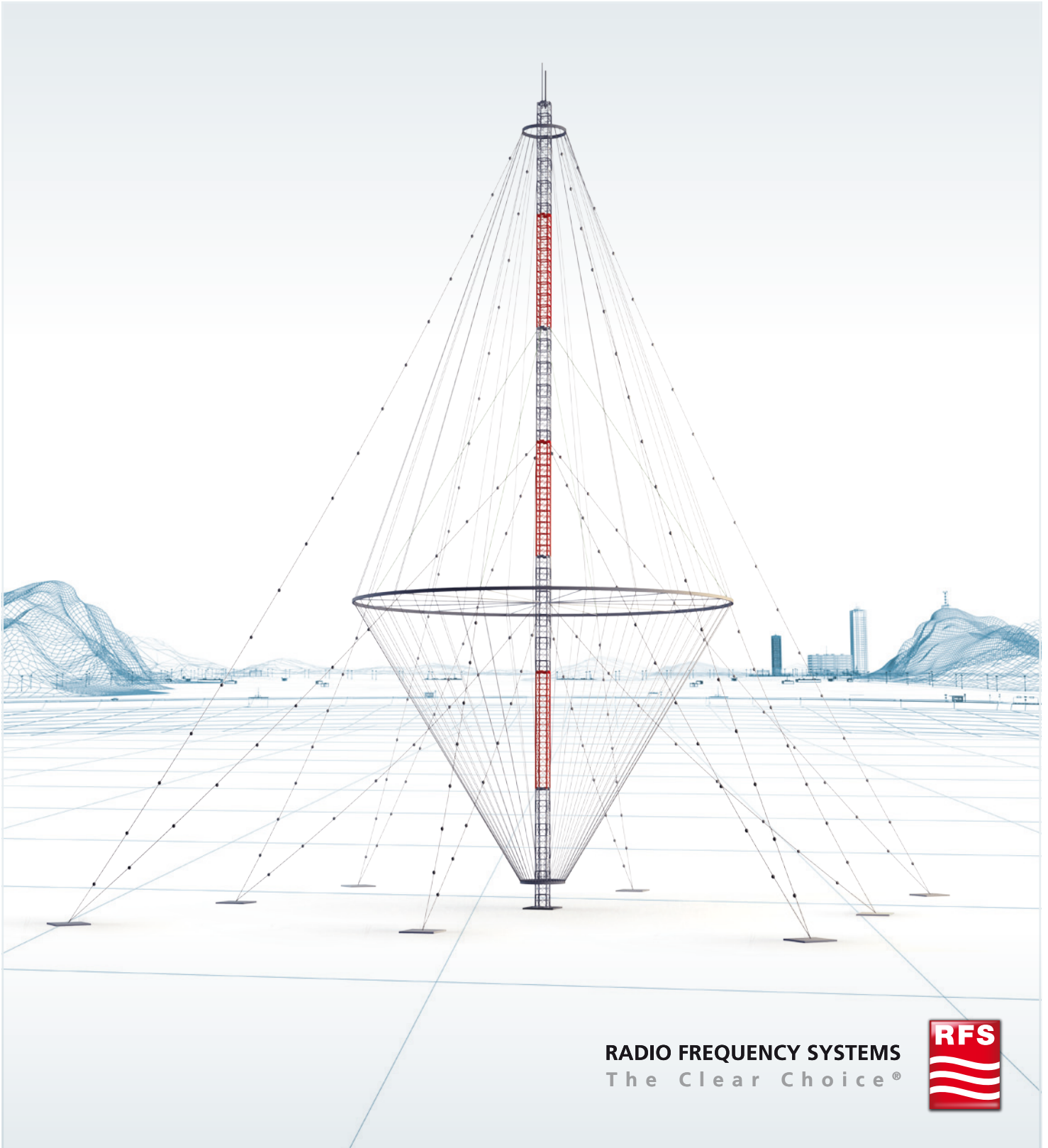


# RFS HF and Defense Solutions

Mobilizing world-class HF communications capabilities



**RADIO FREQUENCY SYSTEMS**  
The Clear Choice®



# Customized, next-generation solutions for the most demanding defense and civilian operations

## Securing the technological edge with HF systems

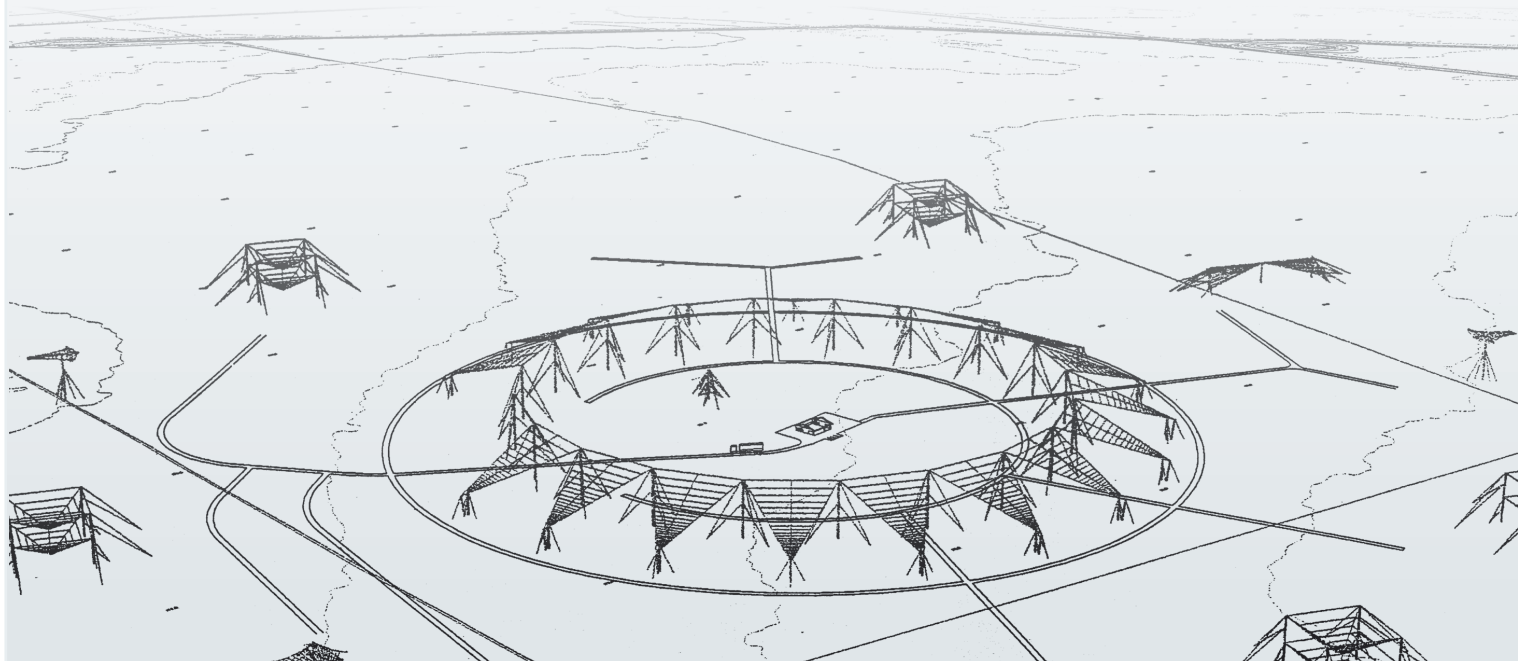
For decades, high-frequency (HF) systems have provided the communications hotline for defense forces and civilian groups around the world. With communications hops of up to 4,000 kilometers, HF systems continue to be a vital component of large-scale installations, and critical for rapid, ever-shifting deployments.

Voice communications have long been the primary focus. But with digital technologies gaining ground, transmitting tactical data via HF systems is an attractive

prospect that raises important questions for the personnel responsible for critical communications networks.

