GENERAL INFORMATION

Eligiblity requirements, regional contests, financial assistance, and more for the SCOUT, RANGER, and EXPLORER classes

OVERVIEW

The **MATE Center** and the **Marine Technology Society's ROV Committee** coordinate an underwater robotics (remotely operated vehicle or ROV) competition that includes an international event and a network of 22 regional contests that take place around the world. Students from elementary through college level are welcome to participate in the competition, which includes three different "classes" of vehicles that vary depending on their complexity and the mission requirements.

This year's competition theme highlights the role that ROVs play in the installation, operation, and maintenance of ocean observing systems. Specifically, the competition challenges students to respond to an RFP – request for proposals – from scientists, engineers, and technicians at the University of Washington working on the development of a regional, cabled observatory on the Juan de Fuca oceanic plate in the Pacific Northwest. In addition to installing underwater "hubs" or nodes, students will have to design and build ROVs that can deploy scientific instruments, and remove biofouling organisms from existing equipment installed on the seafloor, among other tasks.

2013 marks the 12th year of the international competition. The event is being held at the Weyerhaeuser King County Aquatic Center in Federal Way, Washington, USA, June 20 – 22, 2013.

Employers (industry, businesses, government agencies, and research organizations) and working professionals are contributing to the event by donating funds, building materials, equipment, and facilities in support of the teams competing in both the international and the regional events. Working professionals are also volunteering their time and technical expertise as mentors, technical assistants, and competition judges.

GOALS

The MATE Center uses underwater robots as a way to get students excited about science, technology, engineering, and math (STEM) and help them to see the practical applications of these subjects. In this way, the MATE Center is working to encourage and motivate students to study STEM and pursue careers in ocean STEM fields.

Specifically, the MATE competition's goals are to:

- Increase the awareness and visibility of marine technical fields, educational and career

opportunities, and potential employers.

- Help students develop the skills necessary to enter careers in technical fields. These skills include the ability to problem solve, think critically, troubleshoot, communicate effectively, and manage projects. These also include "entrepreneurial" skills – the ability to see the "bigger picture" context of their work and to tackle problems in creative and innovative ways. In addition, students develop interpersonal skills as they work together to solve problems and overcome challenges.
- Connect students and educators with employers and working professionals. Working professionals have the opportunity to share their knowledge and experience as team mentors, complementing what students are learning in the classroom. Students can explore potential careers. Employers are able to evaluate students as potential employees.
- Increase students' understanding of the role that ROVs play in the installation, operation, and maintenance of ocean observing systems.

COMPETITION COMPONENTS

Each year the competition focuses on a new theme in order to expose students and educators to the many different aspects of the ocean workplace and the scientific and technological advancements that are taking place.

Regardless of the theme, the competition consists of the following components:

- **Underwater mission tasks**
- **Technical reports**
- **Engineering presentations**
- **Poster displays**

Information about the **RANGER** and **EXPLORER** class underwater missions and design specifications can be found within their respective **Competition Missions** and **Design & Building Specifications and Competition Rules** documents; the **Engineering & Communication** document contains information about the report, presentation, and display for both the **RANGER** and the **EXPLORER** class.

Information about the **SCOUT** missions, design and building specifications, competition rules, and engineering and communication can be found within the **SCOUT Class Competition** document.

AWARD CATEGORIES AT INTERNATIONAL COMPETITION

In addition to the awards based on point scoring (e.g. missions, technical report, engineering presentations, and poster), the MATE Center presents awards in the following categories:

- Sharkpedo award

- Biggest Bang for the Buck
- Design Elegance
- Safety Conscious
- Aloha Team Spirit
- Guts & Glory
- Engineering MVP awards
- Flying Fish award
- gROVer award
- Martin Bowen Memorial Inspiration for Future Engineers award

For a description of each of these award categories and the 2012 award winners, visit www.marinetech.org/2012-mate-international-competition-results.

COMPETITION CLASSES

There are three classes in which teams can compete – **EXPLORER, RANGER,** and **SCOUT**. (Note that the SCOUT class is not currently available at all of the MATE regional contests. See **REGIONAL CONTESTS** below for more information.) The specific eligibility information for each of these classes is included below.

