



ICCAS 2024

3rd F1TENTH KOREA CHAMPIONSHIP

Cheolhyeon Kwon

Associate Professor

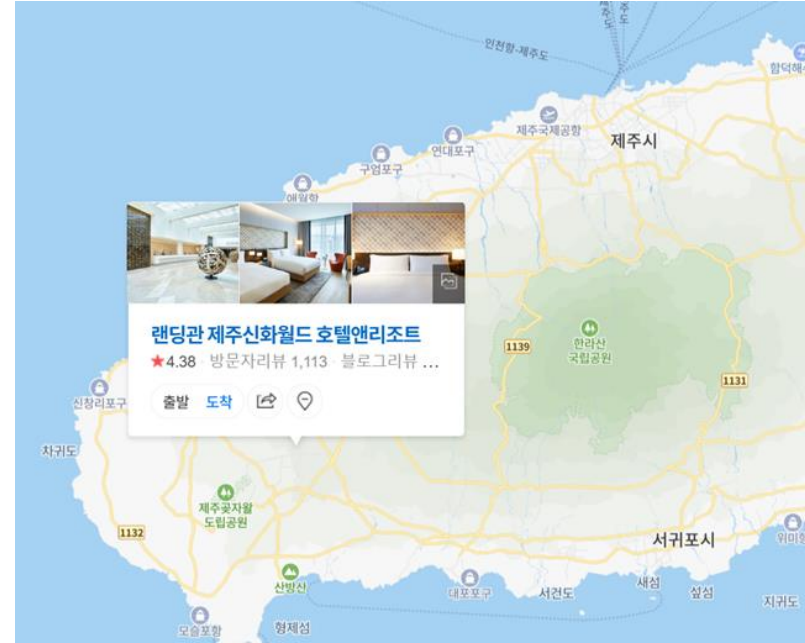
Department of Mechanical Engineering

UNIST

ULSAN NATIONAL INSTITUTE OF
SCIENCE AND TECHNOLOGY

Competition Overview

- ICCAS International Conference on Control, Automation and Systems
 - October 29(Tue)~November 1(Fri), 2024
 - **F1tenth Competition: October 29(Tue) ~ 31(Thu), 2024**
 - Jeju Shinhwa World, Landing Resort, Jeju, Korea



[Home](#) | [Login](#) | [Sign Up](#) | [Contact](#)

October 29(Tue)~November 1(Fri), 2024
Jeju Shinhwa World, Jeju, Korea

Organizers, Sponsors and Award Prizes

- Organizers
 - 권철현, 배동성, 장동영, 김진현, 김강희, 김종찬, 심주용, 김건우, 김백규, 최영권
- Sponsors
 - ICROS, LINC3.0
- Award List
 - 1등 한국자동차연구원장상
 - 2등 ICROS 학회장상
 - 3등 경상국립대 LINC 3.0 단장상
 - 4 등 강원대 LINC 3.0 단장상
 - 5 등 동아대 LINC 3.0 단장상
 - 6 등 국민대 미래자동차 혁신융합대학단장상
 - 7 등 한국전자기계융합기술원장상

Homepage Info.

- The ICCAS 2024 homepage is now open
- korea-race24f1tenth.org
- The contents layout is same as in 2023.
 - Competition information, rules, and registration will be available through the website.

REGISTRATION

This competition is open for everyone of all levels, everyone is welcome to participate in this competition. A team can consist of multiple teammates. Teams with only one person are also allowed. Teams that take part in the in-person competition need to provide and build an F1TENTH car by themselves.

Google Site Registration

A form for race participants

For race registration and more information, sign up to participate in orientation and information session. (Note: One of the team members must register with ICCAS2024 to participate.)

