



UNMESH MASHRUWALA
Innovation Cell
IIT BOMBAY

INDEX

• About Us	2
• Achievements	3
◦ Intelligent Ground Vehicle Competition	
◦ Mahindra RISE Challenge	
◦ ASME Student Design Competition	
◦ IARC Mission 9 Simulation Challenge	
• Subsystems	5
◦ Computer Vision	
◦ Localization	
◦ Motion Planning	
◦ Controls	
◦ Decision Making	
◦ Mechatronics	
• Premium Deliverables	7
• Deliverables	8
• Our Sponsors	9
• Contact Us	10

ABOUT US



Unmesh Mashruwala Innovation Cell (UMIC, pronounced : you-mik), is an all-student technical team at the Indian Institute of Technology Bombay, working towards the advancement of state of the art unmanned aerial and ground vehicles. Started in mid 2000s, UMIC was IIT Bombay's first student technical team that continuously expanded its reach and catered to the general enthusiasm for technical activities in the institute, STAB (now known as Institute Technical Council) was born out of UMIC. The team currently consists of 80+ passionate and technophilic undergrads, coming from diverse fields and backgrounds but united by their love for science and technology. Common goal of the team is to develop cutting edge autonomous solutions to increase efficiency

Vision

"Self-driving cars are the natural extension of active safety and obviously something we think we should do."

Autonomous cars have always been a dream, and the continuous advancements in technologies are bringing us a step closer to this dream every day. We, at SeDriCa, have been living with this dream in our minds for long and are trying our best to accomplish the same!

Team SeDriCa aims to develop India's first self-driving car, trying to achieve Level 5 Autonomy, capable of autonomous driving under Indian Road Conditions. From efficient performance to safety considerations, we plan to cover them all!

Over the years the team has participated in a variety of competitions both, nationally and internationally, finishing podium level in the majority of them. In recent years the primary target of the team has been the Intelligent Ground Vehicle Competition (IGVC) organized by the Oakland University in Michigan, U.S.

ACHIEVEMENTS

World Champions: Intelligent Ground Vehicle Competition

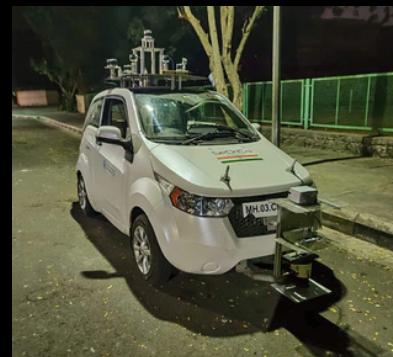
IGVC is an annual international robotics competition for teams of undergraduate and graduate students co-sponsored by Association for Unmanned Vehicle Systems International (AUVSI).

The team emerged as the **overall winners** in IGVC 2017 in the pool of 29 participating teams from 5 different countries, securing first place in the Autonomous Navigation Challenge, second place in the Design Challenge, second place in the Interoperability Profiles Challenge. This has been one of the best performances by any Asian team in this competition to date and a huge improvement from being fourth in the basic and fifth in the advanced Auto-Nav challenge in 2016.

Much like previous years, IGVC 2017 demanded complex autonomous tasks and exposure to these novel domains helped the team to improve its technical expertise.

Mahindra RISE Challenge

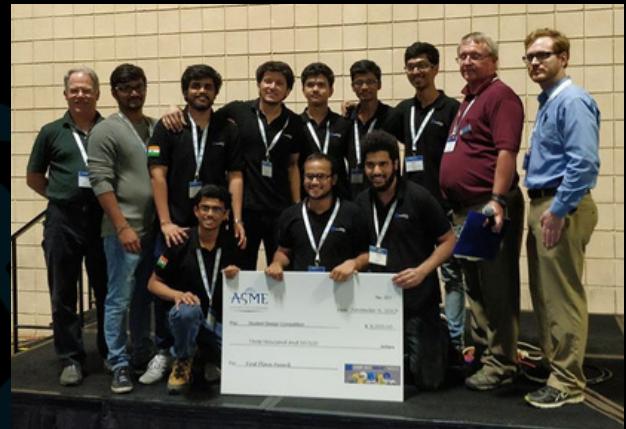
After being recognized as the overall winners in IGVC 2017, the team decided to step up and started working on an actual car for the Mahindra RISE Challenge. The Challenge envisaged developing a working unit of a 'driverless car' for Indian conditions under an intra-city situation. As a part of the competition, the team launched **India's first successful prototype** of a driverless car. The team received a Mahindra E2o model to test its driverless car technology which was given to the **top 11** teams out of 259.



