Resilient Air Power
The Gripen Equation

Jussi ’Miyagi’ Halmetoja

SAAB

Jussi ’Miyagi’ Halmetoja

Professional experience:

• Fighter Pilot – Viggen	1995 - 2005
• Fighter Weapons Instructor - Gripen OT&E	2005 - 2007
• Gripen Test Pilot – FMV, Swedish Defense Material Admin	2007 - 2013
• Op Requirements Manager - Meteor IJPO	2013 - 2017
• Gripen E Requirements & Head of AAM Programmes – FMV	2017 - 2019
• Operations Advisor – Air Domain – Saab Aeronautics	2019 –

Operational experience:

- 2300 hrs+ in-command, including 20+ aircraft types
- Tac exp on Viggen, Gripen… F-16, F-18, Rafale, EF-2000…

SAAB

Mission: Deliver Resilient Air Power!

State of Global Air Power?

- Collectively we have fewer combat aircraft
- Too many fighters are inflexible, not truly multi-role, and not well suited to 24/7 operations
- Too many fighters are increasingly costly to operate and support

- Too many fighters are vendor-locked
- Too many fighters are not futureproof
- …who controls your data?

Operational Environment

Operational Environment

Gripen E
Create your Advantage

Human Machine Collaboration
- Predictive intelligence for advanced decision support
- Fully-fused data from onboard and offboard
- Fully digital cockpit with unrestricted displays
- Auto Ground Collision Avoidance System

Tactical adaptability
- Modular avionics with separated architecture
- Rapid upgrades for software & hardware

Electronic Warfare
- Spherical coverage, multi-aperture, active/passive
- Multi-band, multi-directional Electronic Attack
- Gallium Nitride technology
- Hundreds of active/passive countermeasures

Decisive Information Advantage
- Fully networked sensor fusion
- AESA radar: Raven ES-05
- IRST: Skyward-G
- IFF: Mode 5
- GPS-denied positioning and navigation
- Link-16 and national datalinks

Sustained Combat Operations
- High availability
- Easy maintainability
- Low logistics footprint

Weapons
- 10 stores hardpoints
- Network-enabled weapons
- Multiple pods and other stores
- Rapid integration, supplier agnostic

Performance
- Agile flight characteristics
- Optimised RCS
- Rugged design for extreme climates
- Road base and austere deployment
- Very rapid turn-around

SAAB

Gripen E

Create your Advantage

Availability

Adaptability

Survivability

Lethality

Flexibility

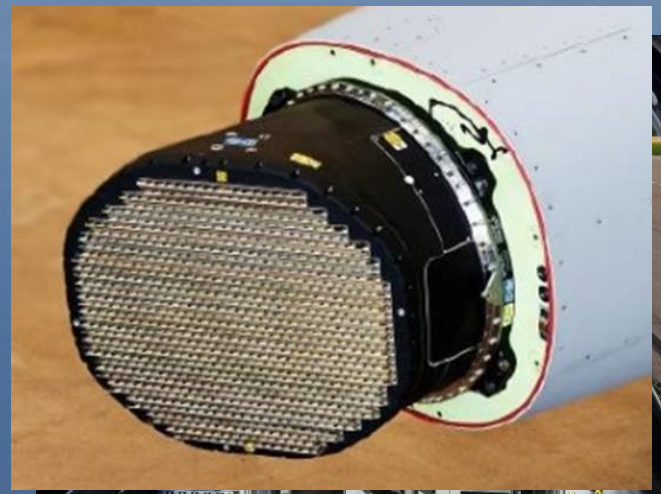
Training

Affordability

SAAB

Gripen E

Create your Advantage



multi-aperture, active/passive
ectional Electronic Attack
nology
passive countermeasures

Human Machine Collaboration

- Predictive intelligence for advanced decision support
- Fully-fused data from onboard and offboard
- Fully digital cockpit with unrestricted displays
- Auto Ground Collision Avoidance System

Decisive Information Advantage

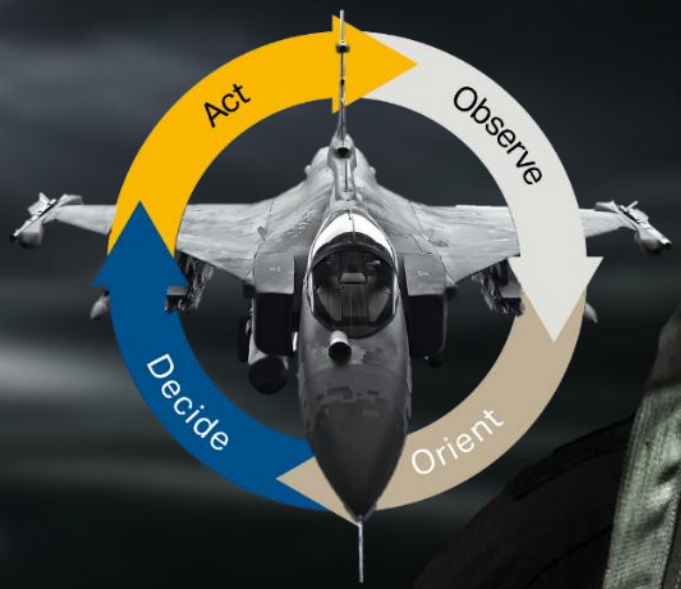
- Fully networked sensor fusion
- AESA radar: Raven ES-05
- IRST: Skyward-G
- IFF: Mode 5
- GPS-denied positioning and navigation
- Link-16 and national datalinks

SAAB

A New Way To Fight

New Human Machine Collaboration enables superior tactics & reduced workload.

To act before the opponent. To win!



The pilot assigns high-level tasks, Gripen optimizes the use of sensors

Perception

- What info is important now?

Comprehension

- What does it mean for the mission right now?

Projection

- What does it mean for the mission in near future?

Decision Support

- What is the best action for success?

