



KOREA INSTITUTE of CIVIL ENGINEERING
and BUILDING TECHNOLOGY

The **KICT** Initiative

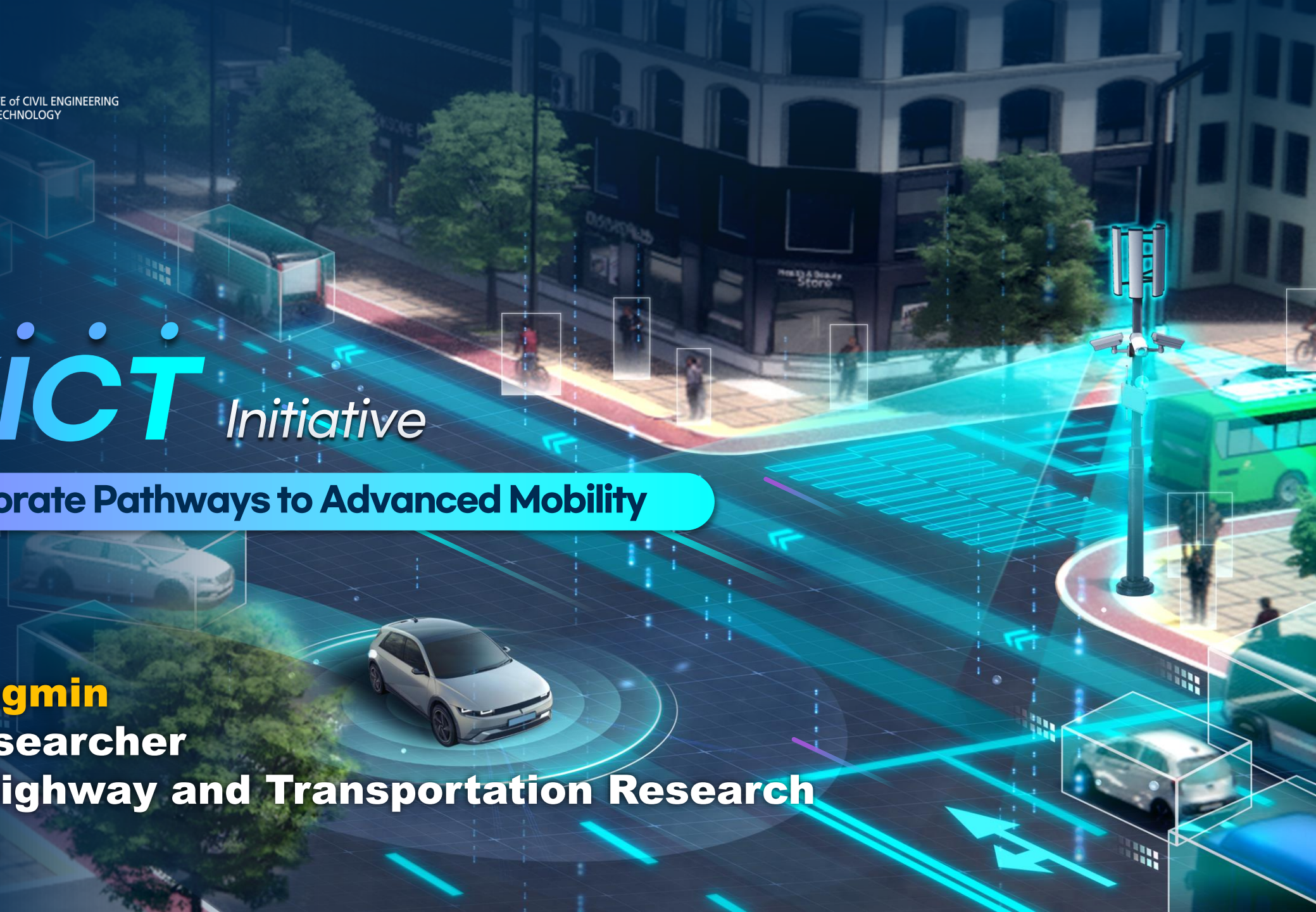
: Collaborate Pathways to Advanced Mobility

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Dept. of Highway and Transportation Research