Military and emergency-response groups are faced with the need to upgrade their infrastructure to keep maintenance costs under control and ensure the system is future-proof for migration to digital technology. Radio Frequency Systems' capabilities are among the most advanced in the world for enhancing existing systems and creating both standard and customized HF and tactical antennas.

With a strong focus on improving system performance through innovative product design, RFS serves major defense groups, government organizations and system integrators across the globe. Our highly qualified team of engineers, technical officers and technicians are engaged in a continuous R&D program, designing and adapting HF and tactical products at the cutting edge of modern technology.



## Reliability on every front

RFS is committed to providing HF system solutions that meet the most demanding communications requirements, across short, medium and long-distance coverage areas, and in the harshest environments.

### ➡ A comprehensive HF range

RFS' base range of broadband HF antennas includes more than 18 different designs. These are combined with a leading transmission line range, which includes the world's only 8 and 9-inch air-dielectric coaxial cables, to provide a comprehensive mix of flexible solutions that will adapt to any situation.

### ➡ Superior performance

A key component of RFS' system design and optimization capability is computer simulation and analysis. This process takes into account the prediction of ionospheric behavior and antenna specifications to enable coverage pattern simulation, ensuring the HF communications system will achieve the desired performance at all times.

### ➡ Mechanical robustness

To certify their reliability, HF systems are specially designed to be low-maintenance and long-lived. Rugged construction and corrosion resistance ensure that RFS' systems safely stand up to the most severe weather conditions.

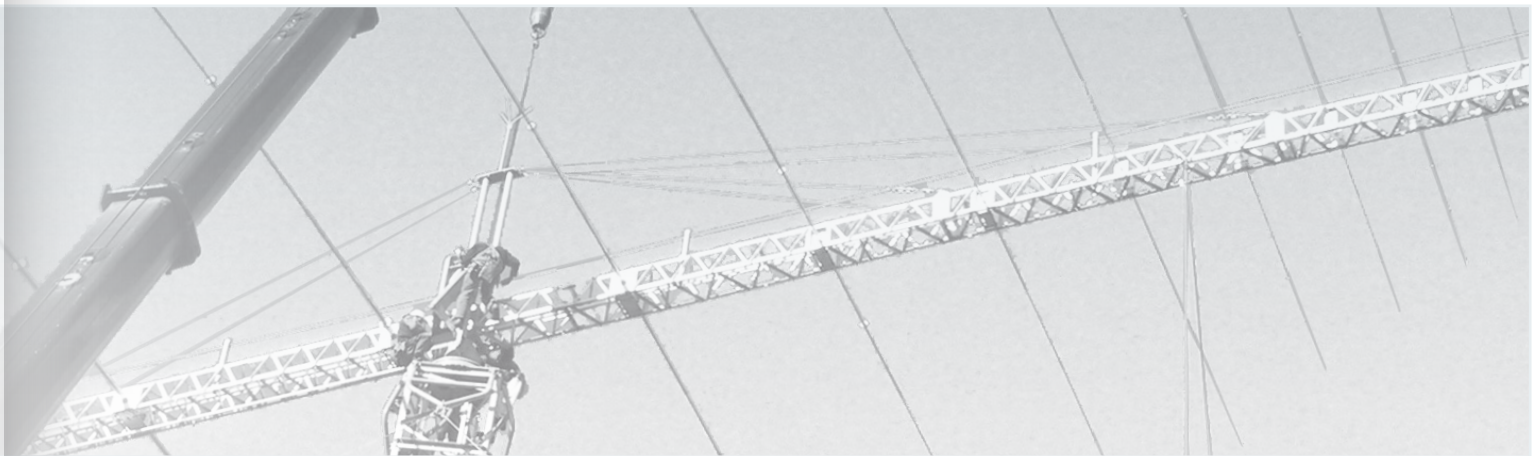
### ➡ Customized solutions

RFS prides itself on its ability to work closely with customers in engineering a tailored HF antenna solution to meet the client's specific needs. Whether part of an upgrade or a new deployment, every component can be fully custom-designed and optimized for a specific application.





