

NOAA SMALL BOAT COMPONENT STUDENT MANUAL

June 2018



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THE NOAA COMPONENT: STUDENT MANUAL

Prepared by the NOAA Small Boat Program

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Tentative Training Schedule

(Your instructor may choose to alter times and delivery)

Morning Session

08:30 Introduction, Registration, Schedule, & Course Objectives

9:00 – 10:30 Lesson Plan 1: NOAA Policy.
Lecture and discussion
Class Exercises

10:30 10:45 Break

10:45 – 12:00 Lesson Plan 2: Risk Analysis
Lecture and Discussion
Class Exercises

12:00 13:00 **LUNCH**

Afternoon Session

13:15 -15:15. Lesson Plan 3: Team Coordination
Lecture and Discussion
Class Exercises:
Individual and Small Group

15:15 – 15:30 Break

15:30 -16:30 Written Test
Review
Critique

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Glossary of Acronyms

AA	Line Office Assistant Administrator
ABYC	American Boat and Yacht Council
AED	Automated External Defibrillator
ASBE	Annual Small Boat Evaluation
ATE	Annual Trailer Examination
BS&S	Boating Safety and Seamanship
COMDTINST	USCG Commandant Instruction
COC	Chain of Command
CPR	Cardio-Pulmonary Resuscitation
DECIDE	Detect, Estimate, Choose, Identify, Do, Evaluate
EPIRB	Emergency Position-Indication Radio Beacon
FRB	Fast Rescue Boat
FTE	Full Time Equivalent
GAR	Green, Amber, Red (Risk Management)
IMO	International Maritime Organization
IAW	In Accordance With
LO	Line Office
LOSBO	Line Office Small Boat Officer
MOCC	Motorboat Operator Certification Course
NAMS	National Association of Marine Surveyors
NAO	NOAA Administrative Order
NASBLA	National Association of State Boating Law Administrators
NC	NOAA Corps
NMAO	NOAA Marine and Aviation Operations (same as OMAO)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NSBP	NOAA Small Boat Program
NWS	National Weather Service
OEM	Original Equipment Manufacturer
OIC	Operator in Charge

OMAO	Office of Marine and Aviation Operations (same as NMAO)
OOD	Officer of the Deck
ORM	Operational Risk Management
PFD	Personal Flotation Device
PM	Program Manager
PPE	Personal Protective Equipment
PQS	Personnel Qualification Standards
SAMS	Society of Accredited Marine Surveyors
SAR	Search and Rescue
SBE	Small Boat Engineer
SBEX	Small Boat Examination
SBO	Small Boat Operator
SBOM	Small Boat Operations Manual (same as VOM)
SBP	Small Boat Program
SBSB	Small Boat Safety Board
SBPM	Small Boat Program Manager
SECO	Safety and Environmental Compliance Office
SEOPS	Special Emergency Operation Procedures
SOLAS	Safety of Life at Sea
SOP	Standard Operating Procedure
SRV	Small Research Vessel
SSBP	Supplemental Small Boat Policy
STCW	Standards of Training, Certification and Watchkeeping
TCT	Team Coordination Training
USCG	United States Coast Guard
USCG Aux.	United States Coast Guard Auxiliary
VOC	Vessel Operations Coordinator
VOM	Vessel Operations Manual (same as SBOM)
VP	Vessel Policy
VPC	Vessel Program Coordinator

MODULE 1: NOAA SMALL BOAT POLICY

Refer to the NOAA Small Boat Standards and Procedures Manual

All small boat operations come with a level of inherent risk. Operating boats in support of NOAA's mission can often elevate exposure and increase risk. One proven approach to help mitigate or reduce these risks is by employing a uniform policy across all line offices within the agency. Even though small boats have conducted years of successful safe operations, incidents and serious mishaps still occur. The basis for NOAA Small Boat Policy is to improve safety, enhance professionalism and increase mission success.

Policy Origin (section 1.01)

Prior to 2002, NOAA had no agency-wide small boat policy, despite the unique risks of its operations, and the size of the fleet.

Recognizing that other federal agencies have such policies, Vice Admiral Conrad Lautenbacher decided in 2002 that NOAA will "establish policies and procedures to ensure a safe, small boat program to support NOAA's program needs."

This created the Small Boat Safety Board (SBSB), who in turn promulgated the Small Boat Standards and Procedures Manual (SBSPM).

Intent of Policy

NOAA's small boat missions involve operations in many kinds of hazards – in shallow water, surf, near rocks and marine mammals, in bad weather and cold water. Despite good success, NOAA has also suffered mishaps, including: Personal injury and death; equipment damage; environmental damage; mission failures; violation of pertinent regulations; and legal liability

This policy aims to mitigate risk by addressing important issues about:

- a) Boats: Who is authorized to Operate NOAA Small boats; how to acquire small boats; how to properly alter small boats; equipment required aboard small boats; and inspection of small boats.
- b) Operators and Crewmembers: The necessity of the chain of command; what training is required; and how to ensure safe manning.
- c) Boat Operations: How to create procedures; how to conduct briefings; how to create and update float plans; how to report accidents and incidents; and how incident investigation works.

The SBSPM is a living document that can be amended as new circumstances arise and new lessons are learned. Comments and contributions from small boat operators (SBOs) and crewmembers are both required by the policy and important to its success.

Scope of Policy (section 1.02)

The policy applies to all NOAA personnel operating boats, all boats owned by NOAA, and everyone aboard a boat operated by NOAA. All NOAA small boats must only be used for official government purpose.

Roles & Responsibilities (section 2.01)

The Manual identified responsibilities for the role designations listed below:

- a) Director OMAO
- b) Small Boat Safety Board (SBSB)
- c) Small Boat Program Manager (SBPM)
- d) Line Office Small Boat Officer (LOSBO)
- e) Program Director (or other responsible management position)
- f) Vessel Program Coordinator: (VPC)
- g) Vessel Operations Coordinator (VOC)
- h) Operator in Charge (OIC)
- i) Small Boat Operator (SBO)
- j) Crewmember
- k) Persons in Addition to Crewmembers

General Policies (section 3)

- a) Supplemental Small Boat Policy (section 3.01)

The purpose of Supplemental Small Boat Policies is to create policy on the boat level, the lab/program level, or the Line Office level.

