9AIR C4I-Eng-1.0-2012/Harleys

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SAAB

9AIR TOCCS

ANY NEED – **ANY TASK**

The 9AIR C4I concept: complete control for all weapons, sensors and communications.

It provides the situational awareness and communications that operators need to make the right choices, and to act on them swiftly and effectively.

The missions that air forces face today, and those that will come tomorrow, demand the ability to seamlessly implement different strategies. This can range from peacekeeping operations, air policing missions and border patrol to full combat and joint war scenarios.

The 9AIR C4I family is scalable and flexible, providing control for all missions, air forces and operations.

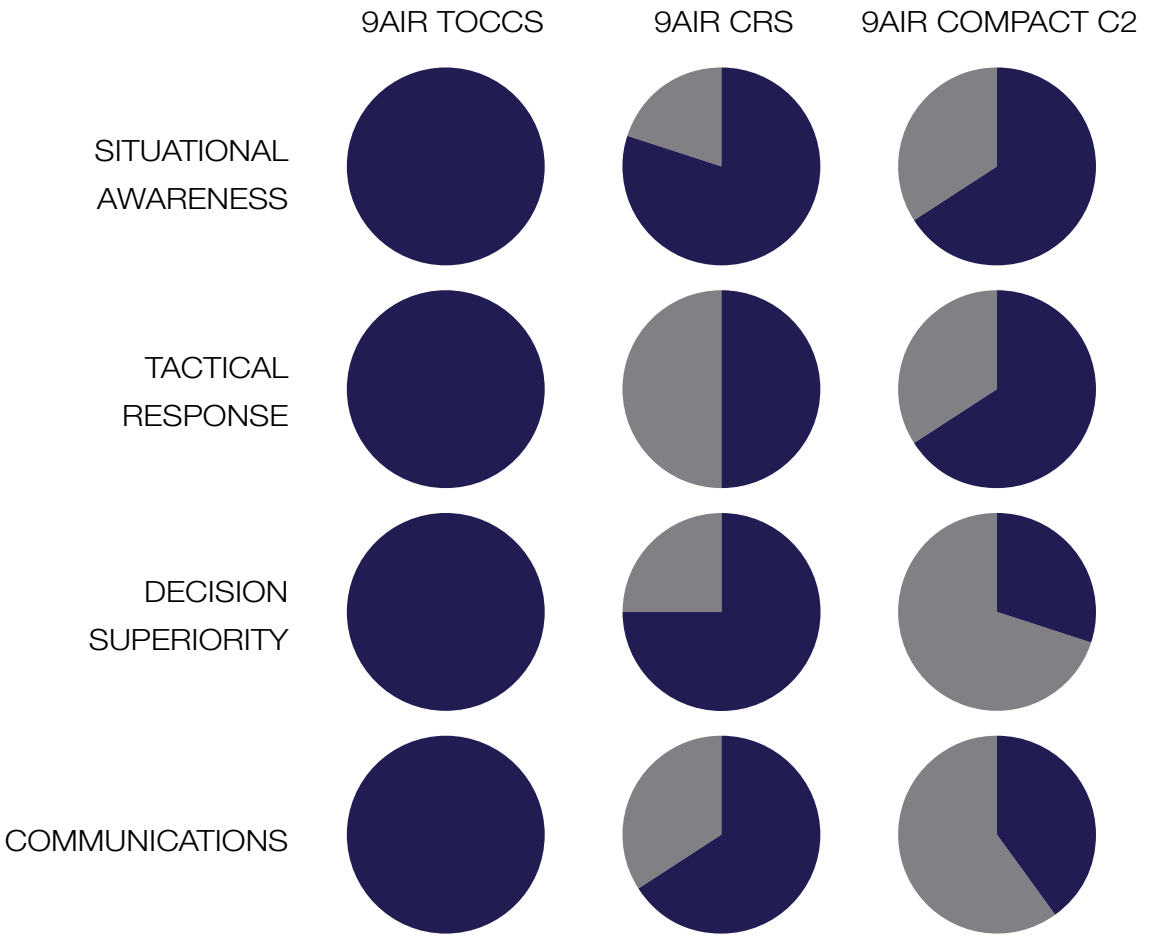
THE 9AIR C4I PRODUCT FAMILY

9AIR TOCCS
Tactical Operations Command & Control System

9AIR CRS
Control & Reporting System

9AIR Compact C2
Command & Control

ANTICIPATE TOMORROW



COMMAND THE BATTLESPACE

The 9AIR TOCCS turns information into knowledge, and knowledge into action.

