AntennasGroup | A discoverIE Company

AntennasGroup

Scope of this presentation

A comprehensive overview of who we are and what we offer

Who We Are - One Group, Two Experts in Antennas

2J Antennas and Antenova form a unified group driven by a shared vision

to advance wireless connectivity. As two complementary brands within discoverIE Group plc, a global technology group focused on electronics and connectivity, we combine engineering excellence and application-specific expertise in embedded and external antenna technologies. Together, we deliver scalable, reliable, high-performance RF solutions to support complex wireless design challenges worldwide.

A discoverIE Company

Who We Are - One Group, Two Experts in Antennas

2J Antennas

2J Antennas is a global manufacturer of high-performance external antenna solutions with in-house design, engineering, and production capabilities. With advanced RF testing facilities and flexible manufacturing, 2J Antennas delivers robust, customizable solutions for transportation, industrial, metering, IoT, mission-critical, among other applications. Our capabilities ensure quality, scalability, and reliable performance from prototype to mass production.

- Founded in 2002, Slovakia
- Specialist in high-performance external antennas
- Facilities in Slovakia, UK, and USA
- Expertise and 4 Labs capabilities for Custom Design, Testing and Pre-certification
- Joined discoverIE Group in 2023

Who We Are - One Group, Two Experts in Antennas

Antenova specializes in embedded antenna solutions designed for seamless integration into wireless devices. With deep expertise in RF design, miniaturization, and best-in-class engineering support, Antenova enables efficient, reliable connectivity for IoT, smart city, medical, and industrial applications. Our focus on compact, high-performance antenna technology helps engineers accelerate development while optimizing wireless performance.

- Founded in 1999, UK
- Best-in-class and Engineering and Integration support
- Trusted across IoT, medical, wearables, industrial sectors
- Expertise in high performance embedded antennas and GPS/GNSS receiver modules
- Joined discoverIE Group in 2021

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Our Global Footprint

- **Strategic Locations: Manufacturing Sites and Offices Across the Globe.**
- **Strengthening Global Reach to Better Serve Our Clients.**
- **Responsive and Agile Operations to Cater to Diverse Markets.**

Slovakia, EU
2J Antennas HQ,
Production, R&D, Sales and Administration

UK
Antenova HQ,
R&D, Sales and Administration

USA
R&D, Sales and Administration

TAIWAN
R&D, Sales and Administration

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Production Facility (2J Antennas HQ)

- **5,260 sqm**
  Production Facility
- **726 sqm**
  Administration
- **1,367 sqm**
  Warehouse

- **250 Employees**
  Production & Administration

Market Coverage

Comprehensive Market Coverage Across Various Industries

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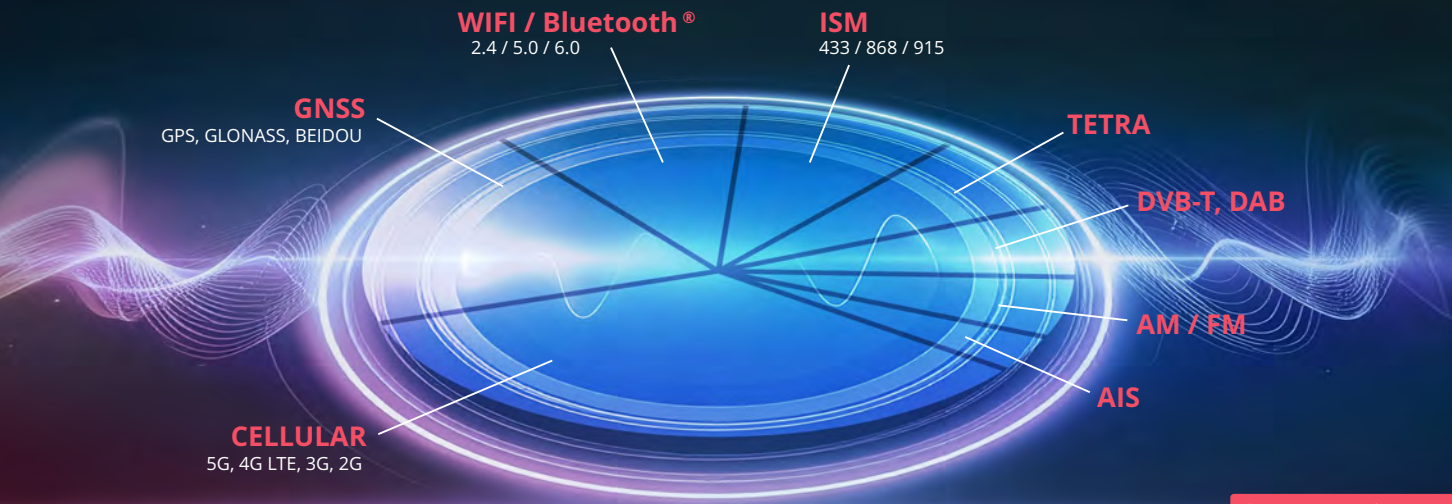
Product Coverage