PARTICIPATION FEE FOR EXPLORER AND RANGER TEAMS

Teams registering for the 2013 MATE competitions are required to pay a participation fee. This fee is for RANGER and EXPLORER class ONLY (not SCOUT) and is your team's commitment to participate in the competition. The fee will be returned to your team in the form of lunches, trophies, and prizes at your regional or international competition event.

The participation fee is $100 per EXPLORER team and $75 per RANGER team. Your team is not officially registered until your registration fee is paid. Information about the fee, including how to pay, is included on the registration form. Teams participating in regionals that take place outside of the U.S. may be exempt from this fee (the registration form will tell you). MATE accepts VISA and MasterCard, checks made out to MATE/MPC, and money orders. The address where to send checks and money orders is included on the registration form.

Participation fees will NOT be refunded or applied to "next year" should your team withdraw from the competition. Regional winners moving on to the international competition are NOT required to pay another registration fee UNLESS they have not already done so.

ELIGIBILTY – GENERAL

(See below for eligibility as it applies to specific competition classes)

- Open to middle school (grades 5-8), high school (grades 9-12), community and technical college, and four-year university students as well as home-schooled students of comparable

grade levels. Students of comparable grade levels participating in afterschool programs or organizations such as the Boys & Girls Club or Boy/Girl Scouts are also welcome to compete.

- Elementary school (grades K-4) students are eligible to participate, but only in the SCOUT class and only if their regional event can accommodate their participation. Contact the regional coordinator in your area for more information.
- Middle school students are eligible to compete in the SCOUT and RANGER classes ONLY. High schools that have previously participated in the RANGER class may apply to compete in the EXPLORER class (see the registration form for more details).
- Graduate students are NOT eligible to compete as student team members, but are welcome to serve as team mentors or lead instructors. Graduate students are encouraged to contribute to the team via advice and technical assistance.
- Students can participate in the competition as a part of a school course, afterschool program, club, or community organization. However, regardless of how the team is formed, it must demonstrate that 1) the participating students fall within the eligible grade levels and 2) if minors, the students are working under the supervision of a responsible adult mentor.
- Teams can consist of students from different schools and/or grade levels.
- Teams must have at least three students with at least one faculty member or adult mentor involved in the process. One student should be designated as the team captain/company CEO.
- The role of the faculty member or adult advisor must be limited to educational and inspirational support. Actual construction of the vehicle, particularly in the complex electrical and software areas, must be completed by the students. Students will be questioned extensively by the judges on their role in designing and building the ROV.
- Individuals from industry, businesses, research organizations, and/or government can act as mentors during the design and building process. The role of these individuals must be limited to technical guidance. Industry mentors should not participate in the actual construction of the vehicle.
- Teams competing in the EXPLORER and RANGER classes are discouraged from using complete, commercially available, off-the-shelf, plug-and-play systems. Teams will not be disqualified from competing for using these types of systems, but the engineering evaluation and technical report score sheets will reflect MATE's efforts to discourage their use. See the **Design & Building Specifications and Competition Rules** document for specific information.

The competition organizers will review the registration forms. Students and/or instructors may be asked to verify that students are of eligible grade level and, if minors are participating, that the team is working under the supervision of a responsible adult mentor who understands the liability that he/she is taking on by overseeing the project.

EXPLORER class eligibility

Grade level

- Participation in the EXPLORER class is open to students in community and technical colleges and four-year universities.
- High school students (and students of comparable grade levels) participating in the MATE ROV competition for the first time are NOT eligible to compete in the EXPLORER class.
- High school students (and students of comparable grade levels) who have previously competed in the RANGER class can apply to compete in the EXPLORER class.
- High school students (and students of comparable grade levels) who have previously competed in the EXPLORER class must also apply, making sure to indicate the total number of returning team members. See the competition registration form for details.
- Elementary and middle school students are NOT eligible to compete in the EXPLORER class.

Number of teams

- Two teams per school are permitted provided that they come from different departments and/or campuses and that there are no common mentors or students (i.e., faculty can only mentor one team and students can only participate on one team).
- Schools with two (or more) teams that do not meet these criteria are encouraged to hold an in-school run-off to determine which team will represent their school at the international competition.
- High schools are not permitted to enter more than one team per school even if they do meet the above criteria.