SAAB

Transforming
The Way to Fight

Cockpit Evolution

Cockpit Evolution

GRIPEN E/F

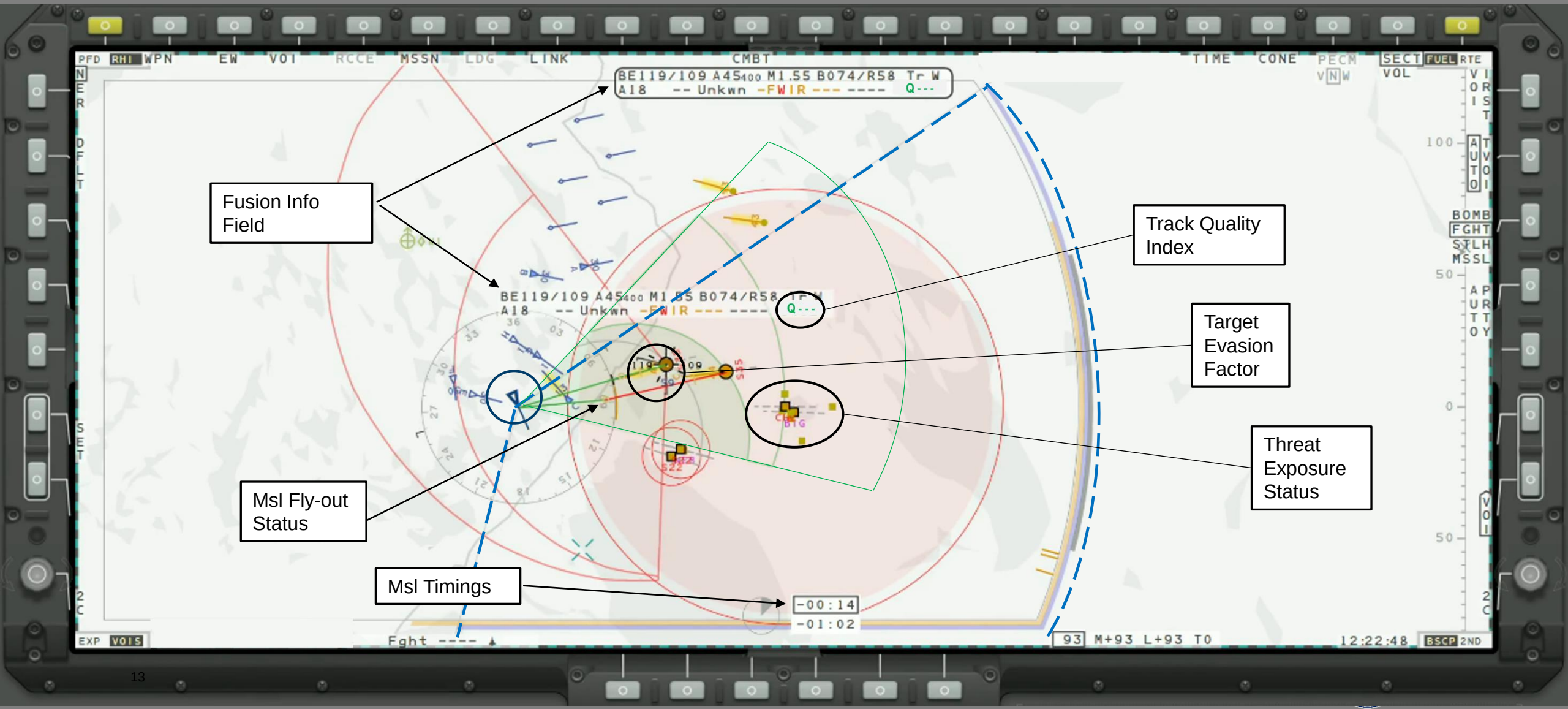
EUROFIGHTER

RAFALE

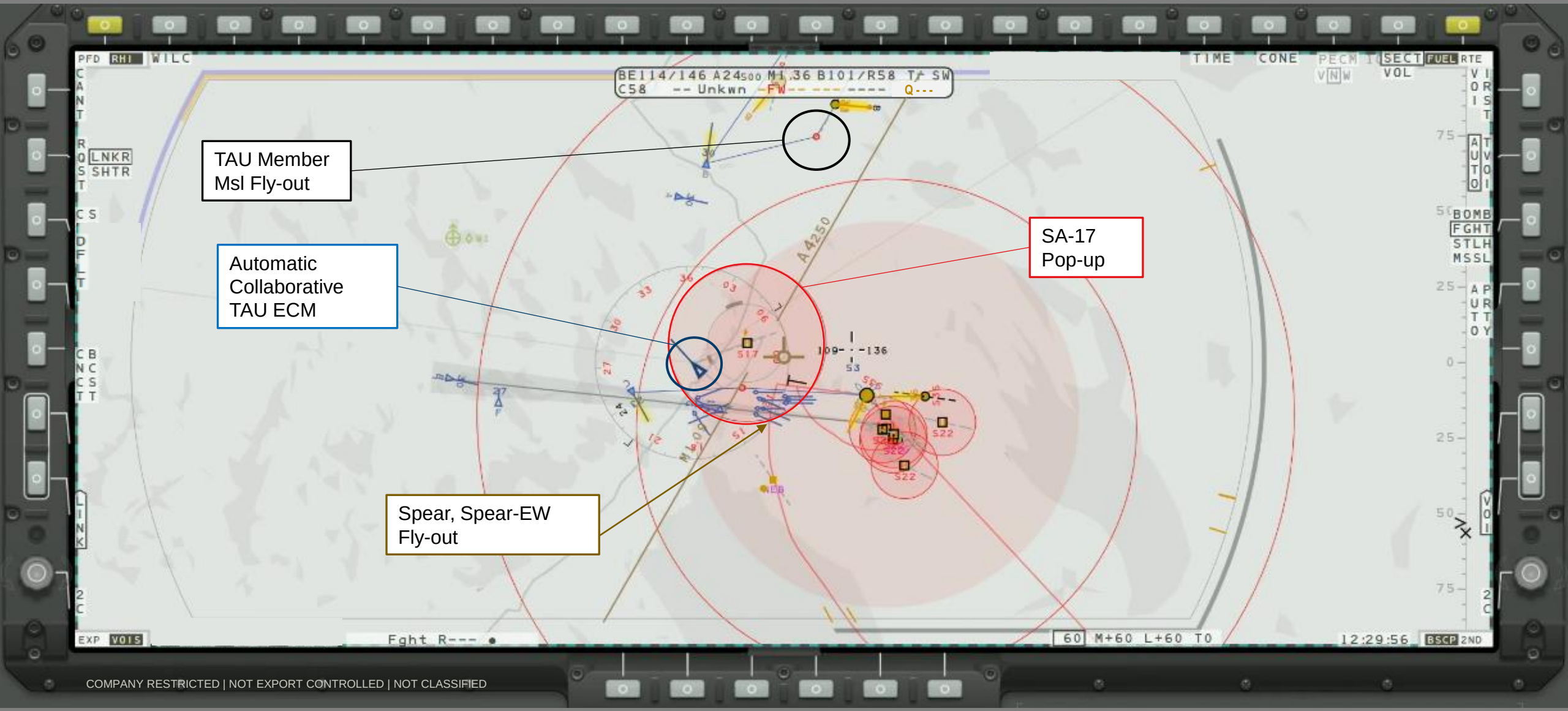
F-16

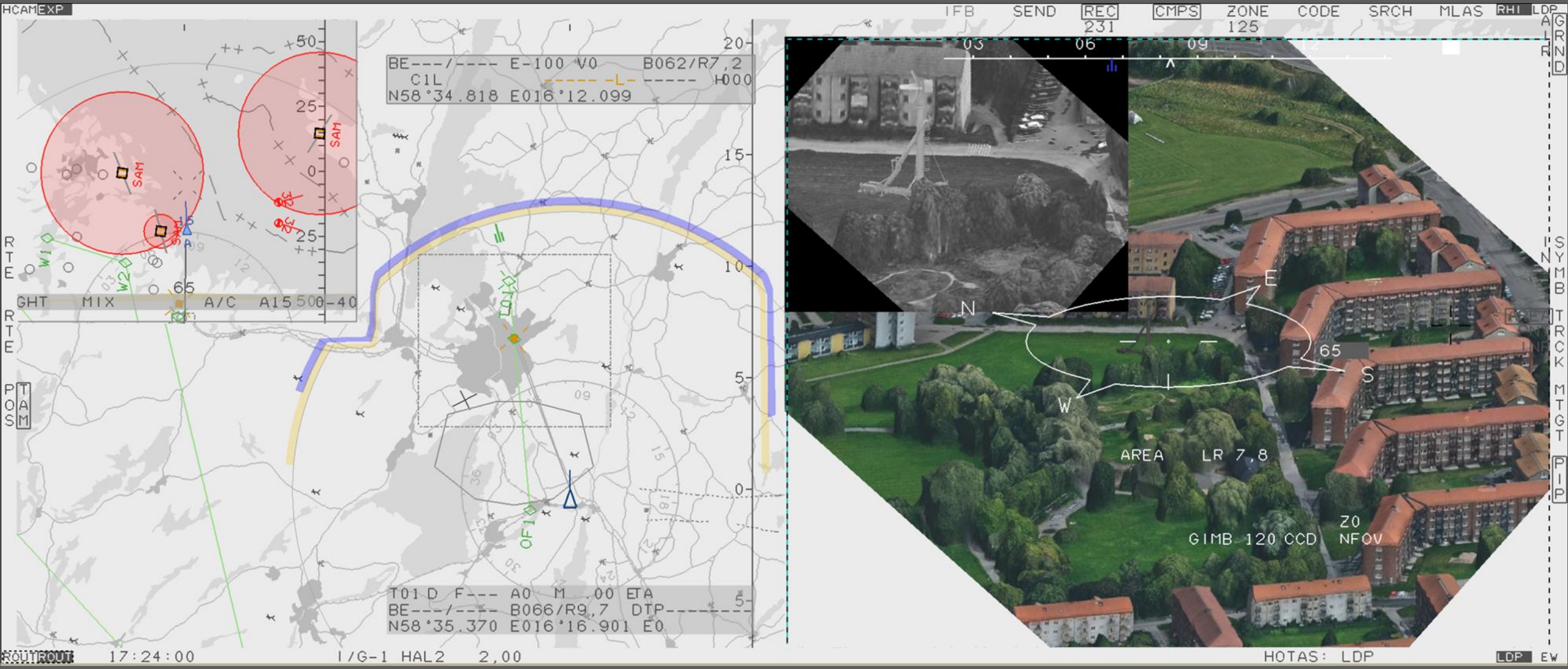
F-35

Gripen E
Wide Area Display



…+8 minutes into the mission…




HCAM EXP
IFB
SEND
REC
231
CMPS
ZONE
125
CODE
SRCH
MLAS
RHI
LDP
BE---/---- E-100 V0 B062/R7,2
C1L
N58°34.818 E016°12.099
GHT MIX A/C A15 500-40
T01 D F--- A0 M .00 ETA
BE---/---- B066/R9,7 DTP--------
N58°35.370 E016°16.901 E0
17:24:00
I/G-1 HAL2 2,00
HOTAS: LDP
LDP
EW
AREA LR 7,8
GIMB 120 CCD
Z0
NFOV
N
E
S
W
65

