Aeronautical R&D at Saab and within the Swedish ecosystem –

Challenges and possibilities

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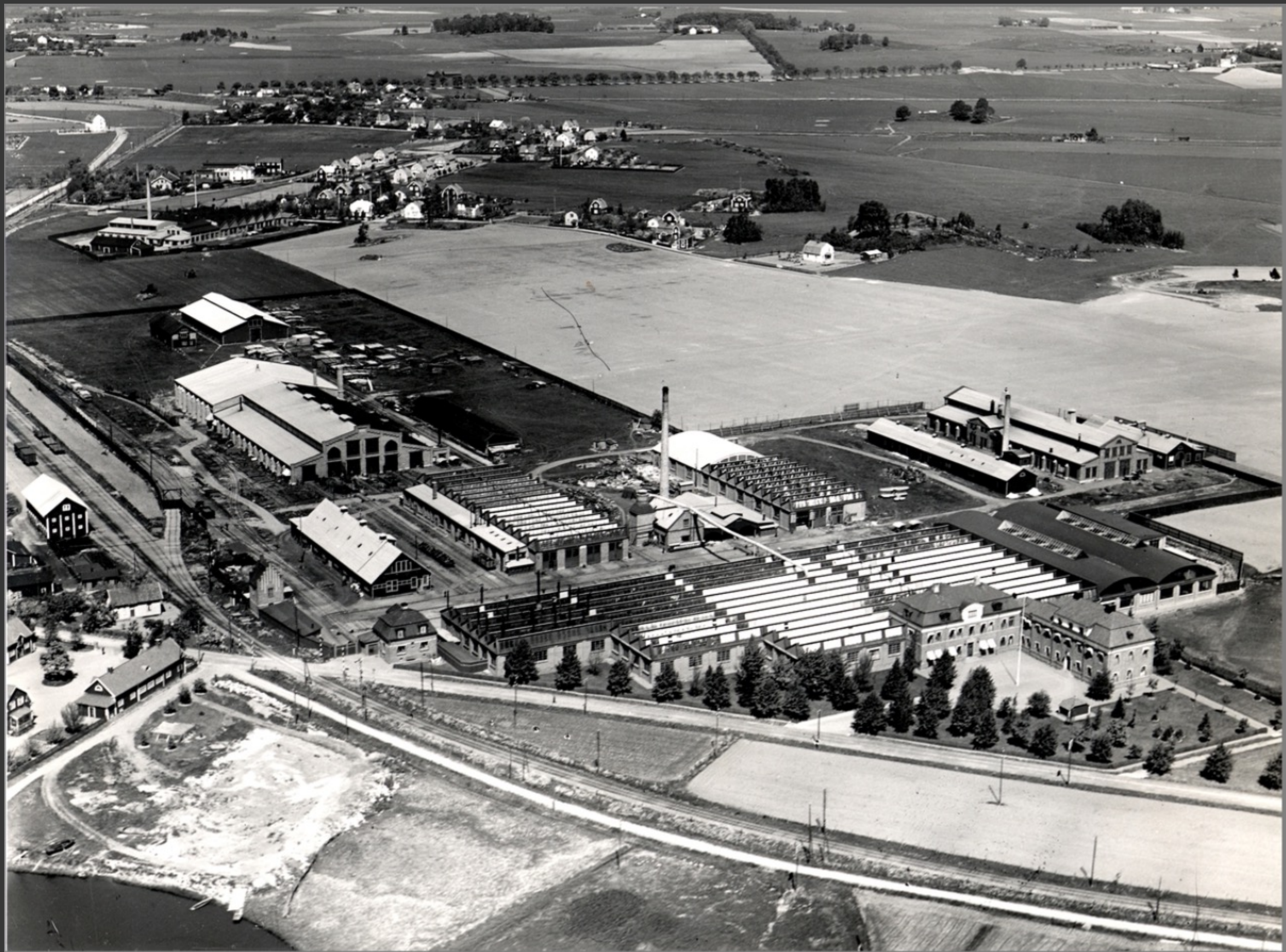
CTO, Aeronautics

Over 400 years of history

As a small country, we were prompted to arm ourselves with good and cost-effective equipment.

