

ICCAS 2023

# 2<sup>nd</sup> F1TENTH KOREA CHAMPIONSHIP Orientation

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**Associate Professor**

2023.09.08

**UNIST**

ULSAN NATIONAL INSTITUTE OF  
SCIENCE AND TECHNOLOGY

# ICCAS 2023

F1  
TENTH

# THE 2ND F1TENTH KOREA CHAMPIONSHIP

*The International Conference on Control, Automation, and Systems (ICCAS) 2023*

📅 2023, Oct 17th - Oct 19th

📍 SonoCalm Yeosu at Yeosu, Korea



# Organizers



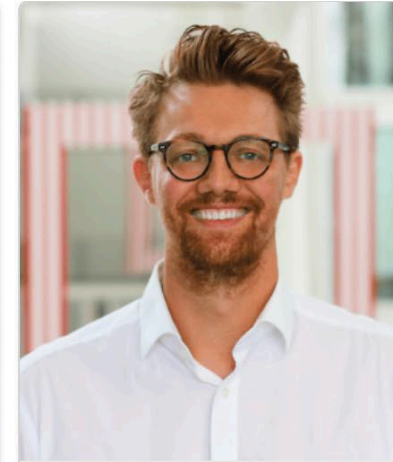
**DONG YOUNG JANG**



**MYO TAEG LIM**



**RAHUL MANGHARAM**



**JOHANNES BETZ**



**JIN HYUN KIM**



**CHEOLHYEON KWON**



**DONG SUNG PAE**



**KANG HEE KIM**



**JOO YONG SIM**

# Sponsors



# Communication Channel

- All the important information can be found on the event page  
: <https://korea-race23.f1tenth.org>
- Slack is no longer available...
- You can communicate with organizers via email below.  
: [f1tenth.korea@gmail.com](mailto:f1tenth.korea@gmail.com)

# Registration

- Registration on the 2nd F1TENTH Korea Website to receive information  
→ If a team drops out, let us know immediately
- Registration officially on the ICCAS 2023 website  
→ **This is very important!** We registered you with your name and email.  
→ **One of the team members must register with ICCAS2023 to participate.**



# Registered Rosters (as of 9/8)

## PARTICIPANTS

TEAM NAME	AFFILIATION	TEAM MEMBERS
Black Crane	Inje University	Seongjun Kim, Hojae Lee, Sunyong Jeong
Tayo Eagles	Chungbuk National University	GeonWoo Kim, TaekLim Kim, Dohyeon Kwon
KMUTT	King Mongkut's University of Technology Thonburi	Benjamas Panomruttanarug, Jirat Lapsittiwong
ICHTHUS	Soongsil University	Min Kim, JinSeob Jung, ByungJi Kim
ICHTHUS2	Soongsil University	Seryun Kang, MinHyuk Jeon, Hyunkyu Lim
HMCAR	UNIST	Kwangrok Kim, Kyungtae Kang, Jeongsang Ryu, Jungbin Kim
TigerOx	Kyungpook National University	Suyong Park, Yundo Choi, Sebin Jung, Hyeonjeong Kim, ChanHyuk Lee
Gudakdary	Chung-Ang University	Kwankyun Byeon, Jiwon Seo, Hojin Lee, Eunji Lee, jonggeon Lim
INHARobo	Inha University	Dongmin Jang, Seungjun Song, Mingyo Kang
AART	Kumoh National Institute of Technology	Saugat Shahi, Jang In sik, Louise Tan, Kim yujin, Lee heoncheol
SAI	Kangwon National University	Youngwoo lee, Kangho Ko, Taehoon Yoon, Sua Kim