The system enables flexible, effective operations. This increases its customers' mission capability. The solution is modular and scalable, allowing unique software connectivity and interoperability. Its design means that it is quick and affordable to install and support.

The operationally-proven 9AIR TOCCS solution is the result of development, innovation and in-service experience spanning over 70 years. It enables straightforward integration of any third-party module, and likewise enables any 9AIR TOCCS module to be integrated with equipment from other providers. This gives you complete freedom of choice, alongside flexible technology which can be adapted to meet specific needs and requirements.

NETWORK-ENABLED CAPABILITY

The level of systems integration you can achieve is directly proportional to the level of situational awareness you gain. Full integration enables efficient information sharing and simplified decision making.

Sweden is one of just five countries in the world with the ability to develop and integrate complete air power systems. This means that working with Saab enables you to access comprehensive integration expertise. We deliver the ability to bring all your systems together into a network-enabled solution: a system of systems environment.

The 9AIR TOCCS is the central element in this environment. It is the connecting enabler in the network. With the capability to plan and task all air operations, it forms the hub that allows information to flow between all systems and assets.

We have proven our capabilities as a Lead Systems Integrator (LSI) by successfully conducting a number of large-scale projects. We have more than 70 years of experience in systems integration, working both as a LSI and a partner.

THE 9AIR TOCCS IS THE HUB OF ALL INFORMATION IN A NETWORK-ENABLED ENVIRONMENT.

SUPPORTING THE OPERATOR

In today's battlespace, assets are being manned by fewer and fewer operators. This creates a greater need for multitasking, and in turn a greater reliance on technology.

The 9AIR TOCCS is designed with this trend in mind. Its HMI supports the operator by ensuring that the right information is delivered at the right time, combined and clearly presented at each single workstation.

The system's features allow operators to handle multiple tasks by reducing manual workload and automating simple functions. It supports operator interoperability by using MIL-STD 2525 symbology.

KEY FEATURES INCLUDE:

- Automatic control of weapons and sensors at various levels, reducing operator workload in critical conditions
- Anomaly detection by bringing unusual activity to the operator's attention, supporting normal operations and reducing human error in detection
- Ergonomic HMI based on thorough studies, testing and user experience, allowing operation to be as intuitive as possible

ACHIEVING YOUR MISSION

The 9AIR TOCCS is built with operational flexibility in mind.

It has the ability to support planning, tasking and control across the entire breadth of possible missions and scenarios. This is done by optimising the use of all organic resources and addresses command, control and communications in a holistic approach.

These capabilities provide effective and efficient multi-tasking. It is these elements of its design that produce a solution that is greater than the sum of its parts.

SECURING ALL DIMENSIONS:

- Inter/intra-theatre airlift
- Air logistics operations
- Combat search & rescue operations
- ISR operations
- Electronic warfare operations
- Air-to-air refuelling
- Air traffic control
- Peace support operations
- Offensive counter-air
- Defensive counter-air
- Air interdiction
- Close air support
- Anti-surface warfare
- Planning & tasking

DATA FUSION AND TRACK CORRELATION

The key to situational awareness is a single, coherent Recognised Air Picture.

