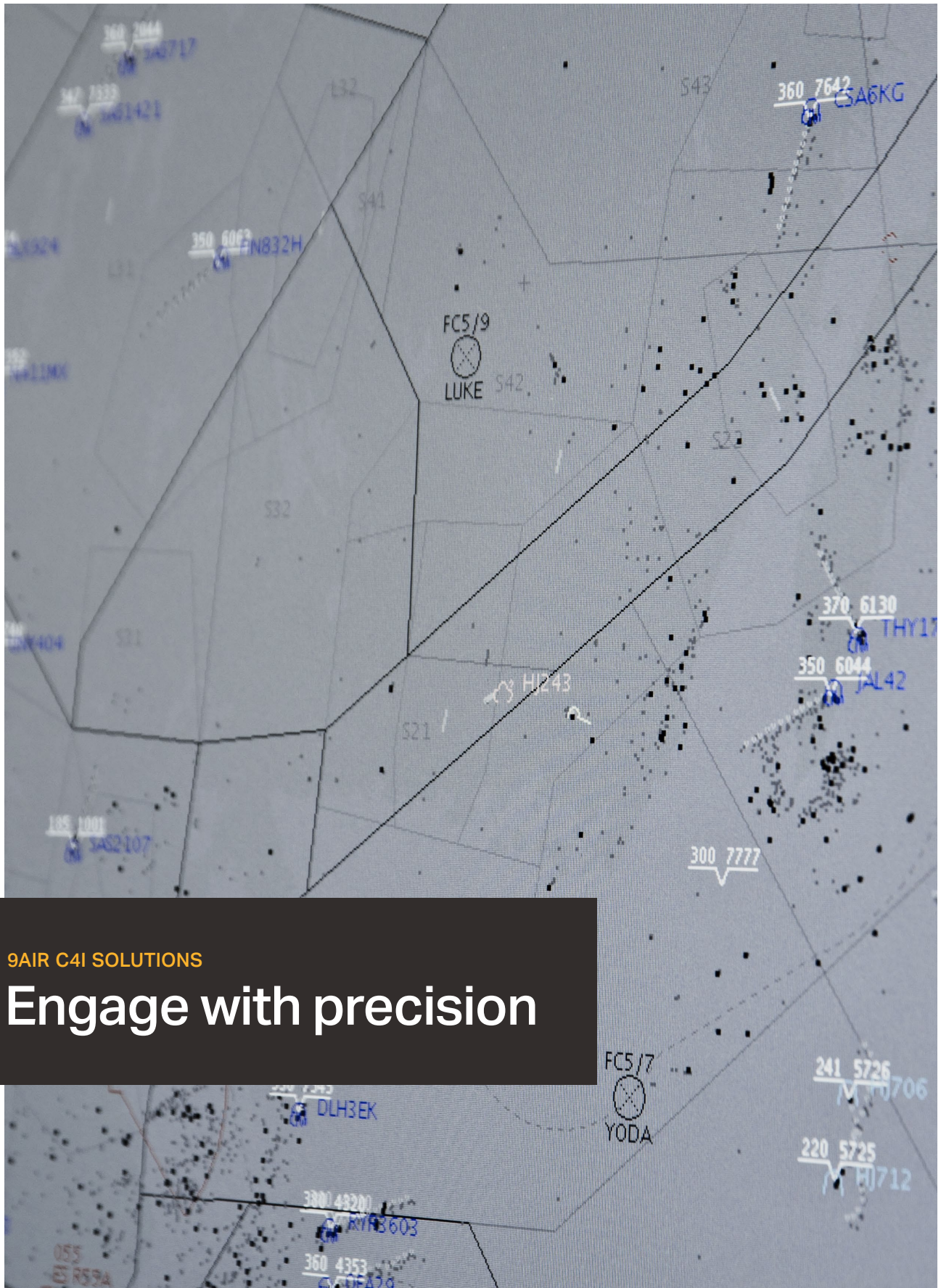




**SAAB**



9AIR C4I SOLUTIONS

# Engage with precision



# Engage with precision

In critical operations and when facing threats, you need to be confident that the information on which you base your decisions and actions, is reliable and correct. **Saab's 9AIR C4I solutions** provide an advanced toolbox with everything you need to know your skies and to have the advantage of being able to act with certainty and the power to engage with precision.

Knowing your skies, means to control all domains – air, land, sea and space are equally important for creating an advantageous overall picture. To do so you need to access and manage information from a wide range of sensors and sources, during all types of missions, interoperable ones included. Saab's 9AIR C4I Solutions gives you the advantage of knowing your entire arena of interest. And to do it better than anyone.