REGISTRATION FOR A RACE

ICCAS 2024

THE 3RD F1TENTH KOREA CHAMPIONSHIP

The International Conference on Control, Automation, and Systems (ICCAS) 2024

2024, Oct 29th - Nov 1st

Jepu Shinhywa World at Uijeon, Korea

F1TENTH RULES

Date: 2024-10-28

Table of content

- 1. General
- 2. In-person (physical) competition
 - 2.1 Vehicle classes
 - 2.2 Track & racing environment
 - 2.3 Inspection
 - 2.4 Time Trial
 - 2.4.1 Definitions
 - 2.4.2 General
 - 2.4.3 Requirements for Time Trial qualification
 - 2.4.4 Penalties
 - 2.4.5 Evaluation
- 2.5 Head-to-Head Race
 - 2.5.1 General
 - 2.5.2 Requirements for qualification
 - 2.5.3 Penalties
 - 2.5.4 Evaluation



CHEOLHYEON KWON

Associate Professor
UNIST
Department of Mechanical Engineering



DONG SUNG PAE

Assistant Professor
Sangmyung University
Department of Software



RAHUL MANGHARAM

Associate Professor
University of Pennsylvania
Department of Electrical and Systems Engineering



JIN HYUN KIM

Associate Professor
Gyeongsang National University
Department of Artificial Intelligence & Communication Engineering



KANG HEE KIM

Associate Professor
Soongsil University
Department of Smart System Software



JOO YONG SIM

Assistant Professor
Sookmyung Women's University
Department of Mechanical System Engineering

Tentative Timeline

DATE	IN-PERSON COMPETITION
June 6 th	Registration opens
Sep 20 th 19:00 KST	Orientation (Online Meeting)
Oct 13 th 23:59 KST	Registration closes
Oct 29 th	Competition Start & Team Practice
Oct 30 th	Qualification Session & Head-to-Head Preliminary Tournament Racing
Oct 31 st	Head-to-head Final Tournament Racing