ACHIEVEMENTS

ASME Student Design Challenge

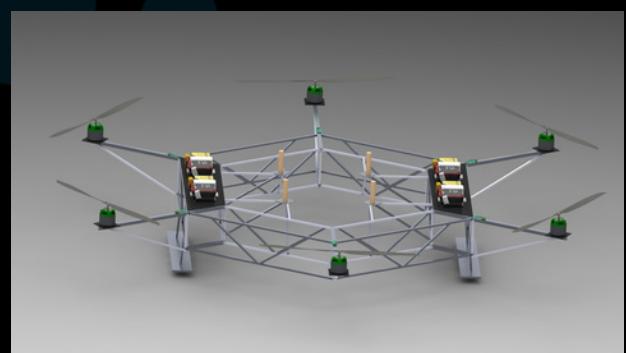
The American Society of Mechanical Engineers. It organizes the Student Design Challenge(SDC). Each team is expected to ideate, design, construct, and operate a prototype that provides solutions to all the intricate problem statements stated. After being declared as the **champions** in the Asia-Pacific region in 2012 and 2013, the team moved on to the **world finals** and secured **2nd** position. Then in 2017 the team was crowned as the champions in the Asia-Pacific region as well as the **World Champions**. In 2019 also the team was crowned as the Asia-Pacific Champions.



World Champions 2017

IARC Mission 9 Simulation Challenge

The International Aerial Robotics Competition, also the longestrunning aerial robotics competition globally, allowed us to bring out the best of our capabilities and made us think in ways like never before! Owing to the team's efforts, we were crowned the **World Champions** for the 2020-2021 challenge.



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Home > Education > IIT Bombay Team Wins International Robotics Competition

IIT Bombay Team Wins International Robotics Competition

A team from the Umesh Mashruwala Innovation Cell representing the Indian Institute of Technology (IIT) Bombay has won the International Aerial Robotics Competition - Simulation Challenge 2020.

Education | Edited by Bhishal Kalita | Updated: May 24, 2021 5:41 pm IST | Source: Careers360

Much like previous missions, Mission 9 demanded complex autonomous tasks such as long-distance outdoor navigation, mobile manipulation of large objects using actuators attached to our drones, interaction, and 100% onboard computations along with time constraints.

SUBSYSTEMS

Introduction

The current technical team is divided into six functional subsystems: Computer Vision, Localisation, Motion Planning, Controls, Decision making, and Mechatronics. The whole process of making a self-driving car starts with sensors collecting the data. The data then moves through various subsystems and finally ends with the control subsystem giving the control inputs to the mechatronics subsystem.

Computer Vision

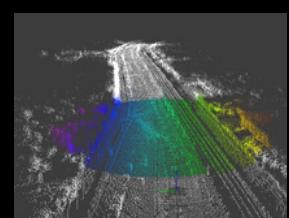
The Machine Learning subsystem tackles the unique challenges faced in our missions using Computer Vision and Machine Learning algorithms. Currently, it is working on environment perception tasks like lane detection and obstacle recognition using Multi-task Deep Neural Networks. In the past, we have implemented many deep learning models for performing tasks such as traffic sign recognition and semantic segmentation.

Localization

The Localization subsystem is responsible for developing an accurate positioning system according to the environment. It assists the vehicle in perceiving the environment by using the input of various sensors. In the past, we have implemented various algorithms like SLAM which is Simultaneous Localisation and mapping technique, and also worked on LIO SAM, and LEGO LOAM, which improves our localization and mapping with each iteration.