- b) Small Boat Operations Manual (SBOM) (section 3.01)

All small boats are required to create a boat-specific Operations Manual. A template for this manual can be found on the <http://www.sbp.noaa.gov/>. This manual is boat specific, and should include:

- I. The Baseline and Mission Based risk assessments
- II. Technical information about the boat
- III. Information about live load capacity
- IV. Operational parameters

V. Start up and Shut down procedures

Operators and VOCs should create local policy that will increase safety aboard their specific boats. This approach takes into account local knowledge and experience regarding local operational risks that may not exist elsewhere (ex: localized shallow water areas, fish trap areas), and issues that are common to boats in that region (ex: localized weather, conditions, or mission types). A Supplemental Small Boat Policy cannot diminish the requirements of the SBSPM.

Classification of Small Boats (section 4.01)

Small Boat Category	Definition
Class A	Less than 16 feet overall length
Class I	16 to less than 26 feet overall length
Class II	26 to less than 40 feet overall length
Class III	40 to 65 feet overall length
SRV	Greater than 65 feet overall length but less than 300 gross tons

Operator Credentials and Training Requirements Overview (section 6.1)

- a) Class A, I, and II Boat Operators:
 - I. USCG Auxiliary Boating Skills and Seamanship or Equivalent
 - II. NOAA Component Course
 - III. Personal Qualification Standards
 - IV. First Aid, CPR, AED Training
 - V. Program-specific training

- b) Class III and SRV Boat Operators:
 - I. Current appropriate USCG License or active Uniformed Service Officer of the Deck
 - II. NOAA Component Course
 - III. Personnel Qualification Standard
 - IV. First Aid, CPR, AED Training
 - V. Program-specific training

Personal Qualification Standards (PQS) (section 6.02.c)

All SBO candidates must demonstrate proficiency, as determined by the VOC, to be designated as a SBO. The class of boat, operating area(s), and the mission is taken into account when determining an appropriate level of experience.

Personal Qualification Standards evaluation must include, at minimum:

- a) Demonstrate knowledge of small boat characteristics, limitations, and equipment
- b) Demonstrate proficiency of small boat handling skills, based on mission requirements
- c) Demonstrate proficiency in communicating risk management

Boat Operators must successfully complete a Personal Qualification Standards process with their VOC (or designee) for each type of mission and for each type of small boat.

Template Personal Qualification Standard checklists can be found on the SBP website, with separate forms for [Class A and Class I boats](#), and for [Class II boats](#).

02. Mission Planning Requirements: (section 8)

Mission planning is a mandatory procedure for all trips, whether planned or unplanned. The major elements of mission planning are:

- a) Float plan
- b) Small boat equipment inspection and boat inspection
- c) Start-Up Checklist
- d) Mission and Safety Orientation Briefing
- e) GAR Risk Analysis – update float plan
- f) Underway equipment checks, weather checks, and updates to the float plan
- g) Post Mission float plan closure, shut-down checklists, and Clean up procedures

Lifesaving Equipment and Small Boat Equipment (section 10)

NOAA boats must carry appropriate communication, navigation, lifesaving, and emergency equipment. Minimum lifesaving and equipment requirements are determined by both the operational area and type of operation. All equipment is subject to inspection and must be stored in serviceable condition. Refer to tables 1 to 4 in the SBSPM section 10 for minimum lifesaving and equipment requirements.

Emergency Readiness (section 11)

Boats operate in dynamic conditions, which can create unique risks. The safety of personnel and boat integrity must be the highest priority of operators and crew. The hazards presented by the marine environment, weather, and mission operations are dynamic and often unpredictable. It is critical that all personnel are prepared to respond to emergency situations.

The nature of the NOAA small boat fleet presents additional challenges associated with the diversity of platforms, onboard resources, frequency of use, rotation of crews, and the skills and handling of embarked mission personnel.

Effective emergency response under adverse conditions is best achieved through a planned progression of frequent training exercises, pre-mission briefing, and underway drills. These

efforts provide opportunities to educate, practice, and critique standard response procedures and review the use of onboard resources and emergency gear.

Acquiring Boats (section 12)

The policy seeks to standardize the method by which NOAA procures or accepts transfers of small boats. The policy requires Program Directors, VOC and LOSBO review the suitability of a new or used small boat before initiating the acquisition of a small boat. This includes both new constructions, as well as used, surplus, or transferred acquisitions. The policy also requires that when acquiring a new boat a cost/mission analysis be conducted.

Visual Identification and Registration (section 13)

A uniform identification scheme is necessary to develop and promote public recognition of NOAA boat activities. NOAA owned boats must be registered with the SBP and entered into the Vessel Inventory Management (VIM) <https://floatplan.noaa.gov/vim> database.

Inspection of Boats (section 14)

Inspections are required for all NOAA boats. Below are the various inspections:

- a) **ASBE (annual inspections)** – All active Class A, I, and II boats are required to undergo an Annual Small Boat Evaluation (ASBE) each year.
- b) **SBEX (Biennial and Triennial Inspections)** – All active Class I, and II boats are required to undergo a Small Boat Examination (SBEX). An SBEX is a thorough examination of a small boat by the Small Boat Program, *or* by a surveyor whose certification meets the policy set in the Small Boat Standards & Procedures Manual.
- c) **Inspection for Class III and SRVs**
Class III and SRVs must to be inspected annually by arrangement with a Small Boat Program Inspector.
- d) **Inspection for Trailers**
Boat trailers also must be inspected. This should be done by the VOC or designee using the Annual Trailer Evaluation Checklist (NOAA Form 57-19-02)

“No Sail” Order

If an inspection reveal a significant risk to personnel, property, or the marine environment, the OIC, VOC, or LOSBO can issue a “No Sail” order which prohibit a boat from being operated until the problems are fixed.

Conclusion

Boat operations have and will continue to make a major contribution to NOAA's mission. The implementation of a unified small boat policy will improve overall safety and the effectiveness of operations. The results of such policies at other government agencies (USCG, USFWS, USACE...) and institutions have shown that a unified Small Boat Program enhances overall operations and reduces mishaps.

VOCs, OICs, SBOs, and crewmembers play a vital role implementing NOAA policy and improving the Small Boat Program.

MODULE 2: PROCEDURES FOR RISK MANAGEMENT and ANALYSIS

As said in the Policy section, all small boat operations come with a level of inherent risk. Using a well-defined method of Operational Risk Management (ORM), especially at the field level when performed by SBOs and crewmembers, has been shown to be an effective method for reducing mishaps in small boat operations.