- Our history goes back to the 1600s, when Sweden was one of Europe's major powers.
- Svenska Aero AB was founded in 1937 to support the Swedish armed forces with fighters.
- A broader base of knowledge, innovative thinking and expertise has been added through acquisitions.
- Saab created the Swedish computer, missile and space industries during the journey.



- AB Svenska Järnvägsverkstädernas Aeroplanavdelning (ASJA)
- ~1930

- Centrala Flygverkstaden Malmslätt, (CFM)
- ~1930

SAAB

- Nohab Flygmotorfabrik AB - 1930
- License manufacturing of Bristol Jupiter in Trollhättan


SAAB
TECHNOLOGIES
SAAB
FÖRSVARSMAKTEN
LINKÖPINGS UNIVERSITET
FMV
LINKÖPING SCIENCE PARK
FOI
SAAB

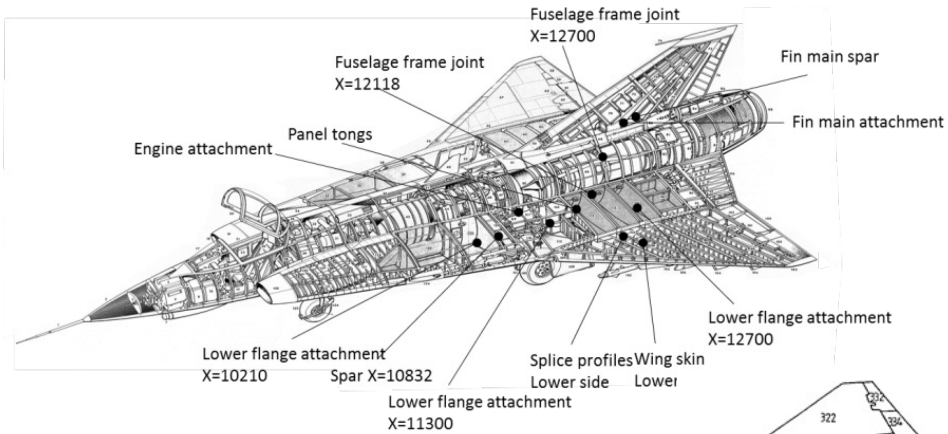
Parts of our important history

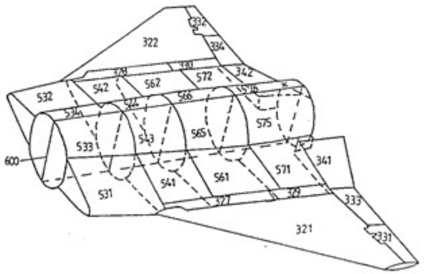
- 1947 the Swedish government sent 5 scholars to the US to learn how to design computers
  - Göran Kjellberg, b 1920
  - Erik Stemme b 1921
  - Carl-Erik Fröberg b 1918
  - Gösta Neovius b 1921
  - Nils Arne Lindberger b 1923
- 1955 - the first Swedish made computer BESK (Binär Elektronisk SekvensKalkylator) was introduced

Från vänster Ingeborg Hilding, gift med en matematiker vid Princeton, Anne-Marie Neovius, gift med Gösta Neovius, Carl-Erik Fröberg, Gösta Neovius och Göran Kjellberg. Foto: Edy Velander.

DIGITALIZATION – AIRCRAFT DESIGN

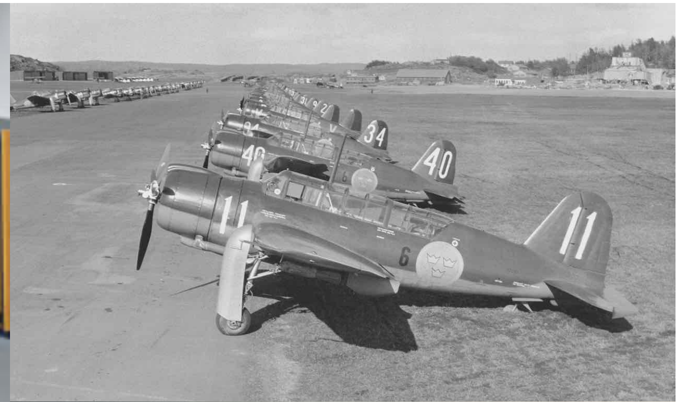
- Introduced in mid 1950
- Load distribution – J35 Draken