EXPLORER class demonstration requirement

EXPLORER class teams are required to demonstrate that their vehicle can 1) maneuver under its own power and 2) complete the first 4 steps of mission task #1 prior to the international competition (see the **EXPLORER Class Competition Missions** document for details). **Note:** EXPLORER class teams will be demonstrating on RANGER class missions, but the first 4 steps of mission task #1 are identical between EXPLORER and RANGER class.

EXPLORER class teams must attend the regional contest geographically closest to them on the date of the event to demonstrate to the regional coordinator (or other designated competition official) that their vehicle can accomplish the tasks described above. If teams are located equidistant from two or more regionals, the MATE competition coordinator and the coordinators of those regionals will discuss with the team which regional is most appropriate.

Prior to the contest, the regional coordinator will contact the EXPLORER class teams within his or her region to arrange a time during the regional event for this demonstration to take place. The regional coordinator will then submit an e-mail to the MATE competition coordinator verifying that the team's vehicle can (or cannot) accomplish the tasks listed above. If the team's

vehicle cannot accomplish these tasks, the team is not eligible to participate in the international competition. There are no second attempts for demonstrations.

International teams that are not located near a regional event should contact the MATE competition coordinator at jzande@marinetech.org so that other arrangements can be made for their demonstration.

Regardless of where the demonstration takes place, the water depth for the demonstration must be greater than 1.5 meters.

Note: EXPLORER class ROVs must conduct their demonstrations at 48V and follow all EXPLORER class power specifications. EXPLORER class teams conducting their demonstrations using an impartial individual must provide their own 48V power source for this demonstration; teams conducting their demonstrations at regional events may or may not be required to provide their own power and should discuss this with their respective regional coordinators.

In addition, on the day of their demonstration EXPLORER class teams must submit – in both hard copy and electronic form – a copy of their Company Spec Sheet to the regional coordinator or impartial individual overseeing their demonstration. Teams must submit an electronic copy of their spec sheet to the MATE competition coordinator at jzande@marinetech.org on the day of their demonstration. See the **Engineering and Communication** document for more information about this spec sheet and its required information.

Teams that modify their vehicles between the time of their demonstrations and the international competition must submit a list that describes the specific modifications along with their revised **Company Spec Sheet** to the MATE competition coordinator 4 weeks prior to the international competition. (See the **Engineering and Communication** document for more information about this submission.) These teams must also be prepared to explain their modifications to the safety check officials and the judges presiding over their engineering presentation during the international event.

RANGER class eligibility

Grade level

- Participation in the RANGER class is open to students in middle (grades 5-8) and high (grades 9-12) schools as well as students in home schools, afterschool programs, clubs, and community organizations of comparable grade levels.
- Students attending community and technical colleges and four-year universities competing for the first time are also eligible to participate in the RANGER class. Note that “first time” is defined as students AND instructors/mentors who have not participated previously.

Number of teams

- Two (or more) teams per school/instructor are permitted provided that the regional contest in which these teams are participating has the resources to host more than one team AND that there are no common students (i.e., students can only participate on one team).
- Where the regional event cannot host more than one team per school/instructor, teams are encouraged to hold an in-school run-off to determine which team will represent their school/instructor at the regional contest.

ALL RANGER TEAMS MUST PARTICIPATE IN A REGIONAL

All teams participating in the RANGER class are required to take part in a regional event. Teams that win their regional event can move on to compete in the RANGER class at the international competition. (See **REGIONAL CONTESTS** below for information on the number of winners that move on from each regional.)

Teams will be assigned to the regional that is geographically closest to their location. If teams are located equidistant from two or more regionals, the MATE competition coordinator and the coordinators of those regionals will discuss with the team which regional is most appropriate. International teams competing in the RANGER class that are not located near a regional event must participate in a demonstration requirement similar to the EXPLORER class. Contact the MATE competition coordinator ASAP if your team falls into this category.

SCOUT class eligibility

See the **REGIONAL CONTESTS** below for a listing of those events that offer a SCOUT class competition.

Grade level

- Participation in the SCOUT class is open to students in elementary (grades K-4), middle (grades 5-8), and high (grades 9-12) schools as well as students in home schools, afterschool programs, clubs, and community organizations of comparable grade levels.
- Note that elementary school students may only participate if their respective regional coordinator approves their registration. Also, in regions that have different school grade configurations, the SCOUT class age requirement may vary. Contact the regional coordinator in your area for more information.