CML	Korea University	Hyeongrae Cho, Jiwon Kim, Sangryul Baek, Hyunah Kim
AGA-CML	Korea University	Garam Nam, Subin Shin, Soorin Cho, Mintaek Oh, Jihwan Mo
BTS	Soongsil University	Younghoon Kwon, Sungyoon Kim, Soomin Kim
SSUWOONG	Soongsil University	Junyoung Park, Minwoo Lee, Junho Lee
ATP	Inje University	Jihong Ryu, Heechul Kim, Jiwoo Seo, Seokwon Seo
MOVE	Inje University	Keonmin Cha, Park Sehun, Kim Seongwoo, Kim Minjoon
QueenCar	GyeongSang National University	Jo Mina, Lee Juho, Lee Hoyun, Jo Sumin
Breath	Handong Global University	Wonbin Lee, Sechan Park, Sunhwan Lee
IDEA_LAB	Gyeongsang National University	Myungjun Kim, Younghoon Kim, Jihong Park, Sunwoong Moon
ENERNET	National Taipei University of Technology	Shangyen Lee, Shangtse Lee
GROMIT	Sookmyung Women's University	Boin Jung, Kyungeun Kim, Yeonji Ryu, Sungbin Lee, Youngseo Cho

# Timeline



DATE	IN-PERSON COMPETITION
May 25th	Registration opens
Aug 7th - 9th	F1Tenth Boot Camp
Sep 8th	Orientation (Online Meeting)
19:00 KST	Meeting Link Demonstrate expectations, prospective participants can ask questions
Sep 16th	Technology Exchange Conference
Sep 17th	Registration closes
23:59 KST	
Oct 17th	Track Setup & Teams Training All Teams can use the racetrack after 3pm.
Oct 18th	Teams Training Qualification Session (14:00 KST)
Oct 19th	Race day (10:00 KST) Award Ceremony

주관 KATECH 한국과학기술연구원 KNU 강원대학교 KNU 경원대학교 동국대학교 서울과학기술대학교 경북대학교 YNU 연세대학교 연경여자대학교 HJU 동북대학교

# F1Tenth Boot Camp

<https://korea-race23.f1tenth.org>, <https://f1tenth.or.kr/bootcamp>

- 목적: 본 캠프는 자율주행 SW 개발 입문자, 초보 교육자 대상으로 한 F1Tenth AV 플랫폼을 활용한 단기 (3일) 자율주행 입문 교육 캠프입니다. F1Tenth AV 플랫폼을 직접 조립하고, 자율 주행 개발을 위한 기본 설정 및 SW 설치, 자율 주행 알고리즘을 개발을 위한 기초를 제공합니다. 이 코스는 최소 자율 주행 경주 트랙을 달릴 수 있는 기본 방법을 익히게 됩니다.
- 일정: 2023. 8. 7.(월요일) ~ 8. 9.(수요일) 3일간 진행
- 장소: DGIST (대구 과학기술원)
- 프로그램

일 자	일 정
1일자	자율주행 소개 ROS2, F1Tenth Simulator, F1Tenth AV 자율주행 플랫폼 조립
2일자	Rigid Body Transform, Wall Following, Follow Gap Mapping, Vehicle States, Vehicle Dynamics and Maps
3일자	Scam Matching, Localization, Particle Filter, SLAM, Pure Pursuit, Run on the Race Track

- 참가신청: <https://tinyurl.com/f1tenthkoreabootcamp23>  
- 신청기간: 2023. 7. 10(월요일) ~ 7. 26(수요일)
- 숙박 및 학습장  
- DGIST 숙박시설 및 학습장 (강의실 & 체육관)
- 등록비  
- LINC 3.0 참여대학 소속 개원(은 대학) LINC 3.0 사업단에 지원하여 확인  
- 개인: 5만원(인) - 기금: 30만원(인)
- 준비물  
- F1Tenth AV 플랫폼 (LINC 3.0에서 지원 받는 경우 일괄 구매 후, 현장에서 배포)  
- Ubuntu 20.04 설치
- 기타문의: 경상국립대학교 LINC 3.0 AI-빅데이터 ICC  
- 센터장 김진현 (010-9253-1935)  
- 행정원 윤재희 (055-772-2485)