SARA – ”Saab Automatic Calculation Apparatus”






A 400-year legacy of defence and security




Saab strategic university partners in Sweden

Swedish Defence University

AVANCEZ 1829 CHALMERS UNIVERSITY OF TECHNOLOGY

LiU LINKÖPING UNIVERSITY

LUND UNIVERSITY

ÖREBRO UNIVERSITET

KTH VETENSKAP OCH KONST

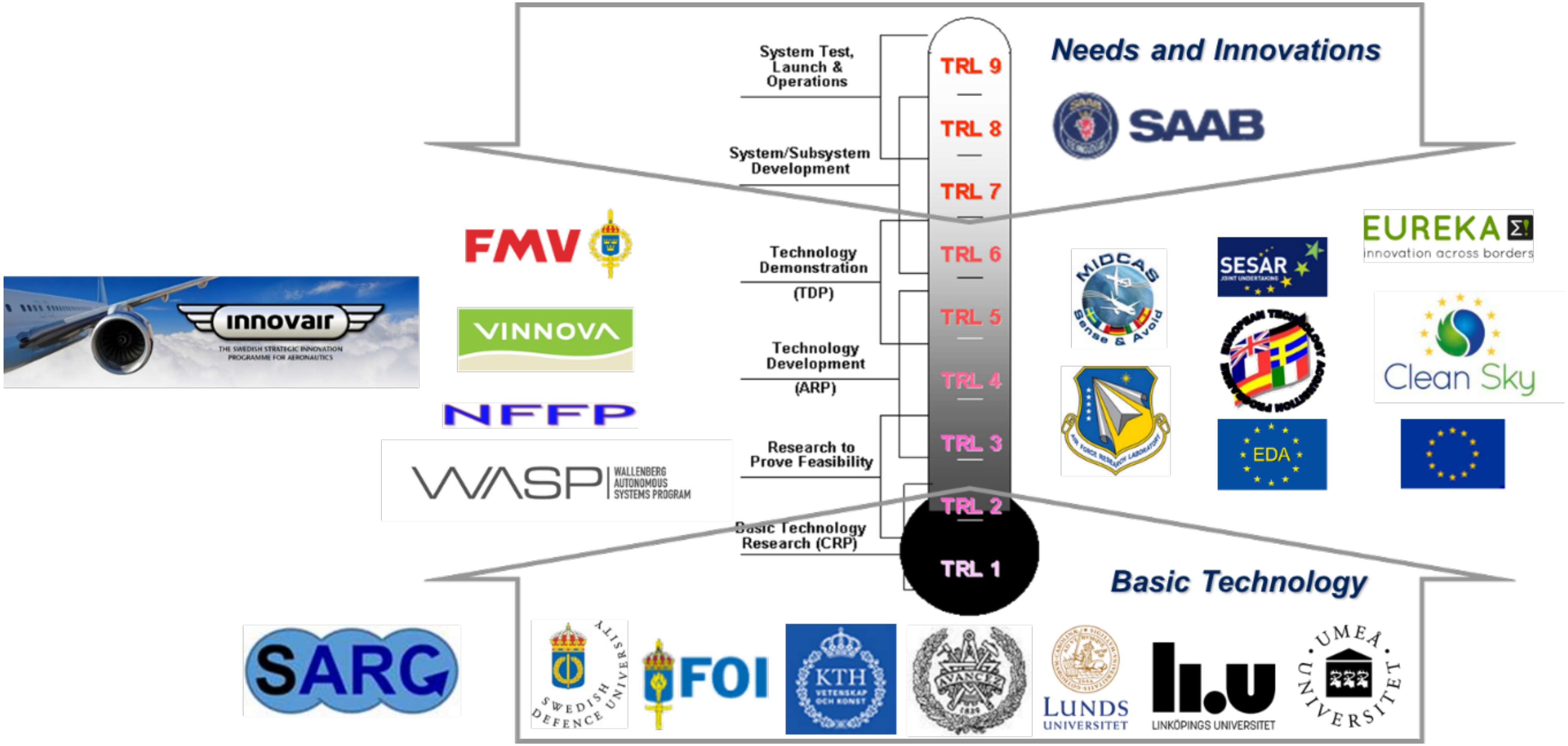
Major topics to be addressed in 10-20 years