For NOAA the management of risk has two main impetuses. The first is obviously to prevent harm to life and property. The second reason to use robust ORM is to ensure **MISSION SUCCESS**.

Origin of Operational Risk Management

The United States Coast Guard introduced ORM methods nationwide in 1992. In the five year period 1994 – 1998, USCG small boat and cutter mishap rates were reduced dramatically compared to the rates for 1987 – 1992.

- a. 1994: 40% reduction
- b. 1996: 66% reduction
- c. 1998: 71% reduction

These are remarkable results. According to a USCG Commandant's Instruction (3500.3, 23 NOV 1999), using formal, uniform, "bottom up" risk assessments performed by SBOs as part of their mission planning "shows these principles are effective, and the tools used are valid."

The Key Principals of Operational Risk Management

There are four basic principles about risk that should be borne in mind when assessing operational risk, and making risk-based decisions:

1. **Accept no unnecessary risk.** Do not accept unnecessary risk. Taking unnecessary risks not related to successful mission completion is unacceptable.
2. **Accept necessary risk if benefits outweigh the cost.** This implies a "Cost/Benefit" analysis. In NOAA operations, if the benefit of conducting the operation outweighs the cost, it's probably worth doing. This analysis becomes more critical as the risk involved in an operation increases. Even in life and death situations, one must estimate the cost and decide if we are willing to pay it.
3. **Make risk decisions at the appropriate level.** Risk-based decisions should be made by the individual(s) with the appropriate level of knowledge and authority. Prudence, experience, judgment, intuition, and situational awareness of the

person in charge of an operation are critical elements in making effective risk management decisions. Making decisions at the appropriate level avoids having people not directly at risk, or have a bias view of the operation, sending others into danger; it also avoids the pressure that may come from the “client,” the press, or a crewmember focusing only on benefits, and ignoring potential costs.

4. **Risk assessment is equally important in planning as in execution.** Anticipate and manage risk by planning. Risks can be mitigated or eliminated when they are identified early. Integrate risk management into all operations and at every level of planning. Involve personnel who will be performing these duties or tasks.

Three Elements of Risk

- a. **Probability** – The chance that a given event will occur. Probability can be expressed as a percentage, ratio, number, etc.
- b. **Exposure** – Factor that can increase or decrease probability, usually expressed as numbers of cycles, duration of mission, number of people involved.

The main point is this: the more times the same mission or task is repeated, without applying risk mitigation, the higher the probability that the unwanted event (the hazard) will occur.

- i. **Exposure = Number of Cycles:** how many times the boat repeats *the same* mission

Murphy’s Law says that, “Whatever can go wrong, will.” The Law of Large Numbers says pretty much the same thing, only adding the phrase, “...if we do whatever we’re doing enough times.”

This is a simple concept that we see in life all the time. For example, if we get underway in a boat to go get fuel in a harbor, and there is some chance we might run over debris in the water during our trip, then the more times we go fuel the boat, the more likely we’re eventually going to run over something – even though the probability of running over something is the same each day.

- ii. **Exposure = Duration:** how long the mission lasts

There is no easy mathematical formula for exactly measuring the effect of “duration,” or time exposure, on probability. But from a practical standpoint it seems obvious that:

- Prolonging our exposure to danger seems like a bad idea
- Things change over time while underway in a boat.

All kinds of things change, for instance, during the course of a 6 hour mission in moderate weather conditions. The weather may change, and lighting conditions certainly do. The crew will change: they can get tired, burned out, hungry, bored, or irritable. The boat changes. It gets six hours older, consumes fuel, and things may break.

These things can change the probability of experiencing the unwanted outcome identified in the risk analysis.

More important, they highlight why SBOs and crewmembers need to monitor the mission in terms of risk. Over time, the original risk assessment may no longer be valid.

- iii. **Exposure = Number of People Involved:** how many people aboard, or how many boats.

The number of people involved in the mission, and therefore exposed to risk, can have both increasing and decreasing effects on Probability.

1. Increasing Effects of Adding People

From a common sense point of view, it seems that increasing the number of people exposed to danger increases the chances that something bad will happen, and often does in certain situations.

But changing the number of people has two obvious effects on probability:

- a. Additional people performing the same event can sometimes be considered as independent repetitions. This could be analyzed as an increase in the "Number of Cycles," which we have already seen will increase Probability
- b. Changing the number of people in a boat affects the boat itself, and practical aspects of the mission.

For instance, adding enough people to any small boat will change its performance characteristics, usually making them slower, less maneuverable, and, of course, more crowded.

Numbers of people involved also affect the mission, Team Coordination, and the OIC's supervisory role.

2. Decreasing Effects of Adding People

On the other hand, increasing the number of people involved in an underway mission can also decrease risk. Here are some examples:

- a. An inflatable boat in the surf is less likely to be capsized with a crew of two than with a crew of one
- b. If a boat is conducting a search pattern, it is more likely to succeed with a crew of four than a crew of two (because it allows two crewmembers to actually look for the target)
- c. Assuming a mission that a single boat would require 4 hours to complete could be completed by 4 boats in one hour, completing the mission by deploying 4 boats would apparently decrease the risk of mission failure or mishap if a storm were expected in the next 3 hours and 45 minutes.

- c. **Severity** – a scale that rates the intensity of the identified prospective loss or damage.

The third element of risk is “severity,” or, “how bad is the bad thing that might happen?”

NOAA Application of Operational Risk Management

NOAA has adapted some of the USCG’s principles and tools for its own use. The purpose of this part of the NOAA Component training is to introduce the NOAA-specific method of conducting ORM.

The SBP requires that ORM be conducted using a specific process and tools. This process includes detecting hazards, assessing risks, mitigating or eliminating any risks that are found to be unacceptable, and maintaining situational awareness as risks change throughout an evolution.

Therefore, it is important that all personnel involved in boating operations are familiar with the following to ensure proper implementation of risk management;

- a. Understand how probability, exposure, and severity affect risk
- b. Know how to apply the three tools NOAA uses to conduct proper ORM;
 1. The Baseline Assessment
 2. The Mission Based Risk Assessment, and
 3. The Green Amber Red (GAR) Model
- c. Applying the key elements during the ORM process and utilizing the three tools to conduct risk assessments and make risk-based decisions.