Saab's 9AIR offer includes the **9AIR C4I** for complete control for all weapons, sensors and communications, the **9AIR Trainer** for preparing operators by wargaming to manage a modern and advanced C4I system, and the **9CCIS** for efficient planning, resource management, reporting, assessment and evaluation. All three parts are integrated to provide a complete solution to engage with precision.







# 9AIR C4I – any need, any task

The missions that modern air forces are facing demand the ability to seamlessly implement different strategies – from peacekeeping operations, air policing missions and border patrol to full combat and multidomain war scenarios. The 9AIR C4I provides control for all missions, air forces and operations.

The 9AIR C4I provides the planning, tasking, monitoring, execution and data fusion required for providing operators with the situational awareness and communications needed to make the right choices, and to act on them swiftly and effectively.

## From information to understanding

Awareness is all about finding and extracting the right information. To refine it into facts, qualifying it for decision-support to the real-time situation picture. This is where Saab and its 9AIR C4I stand out and create unique benefits. With automated information processing and state-of-the-art track data fusion capability it turns information into knowledge and awareness into understanding.

## Own every moment

Regardless of whether it concerns national or international operations, higher tactical levels or the outermost operational nodes, detection, threat evaluation or assessment, the 9AIR C4I provide the capabilities required to own every moment of your mission – all the way from non-real-time planning to real time execution.

## Act with certainty

When the decision to act is made, confidence is a powerful ally. Especially if it is based on the world-leading sensor technology, unparalleled data fusion and state-of-the-art decision support found in 9AIR C4I. With secure communication through tactical data links and secure voice capability, efficient management of own allocated resources such as fighter aircraft and air defense – as well as systems and resources from other nations participating in the operation – 9AIR C4I will not only provide the ability to act with confidence, but with certainty.

## Proven, prepared, flexible

9AIR C4I is the result of development, innovation and operational experience spanning over many decades. It enables straightforward integration of any third-party module, and likewise enables any 9AIR C4I module to be integrated with equipment from other providers.

This gives you complete freedom of choice and access to flexible technology which can be adapted to meet specific needs and requirements.







# 9CCIS – plan and assess your air operations

A vital part of achieving missions and continuously strengthening one's capabilities, is the ability to plan and assess your air operations in an agile and efficient way. That is exactly what 9CCIS provides.

The **9CCIS** is a command-and-control information system that provides tools for enhanced planning, resource management, assessment and evaluation as well as functions for multidomain/Joint HQ and Air, Land and Maritime operations and for civil users which require a classified working environment.

9CCIS is a near real-time military system developed by Saab and designed to handle information up to Secret level. The system is to a very high extent scalable and modular to fit the need of the customer.

9CCIS is a natural extension of all Saab's air, land and naval tactical C2 (i.e. 9Air C4I, 9Land BMS, 9LV CMS and 9Maritime). 9CCIS supports open civilian and military standards and interfaces as well as easy integration of customer specific or third-party tools and subsystems.

## 9CCIS C2 functions:

- Resource management, including interfaces to logistics systems
- Air operation planning and tasking (e.g. AOD, ACO, ATO)
- Air mission management including Air support request management
- Air operation assessment and reporting
- Targeting
- Intelligence and ISR product management
- Common Operational Picture (COP) based on RAP/RMP/ RGP display (Recognized air/maritime/ground picture)

## 9CCIS C2 support functions:

- GIS/map functions and geodata processing
- Met/Weather management
- Office automation and document management
- Chat and instant messaging
- Video and audio conferencing
- Basic data management
- System management
- Security management

## 9CCIS external interfaces to:

- Joint level systems (e.g. order, intelligence, targeting)
- ISR systems (still/motion imagery, INTREP etc)
- Metar and weather systems
- Air C2 systems (air surveillance and weapon control)
- Squadron/pilot level mission planning systems
- Land BMS systems
- Naval shore-based sea surveillance centers and shipborne combat management systems



# 9AIR Trainer

## – mirroring the live system

The complexity of current and future multidomain 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 utilize the full capabilities of the 9AIR C4I.

