



SpeedProbe DL

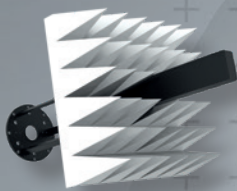
Dual Linear Polarized Multi-Probe Array

**Up to 5x times faster¹ calibration
of active phased array antenna.**

Transforming single to multi-probe capabilities
with a simple hardware upgrade.

Upgrade to

Single-Probe



Standard
speed

SpeedProbe DL

Dual Linear Polarized
Multi-Probe Array



Up to
5X times
speed

APPLICATION

- Calibration of active phased array
in test production

SpeedProbe DL is a dual linear polarized multi-probe array designed to significantly enhance active phased array calibration speed in planar and cylindrical near-field testing systems.

This solution ensures exceptional accuracy and flexibility, featuring a customizable multi-probe array with a frequency range from L-band to Ku-band².



SpeedProbe DL upgrades **standard single probe system** to **multi-probe capability to accelerate calibration and test production**, by enabling simultaneous measurements of multiple signals. This product is adaptable to existing installations, offering a versatile and scalable solution for demanding measurement requirements.

SOLUTION FOR

- Active phased array calibration in production
- Pulsed and continuous wave testing

PRODUCT CAPABILITIES

Technology

- Near-field / Planar
- Near-field / Cylindrical

Features

- **Linear multi-probe array:** contains multiple miniaturized probes with dual polarization and low scattering properties
- **Dual-polarization:** supports H/V measurements
- **Real-time measurement:** automates beam pointing, gain, and directivity analysis
- **Frequency range from L-band to Ku-band**
- **Frequency bandwidth: 25%**

+ Why upgrade?