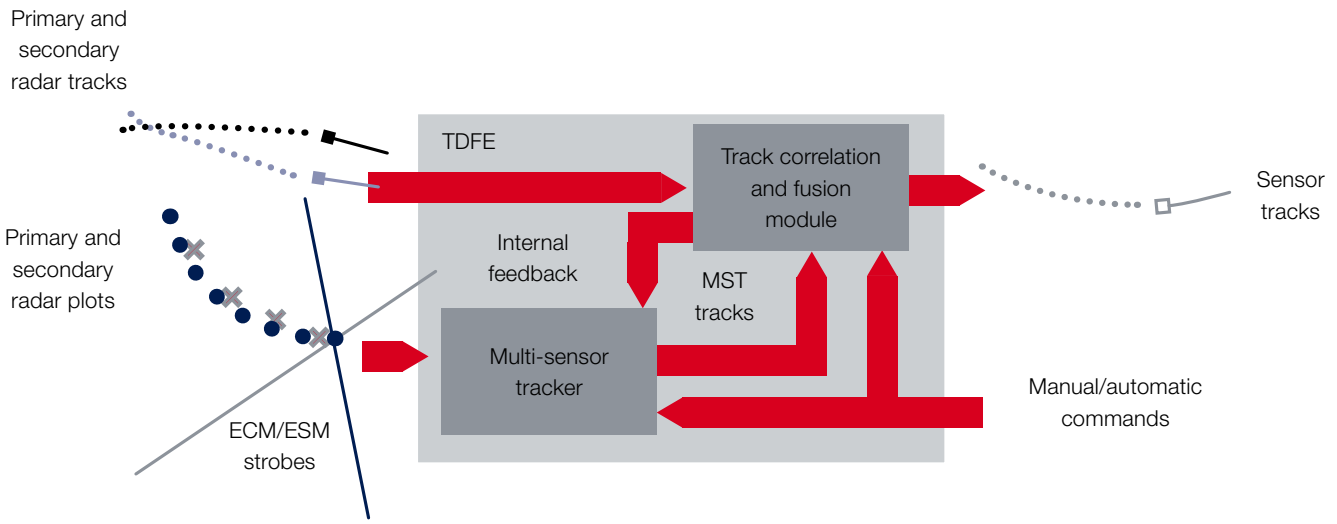
The 9AIR TOCCS utilises all surveillance resources, merging sensor data and Tactical Data Link tracks with manual and platform data. This provides a complete, correlated situational picture.

The system creates a picture using the Track Data Fusion Engine (TDFE), a high-performance, network-enabled multi-target tracker and correlator. It generates the picture automatically from received data inputs, including ballistic missile tracking.

A clear interface enables the TDFE to accept and process asynchronous measurements from air, sea and land-based sensors including:

- Primary and secondary radars
- IFF
- Strobes
- Tracks
- Electronic Support Measure (ESM) sensors
- Electronic Counter Measure (ECM) sensors

The operator can interact with the pilot and can select different correlation processing modes, as well as inputting direct intervention and override commands.



The TDFE is the result of more than 20 years' development of trackers and correlators. The system and its components are operational in a number of countries worldwide, with requirements ranging from 1 sensor and 100 tracks to more than 60 sensors and 10,000 tracks. In practice the upper number is unlimited.

OPEN ARCHITECTURE

The 9AIR TOCCS uses modular functions in a real-time critical system architecture and Service Oriented Architecture (SOA). This increases opportunities for innovation and competition, as well as reducing burdens of cost and risk through life.

SOA involves creating modular, interoperable systems that adopt open standards and have published interfaces. The benefits of this approach are manifold.

REDUCES SYSTEM AND LIFECYCLE COST:

- Brings down development cycle time
- Enables reuse of components
- Reduces maintenance constraints

ENCOURAGES INNOVATION:

- Facilitates rapid technology insertion
- Allows continued access to cutting-edge technologies from multiple suppliers, creating best-of-breed solutions

MITIGATES RISKS, AVOIDING:

- Technology obsolescence
- Unwanted ties with proprietary or vendor-unique technology
- Reliance on a single source of supply

The 9AIR TOCCS can easily be integrated with any third-party subsystem. It provides a wide range of options for user interface integration, including hosted vendor clients, web services, thin clients and fully-integrated HMIs.

Saab can also supply specialised, high-performance subsystems or modules for integration with another vendor's C2 system.

MODULAR

The modular approach to the 9AIR TOCCS involves building a solution based on a number of separate functions, either reused or newly-developed, and merging them together into one operational system. This is built on a single basic platform which provides the guarantee of a well-functioning system with high availability.