# Knowledge gained in over 40 years of in-field experience



## Comprehensive range of HF communications systems

RFS excels in the innovative design, manufacture and installation of HF antennas, tactical antennas, feeder systems, combiners, baluns and associated sub-systems. HF systems from RFS are designed with the use of advanced modeling capabilities, expertly developed and perfected over the past four decades. RFS also boasts proven capability in the design, construction and commissioning of all major HF communications systems and sub-systems.



**Horizontal and vertical log periodics**

Suitable for medium to long-distance applications, RFS' horizontal log periodic antenna performance is virtually ground-independent, with take-off angles that can be tailored to suit particular requirements. Alternatively, the RFS vertical log periodic antenna series provides ground-dependant vertical beam-widths and is characterized by a low-angle radiation that is essentially constant at all frequencies.



**Broadband monopoles**

Designed for medium to long-distance omnidirectional operation, these antennas exhibit low angle radiation patterns – an economical solution for general HF communications applications.



**Tactical antennas**

RFS' wide range of tactical man-pack and transportable antennas are available in standard designs or can be customized to meet specific customer requirements.

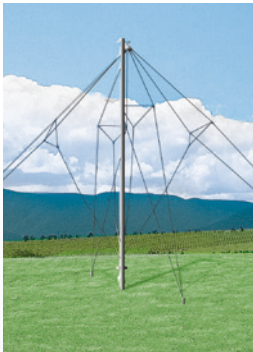
### Total design excellence

As RFS designs are broadband, its antennas suit a wide variety of applications ranging from simple, low-cost, single-sideband radio (SSB) installations to complex, large-scale military installations and electronic warfare countermeasure systems.



**Biconical dipoles**

This omnidirectional broadband series is designed for short and medium-range coverage. As neither terminating resistors nor antenna-tuning hardware is required, essentially all input power is radiated.



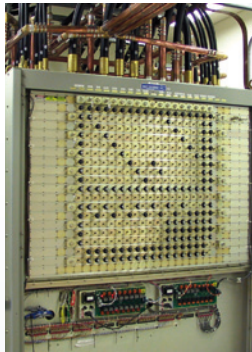
**Standard and tandem deltas**

Omnidirectional high angle radiators designed for ionospheric propagation over short to medium distances. Radiation results from a wave traveling upward to a resistive termination at the antenna's apex. Similar in form to the standard delta, the tandem delta does not have a terminating resistor. As a result, all input power is radiated, achieving gains of 3-4dB over the standard delta.



**Rotatable log periodics**

High-performance directional antennas are designed to provide short, medium and long-range coverage. These units exhibit high-gain characteristics coupled with excellent rotational speed and accuracy, making these multipurpose antennas the ideal solution for multi-link applications.



**Antenna switching matrices**

Antenna switching matrices facilitate multiple transmitter/receiver to multiple antenna interconnections, providing a compact system with low VSWR and high isolation characteristics.



**System design, integration, and commissioning**

RFS offers comprehensive HF and tactical turnkey project services, including specific resources and skills in key engineering areas such as:

- Antenna sub-system design
- Antenna farm design
- Antenna coupling analysis
- Antenna radiation hazard analysis
- Coverage maps – daytime and nighttime

## PROJECT SPOTLIGHT:

# HF Sky Wave Communications System (HF SWCS)

In cooperation with world-renowned manufacturer Boeing, RFS has built an HF communications system for the Australian Defence Force. Developed over a ten-year period, the HF Sky Wave Communications System (HF SWCS) has achieved independent recognition as the most advanced system of its type in the world.

Using the latest HF technology, the system provides a cost-effective information exchange capability of the highest capacity available, and is conceived for use by both military and civilian groups.

## Mission complete: Outfitting the Australian Defence Force

This advanced HF project provides a single, integrated system, which replaces the three ageing communications systems previously used by the Australian Army, Navy and Air Force.

