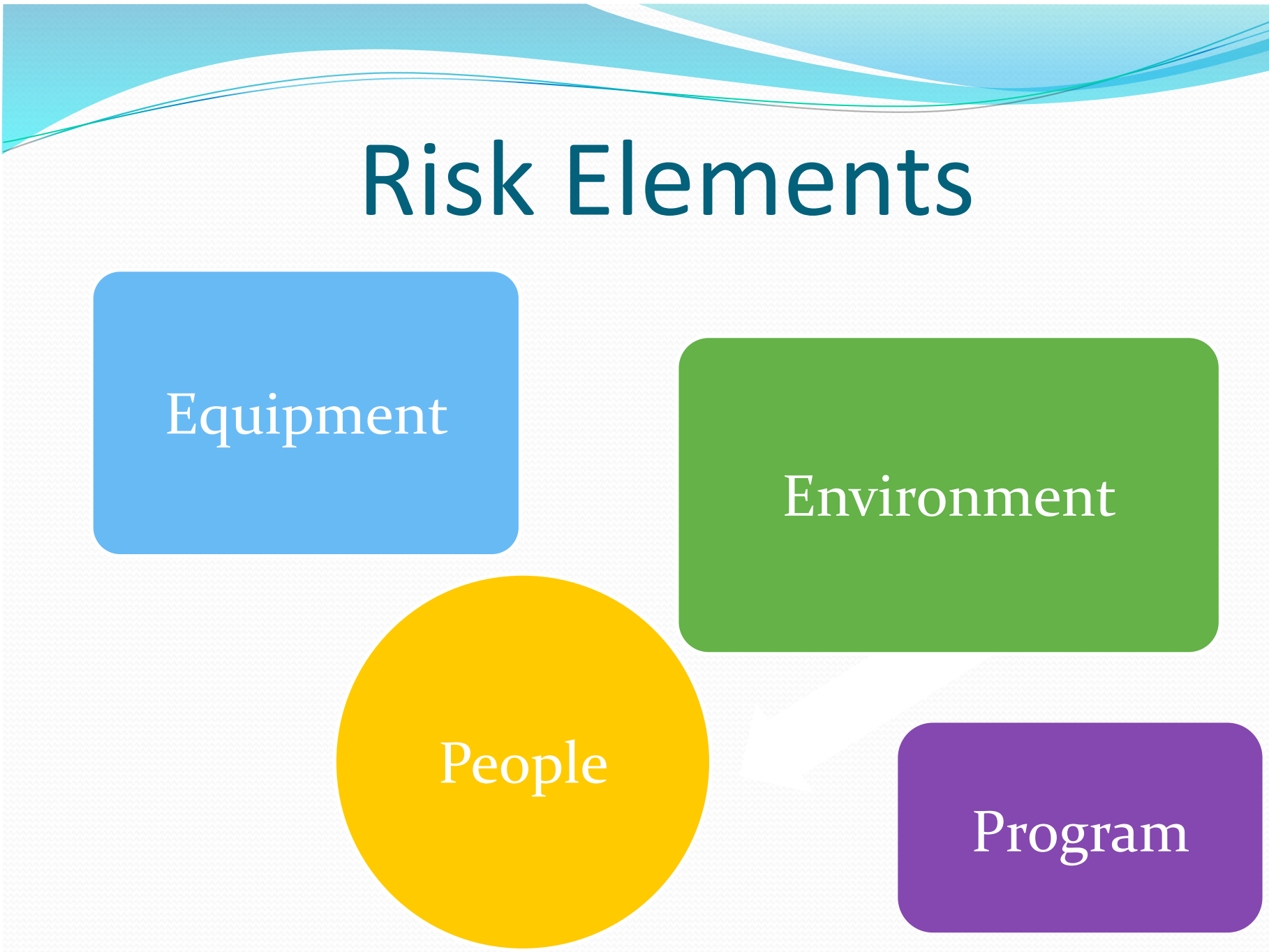
Evaluate the effect of the action

Risk Management

There are four common risk elements associated with every flight/trip.

