New Car Assessment Program in Korea

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Topics

1. MoLIT Road Traffic Safety Policy
2. History of KNCAP & Achievement
3. 2025 KNCAP Roadmap
4. 2025 Autonomous Vehicle Assessment – Roadmap
No. of Vehicle registration increased twice from 10 mil in 1999 to 22 mil in 2018.
60% deaths reduction from 9,358 (1999: KNCAP start) to 3,781 (2018).
8th Master Plan on Transport Safety (2017-2021)

I. New fatality reduction goal & measures

II. Action plans
1. Safer road use
2. Safer road environment
3. Advanced safety vehicles
4. Safety management system
MoLIT Road Traffic Safety Policy

01. POLICY I Vehicle Safety Policy

2017–2021

- Deployment of Safety Assist
- Strengthening Vehicle Safety
- Adapt to Vehicle Trends
- Improvement in Vehicle Safety Management System

2017–2021

- Promote Eco-friendly Vehicles
- Facilitate Future Mobility
- Continuous Improvements in Vehicle Safety
- Establish Vehicle Policy and Systems for Vehicle-related Statistics
- Revise Legal and Institutional System for Better Vehicle Service

Vehicle Safety Policy for the Continuing Improvement in Safety by Promoting Future Mobility, such as Autonomous Vehicles

02. TREND I Technology Trends

- Industrialized countries, such as Germany, England, Sweden, will initiate the development of assessment technology in parallel with the development of L-3, 4 Highly Automated Vehicle technology.
  - England: MUSICC (Consortium of Gov. Vehicle maker, Supplier, Research Inst, est. in 2019, 6, Development of Library of scenarios)
  - Sweden: DriveSweden Program (MUSICC Consortium of Gov. Vehicle maker, etc. in 2018, Development and promotion of Highly automated vehicle, connected vehicle Under Innovation program for “Next generation travel and transport”)

- Autonomous Vehicle Expert Group (GRVA) under UN ECE / WP29 in charge of safety regulations and assessment
  - Informal Groups: function (FRVA) / cyber security (CS/OTA) / verification and validation (VMAD) / data storage (EDR/DSSAD)
  - VMAD will propose step-by-step Safety Validation Method (Phase 1: highway / Phase 2: urban traffic and parking / Phase 3: interurban traffic)
History of KNCAP & Achievement

2019
Revised The 2nd Roadmap will be established (2019-2023)

2017
Expansion of Assessments with child, small female driver and ADAS
- AEB, ACC, SLD, ISA, LKAS, BSD, RCTA, A-airbag
The 2nd Roadmap will be established (2019-2023)

2013
ADAS included in KNCAP
- SBR, FCWS, LDWS
The 1st Roadmap established (2013-2018)

2007
Small trucks subject to KNCAP

2005
Buses with GRW 4.5 ton or less subject to KNCAP

1999
Legislation of KNCAP
- Automobile Management Act Art. 33-2(KNCAP)
History of KNCAP & Achievement

1999 - Full frontal crash
2001 - Full frontal crash braking
2003 - Full frontal crash braking Side impact
2005 - Full frontal crash braking Side impact Roll-over pedestrian
2007 - Full frontal crash braking Side impact Roll-over pedestrian seat
2008 - Full frontal crash braking Side impact Roll-over pedestrian seat Off-set frontal impact
2009 - Full frontal crash braking Side impact Roll-over pedestrian seat
2010 - Full frontal crash braking Side impact Roll-over pedestrian seat Off-set frontal impact Pole side impact

2017 - Child protection
Family driver
Protection Active Safety Features
AEB (high speed, downtown, pedestrian), ACC, SLD, ACC, ISA, LKAS, BSD, RCTA, Advanced airbag

2013 - Active Safety Features
- SBR
- FCWS
- LDWS
Impact Speed: 56 km/h
- Driver: 50%ile Male (1999 ~ 2016)
  5%ile Female (2017 ~)
- Passenger: 50%ile Male (1999~2012)
  5%ile Female (2013~)

Moving Barrier: 950 kg (2003~2012)
AE-MDB 1300kg (2013 ~)
Impact Speed: 55 km/h
- Driver: 50%ile EuroSID II (2003~2016)
  WorldSID (2017 ~)
- Rear Seat: Q6, Q10 Child (2017 ~)

Impact Speed: 64 km/h
- Driver: 50%ile Male (2009 ~)
- Passenger: 50%ile Male (2009 ~)
- Rear Seat: Q6, Q10 Child (2017 ~)

**Full frontal crash percentage**

- 1999: 0% → 2018: 100%

**Side impact percentage**

- 2003: 0% → 2018: 100%

**Offset frontal crash percentage**

- 2009: 90% → 2018: 100%
History of KNCAP & Achievement

- **Fatality of Vehicle Occupant**
- **Live Saving by KNCAP**

- December 2-6, 2019; Seoul, Korea
Vehicle Safety Policy is summarized as the Continuing Improvement in Safety by Promoting Future Mobility, such as Autonomous Vehicles.
## 2025 KNCAP Roadmap

