

Preliminary Mission for the 2011 Annual ASVC

“The four elements”

June 9th – June 12th, 2011

Founders Inn Resort, Virginia Beach, VA

The goal of this preliminary mission statement is to encourage teams to submit comments and questions before the release of the final rules. Please post your feedback before December 23rd on the [ASVC forums](#). All words or questions highlighted in red (ex: **Color of buoy?**) are areas in which suggestions/comments are highly desired.

1 MISSION

All vehicles must be remote-controllable and be able to be brought back to the dock on their own. If a vehicle has to be towed back by the ASVC staff (mechanical, electrical, software, etc failure) the clock will keep running while the AUVSI staff brings the vehicle back to the dock as fast as possible.

2 MISSION TASKS

2.1 *Demonstrate your strength*

You will start by demonstrating the thrust of your ASV can generate by hooking up your vehicle to a thrust measurement system (see Thrust measurement harness diagram). Your vehicle will then generate as much thrust as possible in 10 seconds. This task can be accomplished in a manned manner (you can use a remote, laptop or buttons on the ASV to start/stop this task). See figure 2 in the Annex for the suggested harnessing mechanism between the strain gauge and your ASV. You must provide a harness attached to two points on your vehicle and which offers a single carabiner or loop as the strain gauge interface.

2.2 *Demonstrate your speed*

The vehicle should pass through the starting speed gate demonstrating the ability to steer a steady course and control speed up to a second gate, the speed gate. The starting gate will be in a fixed position with an orientation of about 15-30 feet (7.5-9 m) away from the dock throughout the competition. The speed gate will be 50-100 feet (15-30 m) away from the starting gate. A ‘gate’ is a set of two navigation buoys (Taylor Sur-Mark Marker buoys #950400 & #950410 – 49” in tall, 10-18” in diameter) approximately 6 feet apart from each other. Your vehicle will be timed on how long it takes to transit between the starting gate and the speed gate.

2.3 *Navigate out of the harbor*

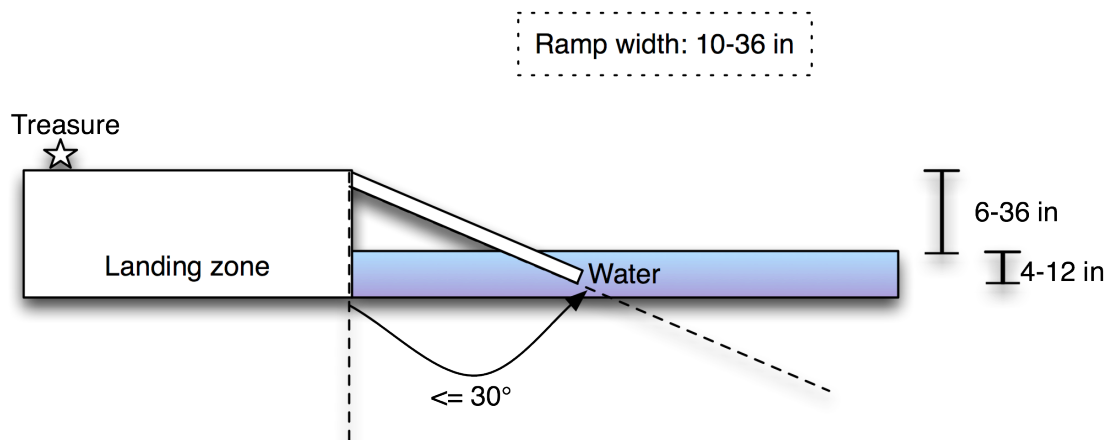
The entrance of the navigation channel will be **10-30 feet?** outside of the speed gate. The navigation channel is delimited by sets of red and green navigation buoys (see Navigation channel diagram). The buoys will be placed in such a manner that you can use the 3R navigational mantra (red-right-return). Follow the navigation channel while avoiding the yellow buoys marking obstacles. At the end of the channel, you will find a **blue** buoy **12"** in diameter. From this buoy navigate following the provided magnetic bearing in degrees up (may change from day to day) to shore where you will find the challenge station for each element.