The Baseline Assessment

Risk management is a progression and refinement of operational boundaries to maintain acceptable safety margins. The capabilities and limitations established by boat manufactures, designers or builders are often general or optimum values. Guidance under the SBP provides further restrictions to the range and use of the small boat according to Class and operating area. The details unique to specific NOAA operations, small boat particulars, and firsthand operator experience must also be considered. A critique of these operational limits and concerns are captured in the Baseline Assessment

The Baseline Assessment is a tool to communicate practical limitations of the boat. This process refines the broad capabilities of a boat to better support operational decision making and reflect existing onboard conditions. Because material condition and the status of installed systems change over time, Baseline Assessments must be updated annually to reflect equipment age, installation and familiarity of new systems, changing crew skills sets and refinement of standard operating procedures.

Starting with the boat design characteristics, systems inventory and the requirements of this Manual, further refinements and constraints are established based upon prudent and responsible operation. This should be a team effort including operators that have firsthand knowledge of the boat and an understanding of underway operations. The format, narrative or table, can be tailored to best communicate limitations based on the boat and system complexity. Small boat characteristics, resources and capacity information, as well as the GAR risk categories can be used as an assessment framework. Examples of Baseline Assessments can be found on the SBP website.

Baseline considerations are critical to effective project and mission planning. This comprehensive evaluation communicates the unique aspects of the boat and systems, instrumentation, skills of the operator and crew, range, lift capacities, handling characteristics, and the resources available for embarked personnel.

The output from this exercise helps define and narrow the range of acceptable risk in each of the GAR categories. For example, the GAR category for weather, without refinement, would have a range from calm to gale force. The Baseline Assessment might establish 2-3 foot waves as the maximum acceptable operating condition, resulting in an acceptable GAR weather range of calm to 3 foot waves.

The Baseline Assessment must be included in the SBOM and reviewed annually by the VOC.

The Mission Based Risk Assessment

The Mission Risk Assessment considers the risks associated with mission equipment, operations, and personnel. Effective Mission Based Risk Assessments should be accomplished through a cooperative effort, including mission subject matter experts, along with field and small boat personnel. This review encompasses the measures of mission success, quality, critical elements, operating parameters, risks and limitations of a particular mission. It communicates requirements such as; expectations for small boat infrastructure, speed and position control, deck space, lifting, cruise duration and operating area.

Mission Based Risk Assessments can help with the selection of a boat for a particular mission by articulating what resources and capabilities are limiting or critical. Boats in the same Class, configured and outfitted differently, may provide different safety and mission success margins. Once the boat is selected, the mission risks identified will better define aspects of that boat that will have an elevated risk or narrowed operating margin.

The findings from this exercise further define and narrow the range of acceptable risk, from a science perspective, in each of the GAR categories. For example, the GAR category for weather on a particular boat might have a maximum Baseline limit of 3 foot waves, but mission success could limit operation to 2 foot waves, resulting in an acceptable GAR weather range of calm to 2 foot waves.

Findings of the Mission Based Risk Assessment must be communicated to all personnel involved in the mission to provide focus on key cruise elements. Changes in the scope, content, or operational area may warrant reevaluation of the Mission Risk Assessment.

Using the GAR Model

The SBO's day to day mission specific risk assessment tool that NOAA has elected to use is the USCG's Green, Amber, Red Model, customized for NOAA missions.

The GAR must consider all elements of both the Baseline and Mission Risk Assessments in the context of predicted weather, team selection and the status of all resources. The GAR Assessment is a tool to help identify probable risks that may pose a threat during a specific mission or evolution. It is effective in communicating priorities to focus the entire cruise team on critical parameters. The GAR Assessment must be completed and communicated prior to getting underway. In all cases, the GAR should be updated to reflect changes in the environment, mission, equipment, or personnel.

The GAR is based on 6 different mission related categories which are defined by, but not limited to, the written guidelines and suggestions from the Baseline Assessment and the Mission Based Risk Assessment.

1. **RESOURCES:** Boat and Equipment, Supervisions, Communications, and Support. Is the boat adequate for the mission? Is it properly equipped with operational and safety equipment? Are the boat and equipment functional and up-to-date? Is there adequate oversight and supervision for this kind of boat, mission, and mission equipment? Is there sufficient administrative and practical support (like fuel and food) for the mission? Is a communications plan in place? Is back-up or rescue available?
2. **ENVIRONMENT:** Is the mission environment inherently hazardous (like a surf zone, ice, rocks, uncharted or shallow water, etc.)? Is it remote or inaccessible to the USCG or EMS? Is it a new environment for this kind of mission, or for the crew? Will boat traffic, debris, or current impact operations?
3. **TEAM SELECTION:** Experience, Training, and Familiarity. Have the crew and mission personnel performed this kind operation before with this kind of boat and equipment, and with each other? Have they operated in this environment before? Is the mission or mission equipment new or un-tested? Is everyone properly trained for this mission?
4. **FITNESS:** Physical and Mental. Is the team well rested and ready to work? (Confirm verbally) Does everyone understand the mission, and are they capable of performing it? (Confirm verbally) For multiple-day missions, are there enough crewmembers to allow adequate rest periods and safe manning? Will weather, stress, or living conditions pose mission, safety, or crew exposure/fatigue problems?
5. **WEATHER:** Are current and expected weather conditions acceptable? What are the likely effects of the expected weather on the mission and safety? Does it pose a problem to the gear that will be used? Is there a plan to mitigate hazards or mission failure, or safely cancel, if the weather is worse than expected?
6. **MISSION COMPLEXITY:** Is the mission or mission equipment complicated, difficult, new or experimental? Is it a multi-unit operation or dependent on other agencies? Is it high profile, stressful, or time sensitive? Will mission equipment restrict the boat's maneuverability, affect stability, or pose a hazard to other traffic? Does the operation carry inherent risks?

Each category calls for a Risk Number from 1 – 10 supplied by the SBO and crew for their specific mission. The numbers are then added together for a total that might range from 0 to 60, and compare to a “Green, Amber, Red,” or “High, Medium, Low” scale.