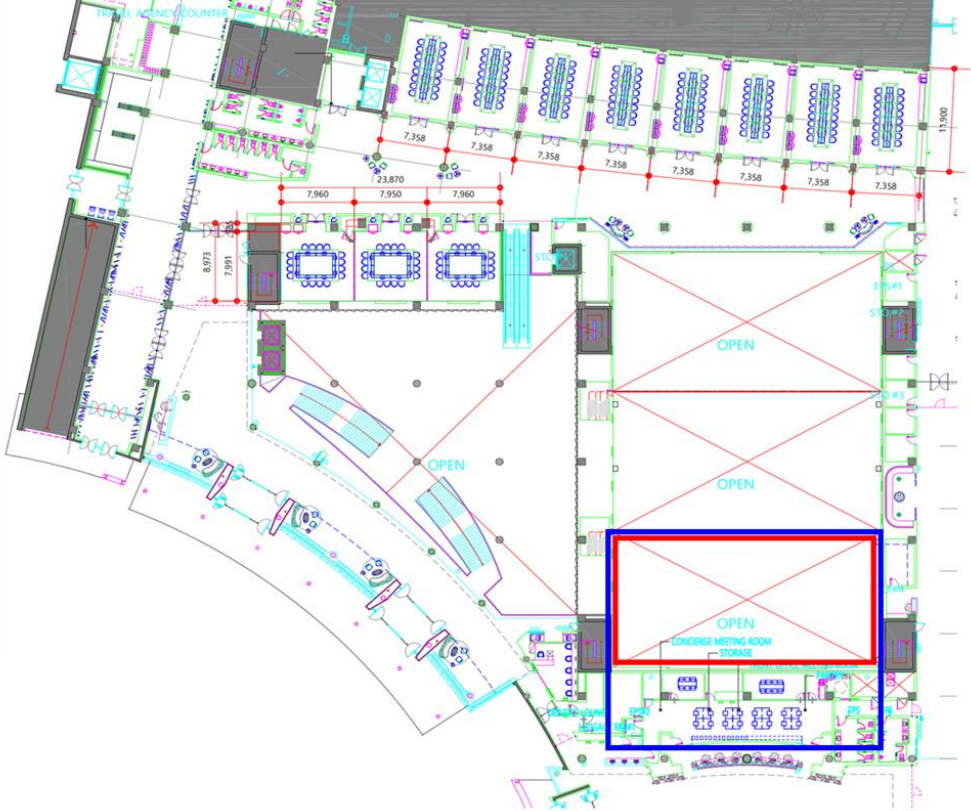


Tentative Timeline

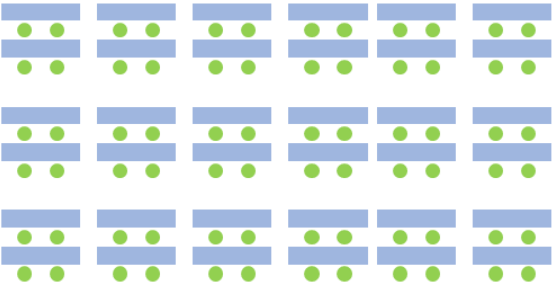
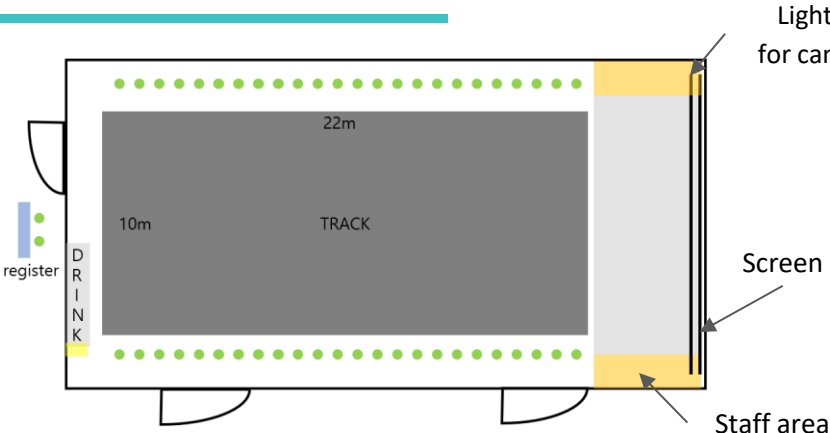
DATE	IN-PERSON COMPETITION
June 6 th	Registration opens
Sep 20 th 19:00 KST	Orientation (Online Meeting)
Oct 13 th 23:59 KST	Registration closes
Oct 29 th	Competition Start & Team Practice
Oct 30 th	Qualification Session & Head-to-Head tournament racing
Oct 31 st	Semi-Final & Final Racing



Projected Competition Place



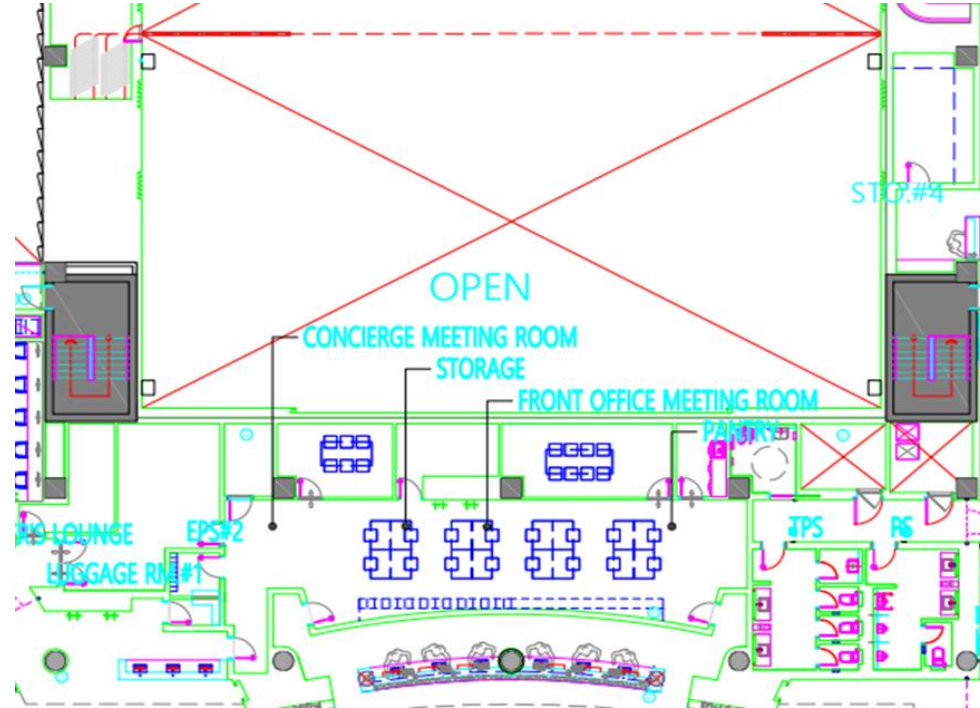
Ballroom C + Additional Space




Lights & speakers for camera(Youtube)