2.4 The challenge stations

You will find four main stations in an area up to 100'-200' (on each side) of the point where your vehicle lands after following the magnetic bearing. These station challenges can be attempted in any order.

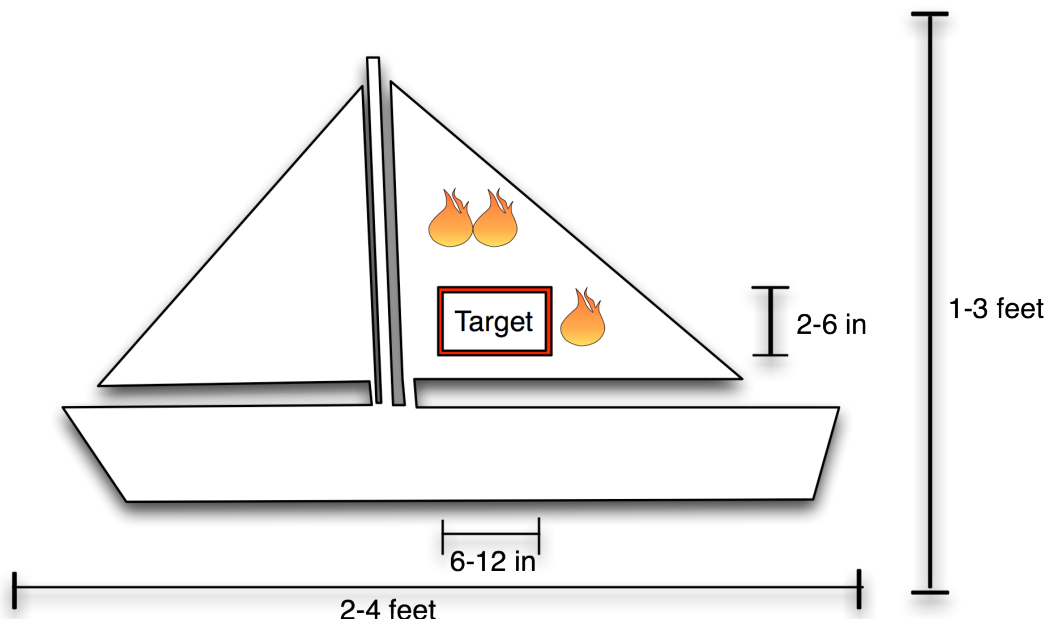
2.4.1 (Earth) Amphibious landing

Your vehicle may locate a landing zone and make contact with it. From there your vehicle, or subsystems deployed by your vehicle, will have to go up the landing zone incline (up to 30°) and retrieve the Earth treasure (a tennis ball?). If you opt to deploy subsystems from your vehicle, you must retrieve every piece of material that has been deployed or you will have to forfeit all the points accrued for the amphibious landing task. Judges reserve the right to end a run if the vehicle leaves the landing zone without retrieving all the material deployed (ex: if the ASV leaves a navigation helping device on the landing zone)



