

European Robotics League Emergency Robots: a multi-domain outdoor robotics challenge



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Vision

- The **European Robotics League (ERL)** is a **novel common framework** for two indoor robotics competition (Service Robots and Industry Robots) and one outdoor (Emergency Robots).
- ERL aims to establish as the leading European competitions to become the **robotics “UEFA Champions League”**, in which best EU institutions compete in local competitions to qualify for the major tournaments (the finals).

❑ ERL Service Robots (indoor)



❑ ERL Industry Robots (indoor)



❑ ERL Emergency Robots (outdoor/indoor)



European Robotics League (ERL) Emergency 2017 Piombino (Italy), 15-23 Sept. 2017



Search & rescue robotics challenge – Multidomain Competition
Sea – Land – Air

- To provide **real-world robotics challenges** that will test the intelligence and autonomy of outdoor robots in demanding mock disaster-response scenarios.
- A competition with a post disaster scenario inspired by the **2011 Fukushima accident**, that can only be met with a combination of air, land and sea robots **working cooperatively**.
- **Focus on heterogeneous team working of autonomous vehicles.**

ERL Emergency background



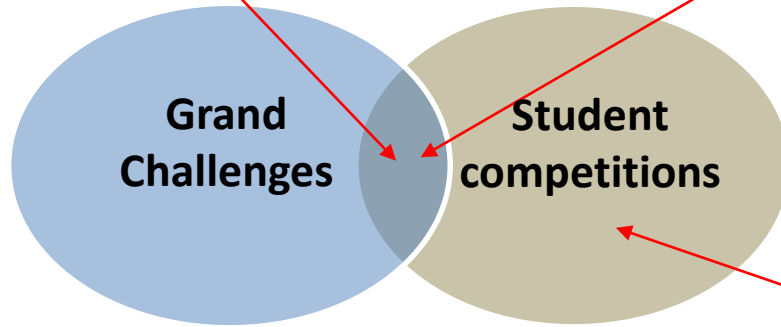
euRathlon 2015 Grand Challenge, Piombino (Italy), 2015, first world's multi-domain robotics competition

2015

2017



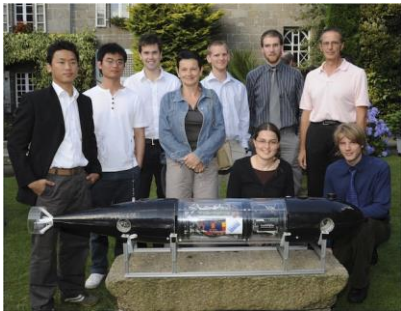
ERL Emergency Robots 2017, Piombino, 15-23 Sept. 2017



2006-now



The student Autonomous Underwater Challenge-Europe (SAUC-E)



challenge (DRC), A), June 2015



environmental conditions)

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FIRST LEGO GENOVA
League Qualifier

High level aims

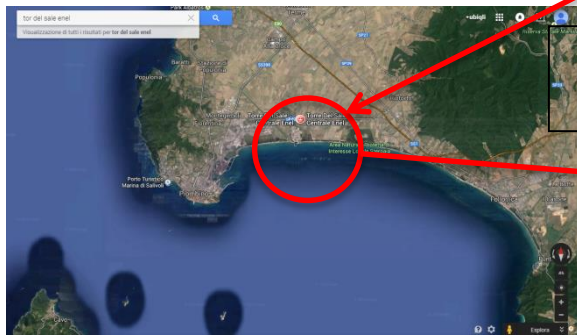
- To spur advances in practical, usable real-world intelligent autonomous robots
 - The world's unique competition which *combines ground, underwater and air robots*, that require intelligent autonomous robots to work together in disaster response scenarios
 - Pushing the state-of-the-art in *multi-robot collaboration, cooperation and shared situation awareness* to tackle real-world complex tasks in dynamic environments.
 - An open and user-led process of *defining the multi-robot competition scenarios, and related standards* for outdoor robotic vehicles
 - An open process for creating research, *industry and user-recognised benchmarks* for robot performance measurement and comparison
 - Interdomain cross-fertilization
 - *Workshops* that foster a community of competitors
 - Imagination grabbing competitions

Scenarios inspired by the 2011 Fukushima-Daichi accident to prepare the 2015 Grand Challenge