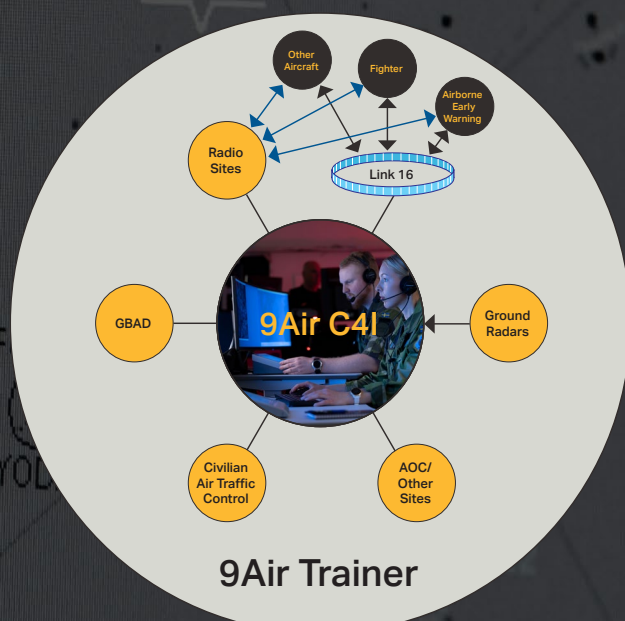
The 9AIR Trainer is built with the “train as you fight” principle in mind to provide realistic, real-time training experience for any operator in a C4I environment. Although the C4I Trainer can be used with other C4I systems, it is optimized for use with the 9AIR C4I and mirrors the live system in every detail – regardless of whether it concerns basic training needs of individual operators or small groups, or highly complex exercises with full C4I staff manning.

The 9AIR Trainer simulates all sensors and moving objects as well as all adjacent systems. It also replicates the interaction between operators and other support personnel controlling and managing operations in the real-life environment.

The Trainer can present a 9AIR C4I system 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 operator can, for instance, interact with the pilot and select different correlation processing modes, as well as inputting direct intervention and override commands.

### Training that secures all dimensions:

- Defensive counter-air
- Offensive counter-air
- Suppression of Enemy Air Defences
- 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
- Air interdiction
- Close air support
- Anti-surface warfare
- Tasking
- Complex scenarios
- Wargaming your CONOPS



# Network-enabled capability

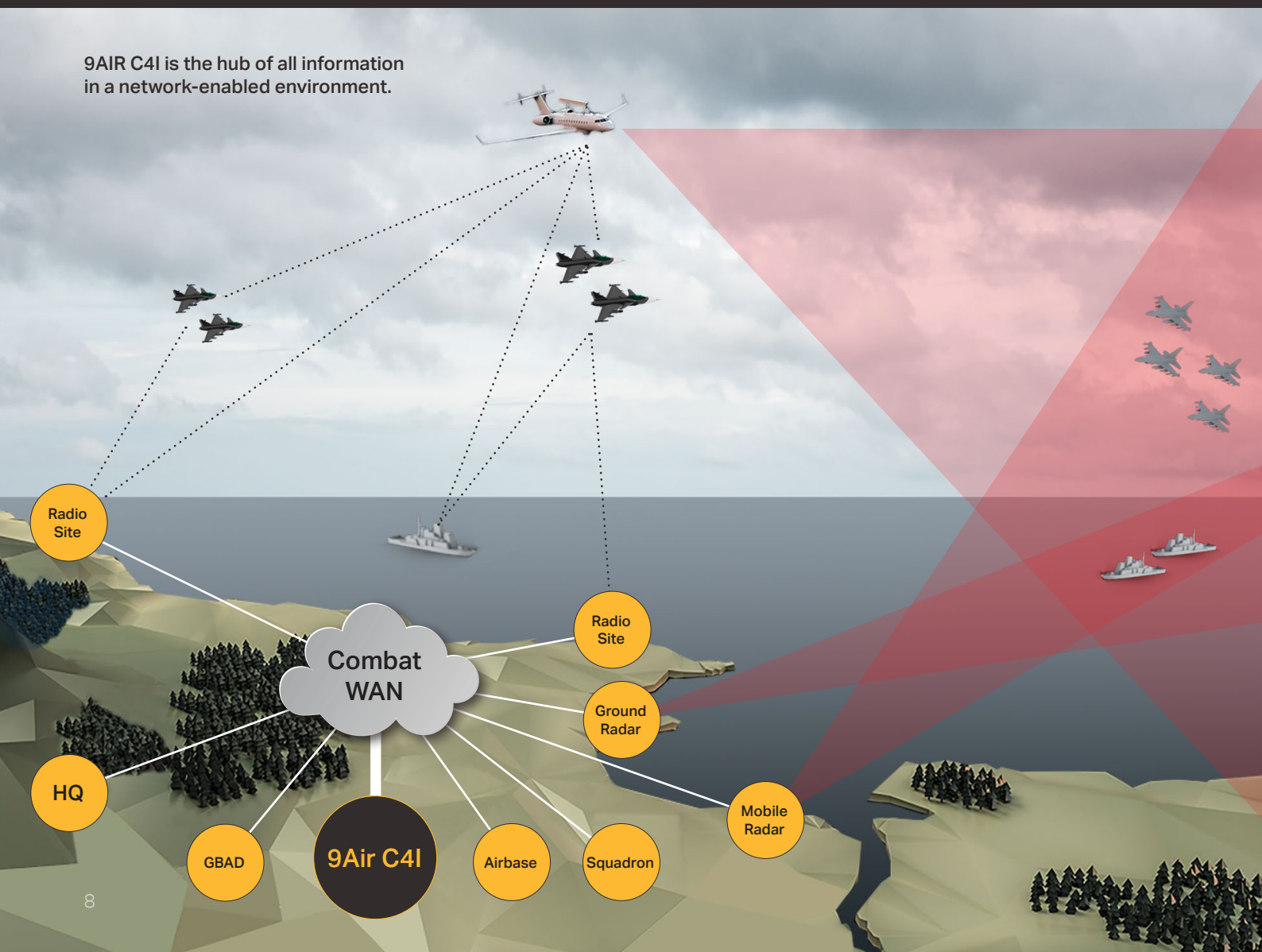
The level of systems integration you can achieve is directly proportional to the level of situational awareness you gain. Full integration enables efficient information sharing and simplified decision making.