Covering a Wide Spectrum of Frequencies



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Company Strengths

IN-HOUSE PRODUCTION
Full control over entire business operations

EXTENSIVE EXPERIENCE IN ANTENNAS
Over 40 years of experience in both Brands

STRATEGICALLY POSITIONED
Production in Europe, Offices in UK, USA and Taiwan

GLOBAL SUPPLIER, LOCAL SUPPORT
Worldwide sales & support through distribution network

COMPETITIVE PRICING
Factory direct prices allow efficient sales strategy

ANTENNAS ONLY STRATEGY
Expertise on antenna products with 100% commitment

HIGH FLEXIBILITY AND EFFICIENCY
With production and first class engineering team

SHORT DELIVERY TIME
Our short delivery time surpasses our competitors

OFF-THE-SHELF & CUSTOM ANTENNAS
Options to customise colors, logo printing

RF ACCESSORIES UNDER THE SAME ROOF
Antennas, RF cables, Connectors, DevKits/Boards, Brackets

STANDARD SERVICE FOR ALL ANTENNAS
Customisation on Cable Type, Length and Connectors

LEADING-EDGE ANTENNA DESIGNS
5GNR, multi constellation GNSS, satellite communication

STATE OF ART 3D ANECHOIC CHAMBERS
For Active and Passive measurements on each Location

PRE-TESTING CAPABILITIES
Certification and regulatory testing guidance

Products

- **1,700+ Active Products**
  Off-the-Shelf and Custom Antennas.
- **220+ Million**
  Products dispatched since founded
- **12,000+**
  Registered Customers

Main Product Categories

2J Antennas

antenova

EMBEDDED & INTERNAL ANTENNAS

Rigid FR4 & Flexi FPC Antennas, SMD Chip Antennas, Ceramic Antennas

CUSTOM DESIGN ANTENNAS

Rigid FR4 & Flexi FPC Antennas, SMD Chip Antennas, Ceramic Antennas, External Antennas

EXTERNAL ANTENNAS

Various Mounting Types

GPS/GNSS RECEIVER MODULES

with Built-in LNA and/or Antenna

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Antenna Mounting Types

EXTERNAL ANTENNAS

2J Antennas

CONNECTOR MOUNT
Antennas that require direct PCB mounting on devices

ADHESIVE MOUNT
Ideal for quick mounting applications

SCREW MOUNT
Secured and permanent installation

MAGNETIC MOUNT
For temporary or permanent installations

WALL MOUNT
For indoor or outdoor installations

POLE MOUNT
Ideal for marine or construction applications

COMBINED MOUNT OPTIONS
MAGNETIC/ADHESIVE, WALL/ADHESIVE, VELCRO®/ADHESIVE

INTERNAL ANTENNAS

2J Antennas antenova

FR4 ADHESIVE MOUNT RIGID
Ideal for flat surface installations

FPC ADHESIVE MOUNT FLEXIBLE
Material flexibility allowing easy installation in devices