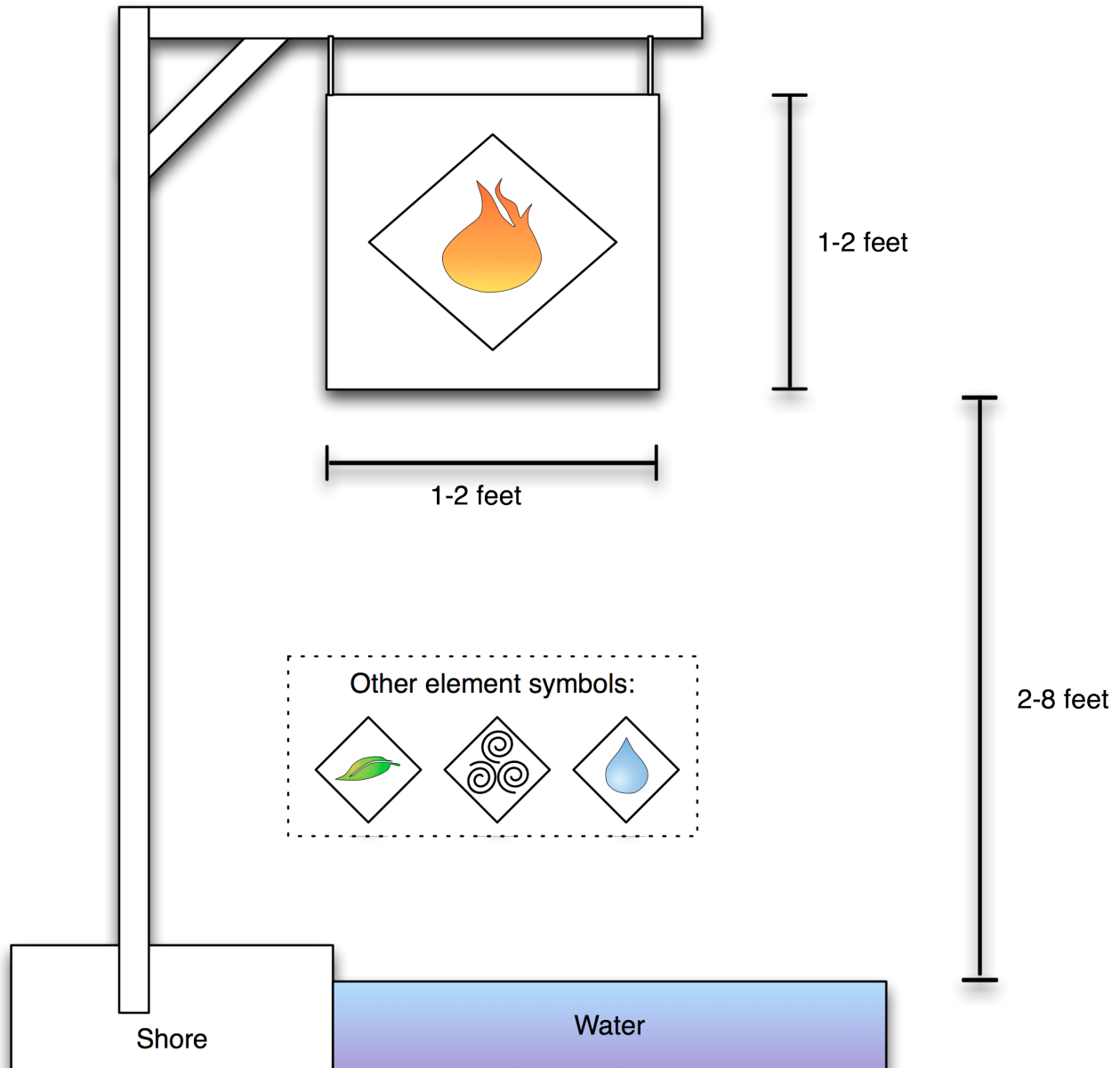
2.4.2 (Fire) Find the fire and extinguish it

Your vehicle may find a burning ship cutout. Once the ship has been located, use your water cannon to extinguish the fire by shooting in the target (a 2-6" x 6-12" hole in the cutout) marked by a red border. If your vehicle fires enough water in the target (approx ¼ cup), the fire will be extinguished. A visual feedback will be provided to notify you if you have extinguished the fire (a LED? A moving part? A strobe?)