We work in close co-operation with you and your users, considering individual needs, both in technical and operational terms.

These elements of the 9AIR TOCCS approach, along with our experience and broad technical knowledge, provide a number of benefits:

- Short delivery cycles
- Cost-efficient projects
- Retention of well-known, well-tested and well-documented functions

FLEXIBLE

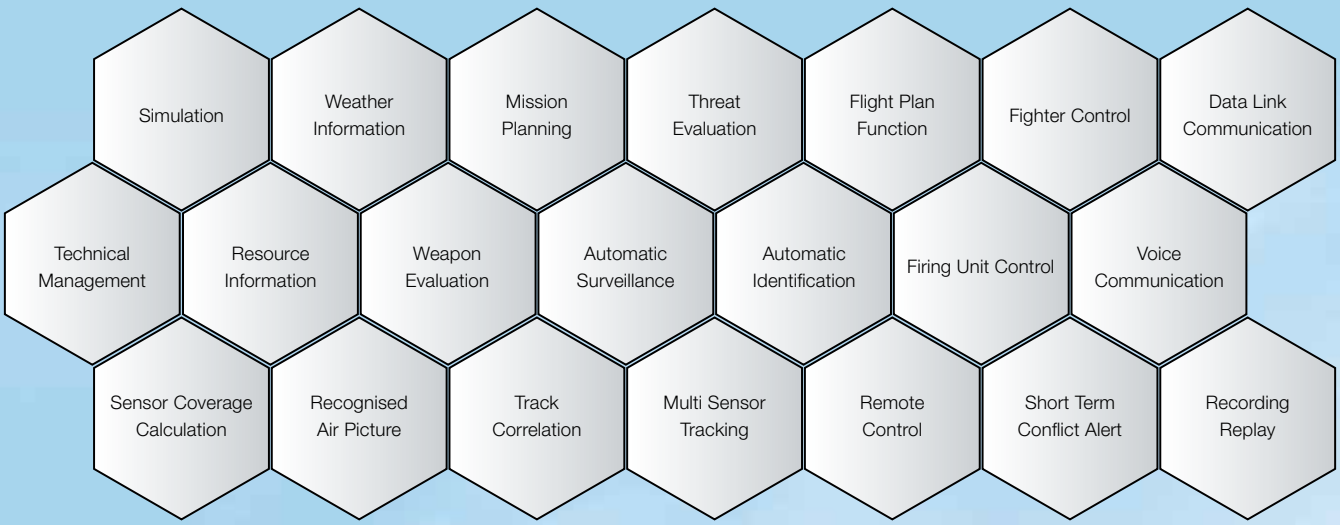
A modular approach means the widest possible range of functions can be offered. 9AIR TOCCS options include, but are not limited to, the following:

- Surveillance
- Fighter control
- Data Link communication
- Automatic identification
- Decision support
- Weapon control
- Threat evaluation
- Multi-sensor tracking
- Communication management

We also offer new, customer-specific functions that we define and develop in partnership with you.

SCALABLE

The 9AIR TOCCS offers the ability to easily change the number of operator workstations. The solution is entirely scalable, from a single workstation up to an almost unlimited number. Remote operator workstations can also be connected.



THE 9AIR TOCCS IS A FLEXIBLE, MODULAR COMBINATION OF INDEPENDENT FUNCTIONS.

SECURE SOA ENABLING PRODUCT SUITE

The Secure SOA Enabling Product Suite enables loosely coupled services, meaning that different services can be used to fulfil a functional requirement.

It also enables 'late binding', where the choice of which service to use can be made in runtime 'service discovery'. The suite also smoothly and transparently adds a security layer for all legacy and COTS applications, along with powerful management. This enables the operator to use the same security administration for the legacy environment and the services, based on the SOA pattern.

The Suite includes a management user interface where services and their attributes can be configured and registered, enabling powerful support and regulation of loosely-coupled services.

