
# DR 8.8: International Conference

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This deliverable describes the TRADR Technical Day 2017 organized by the Gezamenlijke Brandweer in Rotterdam, The Netherlands and the End-User Symposium in March 2018 organized by CNVVF in Mestre, Italy.

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## Executive Summary

This deliverable describes two end user events which were organized in the final year of the project: the Robot-Assisted Disaster Response Technology Day, organized by the Gezamenlijke Brandweer on 17 November 2017 in Rotterdam; and the Final End-User event, organized by the CNVVF on 23 March 2018 in Mestre, Italy. The program of these events consisted of presentations of the final results of the TRADR project and of robot technology adopted by the end-user organizations, complemented by demonstrations and discussions. These events targetted end users. They concluded the efforts undertaken in TRADR to raise awareness of robot-assisted disaster response technology among end user organizations.

## Role of raising awareness among end users at national and international level in TRADR

TRADR has as a non-scientific goal to contribute to develop a culture of using robots in training and emergency cases, network between TRADR and national disaster response instances and share information about robot-assisted disaster response with the end users. The events we have organized at the end of the project directly contributed to this goal.

# Robot-Assisted Disaster Response Technology Day

On behalf of the consortium of the European project TRADR (Long-Term Human-Robot Teaming for Robot Assisted, the Disaster Response), the Gezamenlijke Brandweer, Netherlands organized the Robot-Assisted Disaster Response Technology Day, that took place on 17 November 2017 in Rotterdam.

During the Technology Day we have shown the achievements and shared insights gained during the 4 years of the project, including experience from the **TRADR deployment in Amatrice,** Italy, shortly after the earthquake in 2016, as well as the industrial use case experiments carried out in **2016 in Dortmund** and in **2017 in Rotterdam**.

More than 60 guests from the Netherlands and abroad gathered on the premises of the RDM Congress Center in Rotterdam on November 17 2017 for the TRADR Technology Day. Most of them represented various Firebrigade organizations, several came from robotics companies and some from universities and research institutes. The program of the day consisted of presentations, discussions, a poster session and demonstrations of the TRADR integrated system.

In the introduction about the TRADR project the coordinator Ivana Kruijff-Korbayová explained the TRADR goals, approach and outcomes. She stressed the importance of the close collaboration between researchers and end users in TRADR, which has also enabled the project to deploy its technology in a real disaster response after the earthquake in Amatrice, Italy in 2016.

Martijn Zagwijn, information management specialist of Firebrigade Twente introduced the drone project he is leading. The drone project provides disaster management support and has been in operation since January 1 2016 after two years of preparations, needed to comply with all regulations. Currently it is being extended to a nation-wide project.

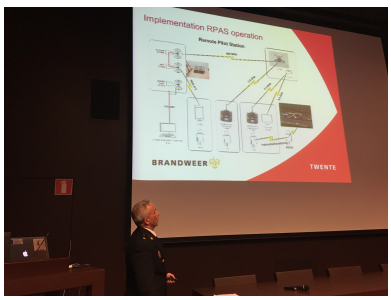


*Figure 1: Martijn Zagwijn, Firebrigade Twente*


*Figure 2: Hauke Speth (Firebrigade Dortmund)*

Hauke Speth, head of the Training Department and Institute for Fire and Rescue Technology at City of Dortmund Fire Department reviewed the experiences of the Dortmund Firebrigage with the use of robots in the research projects ANCHORS and TRADR and the ensuing inclusion of a drone as part of their regular incident response capability. He stressed that it is essential that operators be used to deploy the systems in everyday practice, and underlined the importance of collaboration between research, industry and end users in order to advance the use of robots for disaster response.

During the poster session the TRADR project partners presented their results in a broad range of areas: learning for exploration, detection and 3D mapping; learning and modelling for terrain perception and robot control; perception and control for manoeuvring and manipulation; multi-robot localisation and change detection; multi-robot autonomous patrolling and exploration; 3D mapping for UAVs; human-robot teamwork modelling; enhancing human-robot team performance with work agreements; team communication processing; user strategy for tactical command.