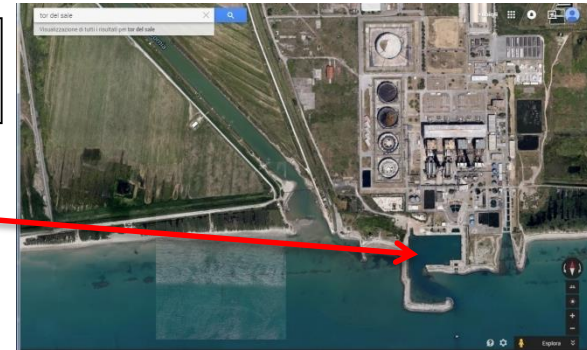


An industrial devastated area and marine robots to intervene

Piombino, Italy, the venue of the ERL Emergency Robots 2017



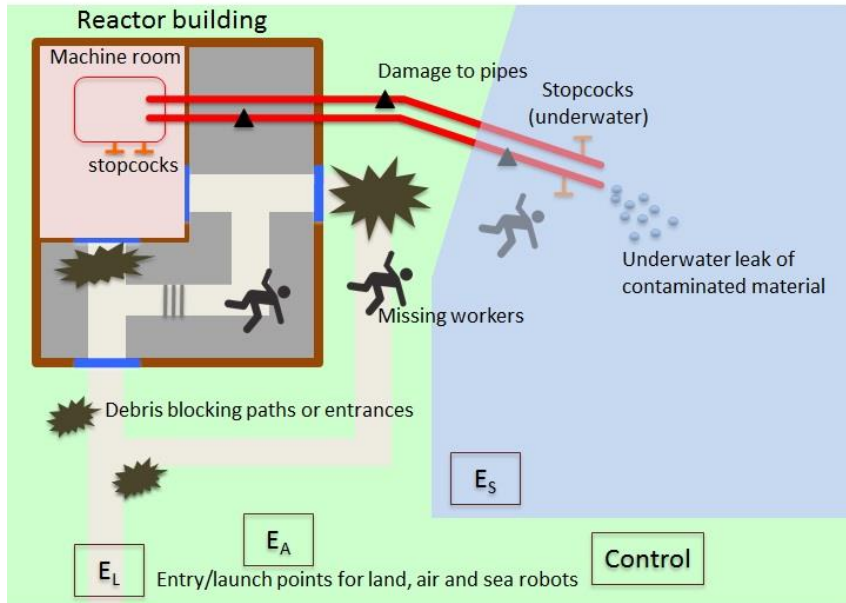
Competition area - surroundings of
Tor del Sale ENEL electric power plant



Conference area at Piombino Castle

Robot demos/talks in Piazza Bovio

ERL Emergency Robots 2017 missions



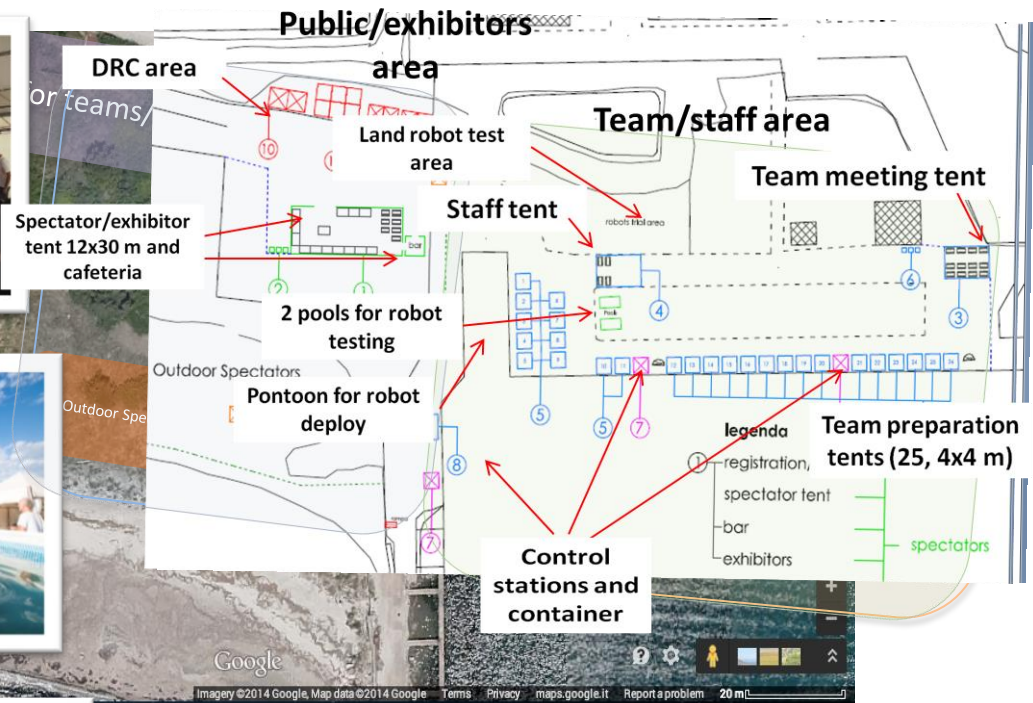
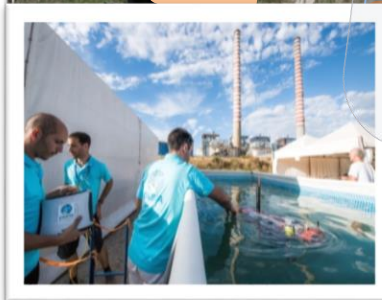
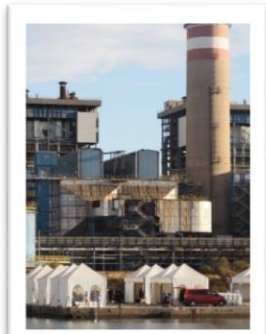
A – Find missing workers bringing to them an emergency kit

