

ASGARD2

Automated Signature Generator for Automotive Radar verification **with angle**

ASGARD2 is the first compact radar target simulator capable of emulating angle of virtual targets electronically, addressing the challenge of testing current and future MIMO and 4D imaging radars in short range.

INTRODUCTION

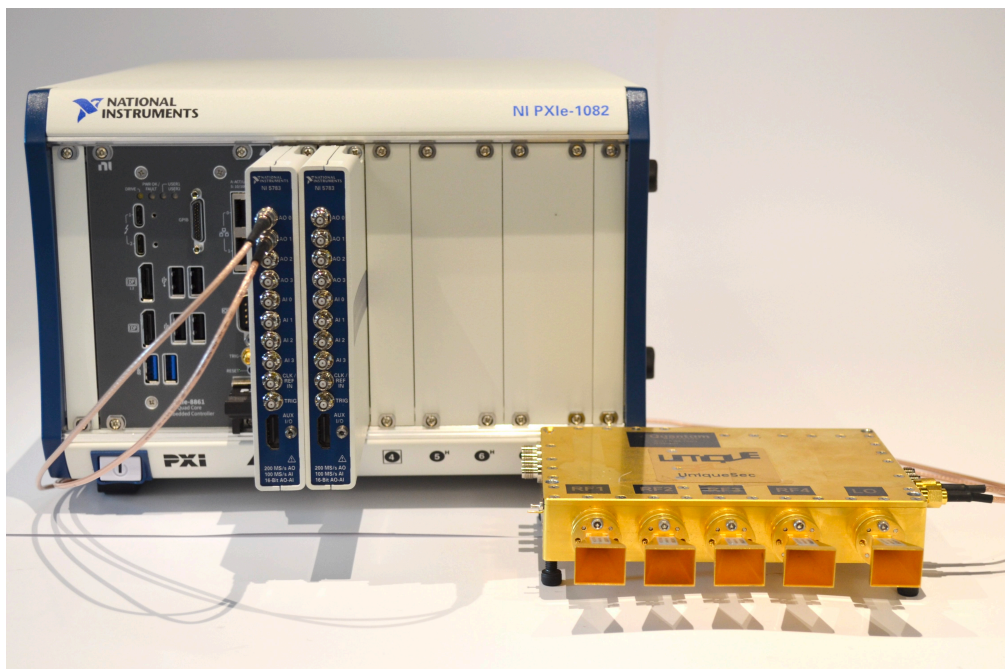
With the emergence of MIMO and imaging radars, the demand for testing them in a compact chamber has risen. The main challenge for far-field testing is the large virtual aperture of these radars. This takes the traditional RTSs to be located in a few meters, which doesn't allow for testing radar against close-range targets.

ASGARD2 offers the first compact future-proof RTS capable of emulating a point cloud for MIMO radars in current ADAS and future autonomous vehicles.

ASGARD2 consists of a scalable digital front-end, scalable RF front-end and different optional hardware and software modules that make it suitable for verification of different radars and for different testing needs.

ASGARD2 uses an award-winning patented spectrum-domain target simulation technology, enabling

- Target simulation from almost-zero distance
- Scalable RTS for adding to number of targets up to 256
- Real-time operation suitable for HIL/VIL testing applications
- Large dynamic range for simulation of different RCS values
- Deployment of several ASGARD units together
- Integrated with variety of environment simulation softwares



SIGNAL PROCESSING

RADAR VERIFICATION

RADAR CALIBRATION

TARGET CLASSIFICATION



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ASGARD2 Features

ASGARD2 uses a MIMO-based angular simulation, where the angle perception is generated completely electronically. It features

- Near-field operation in a small chamber,
- Using only a few number of antennas for simulation of all angles in radar's field of view,
- Coverage for full radar's FoV,
- Support for radars with different polarization,
- Support for next generation and future radars with software/hardware upgrade, including
 - Radars with elevation information,
 - MIMO radars,
 - 4D imaging radars.

The unique approach for signature generation in ASGARD2 enables this system to create the perception of very close targets, and the angular location without the need for an antenna rotation or large antenna arrays, with an affordable price.

Some other features of ASGARD2 include

- Possibility of creating **micro-Doppler** signatures corresponding to soft or deformable targets,
- **Interference generation** for interference analysis between radars and different sources,
- Specification of test scenarios through a GUI, scenario file or through interface to environment simulators,
- Real-time adaptation of test scenarios based on reaction of radar or vehicle under test in HIL/VIL testing,
- Optional sub-systems for detection of radar signal parameters and antenna beam information change,
- Small form factor, suitable for labs, End-of-Line (EoL) testing and workshops.

ASGARD2 Key specifications

Frequency	76–81 GHz
RF Bandwidth	Up to 4 GHz
IF Bandwidth	0–250 MHz
Number of targets	Up to 64 point targets (upgradable with hardware)
Range	0–300 m
Velocity	0 – ±300 Km/h
Azimuth FOV	±90°
Range increments	5 cm
Velocity steps	0.05 m/s
Azimuth resolution	0.1°
Minimum distance	20 cm
Elevation FOV	±15° (upon request)
RCS dynamic range	Up to 98 dB

ASGARD2 use cases

- Radar development testing
- Radar-based safety functions testing (AEB, ACC, ...)
- End-of-line calibration for radar manufacturers
- End-of-line test and calibration for vehicle manufacturers
- Annotated training/testing data generation for AI and ML in autonomous vehicles and radars,
- Over-the-air multi-radar HIL/VIL testing
- Radar performance analysis under interference
- Sensor fusion verification