



RoBoa

A search and rescue robot.



Autonomous Systems Lab

ETH zürich

SDRZ

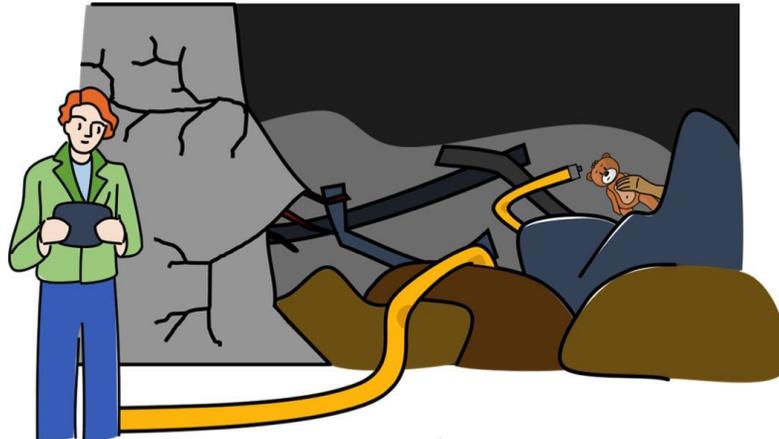
Vision und Motivation

In case of an earthquake or landslide near a populated area, chances are high that people will be trapped and possibly hurt. If they are not found, cared for and salvaged fast enough, their chances of survival are very small.

We want to develop a robot which can assist rescue teams in action and save lives.

Our goal is to build a snake-like robot that can penetrate buried buildings, find trapped people and provide them with the essentials

Up to now, rescue workers mostly work with rudimentary tools which robots that do not penetrate into the rubble. Therefore, they can neither create a precise site plan nor provide for buried people.



We want to change that with our robot!

In order to do so, we rely on a new concept of locomotion. Instead of pushing forward to move like previous robots, our robot should be able to grow from within.

In the following we would like to further introduce ourselves and our project.

We are looking forward to cooperating with you!

Your RoBoa Team

*P. Pfanner U. Husterbergs Samuel Spisat Beate
 Stefan Pascal Müller A. Kuisch Yves Hagenauer*



Working environment



Goals of our project



To fulfill our vision of a novel rescue robot, we have set ourselves the following goals:

LENGTH



Our robot should be able to penetrate **20 meters** deep into buried buildings. Doing so, it manages to reach the vast majority of victims.

DIAMETER



With a maximum diameter of **10 centimeters**, the robot should also be able to easily pass through small gaps.

MOTION



A novel form of locomotion, the inverted, is said to contribute to maneuverability and to **overcome** complicated **obstacles**.

ANALYSIS



Our robot should be able to **scan** the **environment** with the help of cameras and sensors in order to create a precise layout plan and to **find** buried **victims**.

SUPPLY

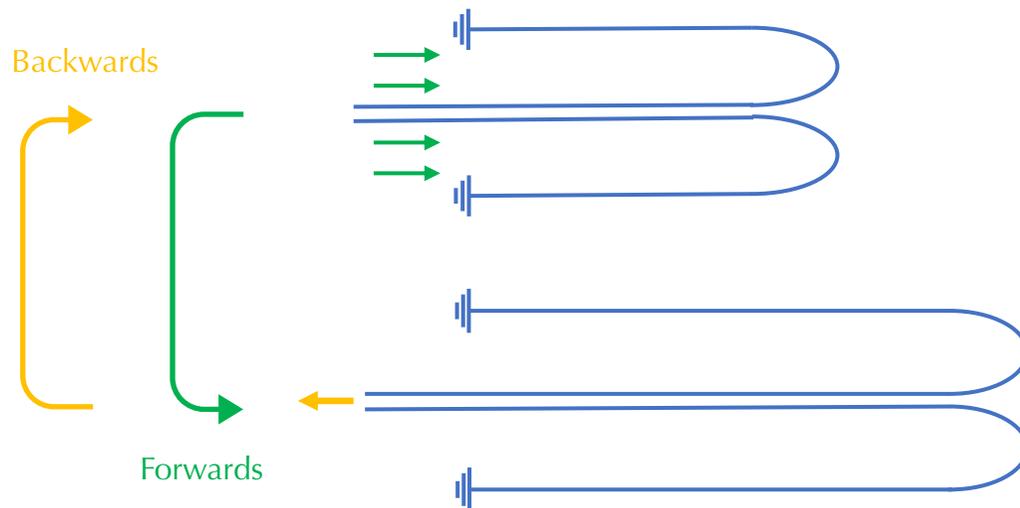


In order to gain more time for the rescue, the robot should take over the first supply with **water** and **medicines**.

