

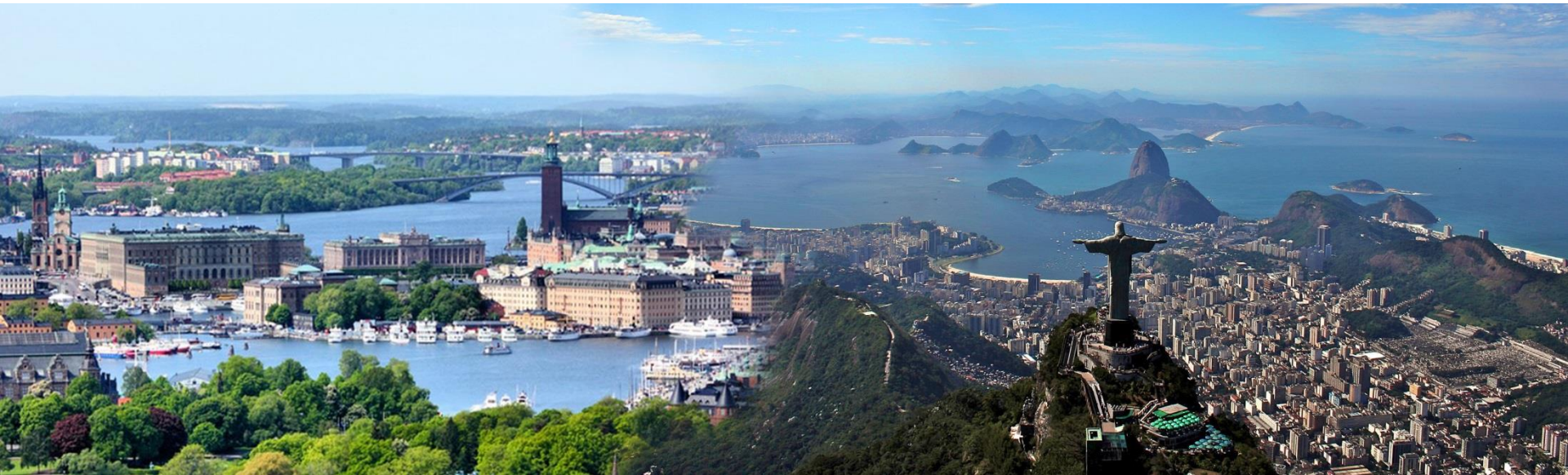
DEVELOPING INDUSTRY AND BILATERAL COOPERATION THROUGH INNOVATION THE AERONAUTICS CASE

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DEVELOPING INDUSTRY AND BILATERAL COOPERATION THROUGH INNOVATION **THE AERONAUTICS CASE**

- The Brazilian Perspective



AERONAUTICS - A HISTORY OF INNOVATION IN BRAZIL

- Aeronautical Industry (EMBRAER)
- Air Defense Systems (Mectron/Avibrás)
- Air Transportation & Traffic Control (ATECH)
- Aeronautical Certification (IFI)
- Space Research (AEB, INPE)
- Spin out to Automotive (Ethanol Program)



