

# Radar Systems Support



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Maintenance & Repair

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Radar Evaluation

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Spare Parts Management

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Documentation

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Training

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In Radar Systems Support, the steep GmbH provides a full-service package for air surveillance and approach radar systems.

**3 Radar Systems**

**4 Maintenance & Repair**

**Radar Evaluation**

**5 Flight Checks**

**6 Spare Parts Management**

**7 Technical Documentation**

**Training**

# Radar Systems are our Core Competence

In Radar Systems Support, the steep GmbH provides a full-service package for air surveillance and approach radar systems. Our support covers the maintenance and repair of radar systems on site as well as the repair and overhaul by our team of experts in the workshops at our headquarters in Bonn. We consider ourselves a competent partner for the entire lifecycle of radar systems, starting with the installation of new systems up to the solution of obsolescence issues.

We service the systems in all aspects of technical documentation and, moreover, support our customers comprehensively in training their personnel. Our in-house developed ra-

dar spare parts for the systems RRP-117/FPS-117 have long been proven in terms of performance and price effectiveness. In addition, our radar evaluation offers a full analysis of the systems in terms of engineering technology through flight inspections and system performance checks.

In our services for air surveillance and approach radar systems, all business units of the steep GmbH interlock, combining the knowhow of the steep GmbH to a full-service package that offers our customers all services from a single source.



# Maintenance and Repair

By the help of our services in the area of maintenance and repair in the civil and military sector, we secure the faultless functioning of radar systems. The wide range of services in systems support includes the traditional service tasks, such as monitoring of operations and performance, maintenance and repair at customer site and in our facilities, as well as analysis, verification and consulting services for the optimization of the employed technology.

The mechanical and electrical radar workshops of the steep GmbH have more than 50 years of experience, especially with services for the German Air Force regarding the systems Ground Master 406, RRP-117, MPR and HADR. Services are provided both in framework contracts as well as by individual order.

## Our services in the technical environment of high-performance radar equipment:

- Reconstruction, maintenance and repair
- Maintenance and modification
- Repair and overhaul on site (national and international)
- Fault and failure analysis
- Analysis of technical specifications of components
- Commissioning and testing of operational capability
- Installation, assembly and disassembly also in deployment

### The technical radar service includes components and parts from the following areas:

- Transmitter
- Receiver
- Antennas
- Repeaters
- Control units
- Mechanics
- Electrics
- Air conditioning/cooling
- Data preparation
- Data presentation
- Communication

# Radar Evaluation

For more than 25 years, steep has been providing checks of the radar systems of the German Air Force (PSR / SSR / Mode S). Regular checks (2-year-cycle) are performed to ensure that the primary and secondary radar systems are up to the specified performance characteristics.

In addition to the services for the German Air Force, steep supports the commissioning of new surveillance or approach radar systems in various European countries, as well as the implementation of flight checks in the Middle East.

## Flight Checks

Radar users, such as civilian aviation authorities, air navigation service providers or military air navigation authorities, need to carry out flight checks on radar systems in order to confirm that the system is within the required manufacturer-specific as well as international regulations and standards (ICAO, Eurocontrol).

## System Performance Check

The system performance check verifies that the systems meet all specified performance demands and all operational requirements. For this purpose, antenna, transmitter, receiver and signal processing are checked regularly. In addition, necessary system alignments are performed.



## Flight Checks

Radar flight checking typically comprises an analysis of the following parameters:

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**1**

Position accuracy in range and azimuth (systematic error and standard deviation) compared with SSR or GPS as a reference

**4**

Cone of Silence evaluation

**2**

Probability of detection (Pd) of PSR / SSR / Mode S systems in graphical or tabular representation

**5**

Decoding rate (Mode A/C und Mode S)

**6**

False plot analysis

**3**

Correlation rate of PSR and SSR

**7**

Calculation of the coverage of a sensor based on terrain data (LoS – line of sight / screening)



## Spare Parts Management

The steep GmbH produces spare parts for original components of the radar system RRP-117 (Remote Radar Post). These have the same form, fit and function as the parts of the original equipment manufacturer, but have a better performance and a lower price. Our portfolio also includes re-designs of obsolete and no longer available original components. The spare parts have proven successful in deployment for many years. As a rule, they can also be used in the system FPS-117.

Our spare parts portfolio currently includes L-Band Amplifiers in the versions 2 x 5 W, 50 W and 100 W, T/R Switches, Phase Shifters, Combiner/Divider (1-fold, 6-fold and 10-fold) as well as DC-Distribution (1-fold, 6-fold and 10-fold).

# Technical Documentation

In addition to the services in radar systems support, our service also covers the technical documentation as well as logistics and obsolescence management. This includes maintenance of material databases in close cooperation with the customer. In addition, our department updates and maintains user manuals and service documentations as well as other relevant documents on the basis of information on technical changes from the workshops and data from radar sites.

## Examples of our services in documentation:

- Technical documentation according to ASD S1000D™
- Maintenance instructions
- Operation and user instructions
- Spare parts catalogues
- Circuit diagrams
- Manuals
- Training literature
- Document lifecycle management
- Obsolescence management

# Training

The aim of our service in the area of training is the ideal qualification and advanced education of our clients' specialist staff for the preventive maintenance of radar systems. Training contents are for example the use of testing equipment and the targeted adjustment of the relevant processes. With the implementation of on-site training, we help to create a particularly close link to the customers' radar system and to the immediate practical application of the acquired knowledge.

In the development of training materials, our specialists from documentation and training closely cooperate and, by doing so, ensure the ideal combination of technical and educational subject-matter expertise. In this context, we benefit from the extensive experience of our training division in qualification of personnel at radar sites as well as in education for civilian and military customers.





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