B – Survey and monitor the incident area

C – Stem the leak closing the right stopcock in the building and underwater



Public/exhibitors and team area



ERL-ER more than a competition: an international event of robotics

Results from euRathlon 2015:

- euRathlon 2015 and ERL-ER are the **unique multi-domain S&R robotics competition** in the world.
- A complex event staffed in total by 78 people including 20 judges for 10 competition events (14 from Europe and 6 from US).
- A great **success** under different points of view:
 - ☐ Good quantitative (16 from 10 countries, ~130 people) and qualitative team participation: e.g. Girona, Cobham, Bebot, ICARUS.



Winner of euRathlon 2015 Grand Challenge: ISEP/INESC TEC (Air), Team Cobham (Land) and Universitat de Girona (Sea)

- ☐ Great connections with international professional associations (IEEE OES, IEEE RAS), EU projects (ICARUS, Robocademy, RoCKIn, Robot-Era) and other robotics competitions (RoCKIn, DRC).

euRathlon 2015 Grand Challenge and now ERL-ER established as the leading EU robotics competition in search & rescue.



Prof. Rene' Garello, IEEE OES President



Prof. Satoshi Tadokoro, IEEE RAS President Elect and Adam Jacoff (NIST) awarding ICARUS team with the SSRR Award for Autonomy

- ☐ Thanks to a strong dissemination we raised the interest of local and national media (more than 120 positive articles only in the last 2 months, >10 media visits, 6 TV videos, etc.).



«Che bello vedere il top della robotica nella mia Piombino»
Oggi si chiude EuRathlon, parla il direttore Gabriele Ferrè: «Tifoso ingegnere, le macchine servono in ambito civile»



euRathlon 2015: more than a competition – an international robotics event for the general public

- 2 nights (20-21 Sept.) of robotics talks by keynote speakers at Piombino Castle for general public.
- 12 exhibitors (company, academia) and Robot-Era EU project (socially assistive robots) demonstration on 22 Sept., by Scuola Sant’Anna, Pisa, in Piazza Bovio, Piombino (~300 people attending).



Robot-Era demonstration in Piazza Bovio



Prof Paolo Dario (Scuola Sant’Anna of Pisa) presenting on the Biorobotics Institute



Prof. A. Caiti (University of Pisa) presenting on underwater robots for archaeology

- Exhibition of two robots from **Darpa Robotics Challenge: WALK-MAN** from Genova, Italy, and **DRC-HUBO** from Kaist, Korea, winner of 2015 DRC.

- Strong interest of general public and schools (~ 1200 visitors), involvement of Piombino community (local associations, schools, etc.).



Public during the DRC exhibition



Visits of schools during the competition



Beppe Grillo, Italian political activist during a visit to euRathlon 2015



DRC-HUBO robot from Team KAIST

Creating the partnership

- **Patrons:**



Piombino Municipality



Province of Livorno



MINISTERO DELL'AMBIENTE
E DELLA TUTELA DEL TERRITORIO E DEL MARE

- **Platinum sponsor:**



- **Silver sponsor:**



- **Bronze sponsor:**



- **Suppliers:**



- **Supporters:**



- **Local supporters:** Scuole Superiori di Piombino, Associazione Ciclistica Piombinese, Porticciolo Salivoli, Pubblica Assistenza, Fotoclub Rivellino

Conclusions

- **ERL Emergency Robots** established as the **leading competition** in Europe for **S&R**.
 - Good quantitative (21 for ~ 9 multi-domain teams) and qualitative participation.
 - Great opportunity for community building: **inter domain cross-fertilization**, connections with international associations (IEEE OES and IEEE RAS), EU projects and companies.
 - Unique opportunity for training new generations of scientists/engineers.
 - **More than a robotics competition**: an international robotics event to disseminate robotics. **Strong interest and involvement of general public and schools** - key driver to raise the **social awareness** about robotics.
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- Complex logistics.
 - Importance of sponsors** to increase prizes and travel support for the teams:
 - Funding for robot development is crucial. Dissemination is therefore crucial.
 - Competition periodicity is a key driver to allow teams to grow:
 - Economic sustainability?
 - Robotics competitions as part of the academic curriculum?
 - Importance to involve industry and end-users (also for designing together tasks of interest).

**Be part of ERL Emergency! As sponsor/exhibitor or being
our guest**

We are waiting for you in Piombino



contacts:

https://eu-robotics.net/robotics_league/erl-emergency

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