Power socket

Team Table



Competition Schedule (attach behind the name tag)

	OCT 29, 2024 (LANDING ROOM C)	OCT 30, 2024 (LANDING ROOM C)	OCT 31, 2024 (LANDING ROOM C)
08:30-09:00	Registration	Qualification Preparation	Head-to-Head Race Preparation
09:00-10:50	Orientation	Qualification Time Trial	Head-to-Head Race
10:50-11:40	Mapping	Practice	Practice
11:40-13:00		Qualification Time Trial	Head-to-Head Race
13:00-14:00	Opening Ceremony	Group Photo Time	
14:00-15:00	Mapping	Practice	Award Ceremony
15:00-16:00			
16:00-17:30	Practices	Head-to-Head Race Preparation	
17:30-18:00			
18:00-19:00		Head-to-Head Race	
19:00-23:00			
23:00-	Practice space open all night	Practice space open all night	

Phases Overview

Racing Day Phases Overview

1. Inspection

- a. Emergency brake

2. Qualification

- a. Number of laps in 5 minutes
- b. Fastest lap

3. Head-to-head

- a. Pre-Check
 - Bumper
 - Perceivable by LiDAR
- b. Race
 - Standing Start
 - Finish 8 laps before the opponent

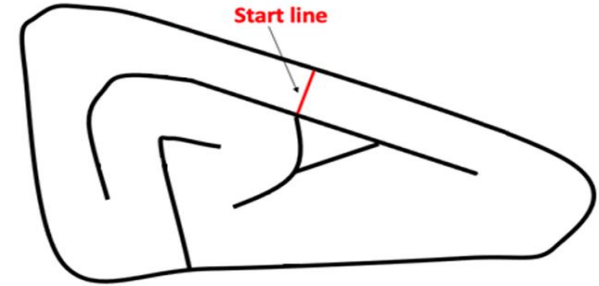
Phase 1: Car Inspection

- The car should be built according to F1TENTH instructions.
- We will:
 - First and foremost, make sure the [vehicle is safe](#)
 - Check the hardware of the car to meet the requirements : korea-race24f1tenth.org/en/race_resources.html
- The team must demonstrate that it is possible to trigger emergency break, autonomously, or at least through remote control.

Phase 2: Qualification(Oct 30th)