The principle

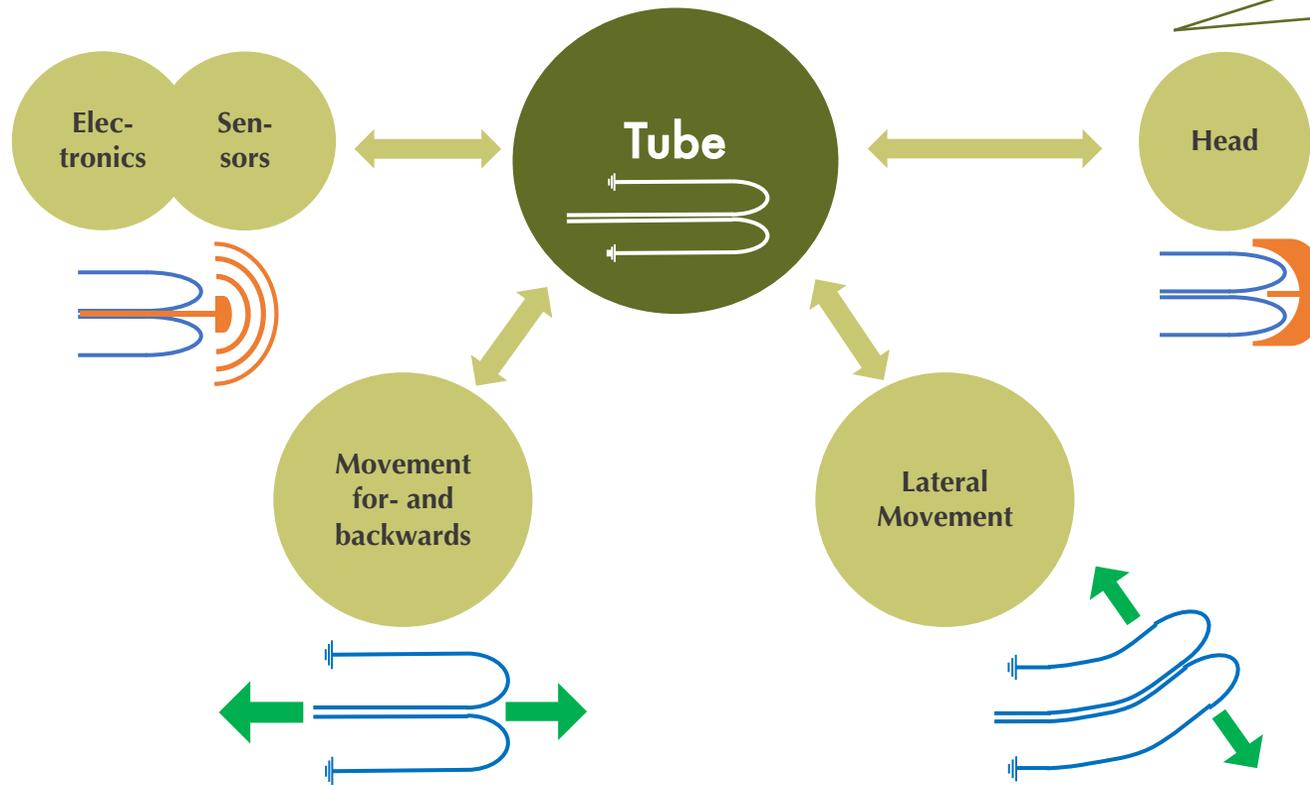
We're using a **flexible tube that everts** inside-out to move forward. Therefore the outside of the tube does not move although the whole robot moves. This leads to almost **no friction with the environment**, the main advantage of the principle.

We would like to find out what is possible for a robot using this principle and do a **technology evaluation** while developing our search and rescue robot.



Technical key challenges

The flexible tube with its principle of moving forwards is the core of our project. In addition we are facing four technical key challenges:



Get some video impressions on Social Media



Our team

Alexander
Kübler

Construction &
Coordination



«Developing new ideas and organizing projects as part of a team motivates me a lot.»

Betim
Djambazi

Prototyping &
Sponsoring



«Seeing the great things, which emerged from the previous projects has always fascinated me.»