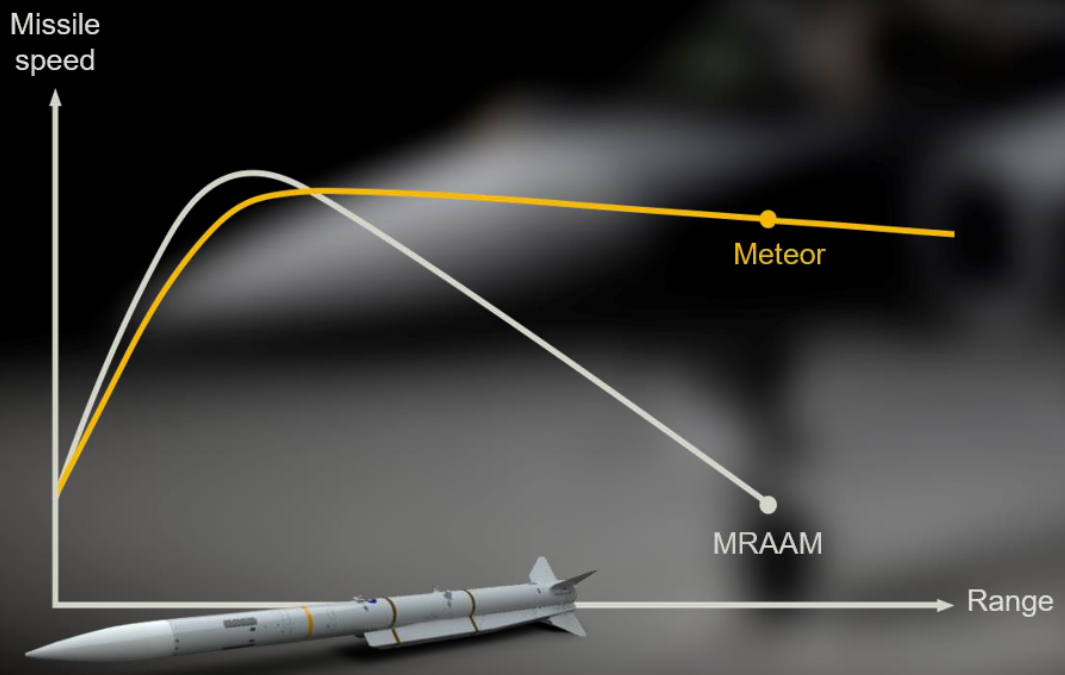
Lethality
Complex Missions

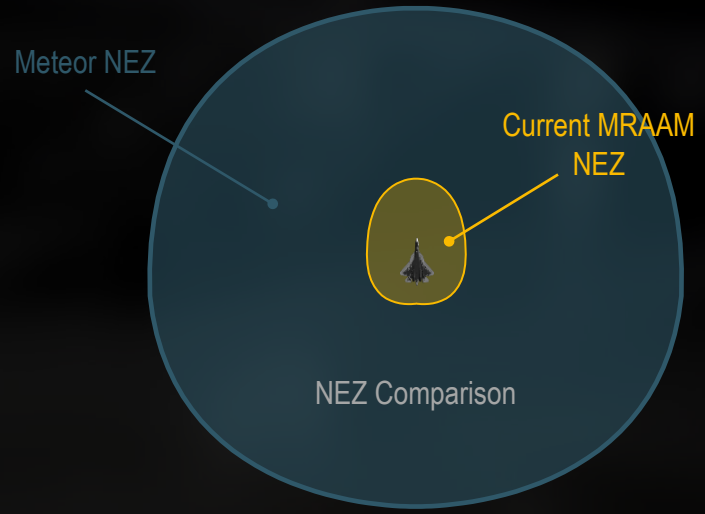
SAAB

Weapon of Choice

Superiority of Meteor

- Very high P-Kill provided by excellent endgame kinematics
- High energy shots throughout the fight
- For a No-Escape-Zone (NEZ) engagement Meteor kinematic range is:
  - **3 times greater** than current MRAAM in head-on engagement
  - **5-6 times greater** in the rear sector





Complex A-G
SPEAR

- Medium range complex missions
- Enables SEAD/DEAD capability
- Networked for flexibility
- Multimode seeker using ATR
- Fixed and moving targets
- SPEAR-EW variant for stand-in jamming

SAAB

Anti-Surface Warfare
RBS-15 Mk4 Air

- Extensive stand-off; >300km
- Kinetic defeat of all vessel types
- Improved survivability & ECCM
- Low life cycle cost
- Future growth potential

SAAB

Survivability
Any Threat Anywhere

SAAB

More than 50 years of experience from EW development

Spiral development

J32E Lansen

Jammer Pod

37 Viggen

RWR & CMDS, U22 & U95 Jammer Pods

Gripen A/B

VMS 39 RWR & CMDS

Tornado

Tornado RWR & CMDS

Gripen C/D

EWCS RWR, ECM & CMDS

Eurofighter Typhoon

Arexis – RWR/ESM, ECM & CMDS

Gripen E/F

Arexis – RWR/ESM, ECM & CMDS

1960 1980 2000 2020 2030

SAAB TECHNOLOGIES SAAB

State-of-the-Art
Electronic Warfare

Spherical Electronic Protection

- RWR, Missile Approach Warning System (MAW) and internal jammer
- Active Electronic Countermeasures
- Very high volume of chaff, hot chaff, flares and active decoys [Britecloud]

Efficient Electronic Support Measures

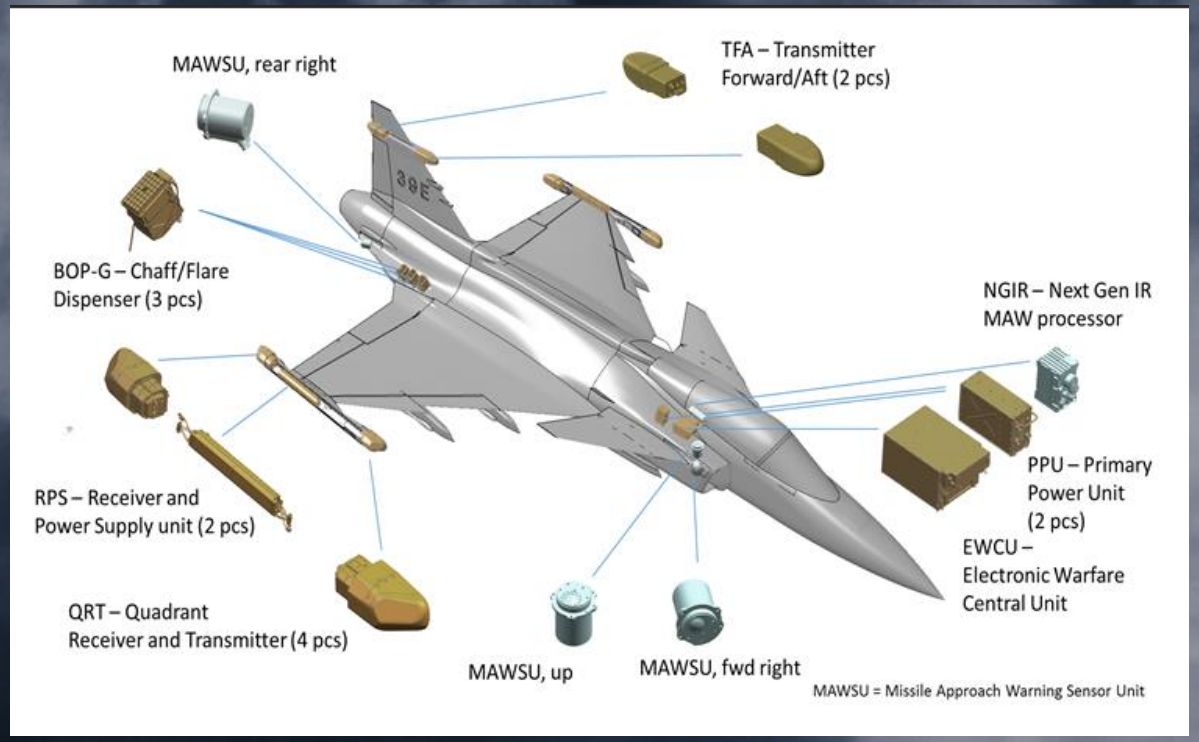
- Situational Awareness by passive sensors
- SIGINT / ELINT