Saab is one very few companies in the world with the ability to develop and integrate complete air power systems. Working with Saab gives you access to a unique integration expertise with the ability to bring all your systems together into a network-enabled solution – a system of systems environment.

The 9AIR Solutions are central elements and connecting enablers in such a 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.

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

9AIR C4I 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 and quality training.

The 9AIR C4I System is designed with this 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 by using AI and ML for decision support. 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
- Ease-of-use – operators quickly learn how the system works and is managed

### Achieving your mission

The 9AIR C4I System is built with operational flexibility in mind and it supports and executes all possible missions and scenarios. This is done by optimising the use of resources and addressing 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.

# Data fusion and track correlation

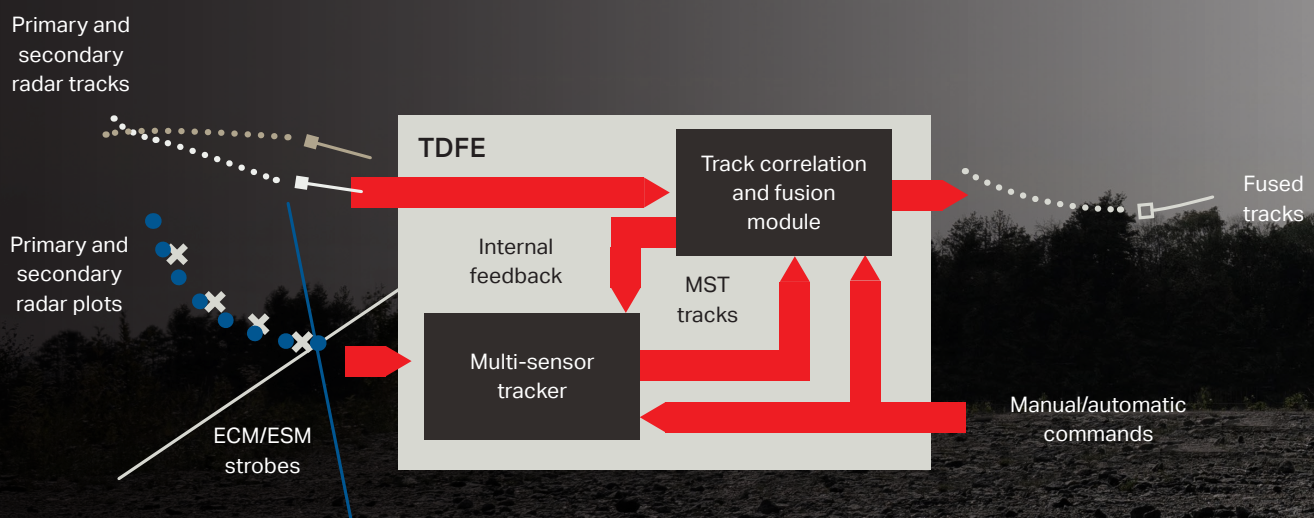
The key to situational understanding is a single, coherent Recognised Air Picture. The 9AIR C4I utilises all surveillance resources, merging sensor data and Tactical Data Link tracks with manual and platform data. This provides a complete, correlated situational picture.

The picture is created with 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 radar, including IFF
- ADS-B and multilateration/TDOA
- Strokes
- Tracks
- ELINT sensors
- COMINT sensors
- IDFM
- Cooperative ESM operations (CESMO)
- Any data/information supporting tracking

TDFE is agnostic to any data/information supporting tracking.



The TDFE is the result of more than 35 years' development of trackers and correlators. The system and its components are operational in several countries worldwide, with requirements ranging from 1 sensor and 100 tracks to more than 100 sensors and 10,000 tracks. In fact, the upper number is unlimited.





» The result of more than 35 years of development of trackers and correlators.



# Open architecture

The 9AIR C4I uses modular functions in a real-time critical system architecture. This increases opportunities for innovation and cooperation, as well as reducing burdens of cost through its entire life cycle.