- Autonomy
- Information Technology & Cyber security
- Communication
- Quantum technologies
- Green technologies
- Human-performance enhancement
- Materials and manufacturing
- …etc

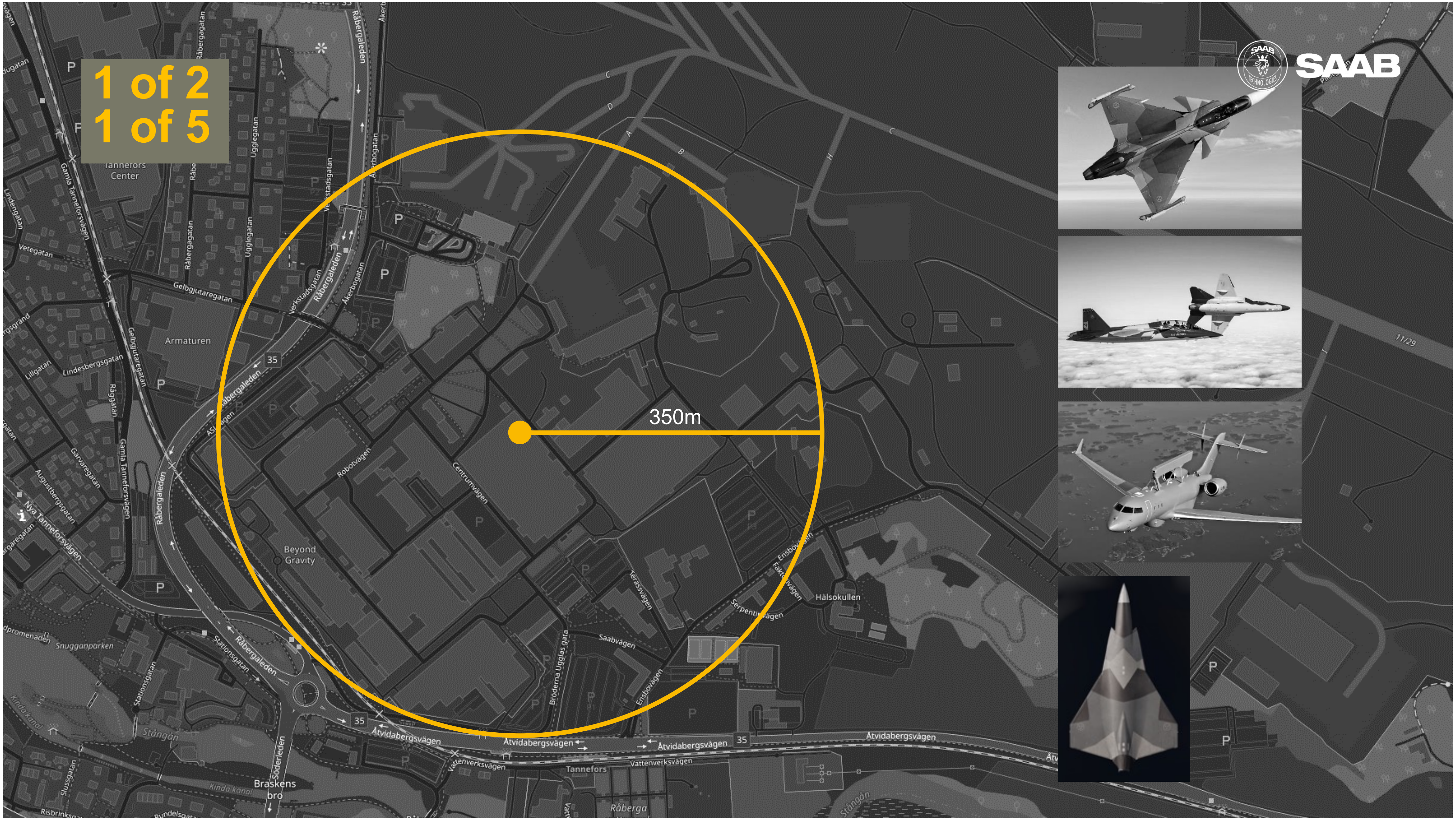
… in a closed system

So traditional aeronautical disciplines will always be needed!


Ai
powered



Needs and Innovations
SAAB
System Test, Launch & Operations
System/Subsystem Development
Technology Demonstration (TDP)
Technology Development (ARP)
Research to Prove Feasibility
Basic Technology Research (CRP)
TRL 9
TRL 8
TRL 7
TRL 6
TRL 5
TRL 4
TRL 3
TRL 2
TRL 1
Basic Technology
FMV
VINNOVA
NFFP
WASP WALLENBERG AUTONOMOUS SYSTEMS PROGRAM
innovair
THE SWEDISH STRATEGIC INNOVATION PROGRAMME FOR AERONAUTICS
SESAR
EUREKA
innovation across borders
Clean Sky
EDA
SARG
SWEDISH DEFENCE UNIVERSITY
FOI
KTH VETENSKAP OCH KONST
LUNDS UNIVERSITET
LINKÖPINGS UNIVERSITET
UMEÅ UNIVERSITET


1 of 2
1 of 5
350m
Tannefors Center
Armaturen
Beyond Gravity
Hälsokullen
Snugganparken
Braskens bro
Tannefors
Råberga
Gelbgjutaregatan
Vetegatan
Lindesbergsgatan
Råbergaleden
Verkstadsgatan
Åkerbogatan
Robotvägen
Centrumvägen
Ensbovägen
Serpentinvägen
Saabvägen
Bröderna Ugglas gata
Terrassvägen
Åtvidabergsvägen
Vattenverksvägen
Stationsgatan
Gamla Tanneforsvägen
Nya Tanneforsvägen
Augustbergsgatan
Garvaregatan
Lillgatan
Ugglegatan
Kinda kanal
Stångån
35
11/29
SAAB

Will this continue?

A message to all stakeholders

Original Equipment Manufacturer relevancy

In an era of rapid technological change—where aspects like new propulsion systems, autonomy, sustainable materials, and digital twins redefine the aeronautical landscape—the OEM must not only absorb innovations, but *shape them into integrated, certifiable, and market-relevant products*.

This demands continuous investment in education, research, and industrial capabilities focused on product realization.

Sweden's ability to act as an OEM for advanced systems such as fighter aircraft has historically created high industrial value and strategic autonomy. This capability is rare, even among developed nations, and should be considered a national asset.

National OEM capability

Maintaining the position as an Original Equipment Manufacturer (OEM) requires sustained excellence in product development and technology integration.

- In the aeronautical sector, where system complexity, safety requirements, and technological advancement converge, the ability to lead and orchestrate the full product lifecycle—from concept to certification and post delivery services—is a decisive national capability.

- This involves not only technological innovation, but also the capacity to integrate subsystems into reliable, certifiable, and high-performing products under stringent time and cost constraints.

- Without a continued strong national capability in product development, technological innovation risks being commodified and captured by other actors who control the system integration and delivery of products and services.

Long-Term Strategy for Competence Supply

A sustainable OEM capability depends fundamentally on a robust and strategic approach to competence development.

