PROVING GROUND PROJECT
HUNGARY
Project summary

2019
CONTENT

Project concept

Proving Ground development  Unique services

Technical details
PROJECT CONCEPT

2014–2017
Industrial inputs
Iparági inputok
Decision on strategic R&D investment

Unique test facility

Capacity constraints in Europe in area of vehicle dynamic testing

Technology change in vehicle industry – single vehicle vs. co-operative vehicle control: different development environment is required

Decision of Hungarian Government in 2016: „contribution to the European automotive community“

Test field for classic, automated and connected vehicles in Hungary
Mobility as social challenge

Inspiring factors for development

1. Zero Emission
   - Fuel-consumption reduction
   - Reducing emission

2. Demographic pressure
   - Support of insecure drivers
   - Increase the elderly mobility

3. Risk of accidents
   - Avoidance of the accidents by reducing the effect of human mistakes

4. Increasing traffic density
   - Management of transport process
   - Comfortable, time-saving travel

5. Assistance systems
   - Intelligent sensors for appropriate process
   - Intelligent actuators (steering, brakes, etc.)

Source: VDA
Test track concept
Test track status
Layout of the Proving Ground

Traditional and autonomous testing modules

- Customer zone
- Service zone
- R&D&I campus
- High-speed CAV testing
- Low-speed CAV testing

Office and workshops
Main entrance and control centre
Development centres (USERS)
Research & Technology center
Research center
Related facilities (event center, etc.)
PROJECT DEVELOPMENT
Actual status – Sep/2019
Phases of the project

Phase 1: 2017-18
- Dynamic platform
- Braking surfaces
- Handling course – high speed
- Smart City basic road grid I
- Main entrance building
- Technical building
  (Innovation center - by industrial park)

Phase 2: 2019-20
- Dynamic platform
- Smart City basic road grid
- Braking surfaces
- Handling course – high speed
- Rural road – Eastern section
- Smart City road grid II, facades, buildings
- Highway section
- Rural road – Eastern section
- Main entrance building
- Technical building
- Control center

Phase 3: 2020-21

Concept under finalization
UNIQUE SERVICES
Multi-level testing environment
From computer to real traffic – essential for automated driving

- Public road
- Limited public road
- Proving ground
- Laboratory
- Simulation
Proving ground service portfolio

...til future of mobility

Service Line A: classic services
- Traffic situations
- Modular services
- Linked modules
- Modules

Service Line B: autonomous testing services
- Lab
- Simulation
- Data system
- Usecase definition
- Special services
- Infrastructure
- Sensor cluster

Service Line C: public road tests
- Cross borderer tests
- Public road tests
- Smart City tests
- Standard tests

Service Line D: R&D services

Service Line E: infrastructure & technical services

from classic tests…
Leaving the closed testing environment…

Zalaegerszeg as Smart/Digitalized City environment for Testing

Test track modules and scenarios for controlled and repeatable tests in a safe environment

City environment for random real-life testing
Leaving the closed testing environment …

High speed testing in real environment

Loop_1: Hungarian roads
Loop_2: International roads
TECHNICAL DETAILS
Technical concept of the project
Communication technology concept

- **3 level approach:**
  - **1st level:** ITS G5 basic V2X test environment
  - **2nd level:** V2X developer environment: **freely configurable**, open interface for application developers, full data logging infrastructure
  - **3rd level:** fully **customer defined** test environment
- **5G cellular** test network for future ITS applications
- **Redundant layout** for parallel customer networks
Service Line A: Classic services

A.1 Modules

A.1.1 Dynamic Platform

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>300 m</td>
</tr>
<tr>
<td>Acceleration lane length</td>
<td>768 m</td>
</tr>
<tr>
<td>FIA compliant run-off area</td>
<td>20 m</td>
</tr>
<tr>
<td>Inclination to south</td>
<td>1%</td>
</tr>
<tr>
<td>Separated return way</td>
<td>yes</td>
</tr>
<tr>
<td>Wet basalt surface as part of the eastern acceleration lane</td>
<td>completed by 2020</td>
</tr>
</tbody>
</table>
Service Line A: Classic services

A.1 Modules

A.1.3 High-Speed Handling course

Σ 2040 m long

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>2040 m</td>
</tr>
<tr>
<td>Width</td>
<td>12 m</td>
</tr>
<tr>
<td>Speed range</td>
<td>up to 120 km/h</td>
</tr>
<tr>
<td>Curve radius</td>
<td>40–100 m</td>
</tr>
<tr>
<td>Gravel covered safety area</td>
<td>yes</td>
</tr>
<tr>
<td>Variable / Diverse topography</td>
<td>yes</td>
</tr>
<tr>
<td>Wet track sections</td>
<td>to be realized in 2020</td>
</tr>
</tbody>
</table>
Service Line A: Classic services

A.1 Modules

Smart City zone: A + B + C
Realization 2018

- Parameters
  - Low-speed parking zone
  - Parking area
    - 30 m x 80 m
  - Logistics yard
    - 50 m x 70 m
  - Parking house
    - 60 parking places

