



CAPABILITIES GUIDE

End-to-End Engineering Expertise
in Deployable Masts and RF Systems



ABOUT SMC

Established in 1958, SMC Group is a UK-based end-to-end manufacturer with more than 67 years of communications engineering expertise, delivering turnkey solutions to defence, security, telecoms, emergency services, broadcast and government sectors worldwide.

As a proud signatory of the Armed Forces Covenant, we are committed to supporting the Armed Forces community and delivering mission-critical solutions built on quality, trust and reliability. Our reputation is founded on consistently delivering projects on time and in full, ensuring customers can depend on us when it matters most.

Our capabilities include:

- Antennas and RF Infrastructure
- Masts and Deployment Solutions
- UAV Systems Integration
- Command, Control and Communications (C3) System Integration
- Installation and Commissioning Services
- Training and Technical Support

From design and manufacture through deployment and lifecycle support, SMC Group provides reliable, operationally proven communications solutions for some of the world's most demanding environments.



OUR CORE STRENGTHS

From individual RF components and antennas to complete mast and communications systems, we manufacture and deliver reliable, life-critical solutions tailored to demanding operational environments.

Our integrated approach enables rapid innovation, rigorous quality control, and dependable support throughout the entire product lifecycle.

- ✓ Design-to-deployment capability
- ✓ In-house engineering and manufacturing
- ✓ Military-grade communications solutions
- ✓ Rapid customisation and prototyping
- ✓ Global logistics and support
- ✓ ISO 9001 and ISO 27001 certified operations
- ✓ Full lifecycle support and maintenance services



ENGINEERING AND DESIGN CAPABILITIES

SMC's design capability is centred on delivering optimised communications solutions where standard commercial off-the-shelf products cannot fully meet operational, environmental or performance requirements.

Working closely with customers, our design team develops bespoke antennas, mast systems, RF components and integrated communications solutions tailored to specific applications, mitigating project risk at every stage.

FROM CONCEPT TO DEPLOYMENT

By combining decades of communications expertise with advanced design tools, prototyping, testing and manufacturing capabilities, we ensure every solution is engineered to achieve the required performance, reliability and deployability in demanding real-world environments.

- ✓ Concept development
- ✓ RF system architecture
- ✓ Mechanical design
- ✓ Environmental qualification
- ✓ Design tools and processes
- ✓ 3D CAD modelling
- ✓ Finite Element Analysis (FEA)
- ✓ Design for Manufacture (DfM)
- ✓ Rapid prototyping
- ✓ TRL lifecycle support
- ✓ Mechanical and functional testing
- ✓ Custom development

WHAT IS SMC CUSTOM?

SMC Custom is our specialist design, engineering, prototyping and testing service for customers with complex design and integration projects.

We help our customers to de-risk their projects early, accelerating delivery and ensuring high quality and performance. Specific activities include feasibility assessments, bespoke design and rigorous product testing of solutions such as:

- Bespoke antenna systems
- Modified standard products
- Custom mast designs
- Vehicle-mounted solutions
- Special mission equipment
- Integrated RF communication systems
- CE marking of new designs



MODIFY OUR STANDARD RANGE TO FIT YOUR NEEDS

We understand that standard products don't always meet the exact demands of every application. If you see something of interest in our standard range but require a heavier headload, a change in height, bespoke brackets, enhanced materials, or other dimensional or performance adjustments, our experienced in-house design team can work with you to tailor a solution.

You don't have to choose an entirely bespoke product - by modifying proven designs, we help you achieve the right fit and performance while minimising development cost, reducing lead time, and avoiding the full expense and duration of a fully bespoke development programme.

KEY BENEFITS OF MODIFICATION



OPTIMISED PERFORMANCE

Adjust headload, height, and key parameters to suit your application.



PROVEN RELIABILITY

Modifications are based on validated, field-tested products.



FASTER DELIVERY

Build on existing designs to reduce lead times versus full custom builds.



ENGINEERING SUPPORT

Expert guidance to ensure compliance, safety, and performance requirements are met.



COST EFFICIENCY

Lower development and tooling costs compared to ground-up solutions.



SIMPLE LIFECYCLE MANAGEMENT

Modifying established products offer predictable spares and maintenance, reducing long-term ownership complexity.