KEY FEATURES:

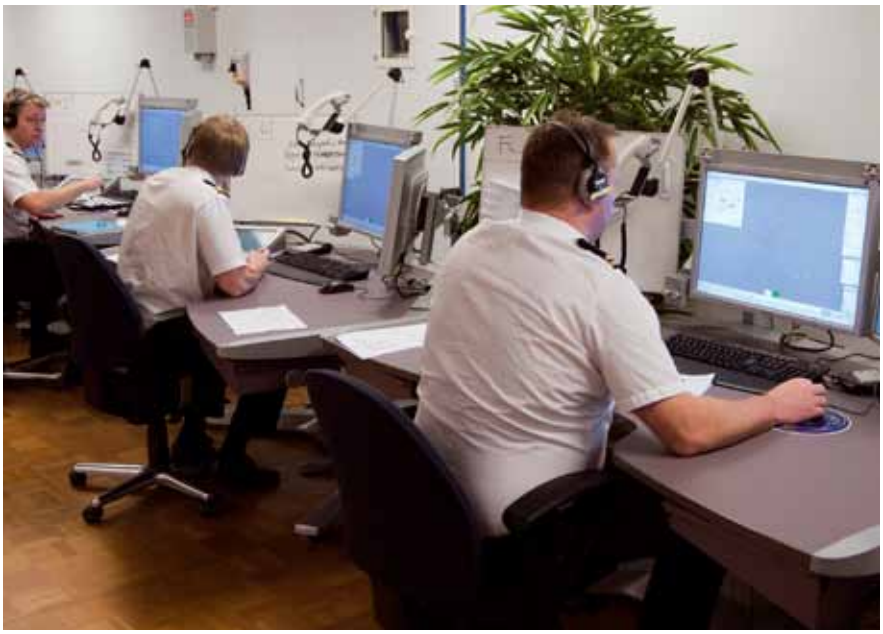
- Enables the operation of loosely-coupled services with:
  - High security
  - No single point of failure
  - Distributed management
- Functions in heterogeneous communication networks
- Has minimal impact on legacy systems and development
- Works independently of operating systems

SYSTEM ELEMENTS:

- Management user interface
- Secure session provider
- Secure SOA library
- Secure SOA runtime agent:
  - Communication broker extension
  - Data distribution extension

TRAINING AND SIMULATION

Mission success relies on adequate mission training. The 9AIR Trainer was built with the 'train as you fight' principle in mind, providing an experience which mirrors the operational 9AIR TOCCS system in every detail.



The 9AIR Trainer provides realistic, real-time training, for any operator in the C4I environment. This spans from the basic training needs of individual operators or small groups to highly complex exercises with full C4I staff manning.

The system can present a real, non-modified air defence centre with a complete simulated environment. This means that the operator conducts tasks and missions in an identical manner to those in a live operation, enhancing training value.

The system simulates all sensors and moving objects as well as all adjacent systems, in various weather conditions. It also replicates the interaction between operators and other support personnel controlling and managing operations in the real life environment.

The 9AIR Trainer also features pilot consoles including MMI for national and interoperable Tactical Data Link capabilities such as Link 16. The simulator can also be connected through DIS/HLA over commercial networks to other entities, operational or simulated, in the air defence domain. It uses the same protocols, messages and other inputs that are present in the live environment. It also provides pilot training simulators at remote locations for realistic interaction between operators and pilots.

The simulator has a modular structure and open standard interfaces. It can simultaneously run single-user and many-versus-many scenarios, providing the flexibility to account for different backgrounds and competence levels. Upgrades and enhancements are straightforward and cost-effective to introduce.

INTEROPERABILITY

9AIR TOCCS systems are installed with customers around the world, configured in all types of COTS hardware and operating systems.

In co-operation with each customer, we implement the system using interoperable standards. This gives you the ability to operate in synergy in the execution of assigned tasks.