Oct. 15, 2025



The **KICT** Initiative
: Collaborate Pathways to Advanced Mobility

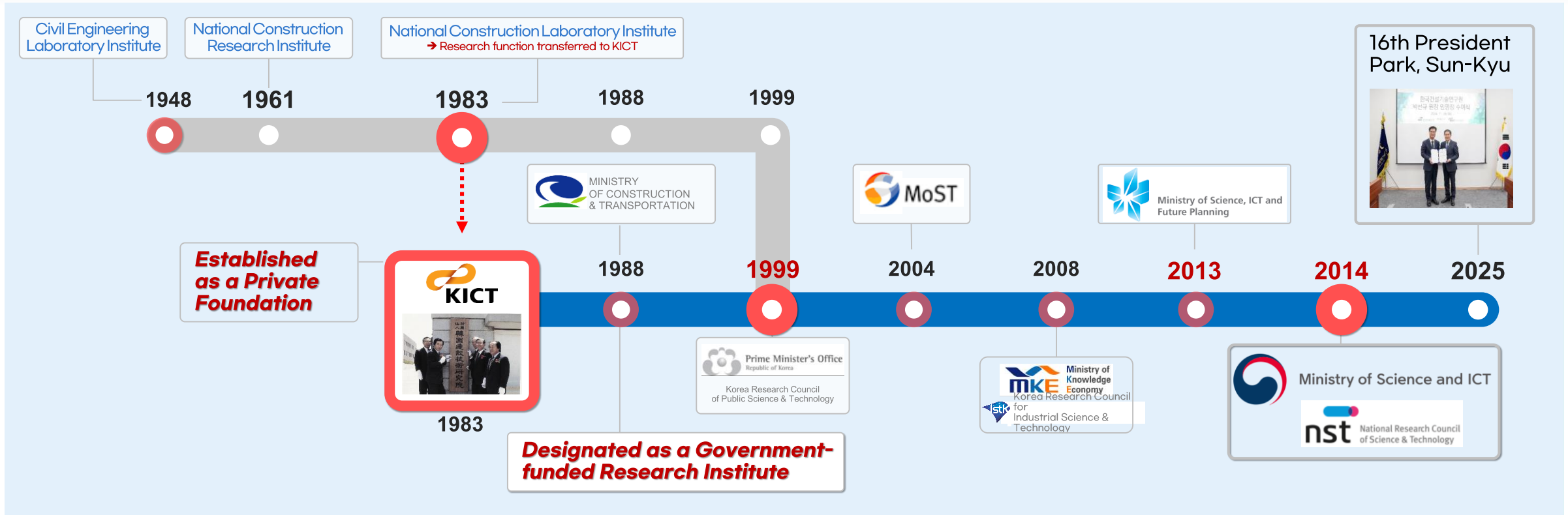
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01

About KICT

History & Mission



Mission

Driving innovation in the construction industry through the **development and dissemination of original technologies in construction and land management**, thereby contributing to an **improved quality of life and sustainable national growth**

KICT's Roles and Responsibilities (R&R)

To be a global research institute that **increases Korean people's safety and happiness**



R&R 1

Solve national issues and social problems through safe and reliable land and transportation technology



R&R 4

Solve global problems through cooperative global infrastructure development projects



R&R 2

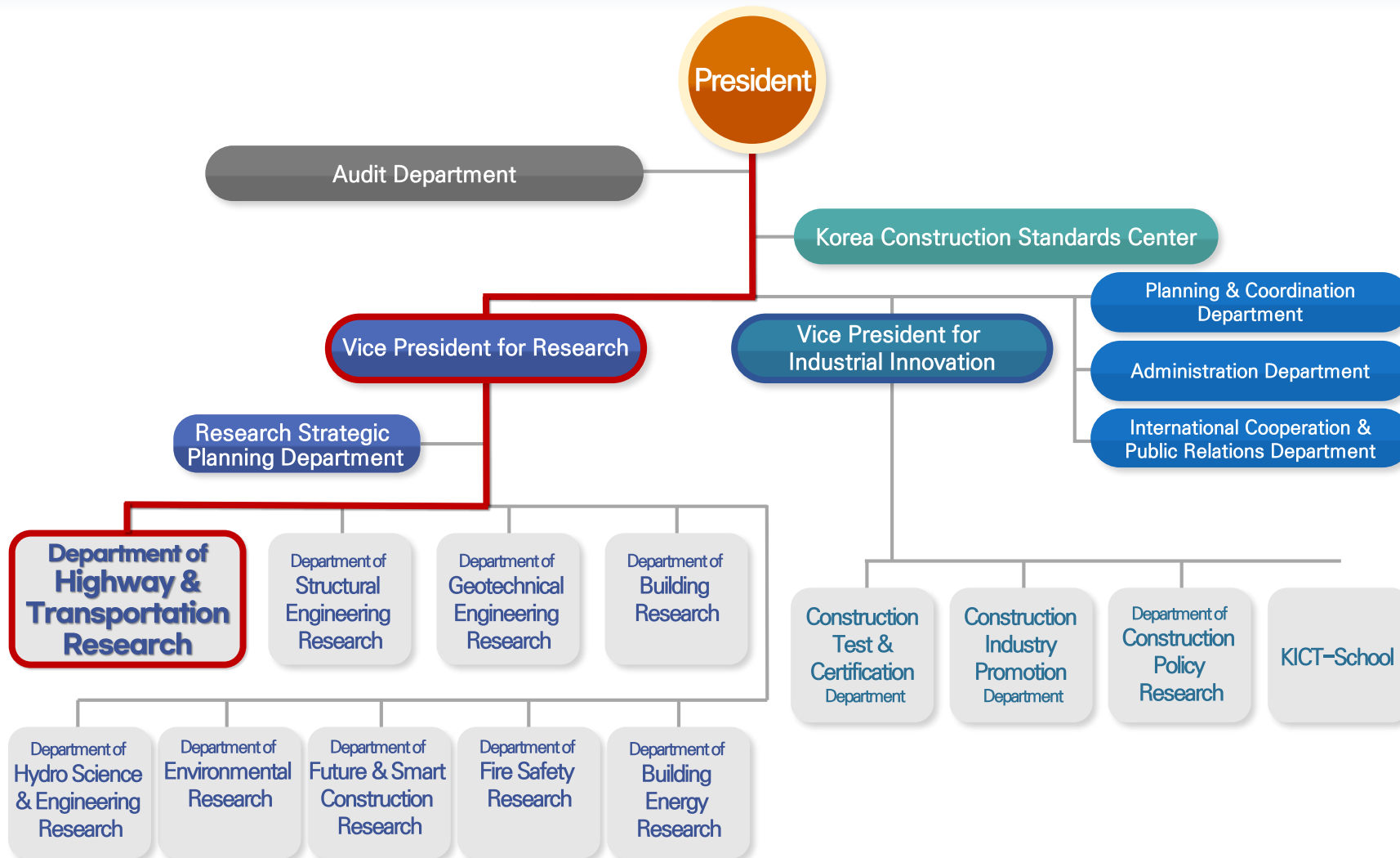
Contribute to the innovative growth of the construction industry by leading a new construction paradigm