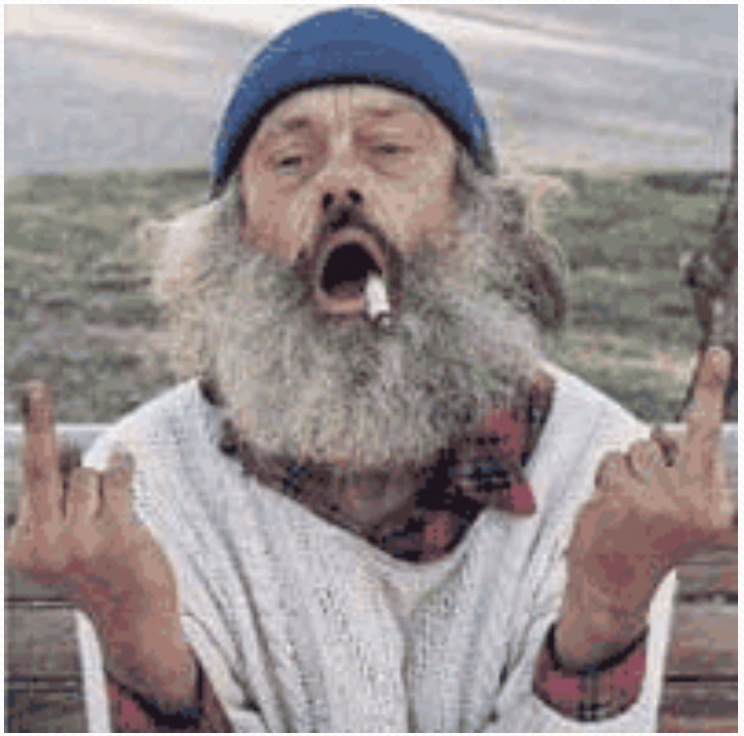
They are… ???

Risk Elements



Pilot/People

- Competency
- Health
- Fatigue
- Mental/Physical State
- Etc.