## Reduces system and life-cycle 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

## Modular approach

The 9AIR C4I is based on a number of separate functions, either reused or newly developed, that are merged into one operational system. Built on a single basic platform it provides the guarantee of a well-functioning system with high availability. We work in close co-operation with customers and the users, considering individual needs, both in technical and operational terms. These elements of the 9AIR C4I approach, along with our experience and broad technical knowledge, provide several benefits:

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

## Flexibility in functions

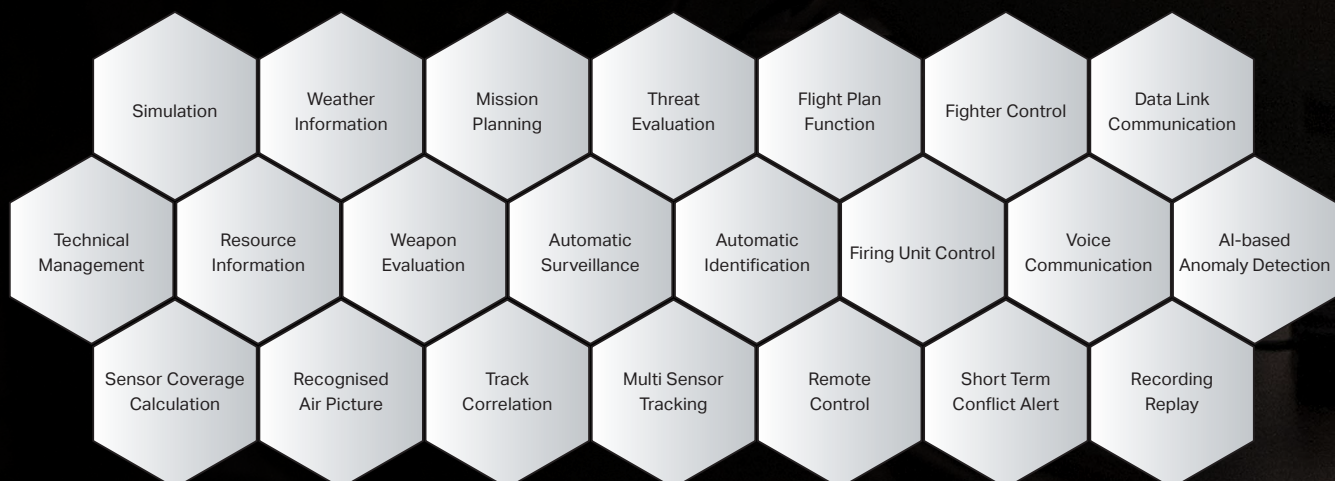
A modular approach means the widest possible range of functions can be offered. 9AIR C4I options include, but are not limited to, the following:

- Surveillance
- Data Link communication
- ID fusion
- Situation detection (AI as well rule based)
- Decision support
- Weapon control
- Threat evaluation
- Multi-sensor tracking
- Communication management

Saab can also offer new, customer specific functions that are defined and developed in close partnership with the customer.

