Virtual Integration and Simulation Environment (VISE®)

The Virtual Integration and Simulation Environment (VISE) is Neya's 3D sensors and physics simulation software that is optimized for the integration and testing of autonomous systems. Built on the Unreal Engine, VISE is fully integrated with ROS and JAUS communication paths. By testing and validating our autonomous systems in realistic synthetic environments, users can increase the time spent running software through complex scenarios and across thousands of Monte Carlo tests. With VISE, you can test anytime, anywhere.

Digital Replication of the Vehicle

When it comes to running a successful autonomous mission in simulation, the most important factor is that the autonomy software does not need to reconfigured to work with the simulated vehicle.

Often, to work with a simulation, developers will create bypasses and alter system parameterizations to work with the simulator interface. This is not the case with VISE. Instead, VISE is built to digitally replicate the behaviors of vehicles by providing accurate physics responses. In addition, by simulating the hardware specific to a vehicle, such as the B-Kit, VISE also provides the same interface the vehicles provide to outside software.

In short, VISE uses the exact same commands in simulation that are used to run the system on the vehicle in the real world—with no shortcuts or hacks.

To create our accurate vehicle models, Neya has developed and integrated the Rapidly Processed and Integrated Digital Vehicles (RaPID-V) framework. RaPID-V is integrated into both VISE and our next-generation Simulation Management System (SimMS), Neya's testing system and user control interface. Using this vehicle-modeling architecture, we can take data collected from a real vehicle and run it through thousands of simulated vehicle tests, improving the accuracy of the digital vehicle's dynamics across each run.

VISE can support any type of vehicle — including Ackermann, differential drive, and unmanned aerial vehicles — in any environment.

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VISE®

SimMS is Neya's next-generation Simulation Management System. Through the use of a distributed simulation architecture, SimMS enables an operator to:

- Perform multiple, Monte Carlo simulations in varied simulation scenarios
- Review and compare generated metrics
- Rapidly perform multiple simulation runs
- Evaluate and review performance metrics of simulation runs for autonomy instantiations in dynamic scenarios, allowing them to assess capabilities in varying situations.

Modeling the World

VISE provides a vast array of configurable landscapes for the testing and evaluation of machine learning, mission planning and robotic systems. By leveraging these simulated environments, users can safely test new capabilities across thousands of permutated scenarios before moving to field testing. VISE contains digital recreations of real-world locations, as well as configurable representative environments. Partnering with the Virtual Heroes Division of ARA, we can rapidly create new, highly detailed, and realistic virtual environments.

Terrain and Feature Generations Tools (TFGT) can be leveraged to create hundreds of miles of testable landscape with complete features, such as vegetation, roads, and other environmental objects—all at runtime. VISE is configurable using the metadata contained in scenario files, allowing users to run generated environments multiple times and share their setup with the rest of the development team.

Sensor Suite

Our simulation platform supports a broad range of sensors such as LiDAR, Stereo Camera, GPS, IMU and RADAR. Every sensor in VISE is fully customizable and can be configured to fit the requirements of the project or match the behavior of a real-world sensor model. Neya has developed a Dual Return LiDAR model that can accurately represent the noise of vegetation returns.

Expandable and Customizable

VISE is built on the Epic Games Unreal Engine, which allows for rapid development of new features and can be extended to work with any Unreal Engine-based plugin.