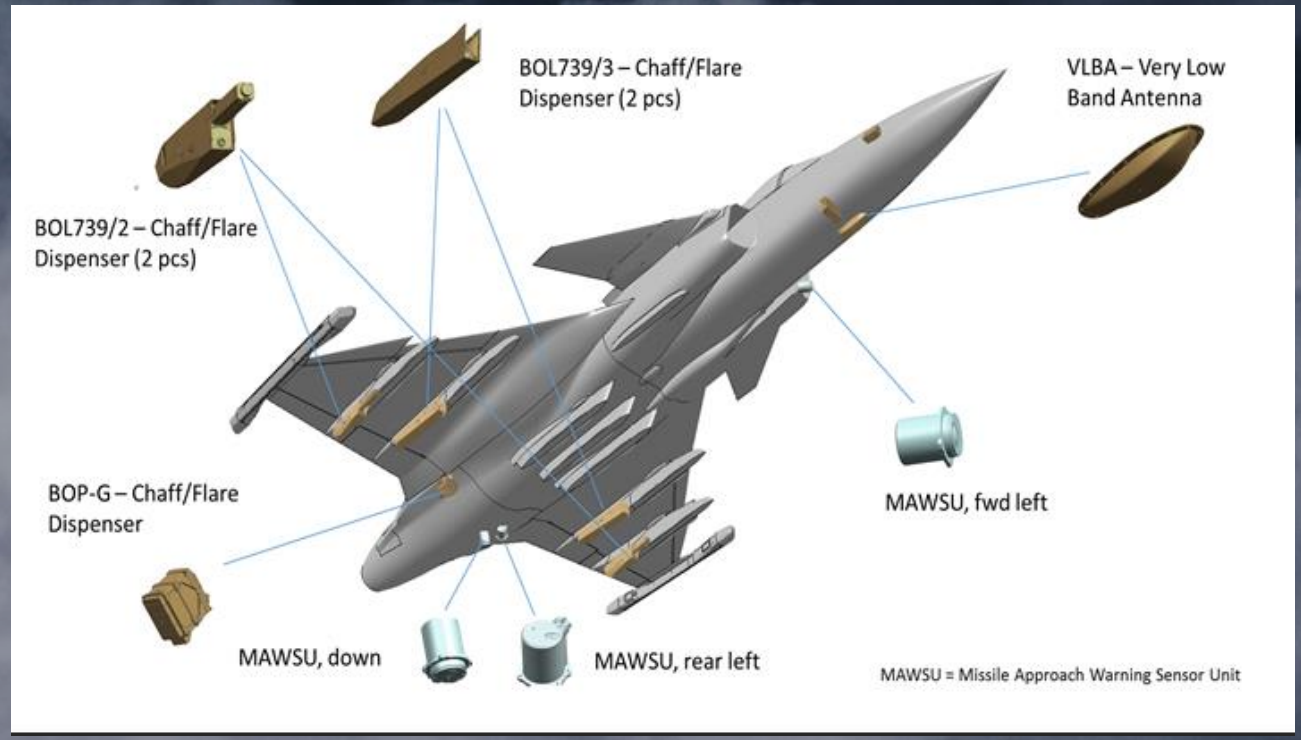
Powerful Electronic Attack

- Electronic Attack with on-board EW
- SEAD without specialised platforms

SAAB

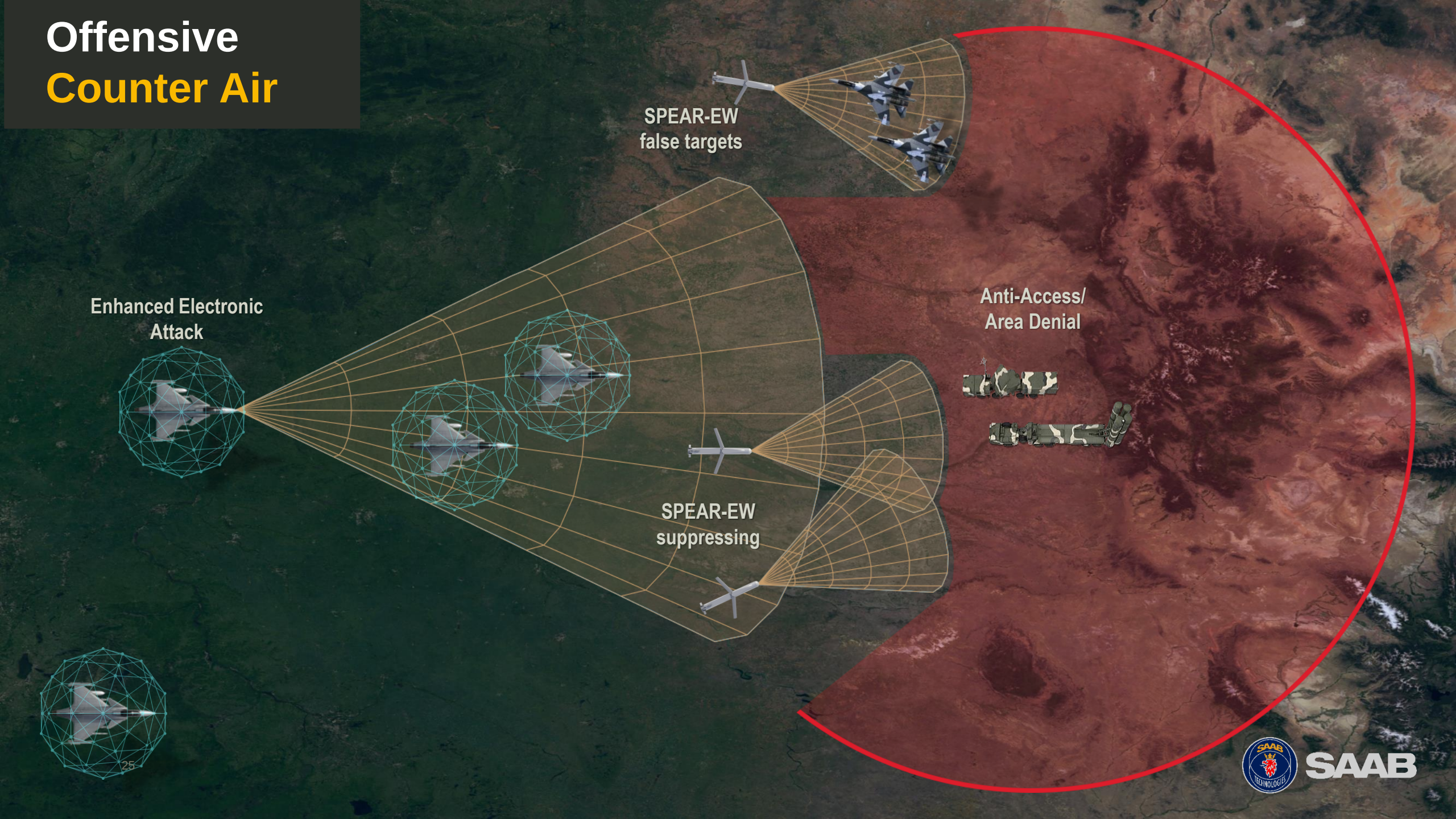
Electronic Warfare Suite





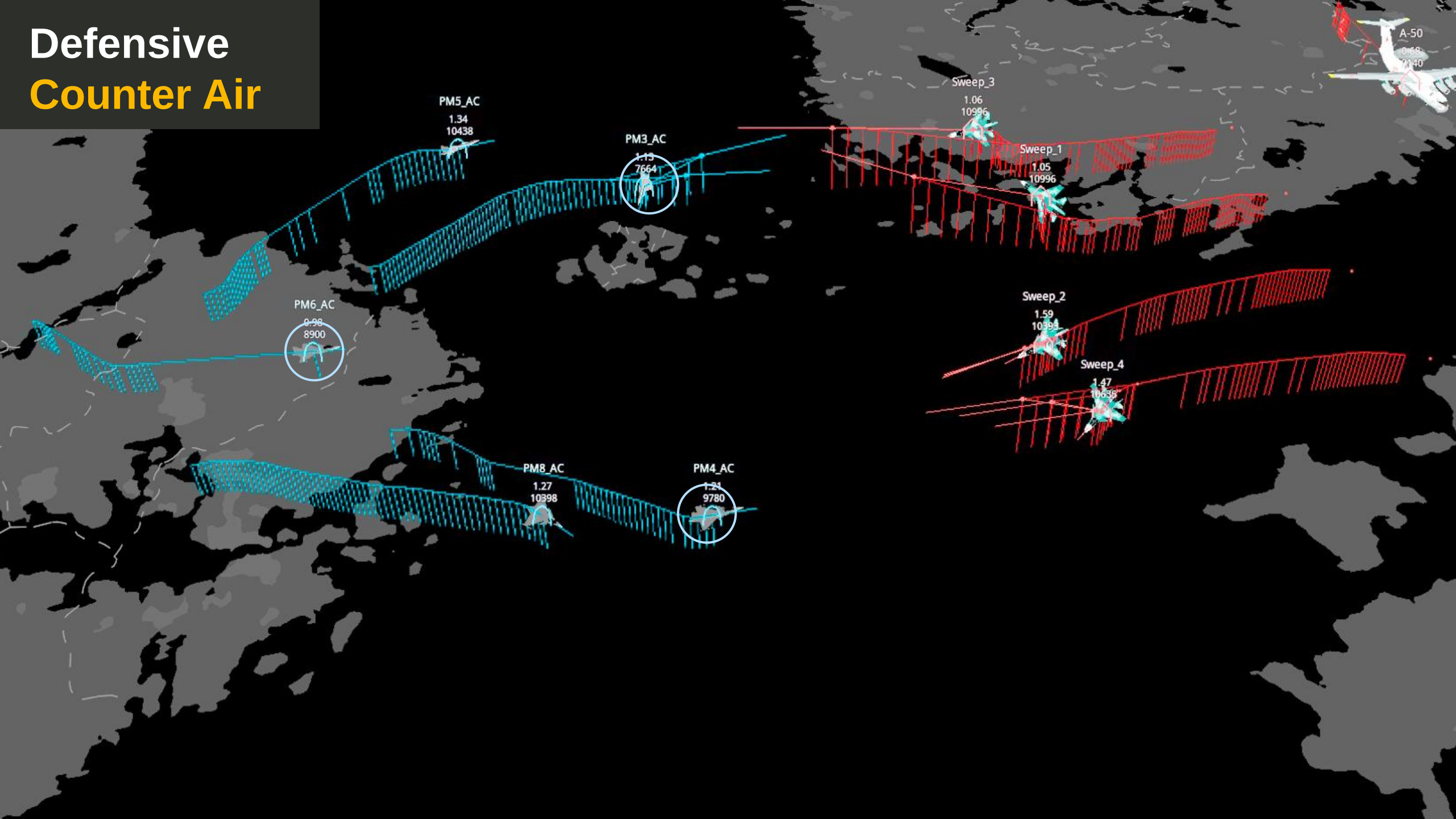
SAAB TECHNOLOGIES SAAB

Offensive
Counter Air



SAAB TECHNOLOGIES SAAB

Defensive
Counter Air




A-50
PM5_AC
10493
PM3_AC
3178
Sweep_3
1.06
11004
Sweep_1
1.05
11000
PM6_AC
1.00
10152
Sweep_2
1.59
10378
Sweep_4
1.47
1057
PM4_AC
1.27
3400
PM8_AC
1.27
1089

Flexibility

Any Mission Anywhere

SAAB TECHNOLOGIES
SAAB

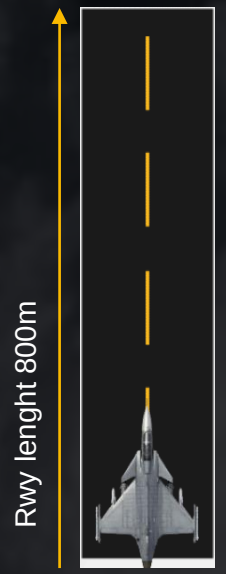

54
VOLVO
258


130275
västtrafik


230
276

Credits: Photo By Tim Jansson

Be
Unrestricted



Designed for Dispersed Operations

- No complex infrastructures needed
- No complex support systems
- Self sufficient - APU
- FOD resistant
- Turnaround within 15 minutes

Rwy lenght 1300m

GPS-Denied Navigation

To further strengthen the GPS independence and the jamming resistance, Saab has included an extended navigation capability for GPS-jammed environment.

Provides operational flexibility
Navigation and target data accuracy remains also when the GPS is jammed, spoofed or un-available

A ”disruptive” capability
Three independent technologies work automatically in the background. No additional pilot workload.

- **Terrain navigation**
  Comparing measured height profile from radar altimeter with a terrain database in the aircraft
- **Odometry navigation**
  Estimating velocity and relative displacement by feature and pixel tracking in images collected from on-board optical sensors
- **Image map navigation**
  Comparing images from on-board optical sensors with an on-board image map database