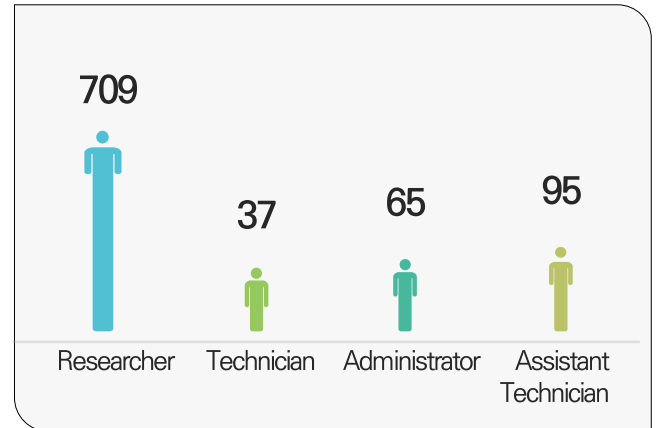
R&R 3

Promote mutual prosperity in the Korean Peninsula through balanced land development

Organization & HR & Budget



Human Resources : 906



Budget : about 103.5 mill.€



R&D Infrastructure



SOC Demonstration Center

(Yeoncheon, Gyeonggi-do)

National full-scale test and verification site

to invigorate nationwide R&D and new technologies

Key facilities: Experimental test-drive courses, test facilities for reproducing various climate environments

Fire Research Center (Hwaseong, Gyeonggi-do)

Korea's largest total fire safety research center

aimed at advancing fire safety technologies

Key facilities: Real-Life Fire Performance Experiment Building, Materials Performance Evaluation Test Building



Head Office

(Goyang, Gyeonggi-do)

Korea's only comprehensive construction research infrastructure

Key facilities: Future Convergence Building, Large Structure Experiment Building, Port Experiment Building, Integrated SOC Management Center



River Experiment Center

(Andong, Gyeongsangbuk-do)

Develop technologies to preserve and restore rivers using

large-scale test waterways modeled after real rivers

Key facilities: Steep, straight, and meandering channels



Global Cooperation

Specialized to suit the local requirements



- Establishment of Self-Reliant Foundation for Road Construction and Management in Laos



- Water resource management and flood forecast system to help underdeveloped countries respond to climate change



- Localization of technology to support SMEs for entry into overseas markets

MOUs with Various International Institutions



Region	Key MOUs in the Road Sector
EU	• TRL (United Kingdom), EURECAT (Spain), LCPC (France), BAM (Germany) etc.
USA	• NCSU, UC Davis, CII (Construction Industry Institute)
JAP	• JICE, PWRI (Public Works Research Institute)
AUS	• CSIRO, ARRB (Australian Road Research Board)
CHN	• CABR, RIOH (Research Institute of Highway)

Support developing countries with ODA



- Vietnam-Korea Smart City and Construction Technology Cooperation Center (VKC)



- Modernization of Uzbekistan Building Code (UBC) Projects



- Establishment of Self-Reliance for Green-Digital road construction in Indonesia

KICT solve global problems through cooperative global infrastructure development projects

02

About Research Department



General Inform

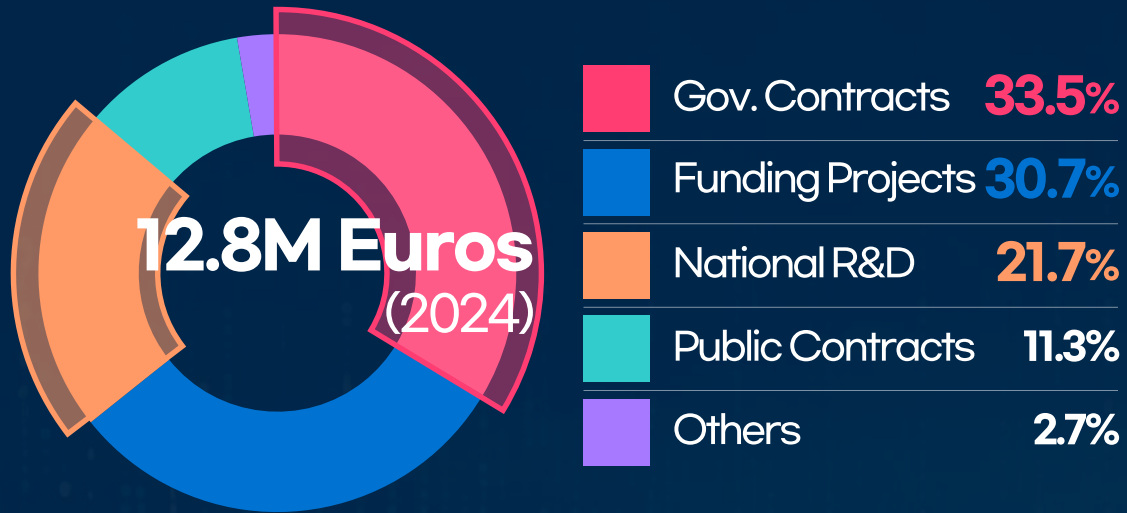
Dept. of Highway and Transportation Research