Airplane/Equipment

- Performance
- Accessories
- Airworthiness
- Age
- Functionality

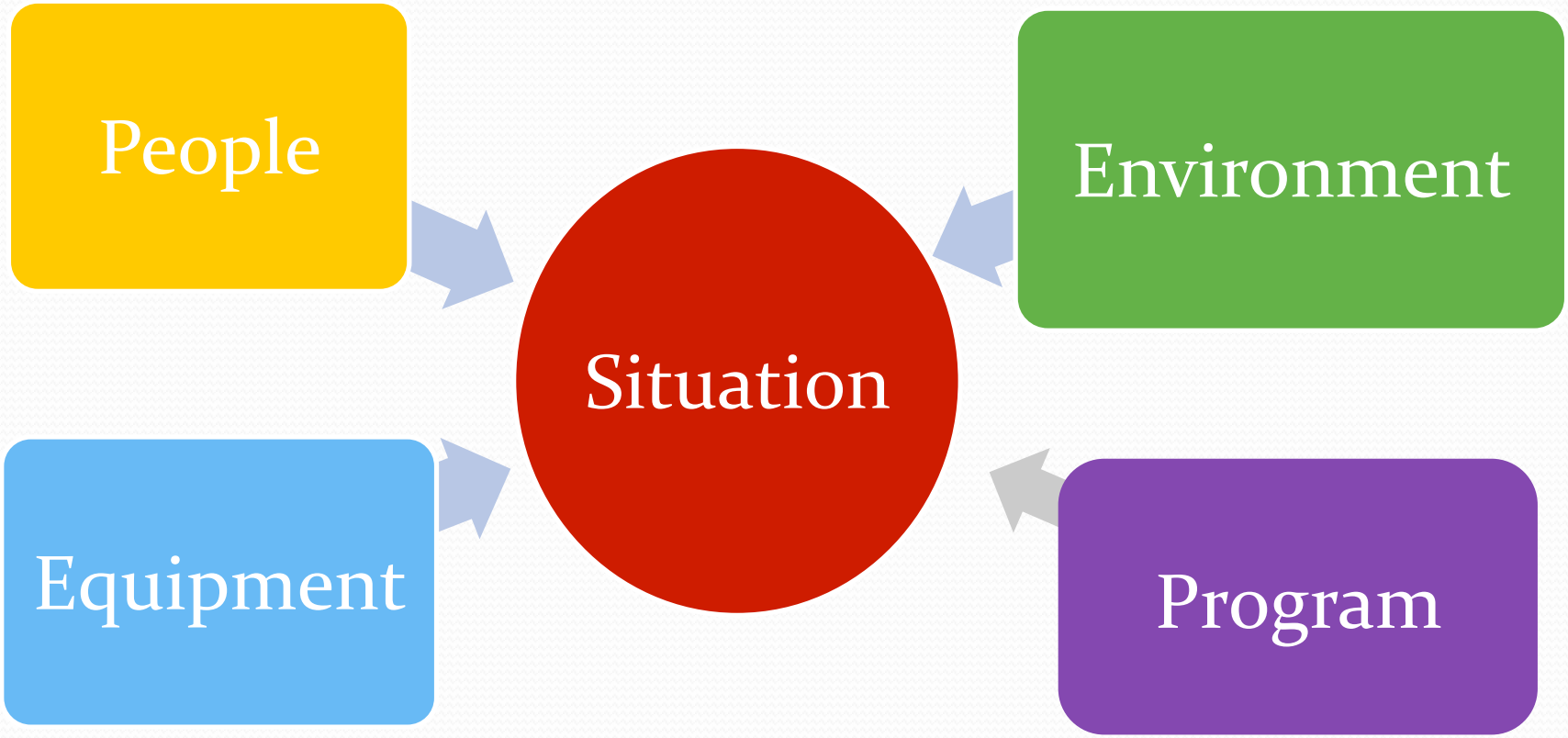
Environment

- Weather
- Remoteness
- Terrain
- Depth
- Currents

Mission/Program

- Purpose of…
- Outside Pressures
- Get-there-itis
- To Complex
- To Challenging

Risk Elements



Situation

In order to maintain situational awareness, an accurate perception must be attained of how the pilot, airplane, environment, and operation combine to affect the flight.

Decision Making Factors

- Pilot/Leader Self-Assessment
- Recognition of the Hazardous Attitudes
- Workload Management
- Operational Pitfalls

Pilot Self Assessment

The I'M SAFE Checklist

- Illness
- Medication
- Stress
- Alcohol
- Fatigue
- Eating

Hazardous Attitudes	Antidote
Anti-Authority – “Don’t tell me”	Follow the rules, they are usually right
Impulsivity – “Do it quickly”	Not so fast, think before you act
Invulnerability – “It won’t happen to me”	It could happen to me
Macho – “I can do it”	Taking chances is foolish
Resignation – “what’s the use”	I’m not helpless, I can make a difference

- Certain attitudes can impinge on the pilot’s ability to make sound decisions before and during flight operations

Workload Management

- Staying ahead of the plane
- N2t – Next two things
- Aviate, Navigate, Communicate
- Lead, Deal, Reach-Out

Operational Pitfalls

- Peer Pressure
- Tunnel Vision
- Get-there-itis
- Duck-Under Syndrome
- Scud Running
- Flying outside the Envelope
- Neglect of Flight Planning, Preflight Inspections, and Checklist

Ahhh…. Checklist!

Checklist

- Incredibly Handy
- Often Resisted
- Why???