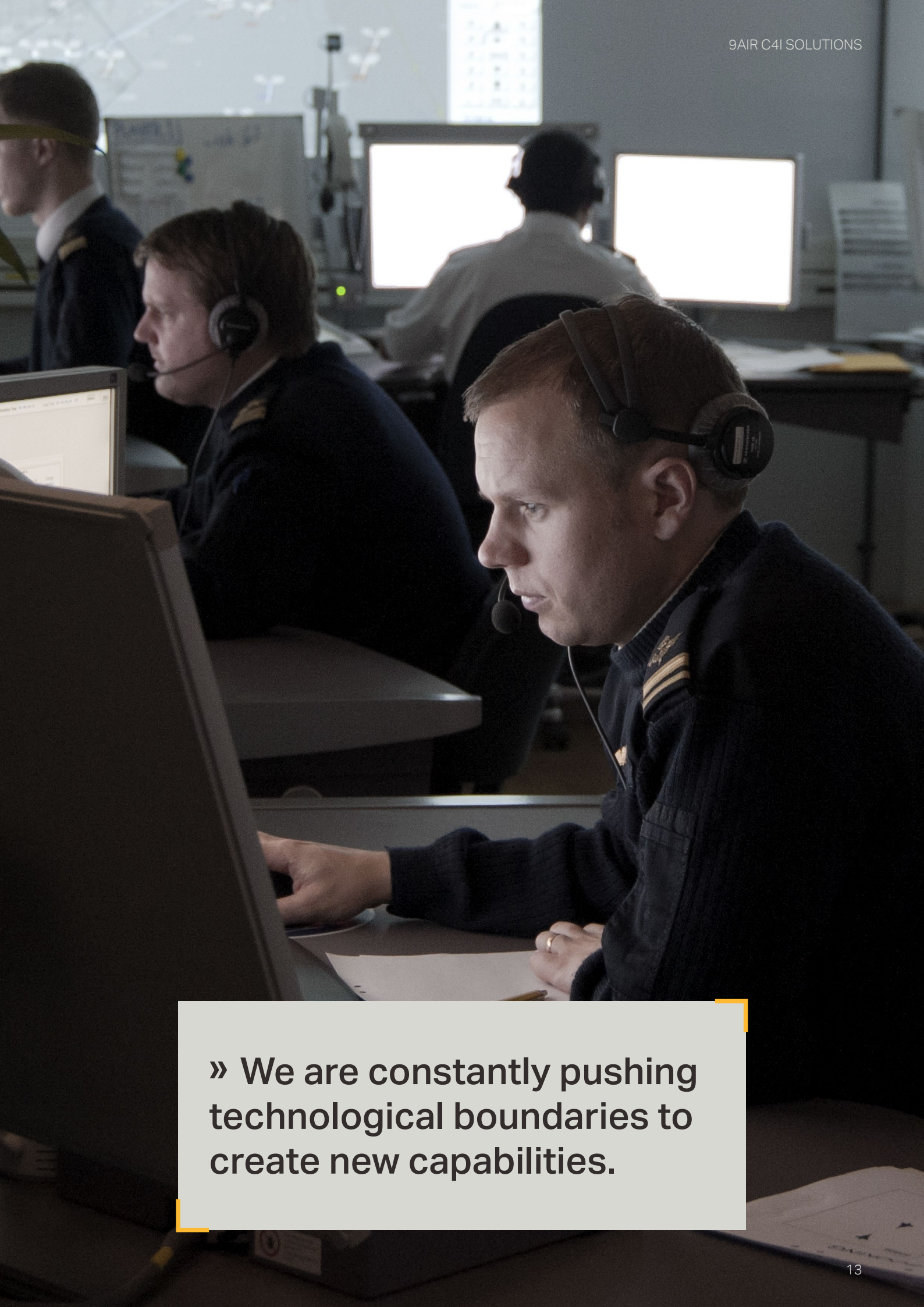
## Scalability

The 9AIR C4I 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 C4I is a flexible, modular combination of independent functions.





**» We are constantly pushing technological boundaries to create new capabilities.**



# Interoperability

9AIR C4I 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.

Saab's global experience includes handling a wide range of interoperable requirements, as required by the corresponding MIL-STD or STANAG, formatted messages as well as national and international Tactical Data Link standards.

## Interoperable standards, examples

- **MIL-STD or STANAG**
- **USMTF and ADatP-3 formatted messages**
- **Asterix**
- **ADEXP**
- **Chat (XMPP)**
- **VoIP (SIP, RTP, Ed.137)**
- **OGC Web services**
- **HLA**

The functionality of the 9AIR C4I will support any interoperable method of conducting weapons control.





# Secure communication

The 9AIR C4I utilises state-of-the-art TactiCall technology to provide secure and robust communications, black and red networks – internally and externally, voice as well as data.

TactiCall covers the entire communications spectrum, from ground telecom infrastructure over radio sites to integrated airborne communication and radio systems. It is a single operator point for voice communication, chat, video monitoring and equipment remote control.

The system comprises an intuitive user interface which provides a straightforward situational overview, facilitating swift operation and decision-making. It is robust and highly survivable, with no single point of failure.