“Leading Future Innovation in **Smart and Sustainable Transport Systems**”

Key Research Areas

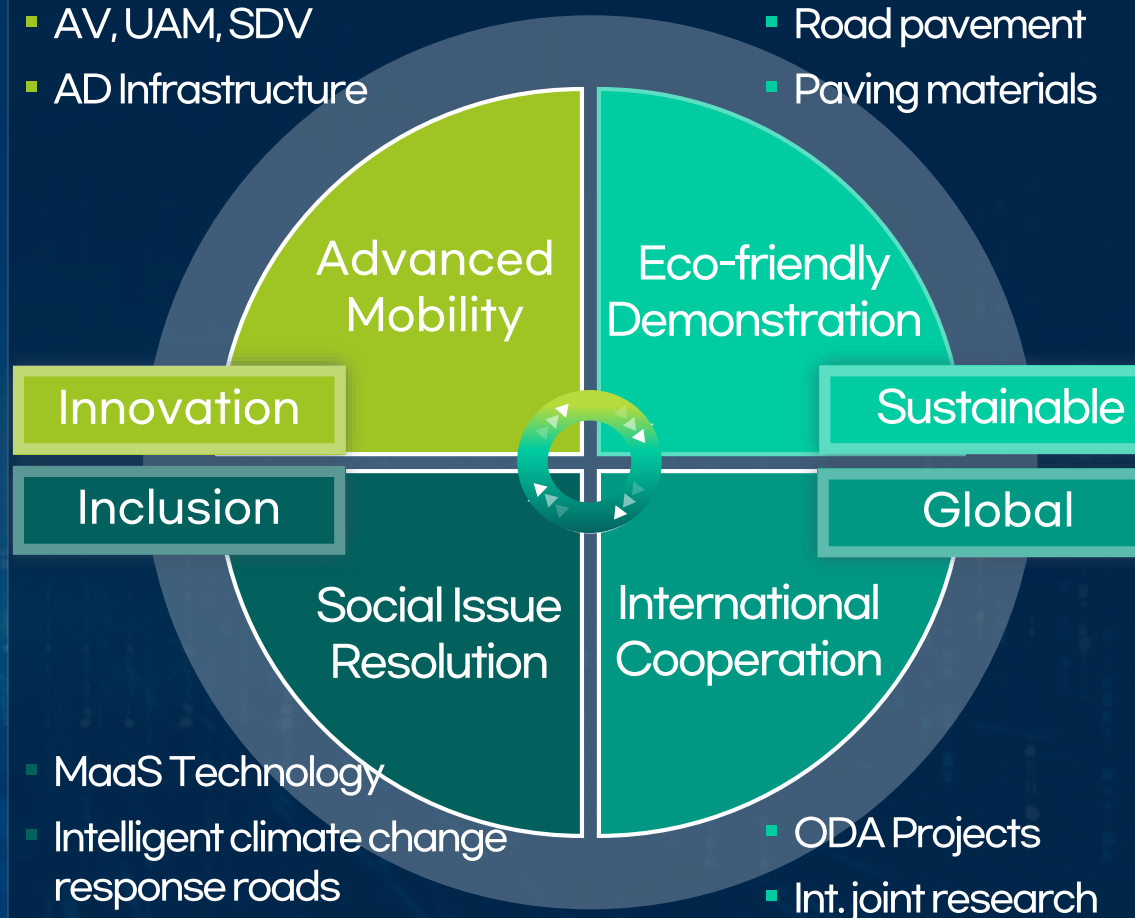
Portfolio by Research Project Type



Department's Achievements (in 2024)

Paper	• SCIE/SSCI: 15 • KCI (Korea Citation Index): 41
Patent	• Application: 25 • Registration: 29
License Fee	0.67 bil. KRW (4.1 mil. EUR)

Portfolio by Key Research Areas



Research Achievements

KICT

Driving Innovation in Advanced Mobility Infrastructure and Service

1990 ~ 2010

Road Management & ITS Foundation

- ☑ Road managing system
- ☑ Traffic control system
- ☑ Traffic inform system
- ☑ Safety analysis
- ☑ National ITS develop

Laid the
foundation
for
national ITS

2010 ~ 2015

Advanced Traffic Control System

- ☑ Next-generation road
- ☑ Safety inspection vehicle
- ☑ Real-time detection
- ☑ Simulation-based
- ☑ Variable speed limit

Advanced
traffic control
and
road safety

2015 ~ 2020

Road – Vehicle Convergence

- ☑ Cooperative driving
- ☑ Dynamic map platform
- ☑ Sensor-based prediction
- ☑ Road platform tech.
- ☑ Climate adaptation