SURFACE MOUNT CERAMIC
SMT compatible allowing for easy PCB integration

SURFACE MOUNT FIBERGLASS
Allows for small sizes, cost-effective and custom SMD solutions

THRU-HOLE MOUNT CERAMIC
Offers extra installation security for in-device integration

SNAP-IN MOUNT MODULE
Locks the antenna in place, prevents unwanted rotation

SCREW MOUNT MODULE
Modular antennas that can be installed on PCB standoffs

Product Customisation

- **Antenna Branding**
  For both, off-the-shelf and custom designed antennas, we offer company re-branding with logo printing on the antenna housing. Typically there is no additional cost for this service if prepaid and meets the minimum order quantity.

  Additionaly, for most of the antenna enclosures, we are able to create special moldings for unique engraved branding.

Product Customisation

- **Antenna Enclosure Unique Color**
  Custom color of antenna enclosure available even for standard Off-the-Shelf Antennas.

  With RAL pallete color number, we can match antenna housing color to installation surface color with a perfect and seamless match.

Product Customisation

- **Mechanical Parts Customisation**
  If a default off-the-shelf antenna part, for example mounting base does not meet full customers requirements for their specific application, we are able to propose a mechanical adjustments or create fully customised parts to ensure customer satisfaction for specific installation requirement.

RF Cable assemblies

- **The correct selection of RF cable** and connector types are critical for proper antenna function. Selecting a high-quality cable and connector that is compatible with the antenna will ensure optimal antenna performance.

We offer a wide range of high-quality cables from thin Microcoax cables to thick low loss and specialized RF Cables as standard and also offers alternatives for any customization needs.

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RF Connectors

- **The connector serves as a mechanical connection**
  between the Antenna and RF system. When considering a product, it is important to determine the correct connector gender, polarity and geometry.

We offer a wide range of standard high-quality connectors that include ultra-small UFL connectors, SMA connectors and connectors for specialized requirements such as Quad FAKRA or waterproof connectors.

Products

Mounting Brackets

- **Mounting brackets extend mount options**
  of the antenna by allowing to turn the original antenna mounting type into different mounting type options.

We offer screw, magnetic, adhesive, wall and pole mount bracket options. As an example, connector mount antennas can be used as a magnetic mount, or wall mount with the appropriate bracket.

Development Boards & Kits

- **They have been designed to increase efficiency**
  of the customer device design stage.
  Our seemingly simple plug and play and compact concept brings fully professional engineering tool to the table.

  This will assist you in identifying correctly tuned ceramic patch antenna on provided development board in minutes or adjust device PCB layout to achieve antenna performance and frequency precision.

Services We Offer

- **Selecting the appropriate antenna solution is a critical step**
  during the design and development phase of any connected device.
  At Antenova and 2J Antennas, We implement a wide range of services that help every customer bring a product to market with little to no effort by providing a true end-to-end process.

  Our engineering tools include network analyzers, RF anechoic chambers, simulation software and 3D printers helping us to reduce the design phases and enable us to react promptly and efficiently to our customers' needs.

Custom Antenna Design

Integration Support Services

Active & Passive Pre-Testing

Certification Guidance

Custom Antenna Design

- **From prototype to final product**

We ensure your antenna requirements are met and optimized for the market by designing custom antenna solutions and providing integration support that meets the demand for high-quality network services.

PCB & RF CIRCUIT DESIGN

Our highly experienced engineering and design teams develop the right antennas for a wide range of applications that meet all RF requirements

RAPID PROTOTYPING

With the use of industrial-grade Stratasys® 3D printers and LPKF ProtoMat PCB prototyping, we develop prototypes in record time

PLASTIC INJECTION

Our 9 plastic injection molding machines use only top-grade materials, meeting high-quality standards and ensuring on-time delivery

CABLE ASSEMBLY

We offer superior RF cable assemblies catering to any customization needs

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Integration Support Services