Risk Assessment Matrix

----------Severity----------

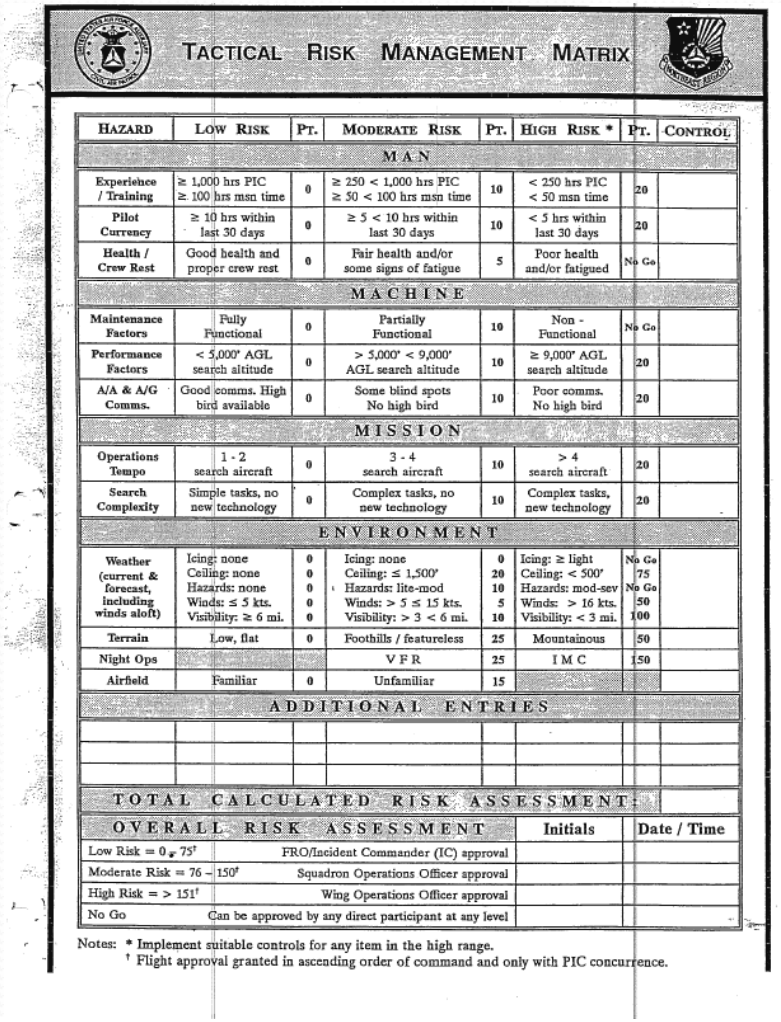
Likelihood	Catastrophic	Critical	Marginal	Negligible
Probable	HIGH	HIGH	SERIOUS	MEDIUM
Occasional	HIGH	SERIOUS	MEDIUM	LOW
Remote	SERIOUS	MEDIUM	MEDIUM	LOW
Improbable	MEDIUM	MEDIUM	MEDIUM	LOW

Aviation Risk Assessment Matrix

Civil Air Patrol Model

- Exercise:

  Take handouts and using this matrix and the next example from the sailing industry work with two other partners to develop a rough outline of one for your own program



TACTICAL RISK MANAGEMENT MATRIX

HAZARD	LOW RISK	PT.	MODERATE RISK	PT.	HIGH RISK *	PT.	CONTROL
MAN							
Experience / Training	≥ 1,000 hrs PIC ≥ 100 hrs msn time	0	≥ 250 < 1,000 hrs PIC ≥ 50 < 100 hrs msn time	10	< 250 hrs PIC < 50 msn time	20	
Pilot Currency	≥ 10 hrs within last 30 days	0	≥ 5 < 10 hrs within last 30 days	10	< 5 hrs within last 30 days	20	
Health / Crew Rest	Good health and proper crew rest	0	Fair health and/or some signs of fatigue	5	Poor health and/or fatigued	No Go	
MACHINE							
Maintenance Factors	Fully Functional	0	Partially Functional	10	Non - Functional	No Go	
Performance Factors	< 5,000' AGL search altitude	0	> 5,000' < 9,000' AGL search altitude	10	≥ 9,000' AGL search altitude	20	
A/A & A/G Comms.	Good comms. High bird available	0	Some blind spots No high bird	10	Poor comms. No high bird	20	
MISSION							
Operations Tempo	1 - 2 search aircraft	0	3 - 4 search aircraft	10	> 4 search aircraft	20	
Search Complexity	Simple tasks, no new technology	0	Complex tasks, no new technology	10	Complex tasks, new technology	20	
ENVIRONMENT							
Weather (current & forecast, including winds aloft)	Icing: none Ceiling: none Hazards: none Winds: ≤ 5 kts. Visibility: ≥ 6 mi.	0 0 0 0 0	Icing: none Ceiling: ≤ 1,500' Hazards: lite-mod Winds: > 5 ≤ 15 kts. Visibility: > 3 < 6 mi.	0 20 10 5 10	Icing: ≥ light Ceiling: < 500' Hazards: mod-sev Winds: > 16 kts. Visibility: < 3 mi.	No Go 75 No Go 50 100	
Terrain	Low, flat	0	Foothills / featureless	25	Mountainous	50	
Night Ops			VFR	25	IMC	150	
Airfield	Familiar	0	Unfamiliar	15			
ADDITIONAL ENTRIES							
TOTAL CALCULATED RISK ASSESSMENT							