The GAR Model does not use an explicit severity scale. We will see that SBOs, the crew, and

Operational Risk Assessment Form

GAR Evaluation Scale

Rate the following where:

0 = no risk and 10 = the highest risk

		<u>Comments/Sources</u>
Resources: Boat and Equipment, Supervision, Communication, Support	→ <input type="text"/>	
Environment: Surf Zone, Remoteness, Ice, Rocks, Traffic, Shallow or Uncharted Water	→ <input type="text"/>	
Team Selection: Experience, Training, and Familiarity	→ <input type="text"/>	
Fitness: Physical and Mental	→ <input type="text"/>	
Weather: Effects on mission and safety	→ <input type="text"/>	
Mission Complexity: New or Experimental, Restricts Maneuverability	→ <input type="text"/>	
	<input type="text"/> <u>Total Risk</u>	

Green = 0 - 23 (Go, Low Risk)

Amber = 24 - 44 (Use Extra Caution)

Red = 45 - 60 (Stop, High Risk)

Initial

Refer to the Boat's Operation Manual for a more detailed description of Risk Considerations

mission personnel will have to formulate their own conceptions of severity when using the GAR Model.

Assigning the Numbers

The practicalities of using the GAR model are pretty simple, but they need to make sense. The risk of the mission is finally defined by the “Total Risk.” But the Total Risk Number, which is on a scale of 0 to 60, is entirely dependent on how the SBO, crew, and mission personnel use the 1 to 10 scale for each category.

The Total Risk scale is defined in the model itself:

- Green = 0 – 23 (Go, Low Risk)
- Amber = 24 – 44 (Use Extra Caution)
- Red = 45 – 60 (Stop, High Risk).

Additionally, despite the “Total Risk” number, a “High Amber” or “Red” number (8 to 10 risk value) in any given category should be mitigated before getting underway. For instance, where’s the point in getting underway if every category is a 1, but “Fitness” is a 10?

Using the Baseline, Mission and GAR Together

NOAA has taken a three prong approach to risk analysis. Step one the “Baseline Assessment” considers the vessel capability and limitations. This should take into account the design, age and operational limits. Step two the “Mission Assessment” considers the effect of the intended mission. This should include the impact of equipment or sampling gear on the vessel, associated risk to personnel and environmental limits of the planned mission. When conducting the pre-departure GAR the baseline and mission must be considered. These are basic general guidelines and the expectation is for VOCs, operators and principle investigators to expand and tailor the risk assessment to fit their operations.

Conclusion

The SBSP discussion of Risk makes the point that some Hazards may have more than one possible consequence in terms of Severity. Sometimes the lesser Severity, with a higher Probability, may end up with a higher Risk rating than the other.

SBOs should remember that the point of Risk Analysis is not to find excuses to cancel missions. The purpose is to encourage the performance of successful missions, and reduce the likelihood and severity of mishaps.

Finally, the USCG’s remark about using numerical Risk Models bears repeating: “Team discussion, the understanding of the risks involved and how risk is to be managed, is what is important; not the ability to assign numerical values to risk!”

MODULE 3: TEAM COORDINATION

Many tasks and activities require a team, or are by definition a team activity. Small boat operations share this characteristic with many other professional settings, like orchestras, sports, and assembly lines.

The role of the individual is crucial to the success of a team endeavor, and individual effort needs to be coordinated with the activities of the rest of the team, at the right time, and in the right way. Individual actions can also easily destroy the team's mission.

OBJECTIVES

The purpose of this Module is to:

- Establish the value of teamwork
- Define seven elements of Team Coordination
- Use these elements to analyze Team Coordination
- Equip SBOs with concepts and tools to promote Team Coordination

DEFINITIONS

A team is a collection of individuals working in pursuit of a common mission (or goal, or objective). They are built around the technical and designated capabilities of its members. And, each member has assigned functions.

The “Larger Team”

The team itself is almost always part of a “larger team” composed of other teams. In NOAA's case, this larger team may consist of:

- The chain of command
- Other agencies
- NOAA “clients”
- The public.

Like the boat crew, the larger team relies on the individual efforts of the teams that compose it, and is essential in providing many practical aspects of small boat operations, like:

- Money, boats, and fuel
- Missions
- Help in fixing problems
- Back-up and communications.

Seven Elements of Team Coordination

Observation and studies have revealed that successful, coordinated teams display certain common characteristics. These are:

1. Leadership
2. Mission Analysis
3. Adaptability and Flexibility
4. Situational Awareness
5. Decision Making
6. Communication
7. Assertiveness

1. LEADERSHIP

In NOAA small boat operations there is always a leader at any given time. He or she will fall into one of two categories:

- Designated leader
- Functional leader

Designated Leaders

Designated leaders are appointed, and given certain authority and responsibilities. They are responsible for the overall safety and success or failure of the team. In addition to their own specific functions, like driving the boat, they monitor the performance of the rest of the team, and at NOAA, they are required to have some training and understanding of leadership principles.

SBOs and OICs are designated leaders.

Functional Leaders

Functional leaders are temporary, and emerge or are designated by the SBO in response to special circumstances, or special skills or information possessed by a team member. An obvious example is when an engineer temporarily “takes over” to fix the engine, or the OIC (or even a ship’s captain) relies on someone with local knowledge (like a Pilot) for navigation.

But, just like a Pilot on a ship, functional leaders who are temporarily leading the team do not represent a “change in command.” The SBO or OIC is still responsible for the entire team, and neither their authority nor responsibility is diminished.

Finally, functional leaders relinquish their leadership status when the job they emerged to perform is completed.

Personal Traits

Personal traits are important to how leaders perform their jobs. Everyone knows that some people are easier to deal with than others. Three personal characteristics have been identified among team leaders that affect their effectiveness:

- Personality. Some people are easier to get along with than others
- Ability. Not everyone has the same ability in their specific functions (like driving the boat) or in leadership skills
- “Style.” Leaders have different ways of approaching their jobs.

Team leaders need to take their strengths and weaknesses into account when dealing with team members. In any case, leaders need to be honest, fair, safe, and in accordance with pertinent policies and regulations.

Although everyone is different, an important goal of TCT training is to enhance at least a minimum proficiency in leadership and team coordination by considering and using recognized leadership principles.

Basic Role

The primary tasks of the Leader are to coordinate the efforts:

- Of individual team members towards performing the team’s mission, and their tasks
- The team’s role in the Larger Team.

To do these things, a team leader needs certain skills. These include:

Mission Briefing - It is typically the leader who collects and disseminates the information the team needs for any given mission, and describes the mission in a pre-mission briefing. This includes promoting input from the crew during the briefing and during the mission – someone in the crew may have information or ideas that the leader does not. The leader ensures the team is fully informed about the mission, including the “larger team.” Being informed includes, by definition, an assessment of risk and alternatives before the mission starts.

Tasking - Translating objectives (like leaving the dock) into tasks (release the lines on command) is the nuts and bolts of leadership on a minute to minute basis. This also involves motivating team members to perform their tasks, and assigning the right task to the right person.

