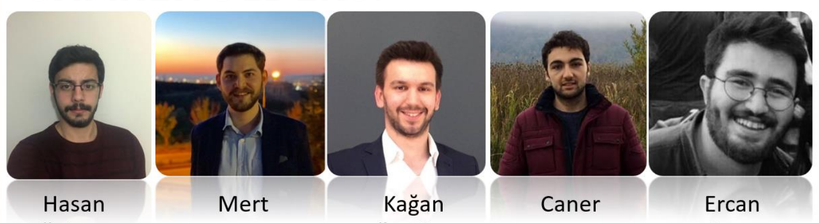
HELEN-V

PROJECT DESCRIPTION

“Design and construct one of the two teleoperated robots trying to shoot and score in opponent’s goal.”

- Robots can hit, push or otherwise drive the ball but not grasp, scoop or otherwise carry it.
- Successive contacts with the ball are allowed but the ball must be transferred to opponent’s half-field in no more than 20 seconds.
- The player scoring 2 goals more than the opponent wins the game.
- The game is started, upon command, with robots placed on their own goal lines and the goal at the center of the field.

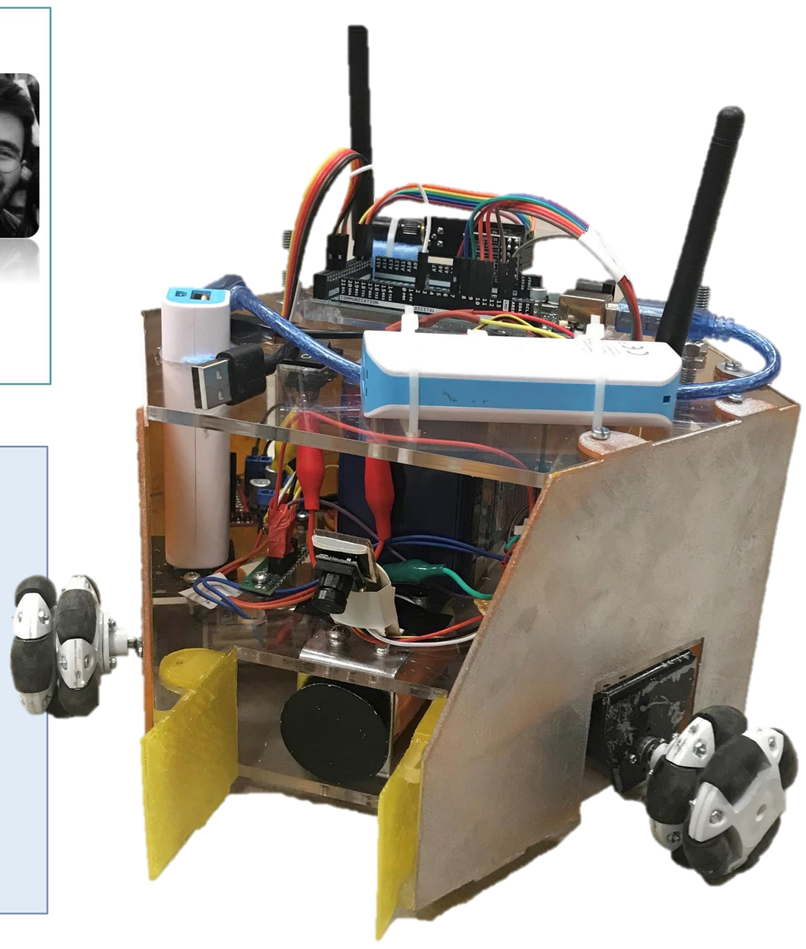
SHAREHOLDERS:



Hasan Özkara | Mert Kayış | Kağan Özaslan | Caner Potur | Ercan Okatan

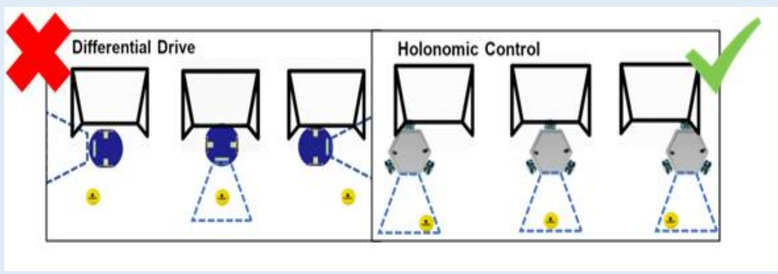
DELIVERABLES

- HELEN-V
- Eachine ROTG02 FPV Receiver
- Command Transmitter Module
- Artengo beach volley ball
- The playfield walls
- User Manual



Outstanding Features

- Holonomic Control with omni wheels

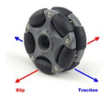


- Powerful shooting with discharging capacitors

- User friendly control with classic style joystick

TECHNICAL SPECIFICATIONS

Robot Part		Controller Part	
Physical Specification		**Physical Specification**	
Height	21 cm	**Size** (height x length x width)	50 x 26.5 x 17 cm
Diameter	29 cm	**Weight**	0.8 kg
Weight	2.6 kg		
Power Specifications		**Power Specifications**	
Stand-by power	4.8 W	Stand-by power	1.56 W
Operating power	49.5 W	Operating power	1.56 W
Operating time	~45 min	Operating time	~5 hour

Subsystems	
Video transfer sub-system ▪ 40CH 5.8G 600MW transmitter ▪ 150CH Dual Antenna Audio FPV Receiver	
Command Transmission sub-system ▪ NRF24L01 2.4G Communication Module	
Motor-drive sub-system ▪ Holonomic Control	
Shooting sub-system ▪ Push-pull solenoid with 35V Capacitors	

BUDGET

Product	Pcs	Unit Price($)	Total Price($)
nrf24l01+	2	1.78	3.56
TS5828s	1	7.70	7.70
Camera	1	6.27	6.27
Video Receiver	1	21.99	21.99
Arduino Uno	1	3.21	3.21
Arduino Mega	1	5.95	5.95
Joystick	1	2.84	2.84
15dBi antenna	1	2.24	2.24
12V Battery	1	9.55	9.55
Powerbank	2	4.75	9.50
DC motor	3	8	24
L298n	2	1.43	2.86
Omni wheel	3	5.42	16.27
Solenoid	1	13.5	13.5
Mounting and Body	1	15	15
TOTAL	**21**		**145**

References

1. C. A. Balanis, *Antenna theory: analysis and design*. Hoboken, NJ: Wiley, 2016.
Perlman, A. (2016, August 20).
2.Everything You Need to Know About FPV Flying. Retrieved from https://uavcoach.com/everything-need-know-fpv-flying/
3.https://infocenter.nordicsemi.com/pdf/nRF24L01P_PS_v1.0.pdf?cp=8_4_0_0

Test Results

Outdoor Range	237 m
Indoor Range	67.58 m
Robot Speed at Gear 1	10.35 cm/s
Robot Speed at Gear 2	30 cm/s
Average Speed of the Ball	204.54 cm/s
Shooting Range	> 6 m

Special thanks to Assist.Prof.Dr MUSTAFA MERT ANKARALI for his support throughout this project