Number of teams

- Two (or more) teams per school/instructor are permitted provided that the regional contest in which these teams are participating has the resources to host more than one team AND that there are no common students (i.e., students can only participate on one team).
- Where the regional event cannot host more than one team per school/instructor, teams are

encouraged to hold an in-school run-off to determine which team will represent their school/instructor at the regional contest.

Please see the respective **Competition Missions** and **Design & Building Specifications and Competition Rules** documents for detailed information about the EXPLORER and RANGER competition classes. Information about the SCOUT class rules, specifications, and missions can be found within the **SCOUT Class Competition** document. You can also visit the competition's web site at www.marinetech.org/rov-competition-2.

INTERNATIONAL COMPETITION VENUE

The 2013 international competition is being held at the Weyerhaeuser King County Aquatic Center located in Federal Way, Washington, USA. Photos of the venue will be posted to the MATE Flickr account. You can also visit www.kingcounty.gov/recreation/parks/pools.aspx.

Detailed information about room and board as well as transportation, shipping, local resources (such as hardware and electronics stores), and more will be posted to the competition web site at www.marinetech.org/events as it becomes available.

REGIONAL CONTESTS

In 2013, the MATE Center is supporting and helping to organize 22 regional contests in the U.S., Canada, Hong Kong, Scotland, Japan, and Egypt. These regionals serve as feeders into the international competition's **RANGER** class, with the top one or two teams from each regional contest "winning" the opportunity to advance to the international competition.

For example, the top ONE team from regionals with 10 or less individual SCHOOLS PARTICIPATING ON CONTEST DAY can advance to the international competition, while the top TWO teams from regionals with more than 10 individual SCHOOLS PARTICIPATING ON CONTEST DAY can advance to the international competition.

The regional contest "hosting" the international competition can send one additional team to the international competition. For example, if the regional has less than 10 individual schools participating, they would send one plus one additional team, for a total of two, to the international event.

Several regional contests also offer a **SCOUT** class competition. These are indicated by an asterisk (*) below.

The following regional events are currently scheduled to take place in 2011:

▼ **Big Island** (Hilo, Hawaii)*

▼ **Carolina** (Myrtle Beach, South Carolina)

- **Florida** (Cocoa, Florida)*
- **Great Lakes** (Alpena, Michigan)*
- **Oahu** (Honolulu, Hawaii)*
- **Hong Kong** (Hong Kong)
- **Mid-Atlantic** (Hampton, Virginia)*
- **Monterey Bay** (Monterey, California)*
- **New England** (Buzzards Bay, Massachusetts)*
- **Newfoundland & Labrador** (St. John's, Newfoundland and Labrador)*
- **Nova Scotia** (Halifax, Nova Scotia)
- **Oregon** (Lincoln, Oregon)*
- **Pacific Northwest** (Seattle, Washington)*
- **Philadelphia** (Philadelphia, Pennsylvania)*
- **Scotland** (Aberdeen, Scotland)
- **Shedd Aquarium-Midwest** (Chicago, Illinois)*
- **Southern California** (Long Beach, California)*
- **Southeast** (Savannah, Georgia)*
- **Texas** (Houston, Texas)*
- **Wisconsin** (Milwaukee, Wisconsin)
- **Japan** (Tokyo, Japan)
- **Egypt** (Cairo, Egypt)

For more information about the regional contest nearest you, visit www.marinetech.org/events.

KEY MILESTONES AND SCHEDULE OF EVENTS FOR THE INTERNATIONAL COMPETITION*

Key milestones:

- December 21st – general information, design specs, and competition rules posted
- January TBD – on-line registration form posted
- April 1st – application for travel assistance posted
- May 17th – deadline for submitting application for travel assistance
- May 23rd – technical reports due to MATE competition coordinator
- June 20th – 22nd – international competition held at the King County Aquatic Center in Washington
    - Engineering & poster presentations due

***Note:** These are milestones that apply to the international competition **only**. Regional contests are held prior to the international event and may have their own sets of key milestones, including registration deadlines. See www.marinetech.org/events for information specific to the regional contests.