Other tasking related skills include:

- a) Preventing work overload by monitoring and preventing uneven distribution. Over reliance on a particular individual can be counter-productive in numerous ways
- b) Keeping the team focused by watching for distractions, fixations, preoccupations, and burnouts. Leaders should also make team members responsible for staying focused

- c) Looking out for team members by knowing and respecting their abilities and rights, matching them with the right task, and staying professional when resolving conflicts.

Feedback - Team leaders should provide feedback – otherwise there is no team concept of where things stand either individually or collectively. Feedback can be “negative,” in order to correct mistakes, or tell the team or individuals what to stop doing (or not to do again). It can be “positive,” meaning to communicate to the team or individual what to continue to do, and what to do next time in like circumstances.

Leaders need to be continually assessing the situation and mission progress while underway, focused on things both inside and outside the boat. This includes watching for unexpected changes, loss of situational awareness, and the emergence of new risks. These things should be communicated to the team, whether they are positive or negative, helping to keep the team on the “same page.”

The entire team, particularly the leader, should spot (or even anticipate) human error, correct it or minimize its impact, and hopefully find ways to prevent it from happening again. This process should be aimed at the error itself – not the person involved. It should be corrective, not accusatory.

Post Mission Briefing - Leaders should make a habit of conducting timely post-mission briefs. To some, this sounds like a meaningless exercise, since everyone knows how the mission went. However, successful teams and leaders take the time to discuss missions after they are finished. The brief should include:

- a) Feedback from the team. Not everyone always sees things the same way
- b) Specific feedback on what went right and what went wrong
- c) General feedback on the entire mission.

The post-mission brief should occur immediately or not long after the mission is completed.

Summary

Designated leaders are part of the team. In addition to their specific functions, they have generalized functions to perform that can result in team coordination or team disintegration, and can result in safe, successful missions, or a complete waste of time (and sometimes, disaster). In summary, these generalized functions, based in part on input from the crew, are:

- Defining the mission and its risks
- Assigning tasks to accomplish the mission
- Monitoring and enhancing performance and safety while the mission progresses
- Assessing the mission after its completion.

2. MISSION ANALYSIS

Obviously, the leader and the team need to know what the mission is, and how it is going to be accomplished. An essential leadership task is performing a Mission Analysis and a mission briefing. To do this, the leader needs to collect information about the mission, come up with a plan, get the crew together, and brief everyone on what the team is about to try to do, including a standard safety briefing if necessary.

The plan should be subjected to a risk assessment by the entire crew. The leader and team should have an operational plan, contingency plans (if they can be figured out), and emergency plans.

Briefing Elements

Analyzing the mission and formulating a plan should include:

- Verifying the information upon which the mission and plan are based
- Stating objectives and assigning tasks
- Risk Assessment.

Once a plan is formulated, it should be critiqued for hidden errors and risks.

Content

The analysis and briefing should also include these attributes:

- Clarification of responsibilities, accountability, and standards so that people can perform their tasks correctly and at the right time
- Discussion of the resources to be used, including its condition and prognosis, and the availability of back-up equipment
- A positive attitude toward the mission and the team
- Promotion of a learning environment to allow crew members to practice and use their skills, and learn new ones
- A timely debrief, including a self-critique.

Finally, a mission briefing should conform to NOAA Policy as presented in Module 1: NOAA Small Boat Policy.

3. ADAPTABILITY AND FLEXIBILITY

“Adaptability and Flexibility” is the ability to change plans or behavior in response to changes in circumstances or, sometimes, changes in the mission once it has started (or even the assignment of a new one after starting the first one).

Types of Changes

Except for changes in the mission, which typically come from the chain of command, the kinds of changes requiring adaptability and flexibility are usually:

- Environmental (changes in the weather or water depth)
- Mechanical (something goes wrong with the boat or equipment)
- Personnel related (something goes wrong with the boat crew or mission personnel).

Spotting changes in mission related circumstances requires situational awareness. Changing behavior or plans to adapt to new situations often also requires a new or modified risk assessment.

Types of Responses

The kinds of responses that may emerge to adapt to new circumstances are almost limitless, but some common responses are:

- Modifying the operational plan to accommodate the change
- Changing to a contingency plan if there is one that meets the new conditions
- Moving to a new operational area (like moving to calmer water where the mission can also be performed if the wind is interfering with the mission at the current site)
- Canceling the mission
- Leadership or team intercession. This is often a response if the detected change has to do with personnel – like fatigue, poor performance, or changed mental state. Maybe it’s simply time for a break.

Adaptability and flexibility measures are constantly occurring while underway. They can be as simple as altering course due to vessel traffic, or redefining the entire mission. Observing changes and adapting to them as they occur is an essential part of Team Coordination, risk management, and mishap avoidance.

4. SITUATIONAL AWARENESS

Every professional boat operator knows what this is, or at least when it is missing. The SBO who puts the boat in gear before the lines are released from the dock; the crew member who releases the dock lines before the engine is started; the boat that gets caught in a storm or inside the surf, gets lost or has a collision or runs aground – all are examples of loss of situational awareness.

Definition

Most simply, “situational awareness” is knowing what is going around you right now, and its consequences on the future; but it is also knowing what is going on inside of you. The first can be called “External Awareness;” the second, “Internal Awareness.”

External

External Situational Awareness pertains to the obvious factors that influence coordination of effort aboard a boat, the boat’s safety in the environment, and mission status. Every crew

member needs to have it in order to know if what they are doing – or are about to do – conforms to the actions of the SBO and the other crew members. The entire team needs to have it in relation to the environment (wind, seas, temperature, time of day, relation to policy, etc.). And everybody needs to know if they are doing the mission at the right time and place.

Internal

Internal Situational Awareness is perhaps the easiest to lose, and contributes to the loss of External Awareness. Internal awareness is knowing when we are losing our focus through boredom, fatigue, routine, familiarity, preoccupation with other matters, anger or other emotions, overload, day dreaming, and so forth. It is particularly hard to detect because its cause and effect are the same thing.

Detecting and Maintaining

Situational Awareness of either kind is probably never 100%, requires a conscious effort to maintain, and its loss is a substantial contributor to mishaps.

It pertains not only to operations and environment, but also to the internal workings of the crew, and how their actions or prospective actions relate to the rest of the crew members. It also requires self-awareness on the part of everyone aboard.