- Product development competencies are to a large extent developed and retained within companies,
- Higher education institutions must take responsibility for cultivating the foundational skills and integrative thinking needed for future engineers.
  - Ensuring a strong presence of product realization and integration, not only isolated technical expertise.
  - Embedding systems thinking, design methodology, and model-based engineering early in the curriculum.
  - Providing structured multi-domain project experiences that simulate real-world engineering collaboration.
  - Reinforcing competencies in areas often under-emphasized, such as certification, safety-critical systems, manufacturability, and lifecycle thinking.

Strategically, this also requires coordination across national stakeholders to ensure continuity in key knowledge areas that may fall outside short-term funding trends or academic specialization.

Continuous Technology Development and Maturation

Product development capabilities cannot be sustained without a constant flow of new technologies, maturing through research and early application. This includes:

- A shared technology roadmap aligned between academia, institutes, and industry.
- Research that bridges technical depth with system-level applicability.
- Development of digital infrastructure that supports the integration and traceability of technologies across lifecycle stages.

Without structured technology maturation, OEMs risk becoming late adopters, reliant on off-the-shelf innovations developed and productized elsewhere

A long-term funding commitment is necessary to support technology development that spans from basic research to system-level application. This includes ensuring access to test environments and digital development platforms where technology readiness can be advanced.

The role of demonstrators

Demonstrators—at both subsystem and system levels—are crucial tools for maturing technology, exercising integration capability, and preparing for full-scale development. A coherent strategy should include:

- Component demonstrators to validate key technologies.
- System architecture demonstrators to explore new configurations and integration approaches.
- Operational demonstrators that explore value creation, mission capability and lifecycle support.

Demonstrators not only accelerate technological readiness—they also act as learning environments where new generations of engineers and managers develop OEM-level competence in a lower-risk context.

Saab highlights the strategic importance of demonstrators as a bridge between research and industrial development. These initiatives help ensure competence development and value creation that preserve complex integration capability across generations.

The role of full scale product development

Full product development programs remain irreplaceable in sustaining OEM capability. Only through the complexity and commitment of a complete development—from clean-sheet design through certification and industrialization—can integration capacity, organizational learning, and supplier ecosystems be fully exercised. These programs:

- Embed long-term capability in the workforce.
- Foster architectural leadership.
- Solidify national value creation by capturing higher tiers of the value chain.

They are infrequent by nature and must be seen as moments of concentrated learning, capability consolidation, and strategic renewal.

To maintain Sweden's ability to deliver complex systems, continuity in full-scale development must be supported through public-private cooperation, particularly during gaps between major procurement programs.

Interplay and Strategic Alignment

To sustain OEM capability, the relationship between education, research, technology maturation, demonstrators, and full-scale product development must be managed as a coherent system. Each part reinforces the others. For example:

- Education creates readiness for research and demonstrator participation.
- Research feeds innovation into demonstrators and informs curricula.
- Demonstrators validate readiness for full-scale programs.
- Full-scale programs consolidate experience and drive future educational needs.

