*10 Underwater Robot Convention in JAMSTEC

Roboticians' Program

Official Guide Book





13-14 March. 2010

Training Pool at JAMSTEC (Yokosuka)

ORGANIZERS

Underwater Vehicle Competitions Forum The Japan Society of Naval Architects and Ocean Engineers IEEE/OES Japan Chapter. MTS Japan Chapter

CO-ORGANIZER

Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

SUPPORTING ORGANIZATIONS

Techno-Ocean Network. Underwater Technology Research Center, Institute of Industrial Science, The Univ. of Tokyo The Univ. of Tokyo Ocean Alliance Faculty of Marine Technology, Tokyo Univ. of Marine Science and Technology

The Goal of this event is to promote friendship between participants and to present opportunity to apply their knowledge and techniques of underwater robotics to solve realistic problems. Another goal is to convey the importance and fun of underwater robotics to the public.

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1, SCHEDULE

The official schedule is shown in Table 1.

13 March: The orientation starts at 11AM, where the basic rules and instructions are explained. The pool is open until 17 PM. All robots have to be checked by a staff member before being submerged into the pool. You can tune your robots using the real field. Technical presentation and workshop will be held after dinner.

14 March: Pool demonstrations are carried out.

Date	Event	Time	Place
13 March	Check in	10:00 - 11:00	Meeting room
(Sat)	Orientation	11:00-12:00	Meeting room
	Lunch	12:00 - 12:45	Meeting room
	Pool open	13:00 - 17:00	Pool
	Dinner	17:15 - 18:00	Seminar room
	Technical presentation	19:00 - 21:30	Seminar room
14 March	Pool open	9:00-9:55	Pool
(Sun)	Opening ceremony	10:00 - 10:15	Pool
	Demonstration (Group A)	10:20-11:50	Pool
	Lunch · JAMSTEC Tour	12:00 - 13:00	Meeting room
	Demonstration (Group B)	13:10 - 14:50	Pool
	Awards ceremony • Closing	15:00 - 15:30	Pool

Table 1. Schedule

2 VEHICLE

- There is no restriction on vehicle types (AUV, ROV, Bio-mimetic and so on).
- The vehicle have to be
 - > able to pass the entrance gate with the width of 160cm.
 - lifted by a crane to the second floor through an isosceles right triangle with a length of each side 288cm (see Fig. 1).
 - \succ less than 0.5 ton (in air).
- If you are going to bring a vehicle requiring an external power source, please inform us beforehand. (Generator is necessary if the required power exceeds 100V-20A)



Fig. 1 Shape of the opening.

3 INSTRUCTIONS

- Pre-registration is required for all the participants.
- Extra oil has to be removed from your robot before in-water deployment.
- Your robot must pass the check of organizing staffs before in-water deployment.
- Be punctual, especially during the pool demonstrations.
 - Your robot should be in the water and ready at least 5 min before its starting time.
 - > Extension of demonstration time is not possible.
- Pool is completely closed from 17:00 on 13 March to 9:00 on 14 March.

4 MISSION RULES

4-1 RATING

- $\boldsymbol{\cdot}$ Each team is rated from the three aspects by the official judges.
 - (1) Weight of the vehicle (Max. 30 points):

30 points are given if the weight is less than 40 kg. 5 points will be reduced for each increase of 5kg. Minimum score is zero. The measurement should be done during the pool open period on the first day.

(2) Technical presentation (Max. 30 points):

Clarity, technical advantage, answering of questions, punctuality and overall impression are evaluated.

(3) Demonstration (Max. 40points)

Total performance is evaluated, including challenge level, performance, transitions, explanation, technical level, design and so on.

• Final ranking will be made public and 1st to 3rd rankers are awarded. Special awards (JASNAOE, IEEE, MTS, (TON)) are given to the teams selected by the judges.

4-2 TECHNICAL PRESENTATION

Each team is asked to present technical points and originality of their vehicle, using PC and handouts. Assigned time is 5 min for presentation and 2 min for discussion. A PC (Windows7, PowerPoint 2007) is available. You can also use your own PC. Handouts are limited to one A4 page.

4-3 DEMONSTRATION

The demonstration is carried out one-by-one, within the assigned time (planned to be 10 min for each team). The way of demonstration is totally free.

Figures 2 and 3 show the training pool of JAMSTEC, the demonstration field. The field consists of two areas with different depth, 1.3m in the shallow area and 3.0m in the deep area. You can use both the "Free area" and the "Mission area" (see Fig. 3).

Four types of missions (Gate, Line tracking, Buoy touch and Landing) are prepared in the Mission area. Further information and actual layout of the courses are not provided. On 13 March you will have the opportunity to visit the pool and tune your robot thereafter.



Fig. 2. Demonstration field (Near side: depth 3.0m, Far side: depth 1.3m) (<u>http://www.geocities.jp/ejiri_takahiro/S_0190_2.html</u>)



I. Gate

Leave the point A (see Fig. 3) and pass the 4 gates set on the floor. The first, second and third gates are gray (natural color of PVC pipes), green and yellow, respectively. They are located in the shallow area. The last gate is in the deep area and painted yellow, with a horizontal bar on its top. The details of the gates are explained in Fig. 4.

Any gate can be skipped. For example, robots are allowed to go to the third gate after passing through the first one.



Fig. 4 Shape of the gates (Left: 1 to 3, Right: final)

II. Line tracking

Leave the point A and go to the point B, following the red line with a width of 5cm laid on the floor. The line consists of straight, curve (R=1 m approx.), right angle and dots, in that order. The idea of the dots is shown in Fig. 5, where the next segment is an extension of the current segment and the length and separation of each segment is approx. 1m. The red line originally laid on the depth border, only the neighborhood of the course (approx. 1.5m in both side), is hidden by white plates.

Going from B to A following the path is considered as a high level mission.



Fig. 5 Dots (black dotted lines are imaginary to show the extensions)

III. Buoy touch

Leave point B and touch a buoy put somewhere in the deep zone. The buoy is an orange sphere with a diameter of approx. 15 to 20 cm, connected to the floor with a thin line with a length of 1 to 2 m.

IV. Landing

Leave the point B and land on a red platform set somewhere in the deep area. The size of the platform is around $1m(width) \ge 2m(length) \ge 0.5m(height)$.