Up to 5x times faster calibration of active phased arrays



Seamless integration with existing systems



Quick customization: for frequency bands and lattice configurations

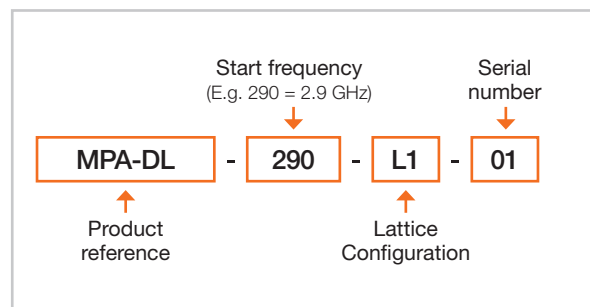


Minimal downtime for probe replacement

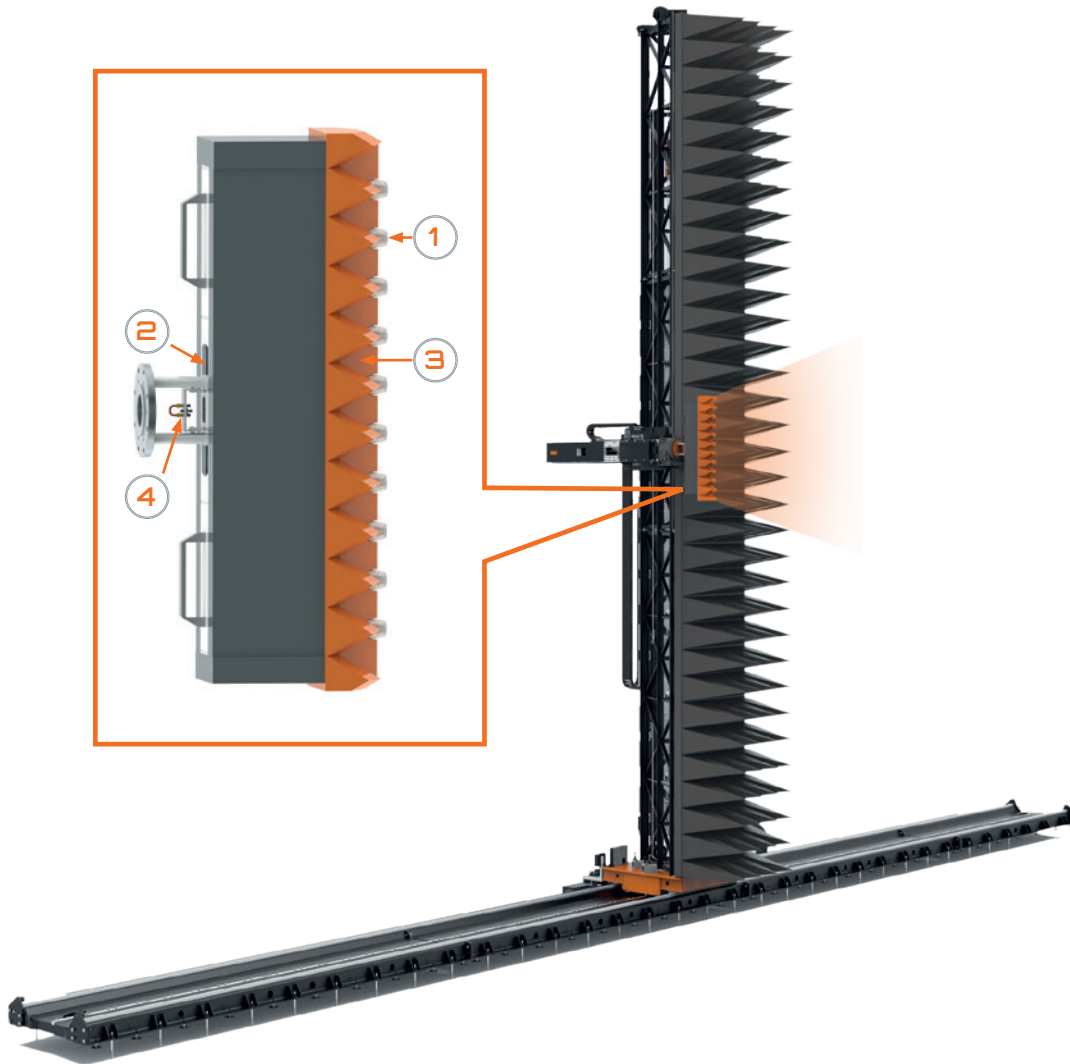


High ROI

PRODUCT CODIFICATION



1. Typical time reduction depending on MPA-DL configuration (number of probes and lattice) and AUT characteristics (polarization and element switching speed).
 2. Frequency band customizable upon request.
 3. Mechanical fixture customizable upon request.



1 Measurement probes

An array of probes customizable from L-band to Ku-band frequency band, enabling wide application use while ensuring measurement precision.

2 Signal Routing Matrix

Allows efficient RF routing between probes, ensuring uniform signal paths for consistent measurements across the multi-probe array.

3 Absorbers

Minimize reflections and reduce mutual coupling between probes and the environment for accurate measurements.

4 Mechanical Fixture

Provides stable positioning of the probes, ensuring accurate and repeatable measurements during near-field scanning.

- *Standard mechanical interface compatible with MVG Scanner Polarization Positioners³.*

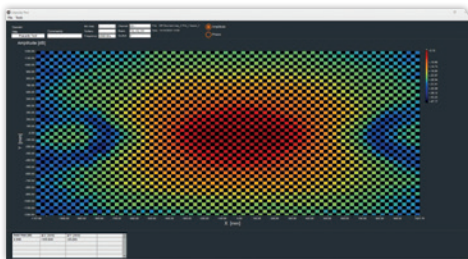
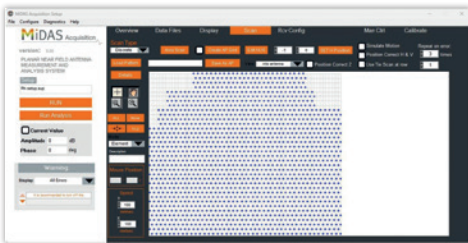
AESA / phased array antenna / radar calibration in Discrete Mode

AESA / phased array antenna / radars with electronic beam-steering, the excitation phase and amplitude of array elements are electronically adjusted to shape and steer the array's radiation pattern in a desired direction. However, real-world imperfections such as phase and amplitude errors in the beam-forming network can degrade the array's performance, leading to higher sidelobe levels, reduced peak directivity, and non-uniform radiation patterns. Coupling effects and the inherent non-idealities of individual antenna elements further impact array operation, resulting in deviations from the theoretical design.

Calibration is a critical process to mitigate these errors and ensure the array's radiation pattern closely matches its theoretical counterpart. By addressing both static errors (due to manufacturing tolerances and structural imperfections) and dynamic errors (arising from temperature changes and component aging), calibration is essential at the production stage. It helps also maintain the radar system's accuracy and reliability once deployed. Active phased array antenna, in particular, require periodic recalibration throughout their operational lifecycle to sustain performance.

MVG Systems for Discrete Mode calibration

MVG systems are specifically designed to support radar array calibration, accommodating both analog and digital beam-forming architectures to meet the needs of modern defense and aerospace applications.



BEAM-FORMING INTERFACES:

- **Digital beam forming interface:** The RF path is integrated within the radar, with the measurement system acting as a trigger and data acquisition interface. It sends position triggers to the probe and directly reads data from the radar, ensuring compatibility with digital radar systems.
- **Analog beam forming interface:** The RF path is managed by the measurement system, which sends synchronization triggers for each beam to the radar, beam-former (BMR), and system-on-board (SOB). RF data is collected using the system's vector network analyzer (VNA), allowing precise control of the calibration process.

CALIBRATION WORKFLOW AND TECHNOLOGY

- **Data acquisition and analysis:** The system transmits RF signals through the antenna's feed system or triggers the radar to send the RF signal and measures the output RF data from the antenna under test (AUT) or Radar. This enables the identification and correction of amplitude and phase discrepancies.
- **Positioner integration:** Advanced positioners direct the probe to predefined locations in the antenna range, corresponding to individual array elements. Each position index aligns with the elements to be calibrated.
- **Element mapping:** Operators can predefine an element map ("i,j" coordinates) in the software, automating the calibration process and ensuring consistency across the array.
- **Simultaneous element calibration with SpeedProbe DL:** Traditional methods involve calibrating one element at a time, but the SpeedProbe DL technology enables simultaneous calibration of multiple elements. This significantly reduces calibration time while maintaining accuracy.
- **Application versatility:** MVG systems are suitable for a wide range of radar platforms, from aerospace systems to high-precision defense radars.
- By leveraging MVG's state-of-the-art tools and technologies, users can ensure that their AESA / phased array antennas / radars achieve the highest levels of precision, reliability, and efficiency throughout their product lifecycle.