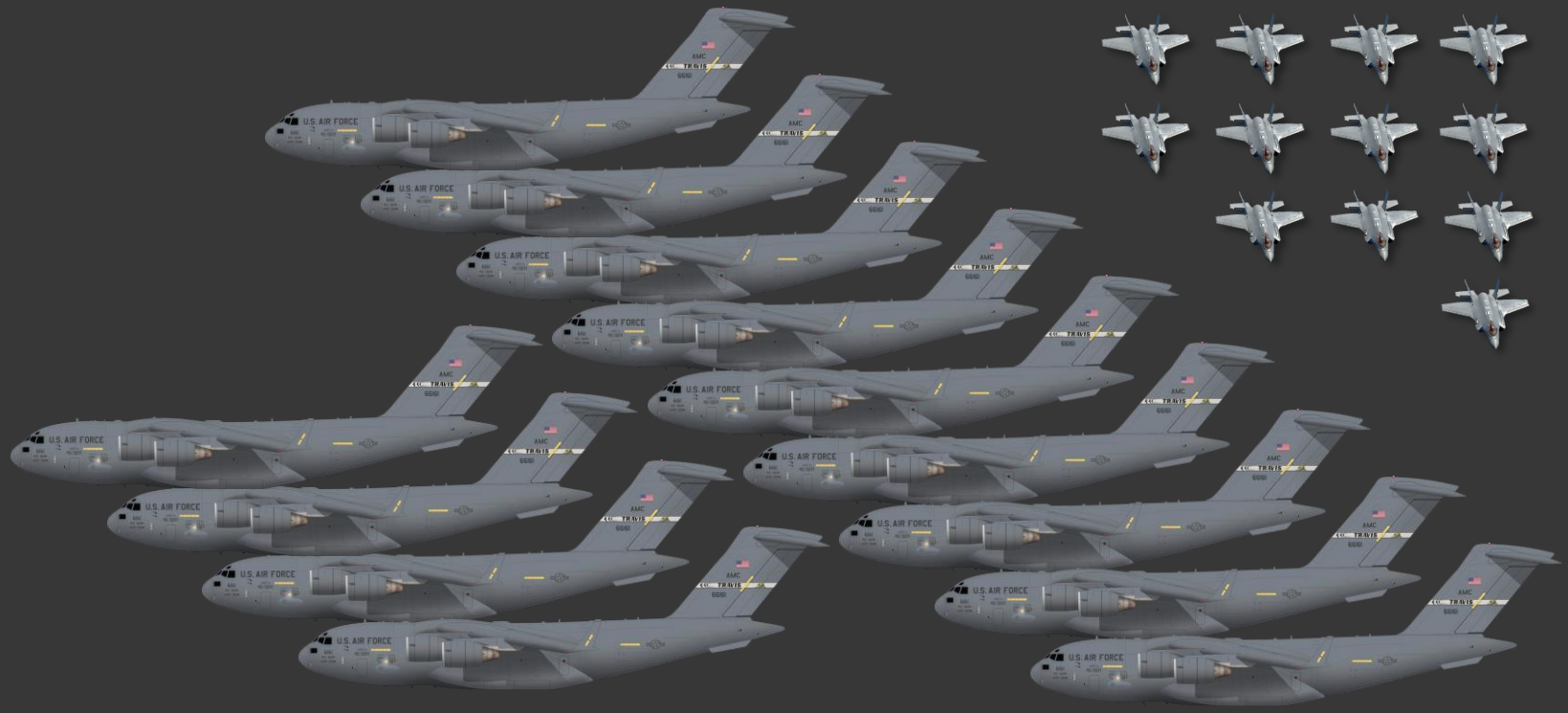
SAAB

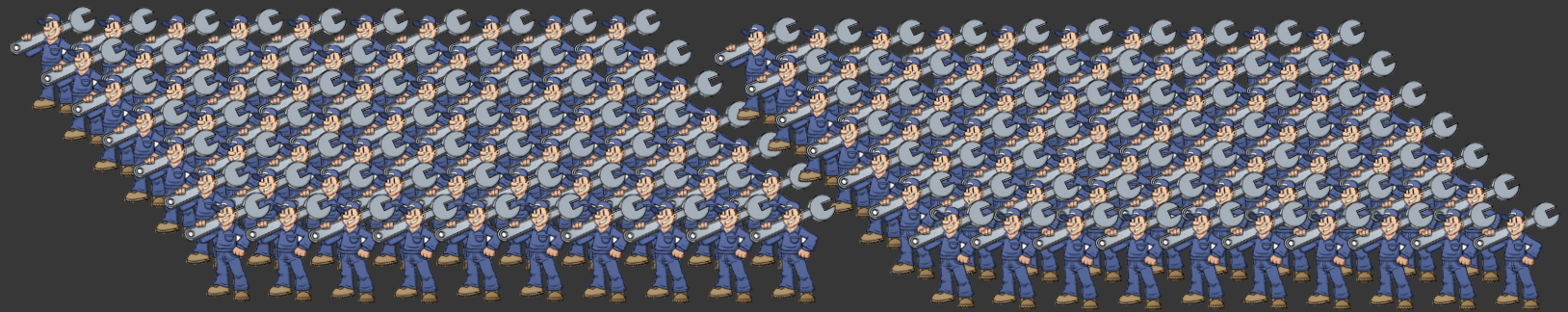
Air Power @RealAirPower1 · 12h

While everyone else is playing touch-and-go camping ⛺ this one has been living in the forest for ages 😉 A pair of rugged JAS-39s, armed with RBS-15 ASMs, patrolling a Swedish highway. #avgeeks #aviation #aviationdaily #aviationlovers #Sweden

"The ability to disperse aircraft is a specialty of theirs. Sweden has got agile combat employment (ACE) down better than any other air force in the world, and we are going to exploit that."
USAFE Commander
General James Hecker, August 2022