ANTENNA POSITION STUDY

Identifying the ideal location for the installation of external or internal antenna inside customers' devices

PCB LAYOUT RECOMMENDATIONS

For embedded antennas, we offer integration services for optimal component placement and general guidance

ANTENNA MATCHING

Testing ideal matching component values for embedded SMT antennas to achieve optimal impedance characteristics

COMPARISON STUDY

Reports comparing multiple antennas, from multiple vendors, or the same antenna in different conditions

FIELD STUDY

Field test of customer devices, e.g. test a car GPS tracker and monitor antenna performance

Active & Passive Pre-Testing

- **Take advantage of 4 certified RF anechoic chambers** available across each of our sites, where active and passive OTA measurements such as Gain, Peak Gain, Efficiency, TRP, TIS, EIRP, 2D and 3D radiation patterns are produced

ECC TESTING

Passive Envelope Correlation Coefficient (ECC) measurements for 5GNR, 4GLTE, WIFI and other standards

ACTIVE MATCHING

We can analyse and optimise matching during active testing in order to reduce risk of Low Total Radiated Power (TRP) upon carrier certifications

TIS NOISE DEBUGGING

We have expertise to provide noise debugging - Poor Total Isotropic Sensitivity (TIS) typically linked to circuit layout or other electronic issues

EMISSIONS TESTING

Radiated Spurious Emission (RSE) testing for wireless communication devices with both intentional and non-intentional radiators

Certification Guidance

- **We offer full PTCRB pre-certification testing** of wireless devices utilising our antennas, including OTA, TRP, TIS, RSE and conducted power/sensitivity of cellular devices, ensuring compliance with the requirements of the PTCRB certification program.

  Obtaining PTCRB certification for a mobile device ensures compliance with cellular network standards; without certification, device manufacturers will not be able to operate with any North American cellular carriers.

  In addition, Specific Absorption Rate (SAR) testing is offered to ensure that a device in close proximity to a human body, in normal working conditions, remains within the advised permissible exposure.

  Our CTIA certified 3D antenna measurement systems provide measurements that ensure devices will meet the OTA requirements for network carriers and PTCRB certification.

Production Capabilities

- **In Production plant**

at 2J Antennas we utilise plastic injection, SMD pick and place, ultrasonic welding, hotplate welding, automated cable machines, and many more to carry out the antenna production process from start to finish.

Our IATF 16949 certified manufacturing plant in Central Europe ensures production of the highest quality of antennas. All products are manufactured under the RoHS directive and are REACH compliant. In addition, a wide range of Antenova or 2J Antennas products are TSCA, PROP65, HF, CMRT, CE complaint and declared various ratings IP67, IP69, IK-09, UL94-V0 or the others.

IATF 16949 Automotive standards

EN ISO 14001 Environmental

EN ISO 9001 Quality management system

RoHS COMPLIANT

REACH COMPLIANCE

TSCA CERTIFIED

PROP 65 compliant

PFOS compliant

HF Halogen Free compliant

CMRT compliant

IP67 Water Resistance

IP69K Hot Water Pressure Resistance

IK09 Heavy Duty - Impact Resistance

UL94-V0 Fire Resistance

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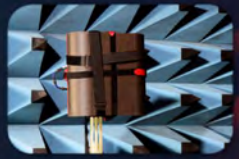
RF Equipment

- **Four CTIA Certified 3D Anechoic Chambers at each location**
  3 meters, 6 meters and 8 meters Anechoic Chambers such as **MVG Satimo StarGate & StarLab** for active and passive measurements.

  Phantom body parts (Phantom Forearm and Phantom Chest) ensure real use case performance data.