Case Study:

THE SMC BUMBLEBEE

THE BRIEF

SMC Group recently completed a successful project with QinetiQ to provide a specialised mast with an integrated winch system for antenna testing. This collaboration was driven by QinetiQ's need for a non-conductive mast capable of lifting, turning, and holding an antenna weighing up to 35kg at a height of 4.6m. The non-conductive material was essential to ensure that the mast would not interfere with the quality of RF transmissions during testing.

UNDERSTANDING THE REQUIREMENT

QinetiQ required a non-conductive mast to maintain signal integrity during antenna testing. SMC Group worked closely with the client across several design phases, presenting drawings, material samples (including yellow GRP), and technical recommendations to ensure the solution met all functional and safety specifications.

HOW WE WORKED TOGETHER

Throughout development, SMC and QinetiQ resolved a number of design refinements together. For example, oversized locking knobs initially caused handling issues, which were resolved through a fast design change. A minor manufacturing adjustment post-delivery further ensured product integrity and performance.

THE OUTCOME

The final Bumblebee mast and integrated winch system significantly improved safety, usability, and stability over QinetiQ's previous setup. Its design allows precise antenna positioning, and a defined Safe Working Load (SWL) enhances worksite safety.

The SMC Bumblebee mast is designed to be highly effective in many scenarios and built to meet specification ED107. Its lightweight and compact GFRP construction means it can easily be deployed and transported by just one person for maximum time and cost efficiencies.

WHY SMC GROUP?

QinetiQ selected SMC based on their established track record, UK-based manufacturing, and proximity to key sites at Boscombe Down and Farnborough. Despite ordering via a third-party (EMC Shielding), the customer rated the service and delivery experience as "very good."





PRODUCTION CAPABILITIES

With a wealth of knowledge and decades of hands-on experience, our seasoned professionals bring practical insights and technical excellence.

We provide tailored solutions that meet the unique demands of each client project, allowing us to tackle complex challenges efficiently, whilst ensuring reliable performance at every stage and delivering outcomes you can trust.

 Spraying and welding including specialist coatings	 Mast assembly, field-testing and qualification	 ISO 9001 and 27001 certified
 Integrated Manufacturing Systems	 CAD and FEA Design including full TRL lifecycle	 5-axis machining centre and 3- and 4-axis CNC machines
 Rapid Prototyping	 Inhouse servicing and self-service kits	 3D Printing
 Calibrated onsite specialist equipment	 Solutions for static and mobile installations	 Individual component assembly and qualification
 Product systems testing	 One-stop suppliers	 Made in Britain – Trusted UK manufacturer

OUR PRODUCT CAPABILITIES

SMC's portfolio encompasses a range of mast, antenna and integrated communications solutions designed to meet diverse operational needs.

From rapidly deployable mast systems featuring our patented UltraLock™ locking technology and industry-leading headload capacities, to advanced RF infrastructure and integrated communications platforms, each product series is engineered to deliver dependable performance in challenging environments.

Mast Systems

HEAVY DUTY MASTS

Examples: Ultralock and HD Series

Purpose

Designed for applications requiring maximum height, headload capacity and structural stability, SMC's Heavy Duty Mast Systems provide a robust platform for communications, surveillance and sensor payloads in fixed, mobile and semi-permanent deployments.

Featuring the patented UltraLock™ tri-pin locking collar system, these masts deliver exceptional strength and operational confidence, supporting headloads of up to 420 kg.

Applications

- Military HQ and command posts
- Border security and surveillance
- Air defence and radar integration
- Mobile communications hubs
- Critical national infrastructure protection
- Broadcast and telecommunications
- Long-term emergency response deployments

Key Benefits

- Enhanced safety and rigidity
- High headload capacities supporting multiple antennas, sensors and equipment
- Excellent wind loading performance and structural stability
- Rapid deployment and recovery
- Available in trailer-mounted, vehicle-mounted and fixed-site configurations
- Proven performance in harsh and demanding operational environments



