

# Risk Assessment Safety Plan

## Project information:

RoboBoat and Drone

11/16/18

Date of submission

Team Member	Phone Number	e-mail
James Aspinwall	863-899-6750	Jra14e@my.fsu.edu
Sebastian Alonso	305-607-0912	Sa14r@my.fsu.edu
Edwin Diaz Gaitan	850-339-7586	Eed13@my.fsu.edu
Adam Hurdis	239-404-1752	Adh16e@my.fsu.edu
Steven Pisarchuk	904-945-0597	Sap15h@my.fsu.edu
Faculty mentor	Phone Number	e-mail
Damion Dunlap	850-597-1606	Ddunlap@fsu.edu
Shayne McConomy	850-410-6624	smcconomy@eng.famu.fsu.edu

## I. Project description:

To Design and build a fully autonomous boat and drone which can complete the specific challenges described in the Robonation Roboboat and Drone competition manual.

## II. Describe the steps for your project:

To complete and test the boat and drone, we need to implement camera, put boat in water, turn on boat, turn on drone, control boat when in manual mode, choose automated mode, have someone be ready to press emergency cutoff switch, recover boat and lift out of water. Transportation of the boat and drone to and from testing facilities using a pickup truck.

## III. Given that many accidents result from an unexpected reaction or event, go back through the steps of the project and imagine what could go wrong to make what seems to be a safe and well-regulated process turn into one that could result in an accident. (See examples)

During assembly of the camera, small shocks may be felt.

During operation and testing, boat could lose control or people could shock themselves due to the battery. Drone could lose control and propellers could cut people. Someone could slip near water due to wet conditions

During transportation, crushing or hurting of a back could occur if proper lifting of the heavy boat is not followed.

Ensure the boat is lying flat on the pickup truck bed to reduce movement of the boat while in transport.

(for primary source, see IV.)

## IV. Perform online research to identify any accidents that have occurred using your materials, equipment or process. State how you could avoid having this hazardous situation arise in your project.

The boat has a 22-volt battery that can be a shock hazard if someone decides to put themselves in series with the battery. There are blue LEDs that indicate when the battery is turned on. Do not work on the boat when blue LEDs are on. To avoid, remove watches, rings and dangling jewelry, don't touch both battery terminals with bare hands, and remove metal parts from work area.

- [https://www.lanl.gov/safety/electrical/docs/battery\\_safety.ppt](https://www.lanl.gov/safety/electrical/docs/battery_safety.ppt)

To prevent slip near wet surfaces, it is recommended to wear slip resistant shoes when testing. Must have COF of 0.5

[https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_id=24511&p\\_table=INTERPRETATIONS](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=24511&p_table=INTERPRETATIONS)

Whenever possible, a lift or other tools should be used to transport boat. Do not lift more than 50 lbs and use mechanical means.

Including ramps, forklifts, etc. - <https://www.osha.gov/SLTC/etools/electricalcontractors/materials/heavy.html>

## V. For each identified hazard or "what if" situation noted above, describe one or more measures that will be taken to mitigate the hazard. (See examples of engineering controls, administrative controls, special work practices and PPE).

Ensure there are no extraneous wires to touch while the battery is on. Do all wiring when the battery is off indicated by the blue

LEDS that will be off.

Also on the boat are two emergency switches. One is on the boat and one is a remote trigger switch. When activated these switches will power the boat off so it does not move anymore.

The drone automatically turns off when it is turned upside down in the event control is lost.

Tie drone down when testing to constrict available space for drone.

When testing near water, identify wet areas to avoid or dry prior to testing. Ensure footwear has proper soles for grip.

Since the boat is 70 lbs, at least 3 people should participate in moving the boat to reduce the load per person to below 50 lbs.

**VI. Rewrite the project steps to include all safety measures taken for each step or combination of steps. Be specific (don't just state "be careful").**

No additional wiring can be done with the blue lights turned on.

Prior to each test ensure the remote emergency switch works.

Whenever testing drone, no one within the radius of the attached string + drone body.

Test drone with cover so blades aren't exposed.

Ensure dry conditions for testing boat. All water-resistant seals are closed and no testing in rain.

When operating with high voltage, wear gloves and wear clothing protection to cover any metal or dangling jewelry.

**VII. Thinking about the accidents that have occurred or that you have identified as a risk, describe emergency response procedures to use.**

First is assess the situation. Identify the severity and if emergency response needs to be called, call them. With physical injuries, stop bleeding or whatever is medically necessary first. If medical necessities are unknown, call 911. Then call faculty listed below to report the incident and explain the incident. Additionally, notify family members of incident where required. This may include the emergency response contact information given below. Follow all standard safety procedures






**VIII. List emergency response contact information:**

- Call 911 for injuries, fires or other emergency situations
- Call your department representative to report a facility concern

Name	Phone Number	Faculty or other COE emergency contact	Phone Number
Lee Ann Pisarchuk	904-705-6195	Shayne McConomy	850-410-6624
Nicky Aspinwall	(863) 899-4113	Damion Dunlap	850-597-1606
Maria Hurdis	239-404-1752		

**IX. Safety review signatures**

- Faculty Review update (required for project changes and as specified by faculty mentor)
- Updated safety reviews should occur for the following reasons:
  1. Faculty requires second review by this date:
  2. Faculty requires discussion and possibly a new safety review BEFORE proceeding with step(s)
  3. An accident or unexpected event has occurred (these must be reported to the faculty, who will decide if a new safety review should be performed.
  4. Changes have been made to the project.

Team Member	Date	Faculty mentor	Date
	11/15/18		
	11/15/18		
	11/15/18		
	11/15/18		
	11/15/18		

**Report all accidents and near misses to faculty mentor.**