- Parameters
  - High-speed, multi-track section
    - Length: 500 m
    - Multiple lane capability: maximum 2 x 4
    - Heavy truck usage: yes

- Downtown area
  - Parameters
    - Various facade height
    - Multiple lane capability
      - Street parking: yes
      - Urban tunnel: yes
    - Length: 3 – 10 m
    - 1; 2 x 1
      - yes
      - yes
Service Line E: Technical services

E.2 Proving Ground infrastructure services

E.2.1 Workshops & offices

- Double passenger vehicle workshop/garage (8x75m²)
- Commercial vehicle workshop/garage with 3 lanes 27m length with service pit (450m²)
- Offices (20x25m²) with 6 person capacity
- Meeting room with a 30 person capacity
- Development entrance completely separated from the main public entrance which is the reception or conference center building
E.1 Engineering services
From simple to full turn key solutions

- All round test support
- Infrastructure test set-up
- In vehicle test setup
- Data logging
- Data analysis
- Multiuser traffic test scenario
- Public road test licensing
- Support of R&D projects
- Other engineering requirements

1. Workshops support service

2. Testing environment preparation services
Service Line E: Technical services

E.2 Proving Ground infrastructure services

E.2.2 Conference Centre

- Complete separation from technology development area
- High quality Conference rooms (max. 300 persons)
- Unique and attractive presentations, press releases, exhibitions, and conferences
- Flexible room structures
- Foodservices, catering, Canteen
COMING SOON
## Service Line A: Classic services

### A.1 Modules

#### A.1.2 Braking Platform

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low $\mu$ lane length</td>
<td>200 m</td>
</tr>
<tr>
<td>Acceleration lane length</td>
<td>750 m</td>
</tr>
<tr>
<td>Braking surfaces (8 lanes)</td>
<td></td>
</tr>
<tr>
<td>1. Chess surface</td>
<td></td>
</tr>
<tr>
<td>2. High friction asphalt</td>
<td></td>
</tr>
<tr>
<td>3. Ceramic tiles</td>
<td></td>
</tr>
<tr>
<td>4. Basalt tiles</td>
<td></td>
</tr>
<tr>
<td>5. Asphalt 0.8 $\mu$</td>
<td></td>
</tr>
<tr>
<td>6. Concrete 0.6 $\mu$</td>
<td></td>
</tr>
<tr>
<td>7. Normal asphalt</td>
<td></td>
</tr>
<tr>
<td>8. Aquaplaning lane</td>
<td></td>
</tr>
<tr>
<td>Run-off area side wisea</td>
<td>2 x 20 m</td>
</tr>
<tr>
<td>Run-off area at the end</td>
<td>150 m</td>
</tr>
<tr>
<td>Separated return way</td>
<td>yes</td>
</tr>
</tbody>
</table>
Service Line A: Classic services

A.1 Modules

A.1.10 Motorway

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total length</td>
<td>1500 m</td>
</tr>
<tr>
<td>Straight length</td>
<td>938 m</td>
</tr>
<tr>
<td>Lanes</td>
<td>2 x 2 + 1</td>
</tr>
<tr>
<td>Watering system</td>
<td>yes</td>
</tr>
<tr>
<td>Overhead road lighting</td>
<td>yes</td>
</tr>
<tr>
<td>Multiple intersections / crossings</td>
<td>yes</td>
</tr>
</tbody>
</table>
### A.1.11 Rural road

#### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road layout 2x2</td>
<td>500 m</td>
</tr>
<tr>
<td>Road layout 2x1</td>
<td>2500 m</td>
</tr>
<tr>
<td>Public road like layout (junctions, road surface, geometry, traffic signage)</td>
<td>yes</td>
</tr>
</tbody>
</table>
Service Line A: Classic services

A.1 Modules

**Smart City**
Complete concept

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street length</td>
<td>25–500 m</td>
</tr>
<tr>
<td>Multiple lane capability</td>
<td>1; 2x1; 2x2; 2x3; 2x4</td>
</tr>
<tr>
<td>Street width</td>
<td>2.75–3.5 m</td>
</tr>
<tr>
<td>Street slopes</td>
<td>10%; 20%; 4 m slope height</td>
</tr>
<tr>
<td>Various street material</td>
<td>asphalt, concrete, basalt, gravel</td>
</tr>
<tr>
<td>Speed limit</td>
<td>50–80 km/h</td>
</tr>
<tr>
<td>Street orientation</td>
<td>N-S &amp; E-W</td>
</tr>
<tr>
<td>Various junction types, roundabouts</td>
<td>yes</td>
</tr>
<tr>
<td>Low µ surfaces for AD interaction testing at dynamic limits</td>
<td>yes</td>
</tr>
<tr>
<td>No. of city building blocks</td>
<td>8</td>
</tr>
<tr>
<td>City building block sizes</td>
<td>max. 25x60 m</td>
</tr>
<tr>
<td>Parking house</td>
<td>yes</td>
</tr>
<tr>
<td>Different building facade material</td>
<td>brick, concrete, steel, wood, etc.</td>
</tr>
</tbody>
</table>
ZALAZONE - Region Zala

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