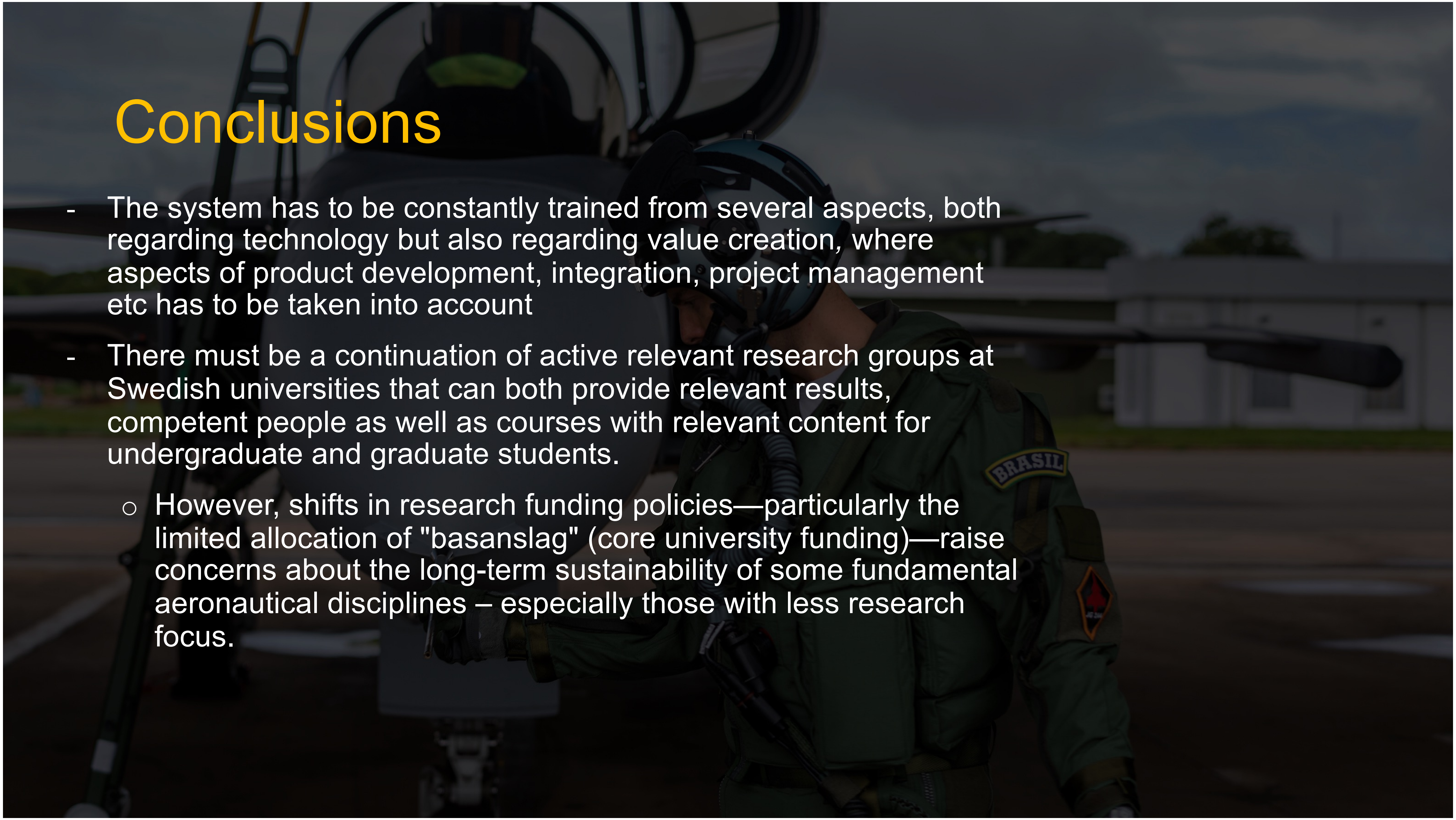
The interplay between these stages should be supported through a nationally coordinated, long-term research and innovation program with shared governance between government, academia, and industry.

Conclusions

With the ongoing programs in Sweden at the moment, e.g. Gripen E, Global Eye and T-7, we at the moment have a unique position to develop and build capability from.

We have a well-functioning collaboration between industry and academia with several joint projects and boundary-spanners with key universities that assures both academic as well as industrial relevance in the research.

There are however a few areas that requires attention both from industry and authorities…



Conclusions

- The system has to be constantly trained from several aspects, both regarding technology but also regarding value creation, where aspects of product development, integration, project management etc has to be taken into account
- There must be a continuation of active relevant research groups at Swedish universities that can both provide relevant results, competent people as well as courses with relevant content for undergraduate and graduate students.
  - However, shifts in research funding policies—particularly the limited allocation of "basanslag" (core university funding)—raise concerns about the long-term sustainability of some fundamental aeronautical disciplines – especially those with less research focus.

Conclusions

- Sweden must continue to graduate engineers at a high rate, both at bachelor and masters level, to provide industry with a sufficient volume of engineering competence.
- There is a need to include new actors in the ecosystem, such as start-ups and small and medium enterprise (SME) as well as new research areas to accelerate the development of future aeronautical systems.
- There is a need to increase the collaboration and mobility between industry and academia and actors like FOI, FMV and FM