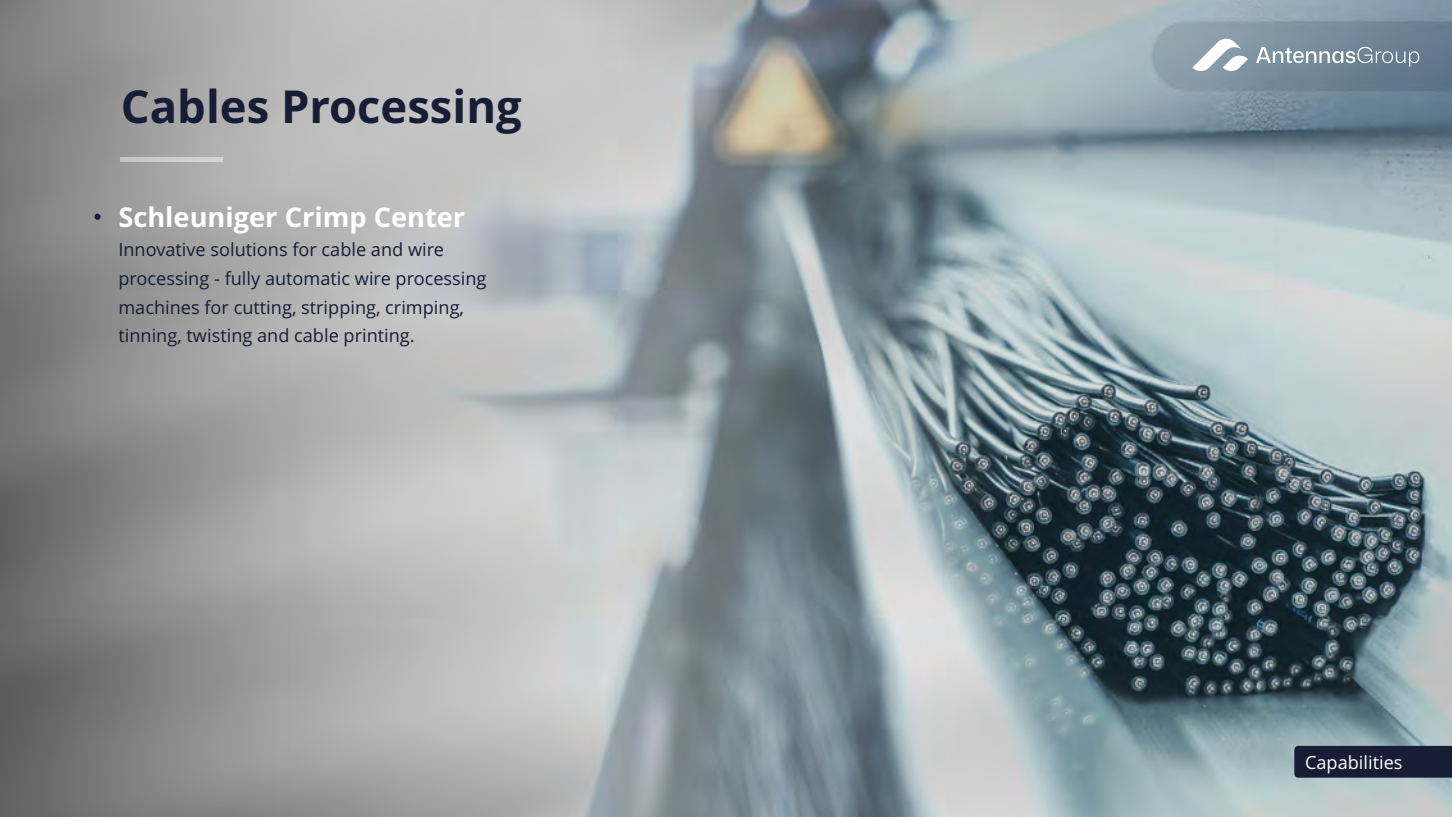


SMT PICK & PLACE Lines

- **Three SMT Lines Under One Roof**
  We use component placement systems for high speed, high capacity and high precision placing of a wide range of electronic components (surface-mount devices - SMDs) on a printed circuit board (PCB). This allows flexibility in the production of printed circuit board assemblies

Cables Processing

- **Schleuniger Crimp Center**
  Innovative solutions for cable and wire processing - fully automatic wire processing machines for cutting, stripping, crimping, tinning, twisting and cable printing.