### Occupants and VRUs

<table>
<thead>
<tr>
<th>Area</th>
<th>Item</th>
<th>Amendments</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
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<tbody>
<tr>
<td>Crash [60+3]</td>
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<td>Implement</td>
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<td>Head, thorax, abdomen, pelvis</td>
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<tr>
<td></td>
<td>Far-side Occupant</td>
<td>New item, develop Korean-method</td>
<td>Research</td>
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<td>Implement</td>
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<tr>
<td></td>
<td>C-to-C crash</td>
<td>New item, replace frontal offset crash, THOR</td>
<td>Research</td>
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<td>Implement</td>
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<td>SBR, Adv. A/Bag</td>
<td>Modifier will be applied</td>
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<tr>
<td>VRU [20+2]</td>
<td>Pedestrian Safety</td>
<td>Expansion of WAD</td>
<td>Research</td>
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<td>Implement</td>
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<td>Advanced PLI</td>
<td>Research</td>
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<td>Implement</td>
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<td>Thorax</td>
<td>Research</td>
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<td>Implement</td>
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<tr>
<td></td>
<td></td>
<td>Pedestrian, Cyclist, Night AEB to be assessed</td>
<td>Research</td>
<td></td>
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<td>Implement</td>
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</tbody>
</table>

- **01**: Same Level of Protection to All Occupants
- **02**: Expansion of VRU Assessment
  - Cyclists will be added
- **03**: New Assessment Method for accident trends
  - New car-to-car assessment method will be added
- **04**: New Assessment Technology
  - Implementation time will be adjusted considering completion level of THOR, aPLI, etc.
- **05**: Other NCAP’s trends
  - Test item and time to introduce will be decided later
### 2025 KNCAP Roadmap

#### Accident Prevention

<table>
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<tr>
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<tr>
<td>Accident Prevention</td>
<td>Rollover</td>
<td>Abolish SSF and Roll-over</td>
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<td></td>
<td>FCWS</td>
<td>Assess AEBS Function</td>
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<td>Phase out</td>
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<td>LDWS</td>
<td>Assess LKAS Function</td>
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<td></td>
<td>LKAS</td>
<td>Subject to 400m curved road, in conjunction with LDWS</td>
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<td>Implement</td>
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<td></td>
<td>AEBS</td>
<td>in conjunction with FCWS Cyclist, Night AEB added</td>
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<td>RCTA</td>
<td>Add Active Function to RCTA(Stand)</td>
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- **Phase out**
- **Implement**
- **Research**

**Effective Assessment for ADAS:**
Comprehensive Assessment of ADAS functions from Individual assessment of ADAS

**New Technology Trends:**
New Item in consideration of commercialization of L-3 autonomous vehicle in 2020

**Other NCAP’s trends:**
Time to introduce and item to assess will be decided later

December 2-6, 2019; Seoul, Korea
## 2025 KNCAP Roadmap

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Knowledge Exchange in Road Safety, December 2-6, 2019; Seoul, Korea
2025 Autonomous Vehicle Assessment
2025 Autonomous Vehicle Assessment – First Step for AV

Autonomous Vehicle? 01
- A vehicle that is capable of sensing its environment and moving safely with little or no human input. (Wikipedia)
  - Need for comprehensive assessment of its functions, not just assessment of individual function
  - Need for abilities responding to failures, infrastructure deficiencies, bad weather, etc.

Strategy for Autonomous Vehicle Assessment 02
- Develop the assessment technology in advance of Government’s target of 2020 Lv.3 AV commercialization
- Propose assessment scenarios based on traffic situations to promote AV technologies
- Start to develop scenarios on roads with low level of difficulty to all roads
  - First, Develop scenarios on highways with low level of difficulty
  - Propose feasible protocol through cooperation with vehicle manufacturers

Assessment for Autonomous Vehicle Safety 03
- Comprehensive assessment of recognition/decision/control of a vehicle.
  - Assess a vehicle based on the fact that a car can cope with certain traffic conditions and perform safe driving.
    - Scenario: real-world traffic conditions, driving behaviors of other drivers, etc.
  - Evaluation of basic driving performance
- System’s response to failures, infrastructure deficiencies, etc.
  - In case of failures, infrastructure deficiencies, Assess control transfer to driver according to proper procedures and Fallback when a failure of control transfer.
2025 Autonomous Vehicle Assessment – First Step for AV

**Assessment Scenarios**

- Develop scenarios for road segments
  - Time line: 2020 ~ 2025
  - Specific segments: highway (driving lane, tunnel, interchange, ramp, tollgate)

**Development of Assessment Scenarios**

04
- **Highway Segments**
- **Conflicting scenario in each segment**
- **Develop Conflicting Scenario for AV**

05
- Analysis Vehicle Behaviors through the monitoring
- Parameter Range
- Develop conditions and criteria for assessment
- Criteria for control transfer & MRM under Limits of Function

- System Limitations (ex. System fail, infrastructure deficiencies, bad weather etc.)
- Effect of AV behaviors in motion (mixing with conventional cars)

**Assessment Protocol for AV**
2025 Autonomous Vehicle Assessment – Roadmap

**Assessment scenarios of AV**

- **Part 1** | Crash Avoidance performance (Conflicting situations in front of AV)
- **Part 2** | Basic driving performance (Crossing & Going straight, Lane change, etc..)
- **Part 3** | Performance of external environments (Weather, Infra, Failure, etc..)

<table>
<thead>
<tr>
<th>Segments(by road characteristics)</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
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<th>2025</th>
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<tr>
<td>Driving lane Tunnel</td>
<td><strong>Scenario research</strong></td>
<td>Basic driving performance scenario(keep lane)</td>
<td>Driving straight road performance scenario(keep lane)</td>
<td>Lane change scenario</td>
<td>Failure, limit system scenario</td>
<td>Assessment protocol each scenarios</td>
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<td><strong>Develop protocol</strong></td>
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Thank you !