후원

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## Location



Soongsil University  
BAIRD HALL 5<sup>th</sup> floor Meeting Room

# Timeline

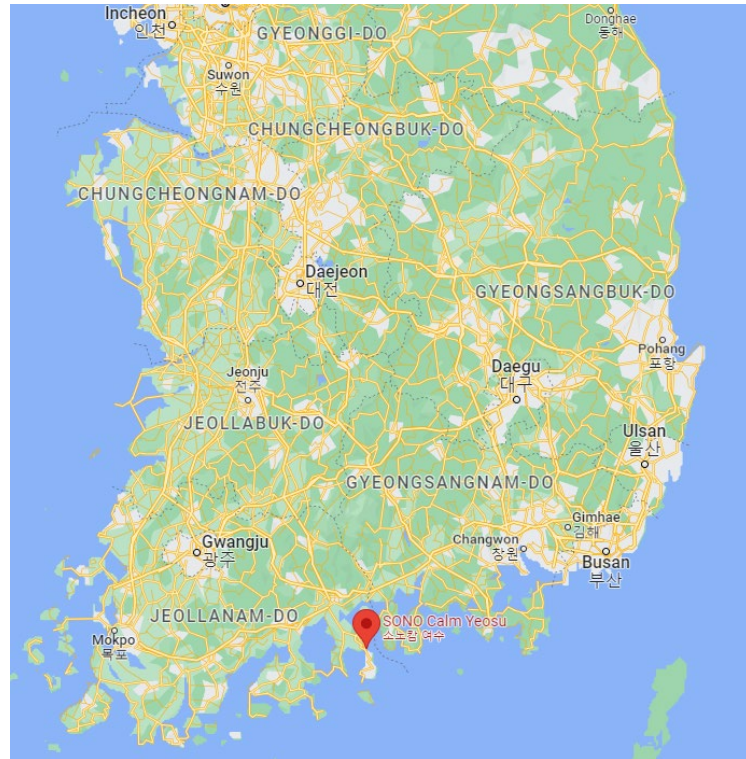
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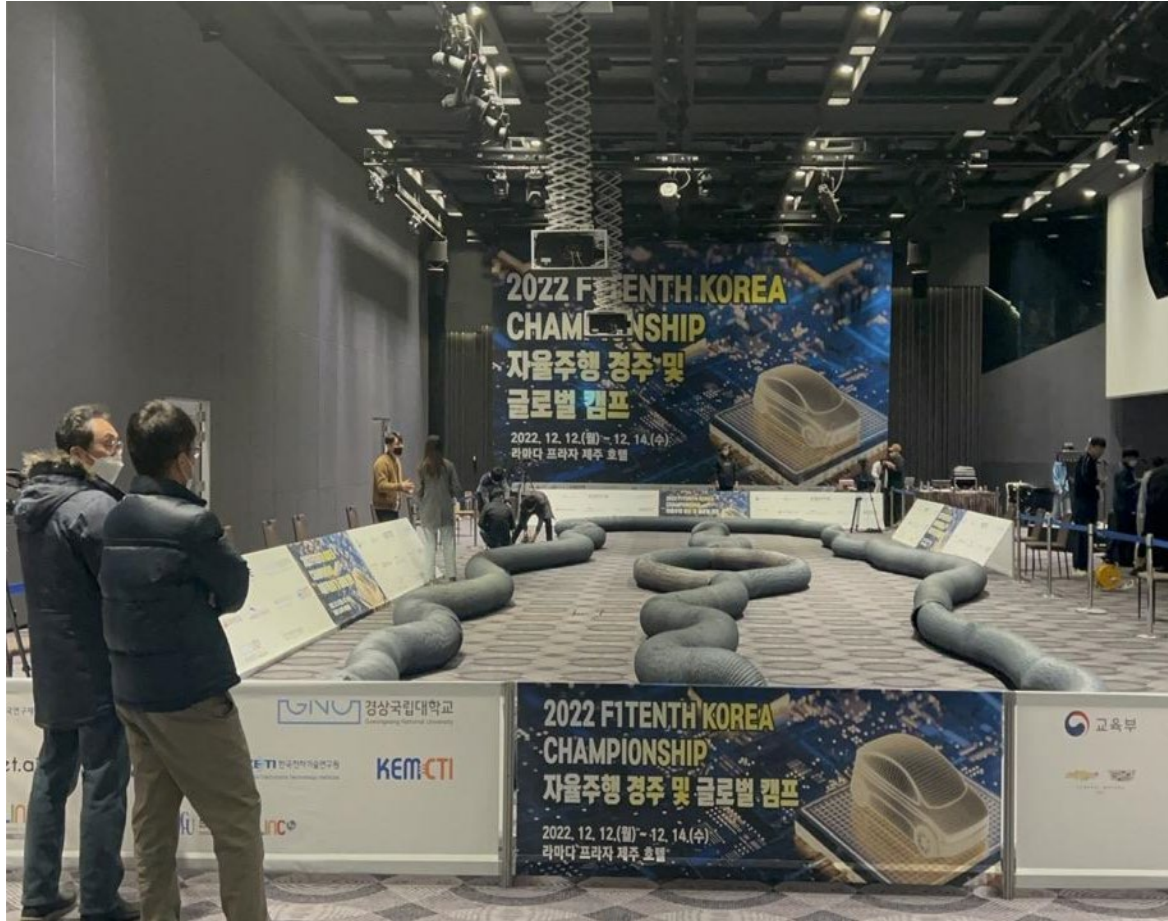
# Competition Place