Pioneered
road-vehicle
convergence
and MaaS

2020s Future Mobility Research



AV Operation, MaaS, Sustainable Road



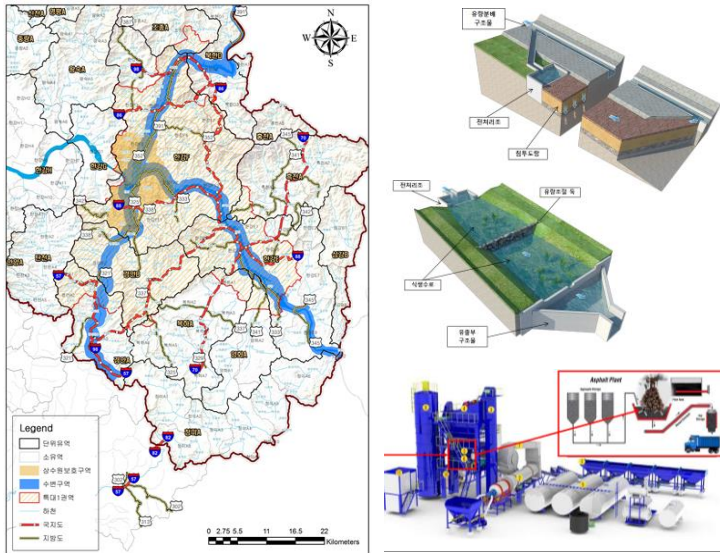
AI-driven autonomous driving infrastructure

03

Interested Calls & Researchers in KICT

Interested Calls

D5-20 : NEE Mitigation

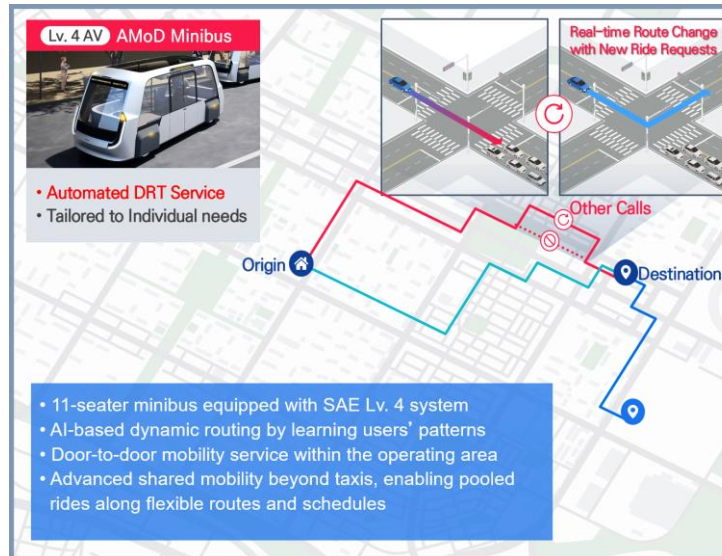


KEY IDEA

- Integrated Framework for NEE Mitigation
- Innovative Road Technologies (Monitoring, Pavement System) for NEE Mitigation

Dr. Cho and Dr. Baek

D6-01 : CCAM Demonstration

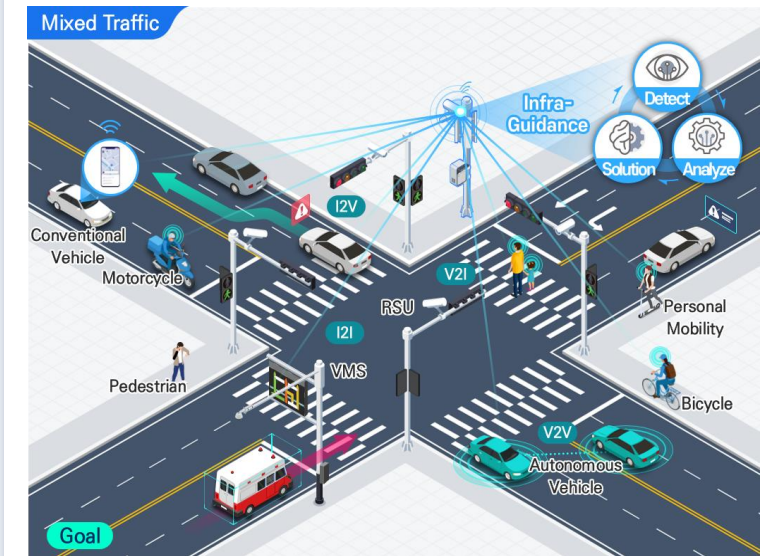


KEY IDEA

- Validating Effectiveness of CCAM Large-scale demonstration based on vehicle maneuvering and driver's psychophysiological workload

Dr. Jang

D6-03 : Gen AI for CCAM



KEY IDEA

- Universal multimodal interface for cooperative guidance based on human-intelligible display of driving intent and optimal behaviors

Dr. Yang

Researchers Interested in D5-20 Call



Researcher

Hye Jin Cho, Ph. D.

- ✓ **Senior Research Fellow** at Dept. of Highway & Transportation
- ✓ **Ph. D** in Transport Engineering, **University of Leeds U.K**
- ✓ **Visiting Scholar** at Road Ecology Center, **UC Davis**
- ✓ **Assistant Professor**, University of Science & Technology
- ✓ Permanent Member, Korean Society of Transportation

Extensive Expertise in Roadside
Non-exhaust Emissions (NEE)



Proven Track Record in Developing
Practical Mitigation Tech



Policy Expertise for **Large-Scale Implementation**



Awards

- **Ministerial Awards Twice (MOLIT, Korea)**
- **Ministerial Awards (MOPAS, Korea)**
- Academic Excellent Book Award (KST, 2015)
- Community Service Award (KSCE, 2009)

Achievements

- **20 Research Projects** (*selected as Principle investigator*)
- **21 Patents** (*selected as main inventor*)
- 52 Publications (Books, Papers and Conference)
- 7 SCI(E) Journal Paper Publications in Recent 5 years

Research Interest

- Sustainable Urban Mobility
- Green Transport Infrastructure
- Road Safety Management System
- Modeling for Driver's Decision-making

Researchers Interested in D5-20 Call



Researcher

Cheolmin Baek, Ph. D.