Motion Planning

The Motion Planning subsystem involves helping the car find an optimal path and avoid obstacles along the way. An efficient motion planning algorithm needs to map the environment using efficient techniques. After mapping, it needs to use that map to determine where the obstacles and free spaces are and lastly, utilize an algorithm to calculate the most efficient or sometimes sub-optimal path to traverse the environment and reach the goal.



SUBSYSTEMS

Controls

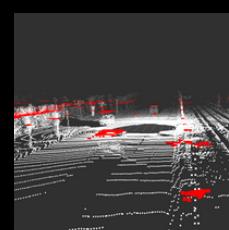
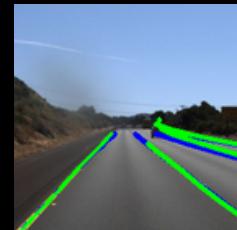
The control subsystem involves commanding and coordinating the precise actions required for achieving desired behavior. To put it simply, the vehicle must navigate from point A to B and follow the most optimal trajectory while doing so. Also, the subsystem integrates all the subsystems into one main framework to make the vehicle drive autonomously.

Decision Making

The Decision Making subsystem makes the vehicle able to mimic a human driver by taking into account various constraints. The architecture is responsible for high level decisions required for executing missions, tackling road driving scenarios and following the rules of the competition by suggesting maneuvers for the same.

Mechatronics

The Mechatronics subsystem deals with complete hardware requirements of the team including all the electronic components. It ideates and executes various Drive-by-Wire components for driving the car electronically. Its work also includes sensor integration, electronic communication and other components like emergency stops.



DELIVERABLES

PREMIUM



Why become a sponsor?



Collaborative Research Projects

We constantly strive to innovate more and more, looking out for better approaches and solutions. Every innovation comes through a lot of studies, errors, and cumulative research. Together we can devise an excellent opportunity by working on a collaborative research project.

Logo Branding on Cars

We have a legacy of being victorious in our past competitions. We can blazon your logo on our autonomous vehicle for boosting your brand on the international level. The marketing achieved via our car imagery is immense.



Media Coverage

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IIT Bombay Wins 25th Intelligent Ground Vehicle Competition

A team from the Innovation Cell of Indian Institute of Technology (IIT) Bombay has won the 25th Intelligent Ground Vehicle Competition (IGVC) that was held at Oakland University in Michigan, USA.

Edited by Shihabudeen Kunju S | Updated: Jun 8, 2017 2:22 pm IST
Source: NDTV

T-Shirt Logo

The unity of the team is represented through its uniform. We wear it with pride and in all of our competitions. We can emboss your logo on our apparel. The outreach of this is massive as all of our competitions are held on an international platform. We look forward to showcasing your brand as our sponsor.



DELIVERABLES

Why become a sponsor?

"Most of the sponsorships help companies enhance their public profile, but with UMIC, it's different. We're much more than that."

Social Media Endorsement

Through us, you can widen your reach to highly qualified IIT-Bombay students pursuing majors in engineering fields. Along with our strong network and well-established campus presence, we can help expose students to your company and can cater to your specific needs.



Qualified Interns

As our sponsor, you will have access to UMIC's latest team resume booklet, featuring highly skilled and enthusiastic undergraduate students willing to work in both full-time and internship positions.



Hardware Support

Explore the possibilities of your product in the domain of Self-driving Cars through our hardware platforms. You can also validate the performance of beta versions of your products with us. Document and solve compatibility issues of your product.



Software Testing

We can aid in testing and benchmarking your software through our technical capabilities. Upon leveraging your software, promoting its use as the Team's benchmark for competing at an international level.



OUR SPONSORS



CONTACT US



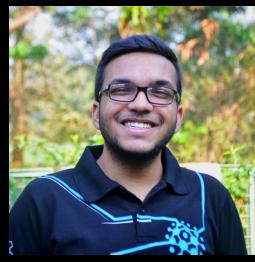
Our vision would not have become a reality without our sponsors and partners' colossal commitment and active contribution. We are grateful to our esteemed Director and Deans, IIT Bombay, our faculty advisors, our sponsors, and our supporters for their overwhelming assistance and having faith in us!"



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