OVERALL RISK ASSESSMENT		Initials	Date / Time
Low Risk = 0 - 75†	FRO/Incident Commander (IC) approval		
Moderate Risk = 76 – 150†	Squadron Operations Officer approval		
High Risk = > 151†	Wing Operations Officer approval		
No Go	Can be approved by any direct participant at any level		

Notes: * Implement suitable controls for any item in the high range.
† Flight approval granted in ascending order of command and only with PIC concurrence.

Sample Risk Assessment Matrix

created by Walter Rybka of the US Brig Niagara

Operations Risk Assessment

1. Human Factors

	Factor/ Hazard	Low Risk	Pt.	Moderate Risk	Pt.	High Risk	Pt.
CAPTAIN	Experience	>5 yrs. command time	X	2-5 years		First Command	
	Training	License higher than required	X	Minimum license		Unlicensed or new min. license	
	Time in type	Previous season in same ship	X	Previous time in similar		New to this rig	
	Health	Athletic level of fitness	X	Health ok- but sea legs not current		Illness	
	Rest	Well rested	X	Some fatigue		Very tired	
OFFICERS	Experience	>5 yrs. and some command time		2-5 years	X	First-time watch officer	
	Training	License higher than required		New and minimum license	X	Unlicensed or low license level	
	Time in type	Previous season in same ship	X	Previous time in similar	X	New to this rig	
	Health	Athletic level of fitness	X	Health ok- but sea legs not current		Illness	
	Rest	Well rested	X	Some fatigue		Very tired	
MEDICAL PERSONNEL	Level of Training	Doctor. Or either an RN, PA, or Paramedic with standing orders from doctor on shore		E.M.T., W.F.R., U.S.C.G. Med. P.I.C. or Med. Care Provider	X	Basic First Aid only	
PROFESSIONAL CREW (AB's, OS's)	Experience	> 3 yrs. Time	X	1-3 years		< 1 year	
	Time in type	Previous season same ship	X	Previous time in similar		New to this rig	
	Health	Athletic Level of fitness	X	Health OK, but sea legs not current		Illness	
	Rest	Well rested		Some fatigue	X	Very tired	
	Ratio- Crew to Trainees	1 to 3 or less		4 to 8	X	Over 8	
TRAINEES	Age	20 overnight – 40 daysails		16-20 overnight 40-60 daysails	X	<16 overnight <60 daysails	
	Prior Training	Previous Sailing Experience		Shoreside Training		Totally inexperienced	X
	Health / Rest	Good Health / Well Rested		Tair Health / Some Fatigue	X	Sick or injured / exhausted	

2. Mission and Environmental Considerations

Factor/ Hazard	Low Risk	Pt.	Moderate Risk	Pt.	High Risk	Pt.
Circadian Timing	Day sails		Passage-making 24hr/ day ops.	X	Unscheduled night operations	
Schedule	Plenty of con-tingency time	X	Adequate but little slack		Unrealistic	
Voyage length	Day sails		2-5 days	X	Longer than a week	
Route	Protected waters		partially protected or coastwise	X	Oceans	
Familiarity	Regular route recent experience	X	Have been here before- long ago		New	
Traffic	Low volume/ recreational	X			Large vessel lane or fishing grounds	
Navigational Hazards	Open water		Some rocks & shoals, but ample room, and well marked	X	Congested area	
Geographic	Weather shore/ alt. to leeward		Exposed shore, shelter available	X	Lee shore, no good ports	
Time to shelter	Less than 4 hrs.	X	4-24 hours		Over 24 hours	
Visibility	Clear		Haze, vis. <5 NM.		Fog/ Heavy rain	
Season	Summer	X	Spring or Fall, long nights/ cold		Winter/ hurricane	
Weather forecast	Favorable Beaufort Force 1-4	X	Won't be too bad, Beaufort 5-6		Batten down, Beaufort >6	

Thank You!

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