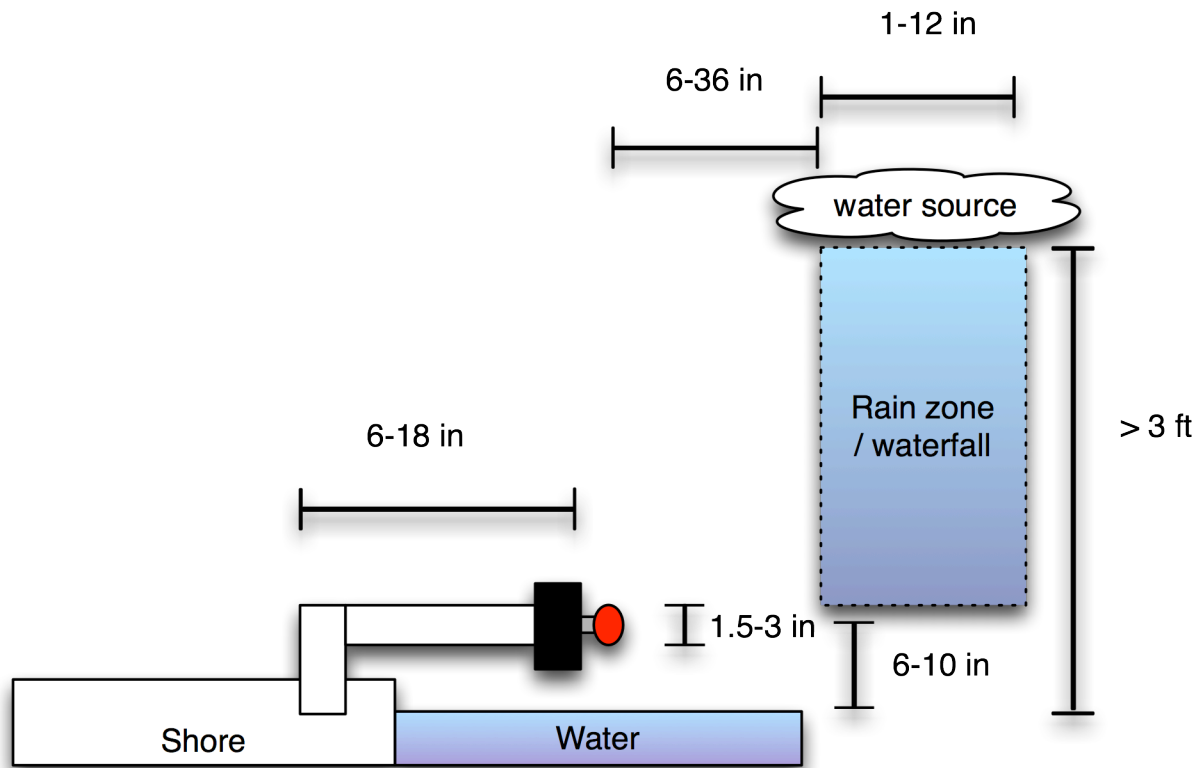
2.4.3 (Air) Find and report the 'hot' target

Your vehicle may locate a set of four low flying targets (between 2' and 8' above the water level) above the playground. Each target will be marked with one of the four elements logo (a flame for fire; a leaf for earth; a water drop for water; three spirals for wind). Each target will be 2-12 feet away from the next one. One of the targets will be 'hot' (literally 20+ degrees warmer than the other ones). Report which target is 'hot' and its GPS position to the base station. Note that the element logo will only be printed on one side of the target. Note: It is possible that only one side of the logo will be 'hot' (the back side may have a normal temperature).



2.4.4 (Water) Turn off the waterfall

Your vehicle may find a waterfall a few feet from the shore. Once the waterfall has been located, go through the waterfall to find a **red?** button (similar to an Emergency Stop button?) in order to stop the waterfall. The waterfall water debit will be limited to < 1 gallon/s over its whole area. Push the red button to stop the waterfall.



2.5 Return to the dock

Once you have attempted (or completed!) all the stations, head back to the blue buoy that marked the exit of the navigation and navigate the channel back in from the end to the start.

Amphibious landing rules

It is expected that during the amphibious landing task, your vehicle or parts of it, will not be in contact with the water and as such the '*surface requirements*' rules will be lifted for the duration of this task (they will however be strictly enforced for the remainder of your vehicle run).

The '*competition area*' rules will also be relaxed during the duration of the amphibious landing task to let you deploy subsystems into the landing zone as long as all these subsystems are retrieved by your vehicle before leaving the landing zone.

Finally, for the duration of the amphibious landing the '*autonomous control requirements*' rules will be also relaxed if you choose to deploy subsystems in the landing zone by letting you remote control these subsystems from the "mothership" (they can either be autonomous or remote controlled by commands originating from the "mothership" but not by outside computers or team members) as long as all the parts are retrieved before leaving the landing zone.