Support required - F-35 Vs Gripen





GAO-23-105341

DSA DG/SI/06/21

Example of Mission Availability

211. TAKTICKÁ LETKA

VAE VICTIS

CZE in Baltic Air Policing 2022

Mission Statistics – CZE AF 2022

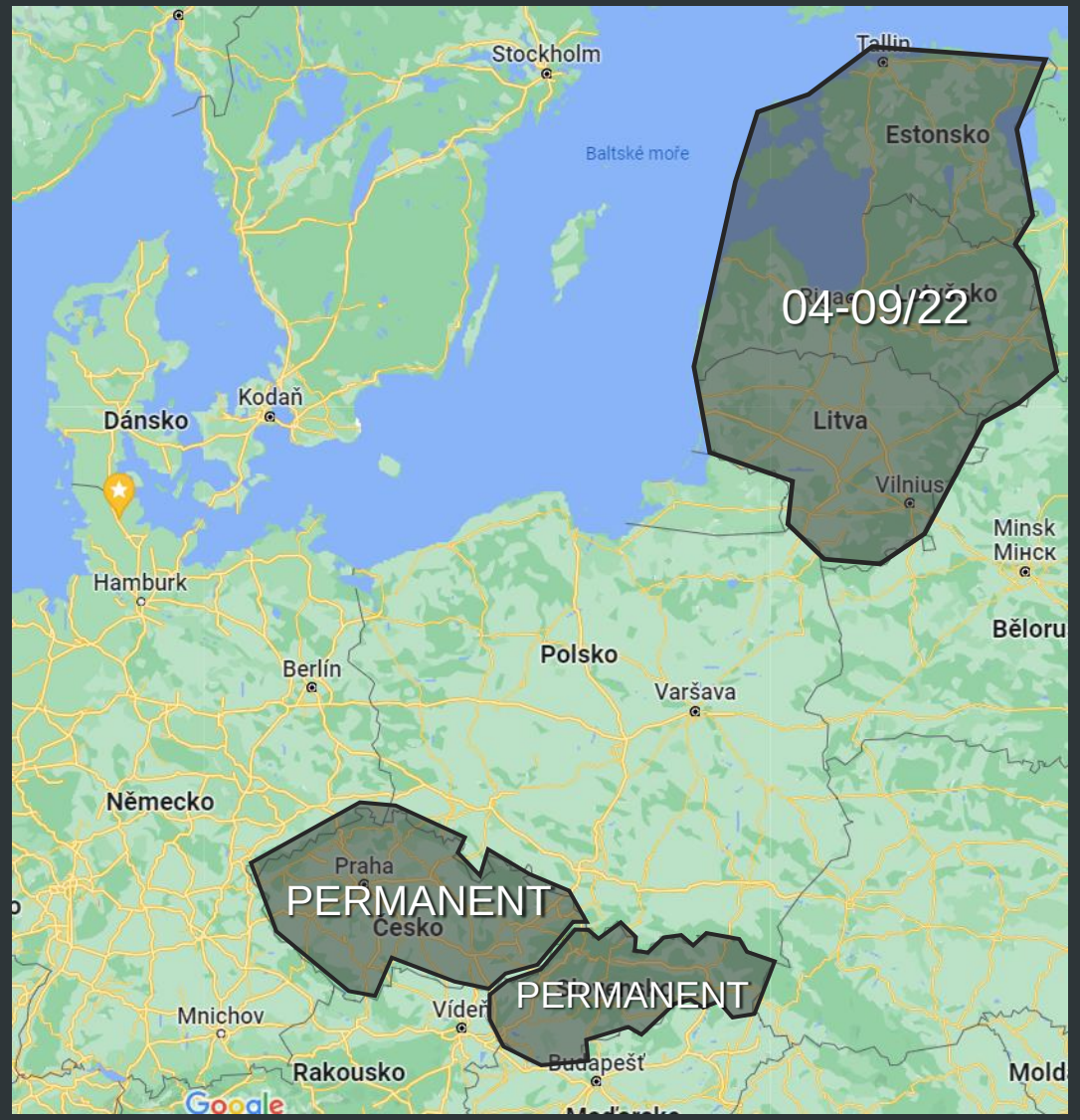
NATO Air Policing over the Baltics

April –> July –> Sept 2022

5x Gripen C aircraft

7x pilots / 35x Ground crew per rotation

Overall a/c availability of ~93%



- Simultaneous national operations
  - Air Policing 24/7, Czech and Slovak Territory
  - Training flights
- Total Gripen fleet size of 12 aircraft

Adaptability

Ready to fight, always

SAAB

Distributed Modular Avionics

No existing fighter of today
Is matching the Gripen E Avionics platform

“To separate software applications from hardware in avionics is extremely hard”

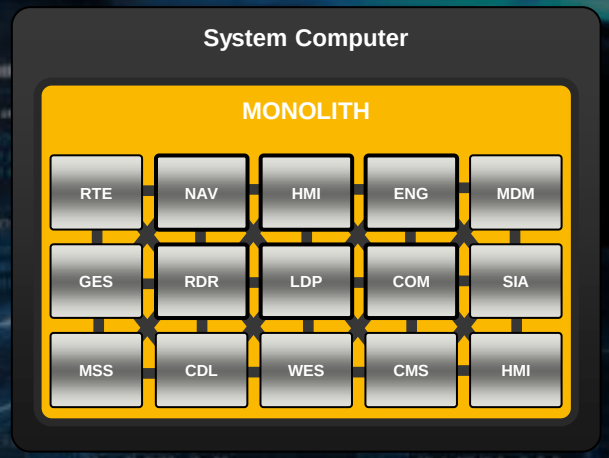
“We were naively brave”

SAAB TECHNOLOGIES
SAAB

Be Ahead

Federated

Integrated



Integrated Modular

1960s

2020s

SAAB

Be Relevant

The key to modern warfare is rapid adaptability - maintaining technological superiority where you are in control.

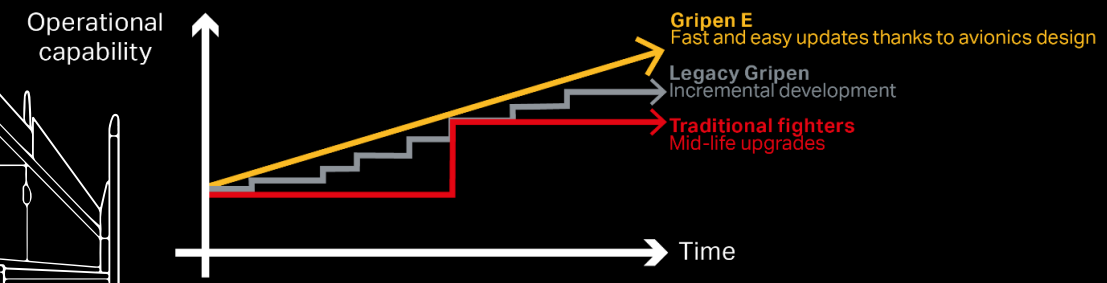
It is essential to be able to rapidly, accurately and safely modify any element of the core tactical mission system as the tactical situation evolves in front of you.

No delays
No doubts
No gaps in capability

Days

Weeks

- Game-changing avionics system design
  - All mission functions separated from flight-critical software
- Adapt to new needs with software applications
  - Do it faster, better and more affordable
- Independent and sovereign control of the entire upgrade process
- Continuous capability growth
  – No mid-life upgrade interruptions



SAAB

To Summarize

SAAB TECHNOLOGIES
SAAB

Mission: Deliver Resilient Air Power!

State of Global Air Power?

- Collectively we have fewer combat aircraft
- Too many fighters are inflexible, not truly multi-role, and not well suited to 24/7 operations
- Too many fighters are increasingly costly to operate and support

- Too many fighters are vendor-locked
- Too many fighters are not futureproof
- …who controls your data?

The Air Power Equation

Tailored war fighting capability

- High-end systems and sensors
- Multiple networking options
- Widest range of weapons
- Flexible, truly multirole, built for 24/7 ops

Designed for resilience

- Well managed route to affordability
- Control in the hands of operators, not OEMs
- Combat mass for your Nation and allies

The most robust and capable fighter in service today!

SAAB


Questions?
31
SAAB
SAAB
TECHNOLOGIES