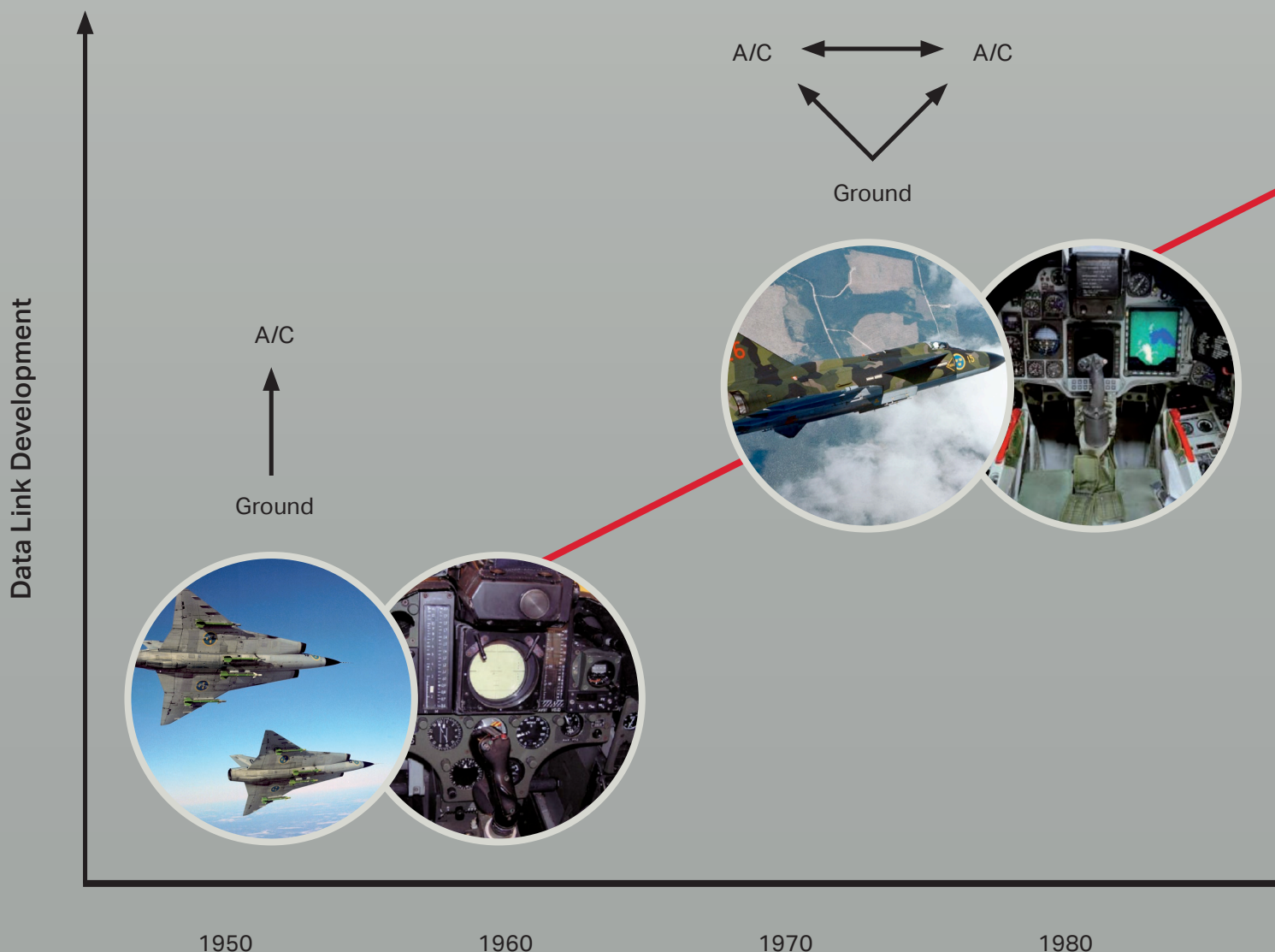


# Tactical Data Links

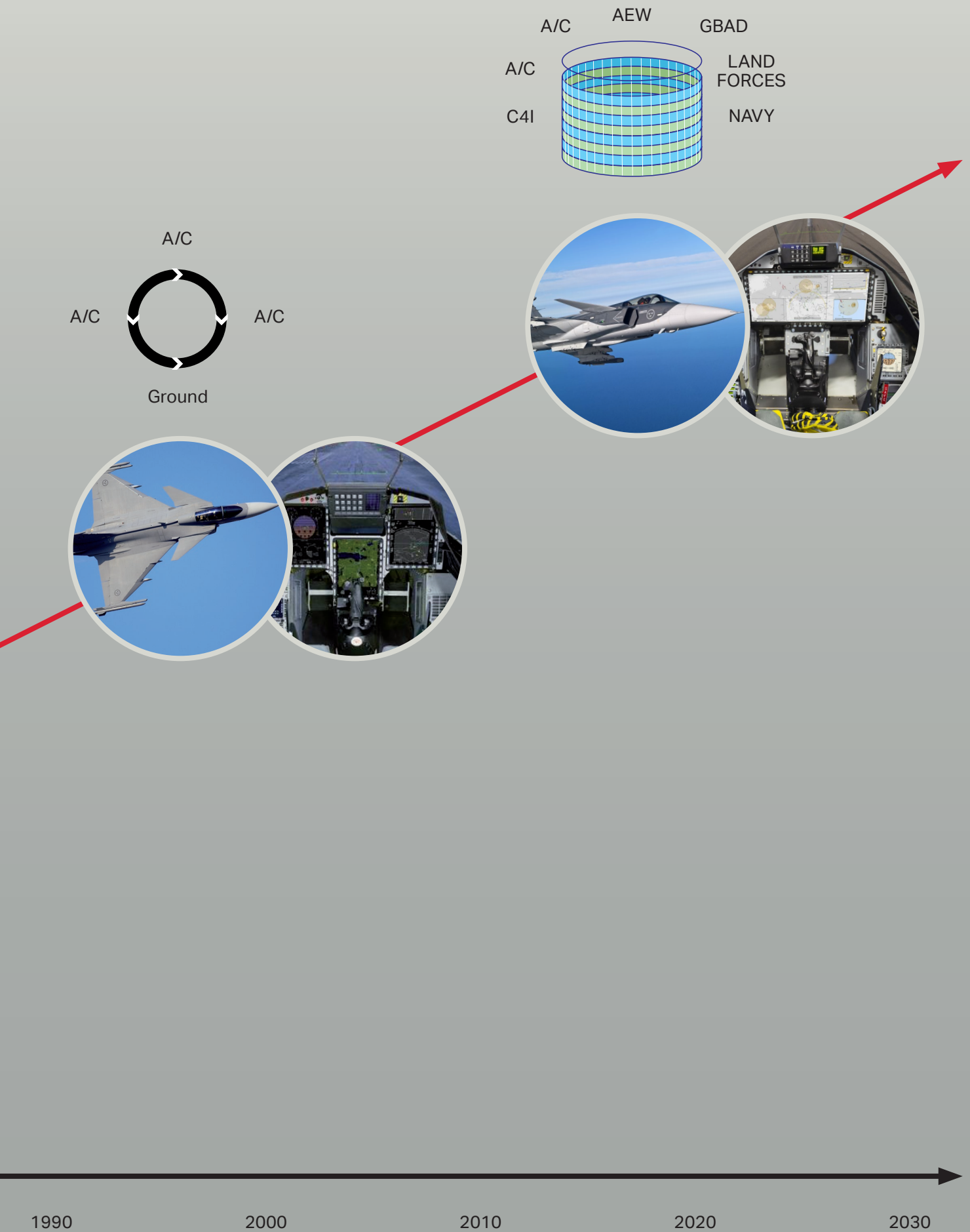
Saab has extensive experience adapting to customer defined tactical datalinks in different countries. Saab can also help customers to define the data content of a new national tactical datalink. In this case TRANSEC/COMSEC may be provided by the customer, otherwise commercially available solutions can be used.

Saab has provided National Tactical Data Links for the air domain under sovereign operational control since the 1960's. Our experience also extends to the integration of international interoperable Data Links, for example Link 11, Link 16, Link 22, JREAP.

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.







# 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.

Our baseline support program is an overall commitment with annual SW releases, monitoring of HW EOL and other services including:

- 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
- Back office support
- Your local 9AIR C4I 'super-user', backed up by Saab specialists

## 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 C4I is built using Open Architecture, enabling cost-efficient system evolution.

The lifecycle perspective supports your adoption of:

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



» Saab is well-known for long term customer commitments.





# 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 organizations around the globe to provide commanders with the right information at the right time.





# 9AIR C4I Technical data

## CAPACITY

- > 100 operators per site