Scoring

Each of the tasks has a point value associated with it. The tasks must be completed in order. Additional points will be awarded if you can get back to the Shire (dock) early (complete task within 20 min). At any point in time, a team can terminate its run. If there is time remaining, they can opt to start a new run. Please note that all points allocated for a run will be lost if a new one is started. Thrust test points can be carried over during a phase of the competition (test, qualifications or final) if no noticeable changes to the propulsion or battery system occurred unless the team decides to do a new thrust test.

Interference

Vehicles that interfere with competition elements may be disqualified at the judges' discretion.

“Interference” does not include cases where, in the opinion of the judges, a vehicle is attempting to complete one of the tasks. If a vehicle becomes entangled on a competition element, the run will be declared complete. Teams may keep the points earned on that run, or may have the vehicle untangled to return it to the dock and start another new run. If a new run is begun, all points from the previous run are lost.

Communications during the run

Communication with the vehicle during the run is strictly forbidden with the exception of the JAUS challenge messages and the message to report the location of the ‘hot’ target. Any running laptop/computerized device connected (wired or wireless) to the vehicle must be left on the dock table. The remote control (for bringing the vehicle back) must be handed over to the designated ASVC official during the run. The official will follow the team leader and will hand over the remote if asked to do so. Handing over of the remote control will terminate the run.

Logistic of putting vehicles in the water

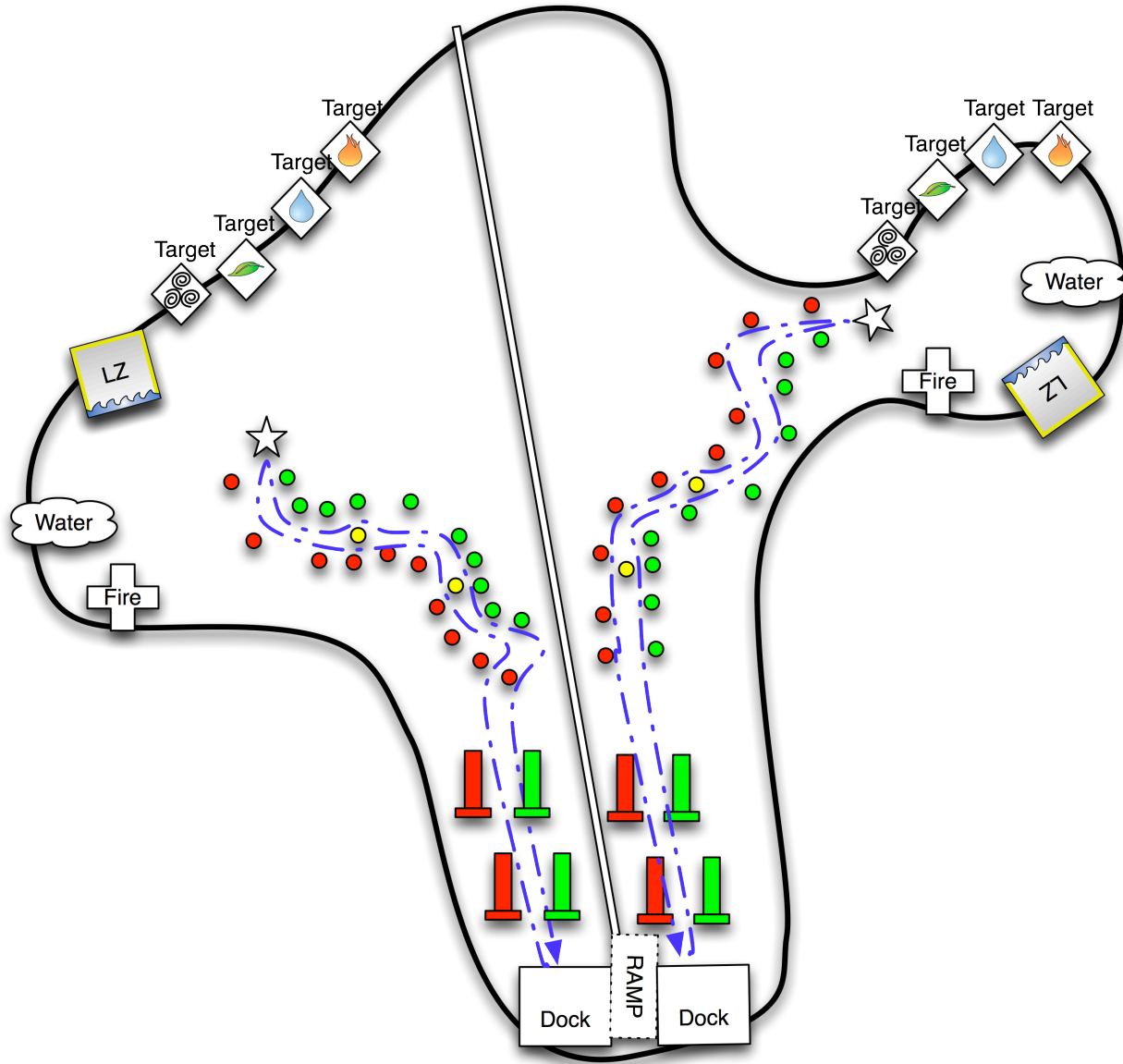
We are in the process of trying to get a ramp to launch the vehicle in the water. Each vehicle should be trailer mountable to be launched from the ramp. Vehicles have to be secure onto their trailer since the ramp will be inclined. More details will come as soon as we can get specifications for the ramp from suppliers.