SonoCalm Yeosu at Yeosu, Korea

Location details will be announced soon



# Racetrack Environment



# Competition Time Line

FKC 23 세부 프로그램					
	Oct. 17, 2023	Oct. 18, 2023		Oct. 19, 2023	
09:00-09:30	Registration	F1tenth 2nd Day	Autoware Workshop	Reveal Tournament Table	Autoware Workshop
09:45-10:00	Opening Ceremony	Teams Training	Autoware Registration	Final Check for Race	
10:00-11:00	History of F1tenth (Raul, Johannes, TBD)		Autoware Initialize	Head-to-Head Race	
11:00-12:00	F1tenth and Autoware (TBD)			Award Ceremony	
12:00-13:00	Lunch				
13:00-14:00	Invited Section 1,2(30min, TBD)	Teams Training	Autoware Programing		
14:00-15:00	Team Orientation	Qualification Session Time Trial			
15:00-16:00	Open the race-course and Schedule		Autoware Mapping		
16:00-17:00	Teams Training				
16:00-18:00			Summary		
18:00-					

# Phases Overview

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# Racing Day Phases Overview

## 1. Inspection

## 2. Qualification

- a. Part 1
  - Vehicle can drive through the track
  - Remote emergency brake works
- b. Part2
  - Fastest lap
  - Number of laps in 5 minutes

## 3. Head-to-head

- a. Pre-Check
  - Time trials
  - Bumper
  - Obstacle avoidance
- 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:
  - Check the hardware of the car to meet the requirements  
: [https://korea-race23.f1tenth.org/race\\_resources.html](https://korea-race23.f1tenth.org/race_resources.html)
  - Make sure the vehicle is safe

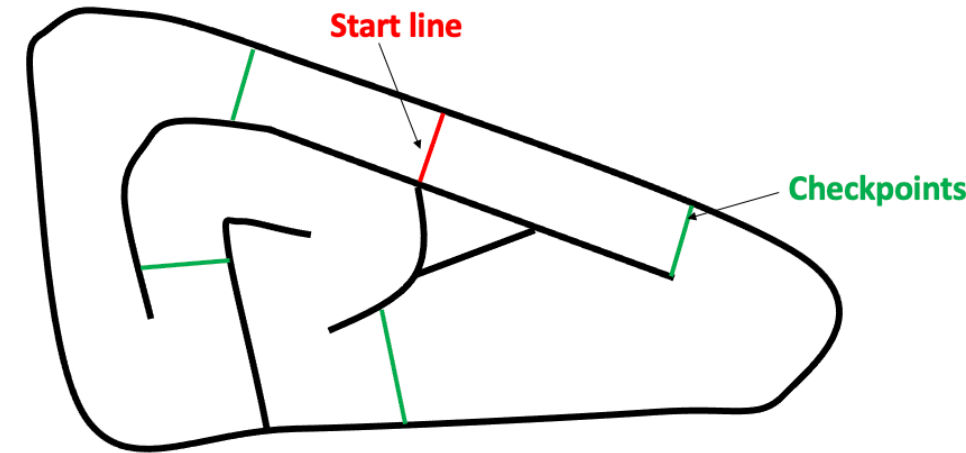
## Phase 2: Qualification(Oct 18<sup>th</sup>) – Part 1

1. Same track as the race
2. Each vehicle must demonstrate that it can drive autonomously through a track without crashing.
3. The team must demonstrate that it is possible to trigger car emergency stop remotely.