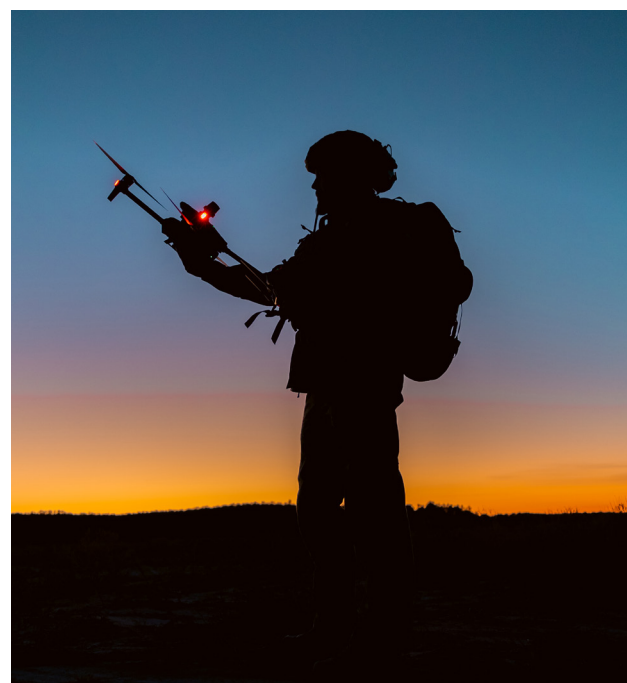
LIGHTWEIGHT DEPLOYABLE MASTS

Example: PFC and SWIFT Series

Purpose

Designed for rapid deployment communications, surveillance and sensor applications, SMC's lightweight mast systems provide a portable and reliable means of elevating antennas, cameras and other payloads in temporary and mobile operating environments.

Engineered for ease of transport and fast setup, they enable users to establish critical capabilities quickly wherever infrastructure is unavailable or impractical.



Applications

- Tactical military communications
- Emergency services
- Disaster recovery
- Rapid response
- Humanitarian operations
- Temporary coverage
- Event communications
- Public safety
- UAV ground control stations
- Temporary surveillance and monitoring systems

Key Benefits

- Lightweight and highly portable
- Fast deployment by minimal personnel
- Compact transport and storage footprint
- Reduced logistical burden compared with heavier systems
- Flexible integration of antennas, cameras and communications equipment
- Reliable operation in challenging field conditions



VEHICLE- MOUNTED MAST AND TRAILER SYSTEMS

Examples: WTM and N Series

Purpose

SMC can mount masts to vehicles and trailer systems, to provide fully mobile communications and surveillance capability. This enables rapid establishment of elevated infrastructure wherever operations demand.

Designed for integration with military, emergency services and commercial platforms, these systems combine mobility with robust operational performance.

Applications

- Mobile command and control
- Tactical communications platforms
- Event communications
- Public safety
- Emergency response
- Border and coastal security
- Broadcast outside broadcasting
- Temporary telecoms deployment
- Intelligence, surveillance and reconnaissance (ISR) missions

Key Benefits

- Rapid setup and relocation between operational locations
- Integrated solutions tailored to vehicle or trailer platforms
- Reduced deployment times and manpower requirements
- Support for communications, surveillance and sensor payloads
- Enhanced operational flexibility Suitable for both temporary and long-duration deployments

HF Antennas

LW8 SERIES

Purpose

The LW8 Series is designed to provide highly portable HF communications capability for users operating in tactical, expeditionary and rapidly deployable environments.

Optimised for ease of transport and rapid field deployment, these antennas enable reliable long-range communications where fixed infrastructure is unavailable or impractical.

Applications

- Tactical military communications
- Special operations and expeditionary forces
- Emergency response and disaster recovery
- Humanitarian and NGO deployments
- Remote site communications
- Field command posts and temporary operations centres



Key Benefits

- Lightweight, cost efficient and compact for easy transportation
- Rapid deployment and recovery by minimal personnel
- Reliable Near Vertical Incidence Skywave (NVIS) and long-range HF communications
- Robust construction for demanding operational environments
- Reduced logistical footprint for mobile operations
- Compatible with a wide range of military and commercial HF radio systems



TWB SERIES

Purpose

The TWB Series provides flexible, broadband HF communications across multiple frequencies without the need for antenna reconfiguration or retuning.

Designed for operational environments where frequency agility and communications resilience are critical, the TWB Series supports modern HF networks and dynamic mission requirements.



Applications

- Military command and control
- Tactical communications systems
- Emergency services
- Government and security
- Mobile and deployable communications platforms
- Remote environments

Key Benefits

- Complete system including mast
- Broadband operation across multiple HF frequencies
- Supports frequency-hopping and adaptive communications systems
- Rapid deployment for fixed, mobile and temporary installations
- Reliable performance across varying terrain and conditions
- Suitable for both short and long-range communications requirements



TFD SERIES

Purpose

The TFD Series is engineered to provide broadband HF communications where dependable performance across a frequency range is required.