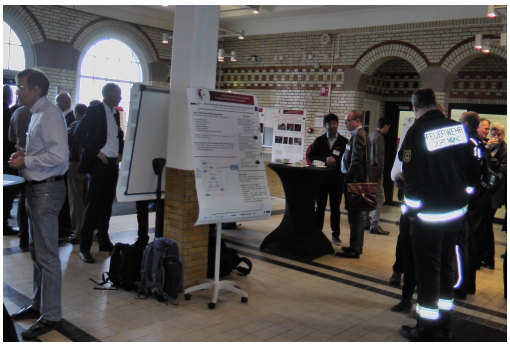

*Figure 4: Poster session*

*Figure 4: System demonstration*

The TRADR integrated system was presented in action in a simulated incident response mission enacted at the Deltalinqs training plant. End users from the Gezaamenlijke Brandweer controlled the TRADR ground robots to explore the incident area, locate victims, identify hazard sources and collect samples. The guests could observe the mission progress in the TRADR command post, where they could see how TRADR supports situation awareness of the team, and in the field, where they obtained

explanations about the robot capabilities, including mapping, autonomous terrain traversal, guided manipulation and multi-robot patrolling and exploration. Since the regulations did not allow the team to fly the TRADR UAVs, the capabilities for UAV 3D mapping and data collection were explained using Video material.

Finally, discussion sessions gave the participants the opportunity to exchange experience and opinions about the current and future use of robots in incident response, the obstacles that block robot use and how to overcome them. The representatives of the Dutch Firebrigade organizations used the opportunity to discuss how to synchronize their efforts at the national level.

The TRADR Technology Day provided a forum for fruitful discussions and establishing new contacts. We hope that it has made a useful contribution to the future of robot-assisted disaster response. A **video** from the event can be found on YouTube (URL: https://youtu.be/lX_Vz-7YFB0)

GB gezamenlijke brandweer

Long-Term Human-Robot Teaming for Robot Assisted Disaster Response

# TRADR Technology Day

## Robotics and AI technology Use in Disaster Response

**Friday 17th November**

**Venue:** Congrescentrum, Heijplaatstraat 17-23, 3089 JB Rotterdam,The Netherlands

TRADR develops technology for human-robot teams to assist in disaster response, using ground and air robots, in realistic missions spanning multiple days. We address a range of issues, from motion, navigation and mapping in complex changing environments, to human-robot team mission management support. First responders from the Italian Firecorps, the Firebrigade of the City of Dortmund in Germany and Gezamenlijke Brandweer in the Netherlands, are involved in the TRADR development cycle, from design to prototype testing. They provide input and feedback, experience the technology and become aware of its potential and current limitations, to in the end facilitate its uptake.

| | | | |
|---|---|---|---|
| **9:30 – 10:00** | Registration and welcome coffee | | Foyer |
| **10:00 – 10.05** | Welcome | | Aula |
| **10:05 - 10:30** | TRADR project overview | I. Kruijff-Korbayová | |
| **10:30 – 12:00** | Robots in use: End-user experiences<br><br>Dutch firebrigade:<br><br>Italian firebrigade:<br><br>German firebrigade: | <br><br>**Martijn Zagwijn**, Fireregion Twente, NL<br><br>**tbc**, Vigili del Fuoco, Italy<br><br>**Hauke Speth**, Feuerwehr Dortmund, Germany | |
| **12:00 - 13:00** | **Lunch and poster session** | | Foyer |
| **12:50** | Group 1 departure by bus to demo site | | |
| | | | |
| **13:00 – 14:00** | **Parallel sessions:**<br>Group 1: TRADR system demonstration<br>Group 2 : Discussion | | <br>Deltalings training plant<br>Conference room |
| **13:50** | Group 2 departure by bus to demo site | | |
| **14:00 – 15:00** | **Parallel sessions:**<br>Group 1: Discussion<br>Group 2: TRADR system demonstration | | <br>Conference room<br>Deltalings training plant |
| **15:15** | Closing remarks | | Aula |
| **15:30** | **Drinks, snacks and farewell** | | Foyer |
| **16:00** | End of the day | | |

*Figure 5: The Schedule of the Technology Day*

## Final End-User Event

On 23rd March 2018 Italian firefighters organized an end-user event in Mestre, directly following the final review meeting.