Four strategic transmit-and-receive sites, or nodes, are outfitted with radio systems for the exchange of voice, data, email and facsimiles. The sites are connected to two purpose-built Network Management Facilities, connecting the entire Australian Defence Force.

Real-time services include secure analog voice, secure digital voice, civilian distress call and fixed network operator. Non-real-time services include organizational messages, fax, e-mail and interactive data services, as well as network maintenance, frequency planning and communications planning.

The HF SWCS delivers the dependable connectivity and throughput the previous HF systems lacked. The Australian Defence Force now has long-range regional and beyond-line-of-site communications capabilities, with more than 93% average grade of service over 30% of the earth's surface for all traffic types.

## Next-generation HF

Harnessing the latest HF technology, HF SWCS works more like a mobile phone system than a typical HF broadcast system. Its ease of operation also enables reduced user training. The system's advanced capabilities include:

- ➔ Greater automation of traditional operator tasks
- ➔ Improved frequency management
- ➔ Improved area of coverage and range
- ➔ Centralized management and control
- ➔ Major infrastructure modernization
- ➔ Directional antenna beam pointing
- ➔ Engineered "quiet" receive sites
- ➔ Automatic, reliable, confirmed link data transfer (BER 1 in 10E8)
- ➔ Automatic link establishment
- ➔ Increased data speeds (up to 4800bps; possible 9600bps)
- ➔ Automatic direct-dial non-secure telephone calls
- ➔ Semi-automatic direct-dial secure telephone calls
- ➔ Mobile configurations include land, sea and air; remote fixed stations

# Why RFS?

## A worldwide leader in wireless and broadcast infrastructure



**Radio Frequency Systems (RFS) is a global designer and manufacturer of cable, antenna and tower systems, along with active and passive RF conditioning modules, providing total-package solutions for wireless and broadcast infrastructure.**

**RFS serves OEMs, distributors, systems integrators, operators and installers in the broadcast, wireless communications, land-mobile and microwave market sectors.**

**As an ISO-compliant organization with manufacturing and customer-service facilities that span the globe, RFS offers cutting-edge engineering capabilities, superior field support and innovative product design.**

## Serious about services

Customers know they can count on RFS for comprehensive logistical capabilities, flawless execution and outstanding technical skills and support. The company's dedicated shipment coordinators, hotline staff and on-site engineers go well beyond mere technology, striving to offer tailored solutions to meet even the most complex site-engineering and delivery challenges.

RFS' value-added services match the exact needs of business partners large and small.

## Ever-present quality guarantee

From design to manufacture, ISO 9001 and ISO 14001 certification standards encompass all aspects of RFS' business worldwide. Every product RFS ships has stood up to the most stringent technical, environmental and quality control tests, continuously meeting and surpassing the expectations of a long list of wireless carriers, transportation and utility operators, and broadcasters.

RFS backs every product bearing its name with a quality guarantee that is unrivaled in the market.

## A legacy of innovation

A total commitment to design and develop the world's most advanced technology for wireless communication has kept RFS at the forefront of the industry for more than 70 years. Dedicated R&D teams, plus a privileged partnership with Bell Labs, are at the source of breakthroughs that are ensuring the mobility of an increasingly wireless world.

RFS is at the frontier of wireless technology innovation, sustaining the boldest ventures to enhance the way people communicate and live.

## A truly global company

With on-the-ground personnel in more than 20 countries and on every continent, RFS always delivers on its commitments, providing a comprehensive range of premium products, systems and services. Its clients benefit from all the advantages of a global supplier, while relying on dedicated support from RFS' local engineering, manufacturing and shipping teams.

RFS' products, systems and personnel can be found in every corner of the planet. As a global group, RFS is committed to upholding the most stringent environmental, health and safety standards, and seeks to integrate green initiatives in every aspect of its business.



## A worldwide partnership

Strengthening their cooperation, RFS and Boeing Defence Australia (BDA), a wholly owned subsidiary of the Boeing company, announced a Memorandum of Agreement (MOA) to jointly market Boeing's HF Sky Wave Communications System (HF SWCS) internationally.