Offering predictable radiation characteristics and no tuning requirements, TFD antennas are ideally suited to fixed, semi-permanent and rapidly deployable communications networks.

Applications

- Strategic and tactical HF communications
- Fixed and deployable command centres
- Emergency communications networks
- Border security and critical infrastructure protection
- Government and defence communications systems
- Broadcast and monitoring

Key Benefits

- Broadband
- Consistent performance across a wide frequency spectrum
- Supports multiple communications channels and networks
- Reliable operation in challenging environmental conditions
- Suitable for fixed, mobile and deployable installations
- Proven solution for mission-critical communications applications varying terrain and conditions
- Suitable for both short and long-range requirements



RF Equipment

COMBINERS

Purpose

RF combiners enable multiple RF signals to be combined into a single transmission path, reducing infrastructure requirements and simplifying system architecture.

Applications

- Multi-radio communications systems
- Shared antenna installations
- Tactical communications networks
- Fixed and deployable RF infrastructure
- Broadcast and telecommunications

Key Benefits

- Allows multiple transmitters to share a single antenna
- Reduces antenna count, cabling and installation complexity
- Optimises space on vehicles, shelters and fixed sites
- Simplifies RF system integration
- Reduces overall infrastructure costs



DIRECTIONAL COUPLERS

Purpose

Directional couplers sample a signal in one direction while isolating the selected signal, enabling accurate monitoring and measurement without disturbing the main transmission path.

Applications

- RF monitoring and testing
- Communications system diagnostics
- Power measurement and control
- Spectrum monitoring systems
- Defence and telecommunications networks

Key Benefits

- Enables non-intrusive signal monitoring
- Supports system testing without interrupting operations
- Improves network visibility and diagnostics
- Assists with performance optimisation
- Enhances system reliability and fault detection

SPLITTERS

Purpose

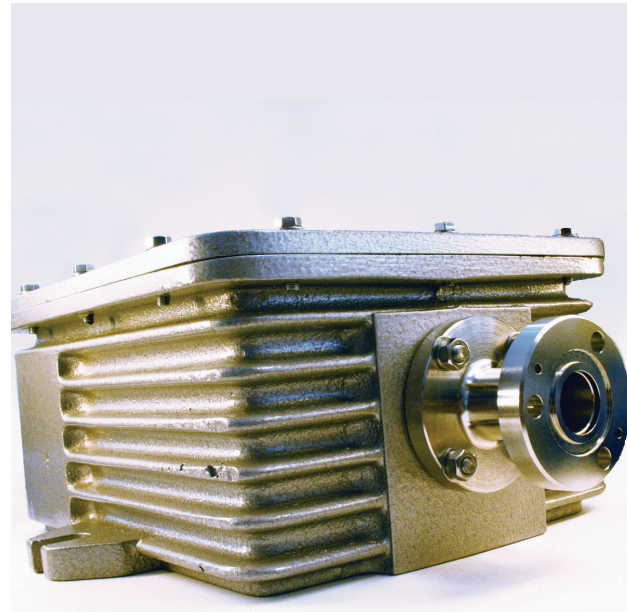
RF splitters are used for signal splitting, combining or for laboratory measurements where high isolation is required.

Applications

- Multi-radio systems
- Command and control (C3)
- HF networks
- Spectrum monitoring and signal intelligence systems
- Fixed and deployable communications infrastructure
- Emergency services and public safety networks
- Defence communications and tactical operations
- Broadcast and telecommunications

Key Benefits

- Enables multiple devices to share a single antenna system, reducing infrastructure requirements
- Optimises installation space on vehicles, shelters and fixed sites
- Supports scalable communications networks and future expansion
- Maintains reliable signal distribution



TRANSFORMERS

Purpose

RF transformers provide impedance matching, signal isolation and balanced-to-unbalanced signal conversion, ensuring efficient signal transfer throughout RF systems.

Applications

- HF systems
- Antenna matching networks
- RF distribution equipment
- Communications shelters and command systems
- Fixed and deployable infrastructure

Key Benefits

- Improves power transfer and system efficiency
- Reduces signal reflections and losses
- Enhances overall system performance

MULTICOUPLERS

Purpose

Multicouplers enable multiple transmitters of different frequencies to work into a common antenna, with minimal losses.