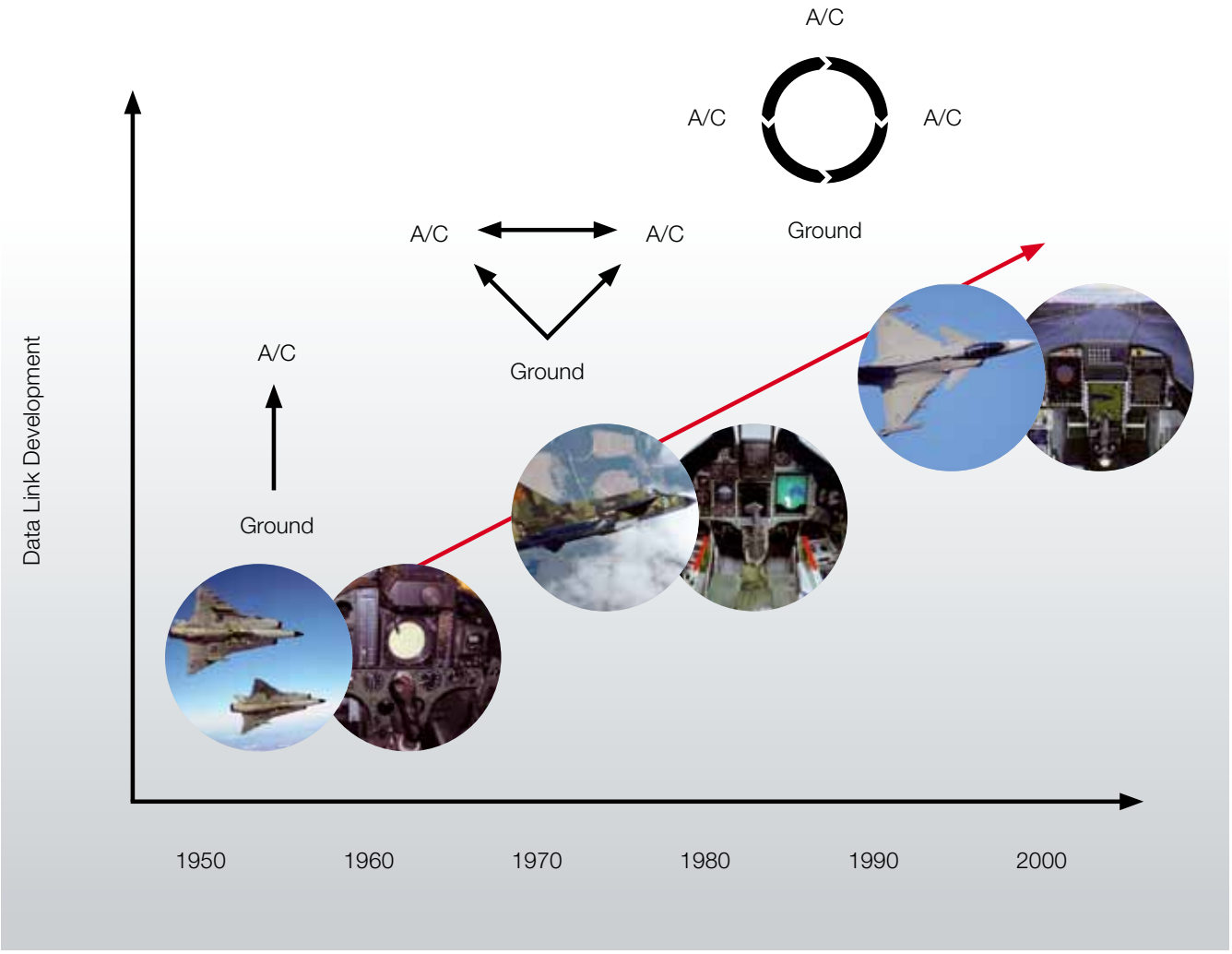
Our global experience includes handling a wide range of interoperable requirements, as required by the corresponding MIL-STD, as well as national and international Tactical Data Link standards.

THE FUNCTIONALITY OF THE 9AIR TOCCS WILL SUPPORT ANY INTEROPERABLE METHOD OF CONDUCTING WEAPONS CONTROL.

TACTICAL DATA LINKS

Saab has provided National Tactical Data Links for the air domain under sovereign operational control since the 1960s. Our experience also extends to the integration of international interoperable Data Links, for example Link 11, Link 16, JREAP and SADL.