✓ **Research Fellow** at Dept. of Highway & Transportation

✓ **Ph. D** in Civil Engineering, **North Carolina State University USA**

✓ **Director**, Korean Society of Road Engineers

✓ **Chairperson** of the Asphalt Concrete Committee,
Korean Society of Road Engineers

✓ Permanent Member, Korean Society of Civil Engineers
& Korean Society of Road Engineers

Extensive Expertise in Roadside
NEE & EE Mitigation



Track Record of various national projects
Developing **Novel Mitigation Tech**



Experience in field applications
of developed technologies



Awards

- Technical Excellent Award (KSRE, 2023)

Achievements

- **12 Research Projects** (*selected as principle investigator*)
- **12 Patents** (*selected as main inventor*)
- 105 Publications (Books, Papers and Conference)
- 12 SCI(E) Journal Paper Publications in Recent 5 years

Research Interest

- Green/Sustainable Road Infrastructure
- Advanced Multifunctional Materials
- Road Infrastructure Design, Construction, and Operations

D5-20 Call Suitability (Dr. Cho)

IDEA

Call D5-20

**Integrated Framework
for NEE Mitigation**



Monitoring &
Estimation



Source-specific
Strategies



Catchment &
Economic Appraisal



Decision & Policy
Integration

Experience

Related Research Projects and Case Examples

PI



National Manual for Roadside
Green Infrastructure

MOLIT & MOE, 2011~2014

- Developed practical guidelines for mitigating NEE at the national scale
- Outcomes became legally binding manuals

Co-PI



Masterplan for Road NEE
Mitigation in Gyeonggi State

Gyeonggi-do, 2018~2020

- Designed mitigation strategies for Korea's largest province
- Provided decision-making models for facility selection and cost-effective management

PI



Technology Development Projects

MSIFP, 2015~2018

- Modular infiltration trenches, filter separation, and pretreatment technologies
- Successfully commercialized FRP modular

Paper



Patent & Publications

Non-exhaust and non-point
pollution reduction

- Over 10 patents directly addressing NEE
- Multiple high-impact publications on pollutant runoff, infiltration facilities, and roadside green infrastructure

D5-20 Call Suitability (Dr. Baek)

IDEA

Call D5-20

Innovative Road Technologies
for **NEE Mitigation**



Standardized
Measurement



Real-time
Monitoring



Reduction
Technologies in
Pavement System



Field Demonstration

Experience

Related Research Projects and Case Examples

PI  MOLIT	Technology Development Projects MOLIT, 2019~2023	Co-PI  MSIT	Technology Development Projects MSIT, 2019~2021
	• Development of technology and management system for road fine dust reduction • NEE reduction technologies in pavement system		• Development of proof technique for particulate matters reduction in urban roadside • NEE measuring facility and analysis method
PI  MOLIT	Technology Development Projects MOLIT, 2018~2023	Paper 	Patent & Publications Non-exhaust and exhaust pollution reduction
	• Development of construction materials and application technologies for fine dust reduction using photocatalyst		• 3 patents of reduction technologies for NEE & EE • 9 publications on monitoring and mitigation technologies for NEE & EE in pavement system

Researchers Interested in D6-01 Call



Researcher **Jiyong Jang, Ph. D.**

- ✓ **Senior Researcher** at Dept. of Highway & Transportation
- ✓ **Ph. D** in Transport Engineering, **Hanyang University (HYU)**
- ✓ **Junior Engineer** at Kunhwa Engineering & Consulting Co., Ltd.
- ✓ **Researcher** at Korea Expressway Cooperation
- ✓ **Transportation Engineer 1 Grade**, HRD Service of Korea

Extensive Expertise in Driving Safety & C-ITS Systems



Large-scale National R&D Project Experiences



Strong Simulation & Evaluation Skills



Awards

- **President's Research Excellence Awards as a Promising Young Scholar (KICT, 2024)**
- **President's Commendation – C-ITS proj. (Korea Expressway Cooperation, 2020)**
- **Outstanding Paper Award (KST, KITSC, 2014)**

Achievements

- **5 SCI(E) Journal Paper Publications in Recent 5 years**
- **3 Patents in Recent 3 years (*selected as main inventor*)**
- **2 Undergoing Large-scale CCAM Demonstration Projects (National Research and Development Projects)**

Research Interest

- **Autonomous Public Transit and DRT**
- **Connected Vehicle & Smart Infra. Safety**
- **Driver Behavior & Psychophysiological Analysis**
- **Integrated CCAM Evaluation Frameworks**

D6-01 Call Suitability (Dr. Jang)

IDEA

Call D6-01

Large-scale
Demonstration of
CCAM



Validating
Effectiveness



Source-specific;
Both Vehicle
Maneuvering and
Driver's
Psychophysiological
Workload