Applications

- Command and control centres
- Signal intelligence and monitoring
- Emergency services
- Defence communications networks
- Fixed-site and deployable RF installations

Key Benefits

- Maximises utilisation of RF assets
- Simplifies installation and maintenance



BALUNS

Purpose

Baluns convert between balanced and unbalanced transmission systems while providing impedance transformation where required, ensuring optimum antenna and system performance.

Applications

- HF antenna systems
- Dipole and broadband antenna installations
- Tactical and fixed networks
- Broadcast and telecommunications
- Deployable communications systems

Key Benefits

- Enables efficient connection between antennas and transmission line
- Improves impedance matching and power transfer
- Reduces unwanted RF currents and interference
- Enhances antenna performance and radiation efficiency
- Supports reliable operation across a wide frequency range



REPEATERS

Purpose

RF repeaters extend the range and coverage of communications systems by receiving, amplifying, and retransmitting RF signals, ensuring reliable connectivity in areas where direct communication is limited or obstructed.

Applications

- Tactical and battlefield communications extension
- Emergency services and disaster response networks
- Remote and rural communications coverage
- Tunnel, urban, and obstructed environment coverage
- Fixed and deployable telecommunications systems

Key Benefits

- Extends communication range beyond line-of-sight limitations
- Improves signal reliability in degraded environments
- Supports continuous coverage in complex terrain or structures
- Reduces need for additional base stations or infrastructure
- Enhances operational connectivity for mobile teams

RESISTIVE LOADS

Purpose

RF resistive loads provide a controlled impedance termination for RF systems, safely absorbing power and preventing signal reflections during testing, calibration, and system operation.

Applications

- RF system testing and calibration
- Transmitter commissioning and maintenance
- Dummy load for safe transmitter operation
- Laboratory and R&D environments
- Defence and telecommunications infrastructure testing

Key Benefits

- Prevents signal reflections and system damage
- Enables safe transmitter testing without radiating signals
- Supports accurate measurement and calibration activities
- Improves reliability during system commissioning and fault-finding



WHY CHOOSE SMC GROUP?

- ✓ Rapid deployment capability
- ✓ Maintenance and lifecycle support
- ✓ Compliance and quality assurance
- ✓ Customised and tailored solutions
- ✓ Scalability and future readiness
- ✓ High reliability



TESTING, QUALIFICATION AND ASSURANCE

Testing and validation are integral to SMC's engineering and manufacturing process, ensuring products and systems meet the required performance, quality, and reliability standards before deployment.

Our comprehensive testing capabilities verify mechanical integrity, RF performance, environmental resilience, and operational functionality, providing customers with confidence in the performance of SMC solutions in demanding environments.

- ✓ Mechanical testing
- ✓ Structural testing
- ✓ Deployment testing
- ✓ RF Testing
- ✓ VSWR
- ✓ Insertion loss
- ✓ Power handling
- ✓ Radiation performance
- ✓ Environmental testing
- ✓ Temperature
- ✓ Humidity
- ✓ Vibration
- ✓ Operational durability



Case study:

WHY TESTING IS SO IMPORTANT

The STORM Mast was trialled during the British Army's Warfighting Experiment 2017 (AWE 17), where it demonstrated strong potential for enhancing tactical communications and overall battlefield versatility.

THE BRIEF

The requirement was for a lightweight, robust mast system capable of supporting a range of payloads while meeting the demanding needs of modern operations. Based on these requirements, the STORM Mast—a carbon composite telescopic mast system—was recommended as a candidate solution.

Capable of lifting head loads up to 35kg to a height of 18 metres without external power, it was put through rigorous evaluation to ensure it was fit for purpose and aligned with application needs.

PROTOTYPE AND TESTING

Testing showed it to be highly effective at Battle Group and formation levels, offering rapid setup, full rotational capability, and support for a broad range of systems.

These included communications (J6) and ISTAR payloads such as CLAMBAKE, REVIVOR, and CORTEX. Its composite construction further reduced complexity by eliminating the need for insulators, while its low thermal signature provided additional operational advantages.

THE OUTCOME

Feedback from trials highlighted the STORM Mast's core strengths while also identifying opportunities for further development. Enhancements to portability, tensioning systems, and accessory options were recommended to ensure the product not only meets current requirements but continues to evolve as the right solution for future projects.

This process demonstrates why prototyping and rigorous testing are essential—validating performance, revealing opportunities for refinement, and ensuring solutions are truly fit for purpose before scaling.



STORM Mast Series
P/N: ST5-(6/9/12/15/18)





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