First, representatives of various parts of the CNVVF gave presentations about their activities, including typical issues of rescue in densely populated area in the Venice region, usage of UAVs in rescue operations and applied topographic techniques for rescue activities (TAS). This last one is useful to better understand an emergency scenario, during the reporting and mapping operations and, most important, to support the management during all the rescue activities. It was applied in recent earthquakes (Abruzzo 2009, Emilia Romagna 2012, Middle Italy 2016, Ischia 2017) in marine scenarios like Costa Concordia Ship Emergency (2012), in forest fires (2013, 2017), building special tridimensional reconstructions of Canadair flights during the extinction operations, in Urban Search and Rescue activities, in Water rescue activity during floods and, last but not least, in rescue approach in industrial risks and emergencies. These applied topographic techniques to rescue activities permit, with GPS devices and Geographic information system - GIS software (Ozi explorer and Global mapper), to edit maps richest of several informations about the real situation on crisis field in order to support local disaster manager. In the next future the prospective is that drones, robots and firemen will work together with support on these new techniques and technologies in order to improve the coordination resources and to reduce the time involved in the scenario.

Sylvia Pratzler from the Dortmund Firebrigade, Germany, presented the use of drones to support management of large scale events. Dominic can der Velde from Gezamenlijke Brandweer, the Netherlands, presented typical issues of indident response in the Rotterdam region. Finally, Ivana Kruijff-Korbayová summarized the results of the TRADR project, which were the outcome of a successful and mutually enriching collaboration with the end users.


*Figure 6: Presentations during the Final End User Event*

# TRADR
# End-user event

**Robotics and other technologies used in Disaster Response**

***TRADR** develops technology for human-robot teams to assist in disaster response efforts, using ground and air robots, in realistic missions spanning multiple days. We address a range of issues, from motion, navigation and mapping in complex changing environments, to human-robot team mission management support. End-users, first responders from the Italian Fire Corp, the Fire Department of the City of Dortmund in Germany and Gezamenlijke Brandweer in the Netherlands, are involved in the TRADR development cycle, from design to prototype testing. They provide input and feedback, experience the technology and become aware of its potential and current limitations, to in the end facilitate its uptake.*

**Friday 23rd March**

**Venue:** Comando Provinciale Vigili del Fuoco, Strada della Motorizzazione Civile 6, 30174 Mestre Venice, Italy

**09:30 – 09.45** *Welcome*
Fabio DATTILO, CNVVF, Director of the Veneto Region, Italy
Ennio AQUILINO, CNVVF, Local Commander of Venice, Italy

**09:45 – 10.05** *National Italian Fire Corp Organization - CNVVF and typical aspects of rescue in the venetian territory*
Francesco PILO, Lieutenant Colonel, Comando Provinciale Vigili del Fuoco Venezia, CNVVF, Italy

**10:05 – 10:30** *Using Remotely Piloted Aircraft Systems - RPAS in rescue operations of Italian National Fire Corp*
Onofrio LORUSSO, Lieutenant Colonel, CNVVF, Air Rescue Coordination Office, Italy

**10:30 – 10:55** *Applied Topographic techniques to Rescue activities (TAS)*
Alessandra BASCIÀ, Lieutenant Colonel, Comando Provinciale Vigili del Fuoco Venezia, CNVVF, Italy

**10:55 – 11:10** **Coffee break**

**11:10 - 11:30** *Management of large scale events at the Fire Department of Dortmund*
Sylvia PRATZLER, Principal Engineer, Feuerwehr Dortmund, Germany

**11:30 – 11:50** *Unified Fire Department, Rotterdam Port Area*
Dominic VAN DE VELDE, Gezamenlijke Brandweer, Rottardam Netherlands

**11:50 – 12:10** *TRADR project*
Ivana KRUIJFF-KORBAYOVÁ, Senior Researcher, DFKI, Germany

**12:10 – 13:00** Discussion

**13:00-14:00** **Lunch**

**14:00** End of the day

*Figure 7: Schedule of the End User Event*