# Phase 2: Qualification (Oct 18<sup>th</sup>) – Part 2

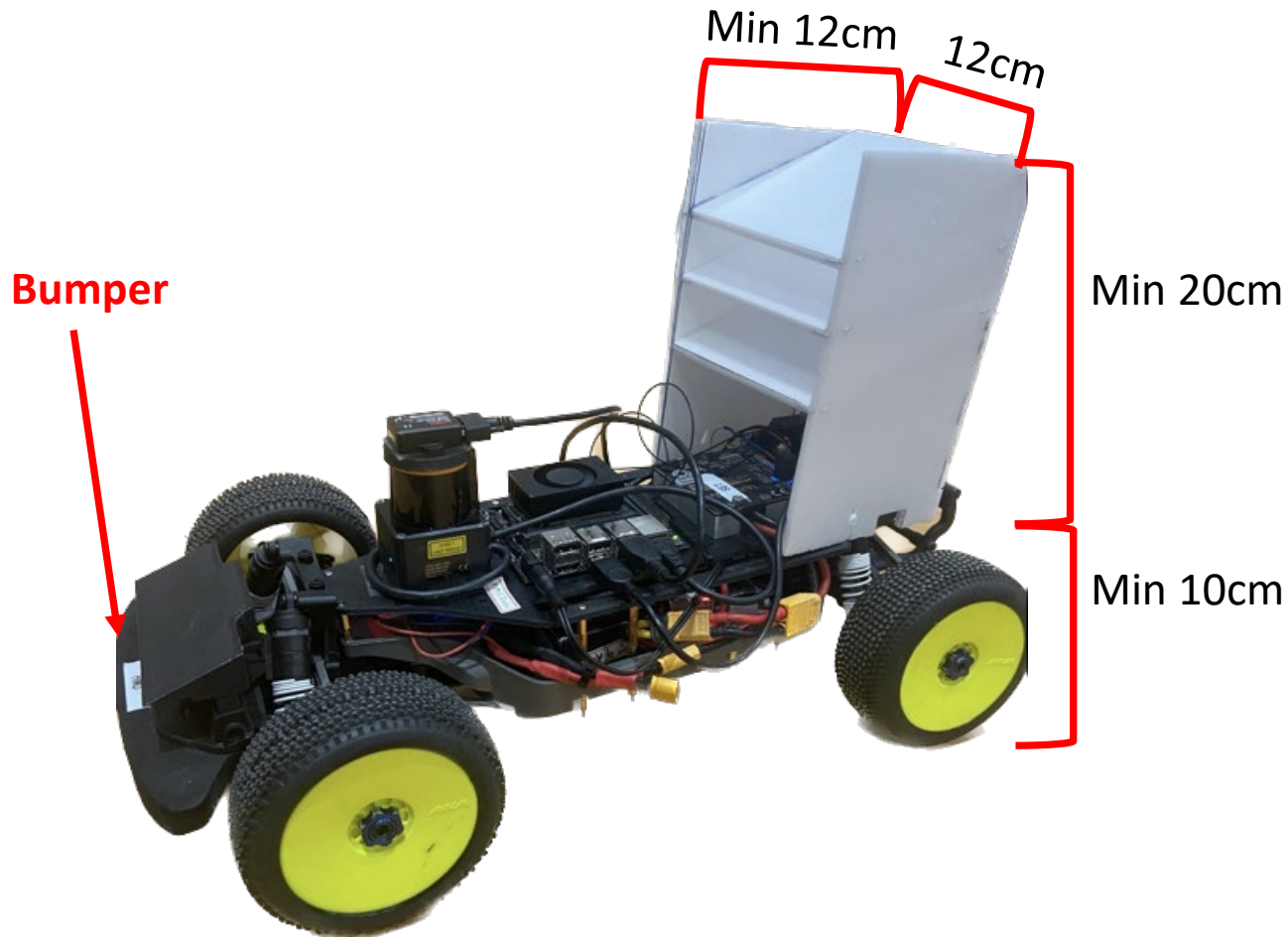
- **Time Trials**

- Two heats, each 5 minutes
- Two goals (two leaderboards):
  - ☐ Fastest lap time
  - ☐ Highest number of completed laps
- The track is the same as in training and race
  - ☐ **Teams can map the track prior the race**
  - ☐ Static obstacles need to be avoided
- Algorithm reconfiguration/tuning
  - ☐ Between the heats
  - ☐ During the heat, but the car must be stopped, and the time is counted
- Crash  $\Rightarrow$  go back to a checkpoint
  - ☐ Penalty = time spent on moving the car and fixing the track



Example check point location

## Phase 3: Head-to-head (Oct 19<sup>th</sup>) – Race



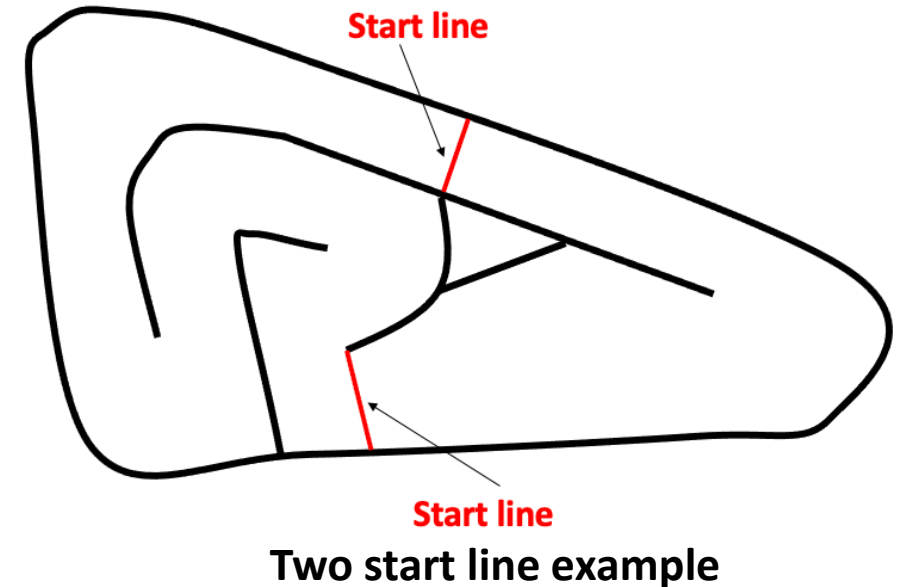
- Completed time trials
- Foam bumper
- Perceivable by LiDAR
- Obstacle avoidance – static and dynamic



Foam bumper

## Phase 3: Head-to-head (Oct 19<sup>th</sup>) – Race

- Race
  - Two cars on the track
  - All-play-all or knockout tournament
  - Finish 8 laps earlier than your opponent
  - Two start lines
    - ⇒ lower probability of crashing immediately
- Crashing
  - Track border ⇒ fix the track and start from the point of the crash
  - Opponent ⇒ allowed once, then disqualification
    - Both cars continue from the same line



# Rules

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- 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: <https://korea-race23.f1tenth.org/rules.html>
- Read the rules carefully and ask questions via email if there is anything unclear : [f1tenth.korea@gmail.com](mailto:f1tenth.korea@gmail.com)

# Podium Ceremony

Ranking	Award	Prize
Grand Prize	KATECH	5,000,000 KRW
First Prize	UNIST Future Mobility Center	3,000,000 KRW
Second Prize	ICCAS	1,000,000 KRW
Third Prize	KEMCTI	1,000,000 KRW
Fourth Prize	Sonnet	F1Tenth Autonomous Vehicle (Worth 4,000,000 KRW )
Fifth Prize	GM	GM Goods

**Any Q**

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Don't be too nervous if things are not going as planned...