*******Example***** schedule of international competition events:**

- Wednesday – teams arrive & check-in
    - Vehicles shipped or hand-carried to competition venue
- Thursday – set-up & pool practice day
    - Welcome & introductions in morning
    - Set-up team workstations & posters, competition arena, and repair station
    - Practice time available
    - Evening social mixer/reception **(attendance required)**
- Friday – engineering presentations & underwater missions
    - Engineering evaluation interviews
        - Teams have scheduled time slots
    - Underwater mission challenges begin
        - Teams have scheduled time slots
    - Free time and optional facility tours when not competing
- Saturday – underwater missions & awards
    - Underwater mission challenges continue
        - Teams have scheduled time slots
    - Free time and optional facility tours when not competing
    - Evening awards ceremony
- Sunday – teams depart

FUNDING AND BUDGET

There is no limit to the amount of money, time, and technical expertise that can go into designing and building your team's vehicle. However, keep in mind that a costlier vehicle does not necessarily mean that the vehicle will perform better or will be better able to successfully complete the mission tasks.

The MATE Center offers each team the following support:

- **Opportunity to apply for financial assistance (up to $500).**
  Teams participating in the international competition can apply for funds (up to $500) to help offset the cost of travel and lodging for STUDENT team members. The application for financial assistance will be posted to the competition web site by April 1st, 2013.

  Note: Travel funds and/or lodging accommodations may be available for teams competing in regional events; teams should contact the regional contest coordinator in their area for more information.

- **Meals – kick-off reception, lunches, and awards banquet.**
  A kick-off reception, lunches on two days (first and second day) of the event, and an awards banquet will be provided to student team members, instructors, and mentors attending the

international competition. Parents, spouses, siblings, cheerleaders, etc. will be able to purchase tickets for the reception and awards banquet (but **NOT** lunches) in advance.

Note: Meals may be provided to teams competing in regional events; regional teams should contact the regional contest coordinator in their area for more information.

- **Special offers from competition sponsors.**
  Several companies offer their products, materials, supplies, and/or access to equipment and facilities to competition teams at no or reduced costs.

  For example, VideoRay's "MATE ROV Competition Store" is available to competition teams **only**. This on-line store offers discounts on cameras, tethers, and, possibly, thrusters, among other items. Carrillo Underwater Systems (CUS) offers a scholarship for free and/or discounted products, and Sound Ocean Systems, Inc. offers free umbilical cable provided teams cover shipping costs.

  SolidWorks provides student edition versions of its software to ALL student members of MATE ROV teams at no cost. Igus, Inc. offers a range of its products at no-cost, while VANTEC, Lights Camera Action LLC, and Parallax offer discounts on certain products.

  Information about these offers and others is included within the "teams' only" section of the competition web site located at www.marinetech.org/team-info.

- **Resources and "teams' only" sections of the ROV competition web site.**
  The resources section of the ROV competition web site located at www.marinetech.org/team-info contains information on where to purchase building materials, and lists of helpful web site and books, among other resources.

  The URL for VideoRay's on-line store, CUS scholarship program, etc., and other information and support available only to MATE competition teams are posted within the teams' only section. Information on potential funding sources at both the international and regional level (e.g., local Rotary Clubs, American Association of University Women, etc.) is also included there. Teams will receive the username and password to access the teams' only section once their registration has been accepted.

- **Access to industry mentors.**
  The MATE Center and the regional coordinators work to connect students with industry professionals willing to donate their time and technical expertise as team mentors. Several regionals have developed extensive mentor networks utilizing members of their local MTS section, for example. Contact the MATE Center or the regional coordinator in your area if

you are interested in connecting with an industry mentor.

- **Additional costs.**
  Teams are encouraged to organize their own fundraising activities to cover building materials, travel, housing, and meal costs above and beyond what the MATE Center provides. The teams' only section of the ROV competition web site includes fundraising tips as well as "tools" (e.g. the MATE logo, a press release template, etc.) that teams can use to support their fundraising activities.

  In addition, the following items are your team's responsibility:
  - The participation fee.
  - Shipping your ROV system and tools to competition venue.
  - Costs associated with fundraising or presentations to community.
  - Miscellaneous expenses for photocopying, phone calls, shipping costs associated with ordering ROV components, mailings, courier, etc.