Plastic injection, Overmolding & Ultrasonic and Hotplate Welding

- **Production Flexibility**

  Our 9 plastic injection molding machines run continuously using only top-grade materials, meeting high-quality standards and ensuring on-time delivery. This gives us flexibility in making overmolded antennas or custom color antenna enclosures.

  We also utilize ultrasonic and hotplate welding technologies, enabling robust and precise assembly of antenna enclosures where durability and sealing performance are critical.

Coils Machine

- **Production of Coil Antennas**
  We ensure efficient and precise production of coil and spring antennas using a 4-axis CNC spring forming machine, designed to meet a wide range of custom requirements. This versatile equipment supports complex shapes and tight tolerances, while accommodating wire diameters of up to 2 mm.

  It enables high-volume production of consistent, high-performance coils used in various RF applications and miniature antennas where size and precision are critical. Our in-house capability allows rapid prototyping, design iterations, and full production under strict quality control.

Metal Machining

- **Custom Metal Machining Capabilities**

  When it comes to customization, certain applications require localized adjustments - whether to fine tune a metal component or adapt the antenna's mounting base to meet unique installation requirements.

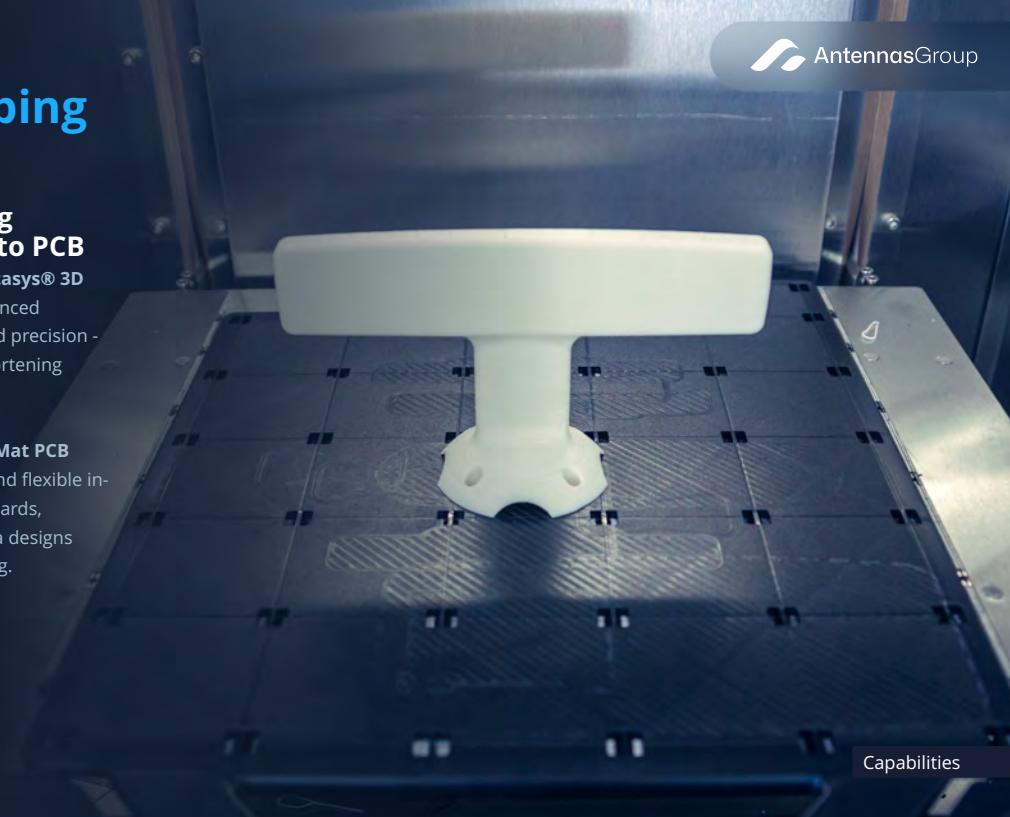
  To support these needs, we offer the flexibility to machine metal parts directly during production, enabling precise modifications without delaying lead times or compromising quality.