Michael
Lustenberger

Electronics & Control



«My goal is to bring hardware and software together and let them master extraordinary tasks.»

Oda
Vigen

Construction &
Design



«I am impatient to see how far we can get with only two years at ETH.»

Our team consists of seven mechanical engineering and one electrical engineering student.

We all attend the 5th Bachelor's semester at the ETH Zurich.

Pascal
Auf der Maur

Communications &
Software Developm.



«I enjoy coding and finding elegant solutions to difficult problems.»

Patricia
Hörmann

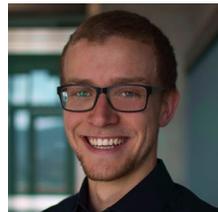
Design, Control &
Coordination



«Solving problems in a creative way while sticking to a tight schedule is my thing.»

Samuel
Sigrist

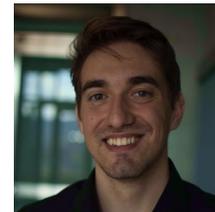
Prototyping &
Finances



«I love building and testing parts that will ultimately all work together as a whole.»

Yves
Haberthür

Prototyping &
Electronics



«I love to see a project being successfully developed built and tested.»

Framework

Mechanical engineering and electrical engineering students of **ETH Zurich** can devote themselves to a one-year project **in the 5th and 6th semester** instead of a specialization in subjects in order to be able to apply their acquired knowledge in practice and to gain experience in a development process. The goal is to present the robot to the public at the end of May 2020 during the roll-out of the focus projects at ETH as well as at the robotics fair ARCHE in Wangen an der Aare.



Our project is part of the "**Autonomous System Lab**" institute of **Prof. Dr. Roland Siegwart** held. He is the supervisor of our project. In addition to the ASL, **armasuisse** is our central research and cooperation partner.

ETH zürich

«Situating in the heart of Europe, yet forging connections all over the world, ETH Zurich is pio-neering solutions to the global challenges of today and tomorrow. It has more than 20,000 students from over 120 different countries.»
– ETH

Autonomous Systems Lab

«Our team's mission, led by Prof. Roland Siegwart, is to create intelligent robots and systems that are able of operating autonomously in complex and diverse environments.» – ASL



SDRZ

“The Swiss Drone and Robotics Center (SDRZ) is part of armasuisse (federal office of armaments) and serves to deal with robotics topics for security tasks.”
– armasuisse

We are accompanied by three coaches who have taken part in prior focus projects and support us with their experience:

Julian Förster	Florian Ackermann	Elias Hampp
Head-Coach	Coach	Student-Coach

Sponsoring I

In the course of the project a lot of **material and development costs** arise. These are mainly caused by ...

- ... Equipment.
- ... electrical, mechanical and pneumatic components.
- ... materials for prototypes and the final product.
- ... production.
- ... marketing and administrative tasks.

From previous projects, we know that the cost of a project is **between CHF 50,000 and CHF 100,000**.

In order to cover our costs, we need sponsors who work with us and support us.

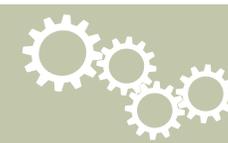
There are **three different types of sponsorship**:

RESEARCH PARTNER



Our research partners are the **ASL** and the **SDRZ**. They support us with their knowledge and their experience.

MATERIAL SPONSOR



As material sponsor, you provide us with materials or components or produce them for us. This is often associated with the providing of know-how.

FINANCIAL SPONSOR



As financial sponsor, you provide us with the financial resources we need to order flexible and independently required materials and components.

Sponsoring II

Depending on the scale of your sponsorship, you are either a **premium, gold, silver or bronze sponsor**. As a material sponsor, the scope depends on the value of the material provided.

In addition, we would be happy to give you insights into some of our **ways of working and findings** that may be of interest to you.

An overview of the marketing advantages you could have as a sponsor can be found in the table below.

	premium	gold	silver	bronze
support	10.000 CHF	5.000 CHF	2.000 CHF	300 CHF
logo on homepage	large	medium	small	name mentioned
social media	large article	small article	mentioned	no
logo on team shirt	large	medium	small	no
mentioning on presentations	yes	no	no	no

Of course we can also arrange an individual form of support, just contact us - we appreciate any form of cooperation and support!

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Contact

If you are interested in working with us or need further information,
you can reach us via email or by phone during the day.

We are looking forward to getting in contact with you!



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