In-depth
understanding
of autonomous
driving

Experience

Related Research Projects and Case Examples

Participant



Safety Benefits for C-ITS on
Korean Freeway

Korea Expressway Corporation, 2018~2021

- Identification of safety benefits by inter-vehicle crash risk analysis using connected vehicle systems data on Korean freeways

Participant



Ministry of Land,
Infrastructure and Transport

Verification and Validation
Method for SAE Lv.4 DRT
Service

2021~Present

- Designed a comprehensive validation methodology for autonomous mobility-on-demand system with level 4 automated driving system

Participant



Ministry of Land,
Infrastructure and Transport

Verification and Validation
Method for Infra-guidance

2022~2024

- Development a comprehensive validation methodology for Infra-guidance system aimed at enhancing the safety of autonomous driving

Paper



Patent & Publications

Evaluating Driving Safety Using
Hybrid Data

- Evaluating Driving Safety of Road Alignment Conditions by Predicted Driver's Psychophysiological Workload Using Vehicle Maneuvering Data

Researchers Interested in D6-03 Call



Researcher **Inchul Yang, Ph. D.**

- ✓ **Research Fellow** at Dept. of Highway & Transportation
- ✓ **Group Manager** of AI Mobility Group (Dept. of Highway & Transportation)
- ✓ **Ph.D.** in Civil Engineering (Transportation), **UC Irvine**
- ✓ **Professor**, University of Science & Technology
- ✓ **ISO/TC204**(ITS Technology) WG 3, 17, 18 **Expert**

Extensive Expertise in Roadside Edge Intelligence for Road Users



Proven Track Record in Developing **AI-Powered Advanced Road Technology**



Professional Expertise for **Large-Scale Implementation**



Awards

- **Minister's Commendation from MOTIE, Korea, in recognition of contributions to the development of Local Dynamic Map**
- Outstanding Paper Awards (Academic Conference of KSCE, KSRE, and others)

Achievements

- **20+ Research Projects in Road Transportation domain**
- **20+ Patents, and Technology Transfers worth 30k EUR**
- 100+ Publications (Books, Papers and Conference)
- 10+ years of Professional Expertise in CCAD

Research Interest

- AI Agent for Optimal Transp. Operation
- Infra. Based Guidance Systems for Cooperative Connected Automated Driving
- End-to-end Architecture for Sensor-equipped Roadside Edge Intelligence

D6-03 Call Suitability (Dr. Yang)

IDEA

Call D6-03

Universal Multimodal Interface for Cooperative Guidance

Human-intelligible display of driving intent and optimal behaviors



Cooperative Scene Understanding



Agentic AI Generating Visual Output



Orchestration of Road Users

Experience

Related Research Projects and Case Examples

PI



Edge Intelligence based Infra-Guidance (IG)

MOLIT, 2022~2027

- Development of next-generation cooperative automated driving services, covering cooperative perception, guidance algorithms, communication messages and IG-based services for non-connected drivers

PI



Large-scale Implementation of Infra-Guidance

Hwasung-Si, 2026~2027

- A two-year living lab operation of the Infra-guidance system conducted at more than 25 critical sites in Hwasung-si, Korea, encompassing diverse use cases such as roundabouts, unsignalized intersections, unprotected turns, NTOR scenarios, and others

Co-PI



Software Defined Road

MSIFP, TBD(2027~)

- Intelligent road infrastructure in which traffic elements—such as lanes, signals, and signs—are managed flexibly through software deployed at edge and/or cloud, rather than through fixed physical installations

Paper



Publications

AI-powered Traffic Modeling

- A series of publications addressing essential core features such as object detection, intent prediction, and behavior recommendation utilizing various AI techniques including CNNs, Random Forests, and Transformers.

D6-03 Call Suitability (Dr. Yang)

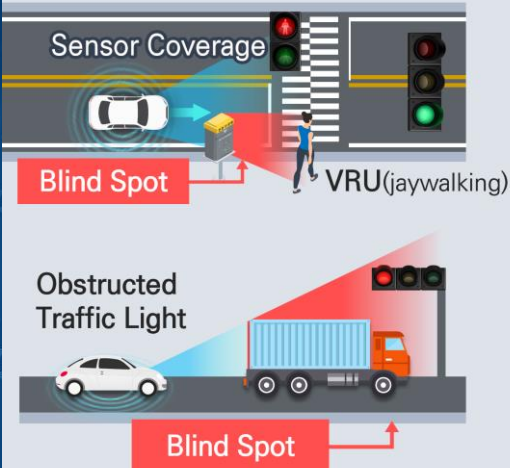
Key Project

Development of
Autonomous Driving
Assistant System via
Infra-Guidance ('22~'27)

Budget : 12 billion KRW
(≈ 7.3 million EUR)

Funder : MOLIT, KOREA

< Examples of ADS Limitation >



SAE J3216™

Cooperative Classification

- Class A Status sharing
- Class B Intent sharing
- Class C Agreement seeking
- Class D Prescriptive