One method to judge one's status of situational awareness at any given moment is by self-questioning. Before doing something, any crew member, including the SBO, can ask themselves:

- Is this the right thing to do?
- Is it the right time to do it?
- Should it be coordinated with what someone else is doing?
- Do I know how to do it correctly?

Without being paranoid or delaying appropriate actions, the SBO and crew members should always know the consequences of their next deliberate action, particularly, what can go wrong if they do it.

Clues to Loss

Studies and mishap analysis have identified clues to the loss, or impending loss, of situational awareness. These include:

- Confusion or a “gut feeling.” Unless it is pre-arranged as part of a larger plan, when a team member is confused about the applicability of what they are doing, or has the feeling that something is wrong, it may be that the SBO or the team has lost contact with reality.
- Using improper procedures or departure from policy. This amounts to “jerry rigging,” which certainly has its place in small boat operations, but unconsciously reverting to

improper or proscribed methods may indicate that something more fundamental is going wrong.

- No look-out or fixation. Without a look-out, the boat's environment is unknown, and is an indication of a more fundamental problem aboard the boat – since having a look out is a fundamental requirement of good seamanship, and the rules of the road. A fixated look-out almost amounts to the same thing.
- Missing planned targets and unresolved discrepancies. If benchmarks are mysteriously missed (e.g., tardiness or incomplete work), something is probably wrong somewhere in the mission analysis or with the crew. Unresolved discrepancies or surprises are signs that the SBO and crew are at least partially, and maybe completely, ignorant of what is happening around them.

Situational awareness is virtually useless unless it is shared among team members.

5. DECISION MAKING

Decision Making is a product of Situational Awareness and Adaptability and Flexibility. Situational awareness lets us know when things are changing. Being adaptable and flexible allow us to change our behavior, plan, or equipment accordingly. Decision Making is the process whereby we choose **what** to do differently.

Minor or Routine Changes

Obviously, not all changes require making a decision; and not all changes represent problems. Sometimes changes are unimportant to what we are doing, or even pleasurable –like the sun coming out and warming the air on a cold day. Other times the change requires a routine or obvious response – like changing course slightly to give a better or drier ride, or because of vessel traffic.

Problems

But if the change we perceive affects the mission, the safety of the boat or crew, team effectiveness, members of the “larger team,” or in some other way represents a problem, something needs to be done about it.

Often, these kinds of changes are related to:

- The environment (like weather or op area)
- Mechanical problems
- Crew problems (sickness, fatigue, conflict, etc.)
- Supervisory or other input from outside the boat
- Emergencies (in NOAA's boat or someone else's).

Emergency Procedures

Emergency procedures for any NOAA boat should already be familiar to the SBO and crew. The decision making process is still inherent in activating and proceeding with emergency response.

Foreseeing Problems

In almost all cases, the approach of a problem is foreseeable. This allows the team to seek alternatives, and then choose one.

Mishaps are sometimes justified by reference to the emergence of “immediate and unforeseeable” crises. A favorite example of this is the infamous “Rogue Wave,” or “Sneaker Wave,” that somehow materializes out of thin air, for unknown reasons, and damages or capsizes federal vessels, but there are other, less mysterious phenomena that are sometimes offered as specious excuses for accidents. These can range from “sudden storms” to the unexpected bizarre behavior of a crewman to ignoring the rules of the road by another vessel.

Except for earthquakes and space aliens, however, investigation will usually reveal antecedent causes and missed clues that should have been spotted by situational awareness – or were spotted, but the crew did not adapt to them – indicating that the boat was approaching danger.

Coping vs. Changing

The situation proposed, then, is when the SBO and crew are facing a current or approaching problem, and something needs to be done about it. The choices basically boil down to either coping with the problem, or deciding to make a change in response.

- Coping - People, and teams, cope with problems all the time. There is nothing inherently wrong with coping with a problem. But coping has an inherent disadvantage: by definition, it is harder to perform the mission while coping with a problem at the same time.

If nothing else, this raises the stress and fatigue level of the crew, and often extends the mission. It can also give rise to new problems. Running (hiking) with a blister is an everyday example of coping with a problem. It hurts; it makes the blister worse; but maybe it works. On the other hand, maybe it leads to an infection.

In any case, coping with a problem should be the result of a conscious decision; in other words, it should be a chosen alternative from among more than one. The choice should be monitored, should not result in ignoring the problem (it’s still there), and it should not be a substitute for solving the problem if necessary.

- Changing - In this context, changing is “deciding to make a change” in response to changed circumstances that require it. The aviation industry has developed a Five Step process for making decisions in response to problems known as the “DECIDE” model.

Risk Based Decisions

While the Baseline Risk Assessment is updated annually and the Mission Based Risk Assessment is updated for each new mission type, the GAR is a mission specific tool. It is used as one step in a seven step decision making process, which is revisited in Team Coordination Training (Module3).

The object of the seven step process is to encourage “Risk-based” decision making, instead of basing decisions on other reasons that can ignore or minimize the possibility of mishaps – a “Benefit Based” process for example, or an “I’m in a Hurry Based” decision.

a. The Seven Steps

The seven decision making steps are based on a mental process people use to make decisions in everyday life. Formalizing the process into an algorithm, then using that algorithm in the workplace has proven useful in reducing mishaps.

The NOAA version of this risk-based decision making algorithm USCG’s “ORM Technical Decision Making” model, but simplified.

The Seven Steps are:

1. **Define the Mission or Task.** Buy a car? Cook dinner? Collect scientific data from a boat?
2. **Identify Hazards.** Every experienced professional SBO still operating boats is familiar with this step. The point of NOAA’s Small Boat Policy, and this training, is to formalize and regularize the process, making sure it occurs irrespective of the experience of any particular SBO.

It is made easier and more standardized by using one basic model, in this case the NOAA GAR model, with defined categories.

3. **Assess Risks.** This is the point at which the SBO and crew determine the numerical value of the risk, deciding if the probability and severity of the identified hazards get a high number, or a low one.
4. **Manage Risks (reduce or eliminate).** Separate models for this step exist, but NOAA takes a more direct and common sense approach by asking the basic questions:
 - a) Can we eliminate the things that might go wrong?
 - a. If so, how?
 - b) Can we reduce the Probability or Severity if the worst happens to a level with which we can all live, and defend?
 - a. If so, how?

- c) If we cannot do either, should we cancel the mission for now, or give it to someone else?