Our Data Link technology and expertise allows the creation of a fully-interoperable Air Force, linking all combat assets in a tactical data network. This provides pilots and weapon controllers with increased situational awareness and enhanced mission effectiveness.



TACTICALL

The 9AIR TOCCS utilises state-of-the-art TactiCall technology to provide robust and secure communications. TactiCall is an integrated solution for cross-technology communication.

The solution supports internal and external communication, both voice and data. It allows the operator to choose the right transmission protocol in order to support the operational mission, regardless of working environment and configuration.

It covers the entire communications spectrum, from ground telecom infrastructure over radio sites to integrated airborne communication and radio systems.

TactiCall includes remote control functionality, enabling all communication tasks to be performed from the subscriber station. This is a single operator point for voice communication, chat, video monitoring and equipment remote control.

It comprises an intuitive user interface which provides a straightforward situational overview, facilitating swift operation and decision-making. The system is robust and highly survivable, with no single point of failure. This allows the operator to handle voice and data communication, red as well as black, swiftly and efficiently.

GENERAL OPERATOR WORKSTATION

The General Operator Workstation (GOW) provides a fully ergonomic workplace for 9AIR TOCCS operatives. It offers a large, flat, horizontal desktop surface which can be customised for the user's individual needs.

The GOW consists of a mechanical framework – the Operator Console – and the display, input and communication devices that the operator requires for man-machine interaction.

The Console can be manually locked into its working position by raising the two front wheels off the floor surface. It features a motorised telescopic pillar for easily raising and lowering the desktop and its equipment. It also comprises attachments for mounting different devices, along with ample storage space.

The GOW is easy to move, by folding the desktop to an upright position and unlocking the wheels.

COMMITTED TO YOUR **MISSION SUCCESS**

SYSTEM SUPPORT

We offer a tailored support package designed to meet your operational demands and requirements, ensuring maximum availability and cost-efficiency over the entire lifecycle. Saab is well-known for long term customer commitments with solutions facilitating future capability growth and operational endurance.

This support could be:

- On-site support with Saab personnel
- Remote support by phone, internet or video
- System administration and maintenance by Saab personnel
- System plan allowing for continual upgrades
- Your local 9AIR TOCCS 'super-user', backed up by Saab specialists

TRAINING SUPPORT

The complexity of current and future operations places even greater emphasis on the need to train individuals using a modern C4I system. We believe that mission success lies within the operators' ability to utilise the full capabilities of 9AIR TOCCS.

We can support you with the following training packages:

- Utilising your CONOPS
- Operator specific training in areas such as: surveillance, weapons control, GBAD and communications
- Air mission wargaming with 9AIR TOCCS
- Yearly refresher training on management, technical and operational levels

LIFECYCLE PERSPECTIVE

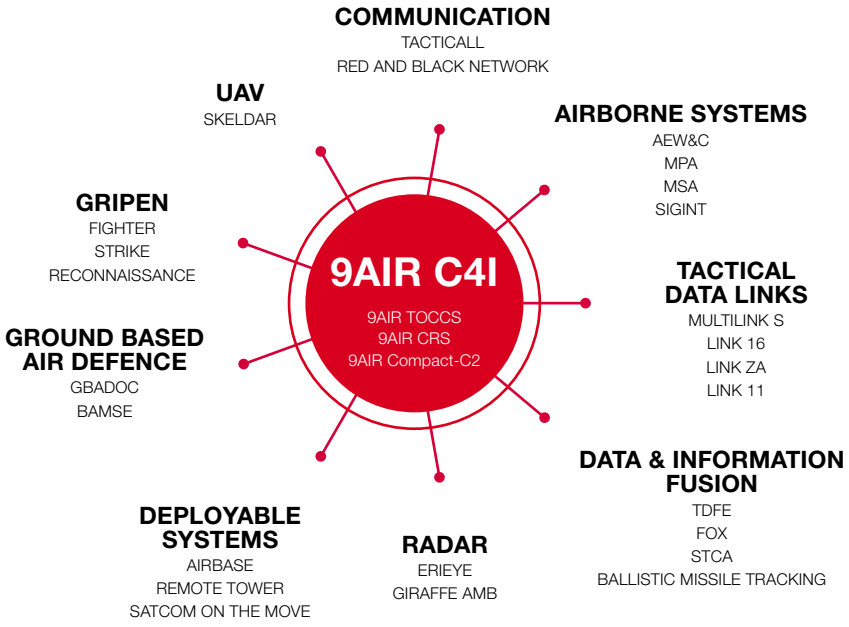
Our lifecycle-based concept means we offer support from the earliest stages of planning, and continue to meet your future needs through a spiral development pattern. 9AIR TOCCS is built using Open Architecture technology, enabling cost-efficient system evolution.