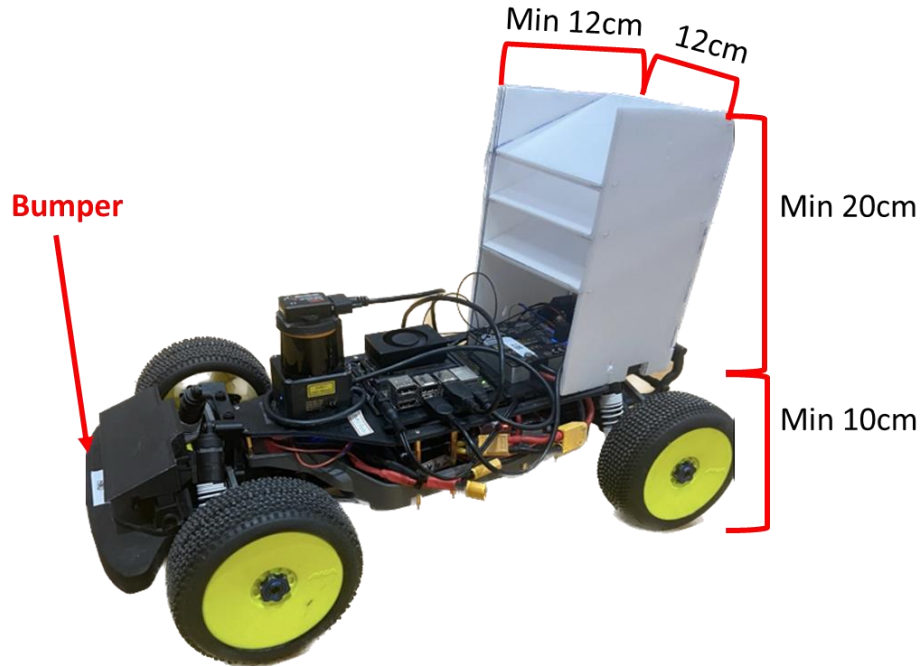
- Time Trials

- Same track as the race
- Each vehicle must demonstrate that it can drive autonomously through a track without crashing.
- For 3 minutes out of the given 6 minutes
- Two goals (two leaderboards):
 - Fastest lap time
 - Highest number of completed laps without crashing
- The track is same for practice and race
 - Teams can map the track before the race
- Algorithm reconfiguration/tuning
 - Between the heats, teams can intervene the algorithm
 - During the heat, the car must be stopped, and the time is counted
- Crash ⇒ Can choose to restart near crash point or go back to start line
 - Reset the count of completed laps



Qualification Example

Phase 3: Head-to-head (Oct 30~31th)



- Completed time trials
- Foam bumper
- Perceivable by LiDAR

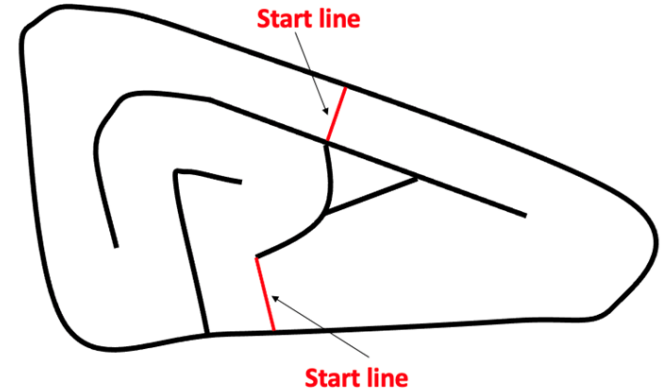


Foam bumper

Phase 3: Head-to-head (Oct 30~31th)

- Race

- Two cars on the track
- Single-elimination (knockout) tournament
- Finish 8 laps earlier than your opponent
- Each tournament - Best two out of three heats
- 3rd-4th and 5th-6th, 7th-8th places are decided in a single heat.
- Two start lines
 - Higher qualification team can choose first
 - The team that lost previously choose the next



Head-to-Head Example

- Crashing

- Track border \Rightarrow fix the track and start from the point of the crash
- Opponent \Rightarrow receive caution or warning
- Both cars resume the race from the same progression line of crash point

Phase 3: Head-to-head (Oct 30~31th)

- Cautions

- Continuous cautions are considered for escalation to a warning
- Receive cautions for interfering with another car's race path
 - Ex) Obstructing an opponent's path while attending to one's vehicle
 - Ex) Stopping on the track in a way that blocks an opponent's path

- Warnings

- Receiving two warnings in a single heat leads to disqualification from that game.
- Accumulating four warnings during the entire round results in disqualification from the round.
- Receive warning for causing serious damage to the leading vehicle

Rules

- General
 - Rules provide the competition setup e.g. types of races, allowed hardware etc.
 - Rules provide the general guidelines for the races
- Details can always be found on: korea-race24f1tenth.org/en/rules.html
- Read the rules carefully and ask questions via email if there is anything unclear : ryujs@unist.ac.kr

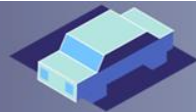
At the RACE day, any detailed decision should be authorized to the referee staffs!!!

Award List

Ranking	Award	Prize
1st place	한국자동차연구원장상	300만원
2nd place	ICROS 학회장상	200만원
3rd place	경상국립대 LINC 3.0 단장상	50만원
4th	강원대 LINC 3.0 단장상	50만원
5th	동아대 LINC 3.0 단장상	50만원
6th	국민대 미래자동차 혁신융합대학단장상	50만원
7th	한국전자기계융합기술원장상	50만원

- We will prepare the certificate of participation for every participant!

Thank you



HMCLAB

High-assurance Mobility Control Lab