SBOs should remember that reducing or eliminating a risk in one category can often reduce the risks in others. For example, the danger of an environment may be increased or decreased based on the fitness of the crew, or how well the engine is running.

5. **Evaluate Risk versus Gain.** After trying to identify, eliminate, reduce, or give to someone else our risks, we are either left with no risk at all, or some risk. The basic question here is: “Is the mission worth it?”
6. **Execute Decision.** This is easy enough. It usually reduces to proceeding with the mission, canceling it, taking remedial action before proceeding, or giving the mission to someone else.
7. **Monitor the Situation.** In some ways, this is the most important step of all. It answers every question posed so far: Was the risk assessment accurate? Did remediation work? Did we miss anything? If we canceled, were we wrong to do so? Are we failing in our mission, lost, sinking, or swimming?

6. EFFECTIVE COMMUNICATION

Every aspect of Team Coordination so far discussed relies upon effective communication between team members. SBOs should remember that what a crewman or mission participant has to say can be as crucial as what the SBO may want to say.

Sender and Receiver

Effective communication involves at least two people: the Sender and the Receiver. Either can prevent effective communication if they don't do their jobs properly, and this can (and has) led to disaster.

The Sender

The “Sender” is the person who has something to communicate to someone else. He or she should always bear in mind that communication involves more than mere words. In boat operations, communication is sometimes completely non-verbal anyway – like using hand signals or a nod of the head.

The obvious basic elements in communication on a boat include:

- Words
- Tone and volume
- “Body language.”

All three can be significant barriers to communication between the leader and the team, within the team, and from the team to the leader.

So the Sender – whether SBO, crew member, or member of the larger team – needs to consider not only what they mean to convey, but how they do so.

Effective Methods

The following attributes are useful in this regard, whoever the Sender may be:

- Providing information in accordance with SOPs and using standard terminology
- Repeating and getting verification of understanding
- Clarifying when required
- Being comprehensive, but to the point
- Stating one idea at a time in simple, unambiguous language
- Getting feedback in the form of an acknowledgment that the message was received
- Avoiding distracting or counter-productive tone or body language
- Using tone (like urgency) appropriately.

The Sender should convey the message when the Receiver has time to listen and can hear it. The message should be relevant, and be phrased in correct terminology.

The Receiver

The person receiving the message is more than simply a passive listener. Effective communication relies as much on the Receiver's ability to understand as it does the Sender's ability to transmit – and the Sender needs to know that the message has been received.

So, Receivers should focus their attention on the message, collecting, if possible, not only the words but the tone and body language of the Sender. Receivers should keep an open mind about the communication until the message is fully delivered. Pre-judging messages before they are complete, like interrupting with the remark, "I know where you're going with this ..." is simply a barrier. Get the message first, then evaluate it.

And, of course, the Receiver should verify what was heard. There are several common ways to do this:

- Simple acknowledgment, like saying, "Roger"
- Parroting: repeating the message back verbatim
- Paraphrasing the message back: repeating the message in your own words.

The Sender can also ask the Receiver for these kinds of responses to make sure the message has been received, or to make sure he or she gave the correct message.

7. ASSERTIVENESS

Assertiveness is a critical aspect of Team Coordination and communication. It is the ability of all team members to state and maintain a factually based position, even if it is contrary to the positions of others. On the other hand, it entails the willingness and ability to change a position if the facts indicate otherwise.

The leader has to be assertive to some degree to perform the leadership function at all. Team members also need to be assertive in order for them to coordinate their contributions to the team effort. Hence, everyone, particularly crew members, need to be assertive enough to make their contribution – otherwise the whole concept of the team falls flat, along with communication and feedback.

Characteristics

In order for assertiveness to work, the team leader, and the institution within which operations occur, must create and maintain a climate that allows it to exist and be exercised. This climate allows personnel to:

- Express their own ideas
- Be listened to seriously
- Be treated with respect
- Ask for information
- Make mistakes

Barriers

There are various barriers to assertiveness, even in the proper climate, including the psychology of the individual involved and personality:

- Passivity, apathy, and fear can inhibit assertiveness. This includes people who don't really care enough to say anything, or fear reprisals for taking a contrary position on an issue, or appearing to question authority or being labeled as a trouble maker. Inexperience, ignorance, or even just shyness may produce reticence
- Aggressiveness is also a barrier to assertiveness and communication. A hostile manner, or being argumentative, sarcastic, or intimidating while stating a position is counter-productive.

When to Be Assertive

Assertiveness is similar to effective communication. It is particularly needed when anyone aboard:

- Is unsure about what's going on or what they are supposed to do
- Believes they have a solution to a problem, or needs to report a problem
- Needs help
- Perceives a safety issue or problem.

Conflict Resolution

Occasional conflict within a team is inevitable. How it plays out and gets resolved (or otherwise handled) is related to communication and assertiveness. Assertiveness allows conflicts to be recognized, and it is far better for conflicts to be revealed and dealt with than for them to be buried, since they have tendency to emerge on their own anyway.

Conflicts, like assertiveness itself, should be based on facts, not personalities or the desire to prove a point.

This means the leader and the team need to:

- Avoid obduracy. All opinions or positions relating to a technical or professional conflict should be subject to change if the facts so indicate
- Seek solutions by reconciling differences
- Agree on the facts. Without agreement on the facts, those with conflicting positions will be comparing apples and oranges, and they will not be communicating very well either.

This is all very well, but sometimes consensus cannot be reached. Even the same agreed set of facts can lead to different interpretations of what they mean, or what the team should do.

Eventually, the SBO or OIC may need to make or postpone a decision or resolution of the conflict without consensus. This kind of situation is a test of both the Leader and the Team.

The Team needs to be able to continue to function effectively in the presence of unresolved conflict. The Leader needs to monitor his or her decision for veracity (from the DECIDE model, “Evaluate the decision”). Defending a bad decision is a waste of time for everyone, and sometimes dangerous. A good leader will recognize a bad decision if that’s what the facts reveal – and change it.

Summary

Coordinated teams are more successful, safer, and usually a lot more fun than teams that are unable to coordinate their efforts. Boat crew leaders play a crucial role in harnessing and directing the energy and efforts of the crew and mission personnel. Coordinating the boat team’s effort with the Larger Team is also efficient, and usually makes life much simpler than the opposite.

The presence or absence of the other six aspects of Team Coordination plays a significant role in achieving coordination of effort, which is the basis for safe and efficient operat