ETRAD ISAD Infra. Support levels for Automated Driving

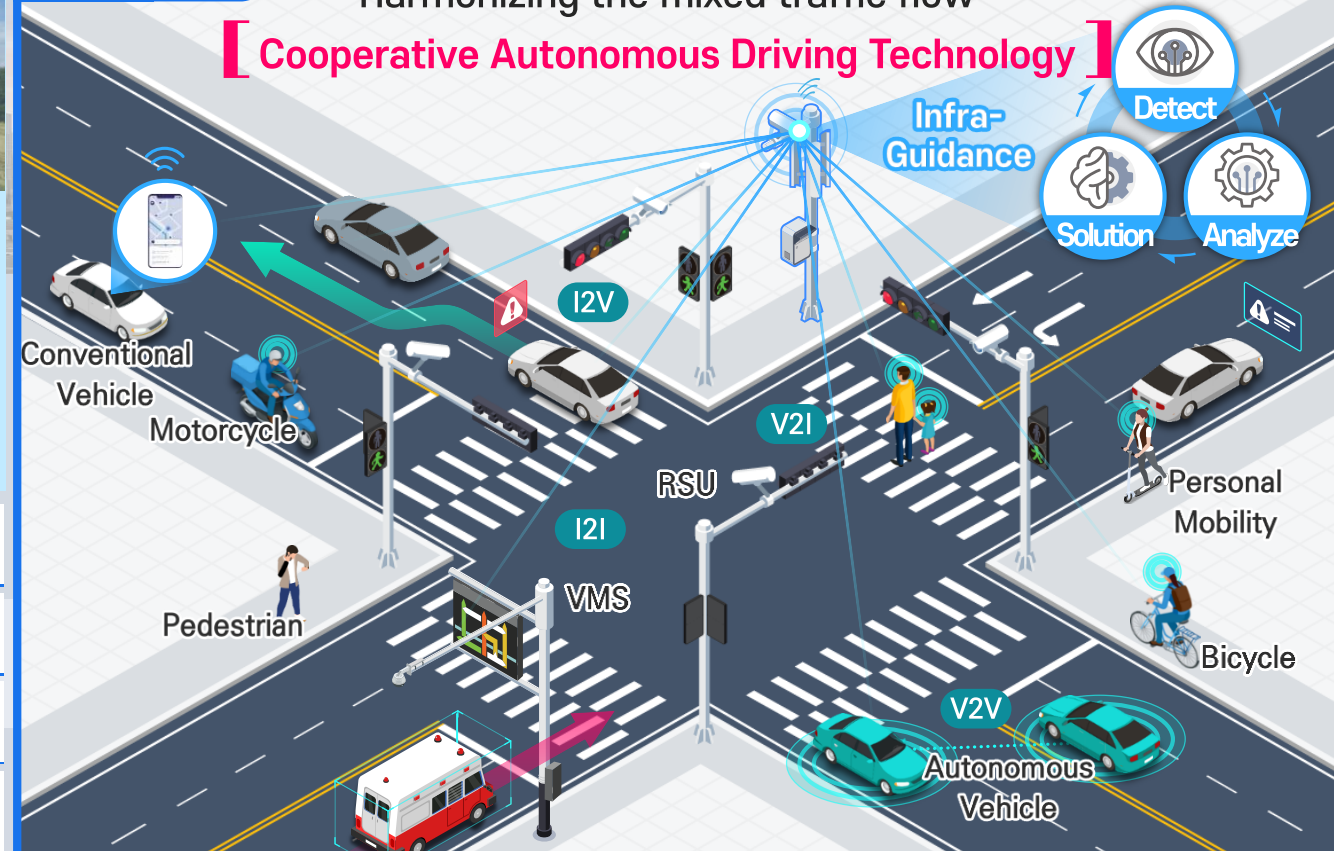
- Level A Cooperative driving
- Level B Cooperative perception
- Level C Dynamic digital info.
- Level D Static digital info. / map
- Level E Conventional Infra.

Traffic	Mixed Traffic with Connected Autonomous Vehicles, Conventional Vehicles, and VRUs
Detection	Cooperative perception between sensor-equipped ITS stations and autonomous vehicle sensors
IG-Server	Providing driving guidance by optimizing autonomous vehicle behavior through analysis and decision-making
CAV	Cooperative Driving according to IG
Conventional Vehicle	Cooperative Driving receiving IG information through a nomadic device

Mixed Traffic

Harmonizing the mixed traffic flow

Cooperative Autonomous Driving Technology



Goal

Harmonizing Traffic Flow through cooperation between
Infra and Autonomous Vehicle (Safety, Congestion, Eco-Friendly)

HARMONY:CAR

HARmonized Mixed-traffic Road Network sYstem based on CooperAtive Relationship



04

Conclusion

Our Commitment for HE Program

Why KICT would be **best partner for Horizon Europe Program** (Especially **Advanced Mobility**)?

Full-Cycle Capability for Advanced Mobility

☑ KICT's Research Capability includes

- **70+ research experts**
- **A wide research range in advanced mobility**
: Advanced Infrastructure
(pavement, road design, etc.) to
Mobility Service(AV, MaaS, etc.)
- **Various test and evaluation facility**



Key facility: SOC Demonstration Center

KICT's Strengths in Collaboration for HE Program

Institute-wide Support System

☑ KICT's Support System includes

- **Strong intention for international cooperation by president and head**
- **Internal collaboration between research departments**
: Policy, Test & Certification
- **Availability of national/international collaboration relationships** for joint research and research outcome application

MOU between
KICT-BAM(Germany)
08/26/2025



NOW WE ARE READY FOR COLLABORATION!

Dept. of Highway & Transportation

Horizon Europe Cluster 5 Networking Forum

Thank you for Listening