- > 10 collaborating sites
- > 100 live sensor feeds
- > 10,000 simultaneous tracks in real time

## SENSOR INTERFACES

- ASTERIX Cat 001, 002, 007, 008, 015, 016, 019, 020, 021, 023, 034, 048, 062, 063, 065, 238, 240, 253
- CD-2
- PSR, SSR, Combined
- Multilateration (MLAT)
- IFF Mode 5 Level 1 and 2
- Derived weather information
- Raw radar video
- Passive emitter trackers (PET)
- ESM sensors
- Sensor management
- Directed SSR/IFF interrogation
- Track exchange

## COMMUNICATION

- VoIP telephony and voice chat groups
- Radio over IP Ed.137-1
- Link 11
- Link 16
- CESMO
- JREAP
- HLA

## MESSAGING

- ADatP-3
- USMTF
- ADEXP flight plans
- METAR, TAF

## OPERATING SYSTEM/HARDWARE

- PC x86 HW architecture
- Linux OS
- Virtualisation

## LAN TECHNOLOGY

- Fault tolerant Ethernet
- IP v4 and v6
- LAN virtualisation

## GIS FORMATS SUPPORTED

- OGC GeoPackage
- ESRI ShapeFiles
- ESRI FileGDB
- MapInfo TAB
- GeoJSON
- S-57
- GEOTIFF
- DTED
- FlatGeobuf
- ...and all other formats that are open and documented.



# Track record

Since its foundation, the 9AIR C4I family has entered operational service with customers and installations in over 10 countries around the world. With a programme of continuous improvements and upgrades, new 9AIR C4I customers benefit from over 70 years of experience, development and innovation.



9AIR C4I • > 10 countries



- > 70 years experience



You can rely on Saab's thinking edge to deliver innovative, effective products and solutions that enhance your capabilities and deliver smarter outcomes.



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