Time considerations

Once time is started at the beginning of the run, it will not be stopped (even while the vehicle is returning to the dock). The only exception to this rule is if course obstacles are damaged by a natural cause (wind, wave, rain, etc), which would result in time potentially being stopped and a run being restarted (time adjusted) at the judges' discretion.

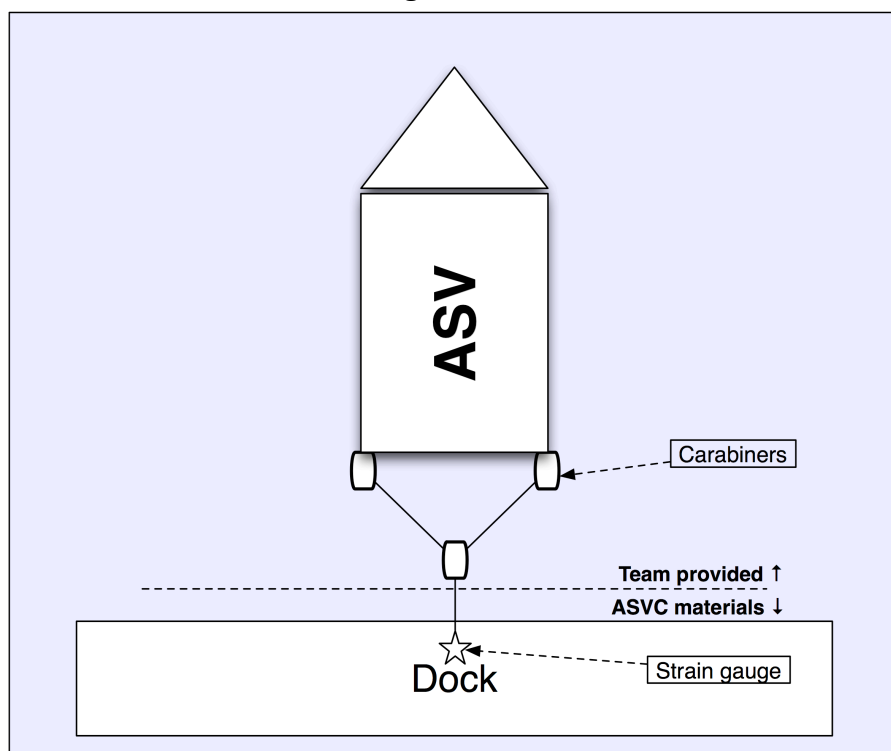
3 Diagrams and illustrations

3.1 Course layout



Map not to scale

3.2 Thrust measurement harness diagram



3.3 Navigation channel diagram