Rapid Prototyping

- **Streamlined prototyping process - from Housing to PCB**

  With the use of Industrial grade **Stratasys® 3D printers**, we are able to develop advanced mechanical prototypes with speed and precision - accelerating design validation and shortening development cycles.

  To complement this, our **LPKF ProtoMat PCB prototyping machine** enables fast and flexible in-house production of printed circuit boards, allowing us to test and iterate antenna designs without the delays of external sourcing.

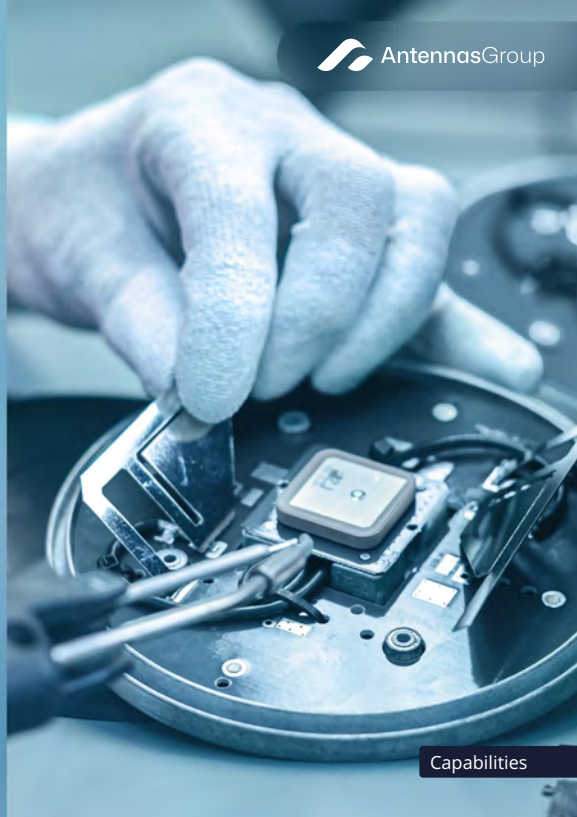


Our Workforce

- **Labour intensive work**

  Our team of over 200 skilled staff members forms the backbone of our success. Their dedication, loyalty, craftsmanship and expertise ensure the consistent production of high-quality antennas delivered to customers worldwide.

  This strong workforce enables us to meet evolving market demands, support continuous company growth, and move confidently toward achieving our long-term goals and vision.



Packing & Warehouse

- **32,000+ Stock Items**
  We offer custom-branded packaging on request, including customer logos, barcodes, specialized bags, or boxes tailored to meet specific branding or handling requirements. For smaller shipment volumes, we use non-wood pallet optimization to reduce shipping costs and simplify logistics.

Our warehouse is efficiently organized to support on-demand production, with critical components always in stock. This allows us to fulfill almost every antenna order without delays, including customization such as cable type or length changes, connector variations, or enclosure color adjustments, even for off-the-shelf models.

Testing & Quality Assurance

- **100% antenna testing**
  to ensure consistent quality and performance across every unit.
  Our test environment includes advanced equipment such as **Rohde & Schwarz communication testers, CTS Clima temperature system** and **Keysight vector network analyzers** , allowing us to capture and analyze real-time data with precision.

  By leveraging these tools, we maintain uncompromised data integrity and deliver antennas that meet the highest RF performance standards.

EN ISO 9001-QMS
Quality management system

IMDS
International Material Data System

IT Infrastructure

- **Reliability & Security First**
  Our world-class IT systems and infrastructure form an essential part of our production ecosystem.
  They ensure secure, reliable access to data, support efficient process management, and reduce dependency on third-party services.
  With a strong focus on cybersecurity, system integrity, and operational continuity, our IT environment is built to protect sensitive information while enabling seamless collaboration across departments.

THANK YOU

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