iARGUS-CMD

Traffic Scenario Planning, Verification, Execution & Visualization Software for advanced Vehicle-in-the-Loop operations on the Proving Ground within the holistic iSWACO-ARGUS Proving Ground Tool Chain

iARGUS-CMD gives the operator the unmatched flexibility to generate and execute repeatable as well as individual Vehicle-in-the-Loop tests using traffic scenarios for scenario based vehicle testing and homologation as well as for operation verification and validation of sensors like radar, lidar, cameras etc. Moveable objects accrding to ISO 22133 can be real vehicles, soft targets and virtual elements.

The **iARGUS-CMD** software, installed on the iARGUS-CC Control Center of the **iSWACO-ARGUS** system, is used to plan, to verify, to execute and to monitor the trajectories of each participating **moveable objects** (vehicles, soft crash targets) as well as the **infrastructure elements** (like traffic lights, wind generators etc.) on the proving ground (PG).

- Traffic scenario definition and **trajectory planning** and generation for each participating moveable object. A powerful import function is available to process scenarios defined by **OpenScenario or iSCAML** (ISO 22133)
- Execution and supervision of the traffic scenario on the PG
- Simultaneous support of several Traffic Simulation Vehicles (TSV) and Soft Crash Targets (SCT) and also Virtual Elements (VE) together with the Vehicle under Test (VUT) and infrastructure elements (ISE) within the same traffic scenario.
- Availability of definable launch procedures and post-test procedures to guide all vehicles into the test and to guide them automatically back to a defined position after the test has finished.
- Definable **Assessment Metrics** and **Abort Test Metrics** to qualify the test result and to abort the test in case of unwanted situations.
- Geo Fence definable to suppress driving of the driverless vehicles outside the allowed area
- Local Fences difinable to support collision avoindance
- Test visualization and surveillance in real-time
- Support of all scenarios, for vehicles up to SAE level 5, on proving grounds and for specific tasks also on public roads.
- Communication protocol suports with the future ISO 22133 standard. iMAR is member of the related ISO WG.
- iSWACO-ARGUS is also aligned to the final results of the German **PEGASUS** project.
- iARGUS-CMD is integral component of iMAR's iSWACO-ARGUS system for enhanced Proving Ground Automation

iARGUS-CMD furthermore performs the download of the planned scenarios to the vehicles and to the ISEs

(Infrastructure Elements), like iTSV-KIA-NIRO as TSV or vehicles with installed driving robot (e.g. Stähle, Vehico), any arbitrary Vehicle under Test, SCTs (4a, ABD, Humanetics / DSD, DRI etc. on request) and traffic lights, wind generators, rain machines etc. as ISE, and controls and monitors the execution of the entire test scenario in real-time.

The **iARGUS-CMD** provides standard maneuvers as default beside a wide range of advanced definable customized scenarios:

- Cutting In: Conditional lane change of TSV, when the TSV has reached a specific distance in front of the VUT
- Cutting Out: TSV drives in front of VUT and performs a lane change. VUT follows TSV
- Cutting Through: Conditional change over two lanes of TSV, when the TSV has reached a specific distance in front of the VUT
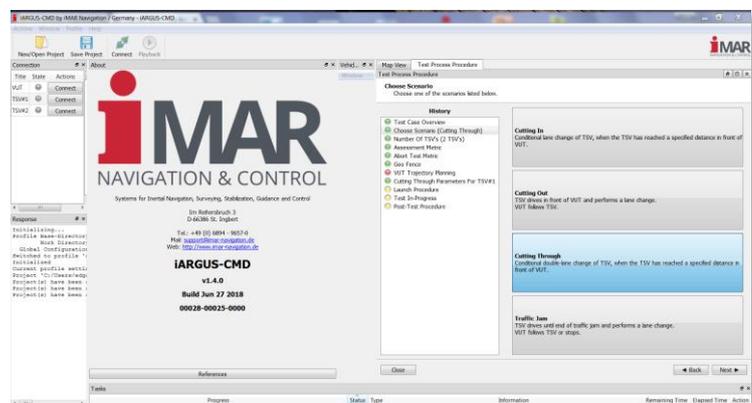
- Traffic Jam: TSV drives until end of traffic jam and performs a lane change VUT to follow the TSV or to stop (whatever the VUT is intended to do in its automated mode)
- Nearly any arbitrary scenario like crossing with SCT, interaction with Virtual Elements, manouvers within round-abouts etc.

iSWACO-ARGUS is the holistic Toolchain for a seamless workflow for scenario based testing from simulation (OpenScenario) to real-world test execution on the proving ground and to data export of all vehicles coordinates over time as CSV or binary file.