The lifecycle perspective supports your adoption of:

- Interoperability
- Changes in doctrine and operational use
- Evolving technologies

OUR **AIR** OFFER

9AIR C4I is an integral part of Saab's air offer. Our capabilities cover all dimensions of the domain, including military subsystems, weapons and next-generation aircraft. We work with military and civil security organisations around the globe to provide commanders with the right information at the right time.



INVESTOR **GROUP**

Saab is a core part of Investor AB. The group features major corporations from sectors including finance, telecoms and pharmaceuticals. Our position in the group not only provides Saab with robust financial stability. It also allows us to partner with a wide range of prestigious organisations to provide outstanding offset and Industrial Co-operation offers.

TECHNICAL **DATA**

9AIR TOCCS

CAPACITY

- > 60 operators per site
- > 10 collaborating sites
- > 60 live sensor feeds
- > 10,000 simultaneous tracks in real time

SENSOR INTERFACES

- CD-2
- ASTERIX
- Thompson-TVT2
- TPS-43
- General 18-Bit
- TPS-75
- MPS1000
- ADS-B
- XML

COMMUNICATION

- VoIP
- Link 11
- Link 16
- SADL
- JREAP

MESSAGING

- AdatP-3
- USMTF
- ADEXP flight plans

OPERATING SYSTEM/HARDWARE

- PC Intel architecture blade centres
- Linux OS
- NAS storage
- Virtualisation

LAN TECHNOLOGY

- Redundant GB TP Ethernet
- IP v4 and v6
- CISCO switches/routers
- VLAN

GIS FORMATS SUPPORTED

- ESRI ShapeFiles
- MapInfo TAB
- DGN
- ESRI ArcSDE
- TIFF
- GEOTIFF
- JPEG
- GIF
- PNG
- ERDAS Image
- ESRI GRID
- DTED

COTS SOFTWARE

- MySQL database
- Jabber collaboration software
- MapServer
- FireFox web browser
- SIP gateway
- Java MMI

GENERAL OPERATOR WORKSTATION (GOW)

DIMENSIONS (WORKING POSITION)

- Length: 1,760 mm
- Depth: 1,250 mm
- Height: 1,230 to 1,730 mm
- Desktop height: 700 to 1,200 mm

DIMENSIONS (TRANSPORT POSITION)

- Length: 1,760 mm
- Depth: 985 mm
- Height: 1,195 mm

WEIGHT

- 163 kg (approx.)

MOUNTING OPTIONS

- 2 C shaped attachment bars
- Up to 6 LCD screens
- Monitor holders (regular/tall)
- Telephone receiver arm
- Adapter plate
- Non-MMI devices
- Work light

EXTENDABLE MOTORISED PILLAR

- 230V AC electric motor
- 3000 N dynamic force
- 500 mm stroke length

POWER DISTRIBUTION UNIT (PDU)

- Compatible with uninterruptible and interruptible 230V AC networks
- Three AC/DC converters for +24V DC equipment
- Sockets for connecting additional equipment

TRACK RECORD

Since its foundation, the 9AIR C4I family has entered operational service with customers and installations in over 30 countries around the world. With a programme of continuous improvements and upgrades, new 9AIR Compact C2 customers benefit from over 70 years of experience, development and innovation.