LIFECYCLE – RESEARCH IN AERONAUTICS

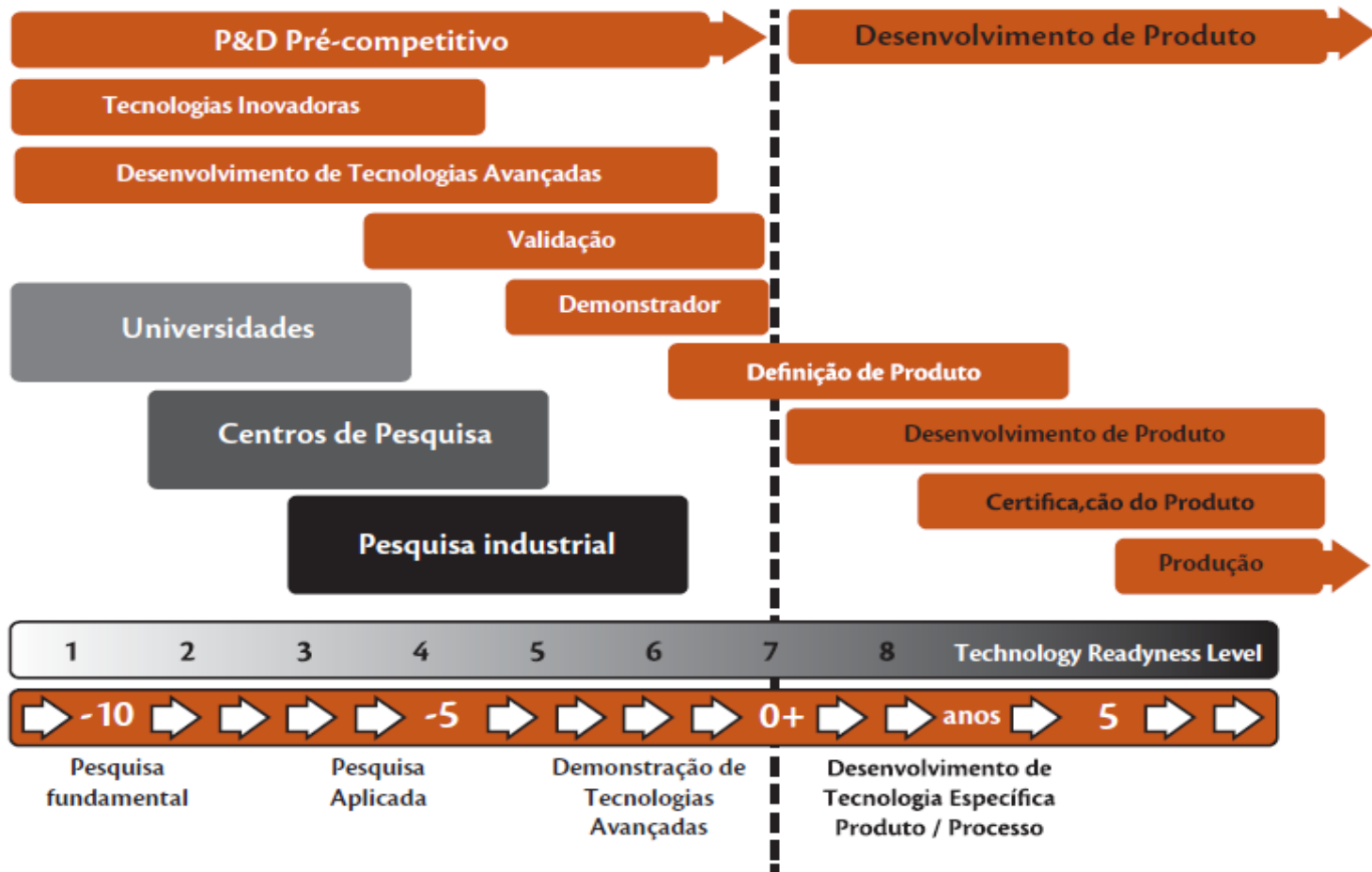


Figura 1. Ciclo de P&D na indústria aeronáutica (adaptado de VON BOSE, 2002 e KELLEY-WICKE-MEYER, 2003) (MATSUO, 2010)

BRAZILIAN AERONAUTICAL AND AEROSPACE SECTOR

- Sector represents 43% of high technology industry exports
- Positive balance of US\$ 1.5 Billion in 2014

Trade Balance 2014 (US\$ BillionFOB)	Exports	Imports	Balance
Total	225.1	229.1	(4,0)
Industrial Products (*)	138.4	196.7	(58.3)
Non-industrial Products	86.7	32.4	54.3
High and Medium-High Technological Industries	44.1	134.3	(90.2)
High Technological Industries	9.6	41.8	(32.2)
AERONAUTICS AND AEROSPACE	5.8	4.9	0.9
NCM 88 – Aircrafts, other aerial equipments/space	4.1	2.6	1.5

Fonte: SECEX/MDIC

(*) Classificação extraída de: OECD, Directorate for Science, Technology and Industry, STAN Indicators, 2003.



DEVELOPING INDUSTRY AND BILATERAL COOPERATION THROUGH INNOVATION THE AERONAUTICS CASE

- The Swedish Perspective



AERONAUTICS, A HISTORY OF INNOVATION IN SWEDEN 1937-

- 1st Ejection Seat
- 1st A/C modified from propeller to jet engine
- 1st Swept Wing Jet in Europe
- 1st production A/C with afterburner
- 2 world speed records
- 1st Saab Supersonic A/C
- 1st Saab System A/C ex Radar
- 1st Double Delta Wing
- 1st Canard configuration in production
- 1st A/C w Central Computer
- 1st Tactical Data Link bw A/C
- 1st Digital FCS
- 1st Auto Gun Aiming
- 1st HUD in production
- 1st virtual target training aid
- 1st metal bonded wing panels in Mach 2 A/C
- Unprecedented capability- size ratio
- First Nato fighter of 4th generation
- First fully autonomous flight in Europe
- First fighter to fire Meteor
-
-

J21 (prod.1944-47)



J21

Tunnan (1st flight 1948)



Tunnan

Tunnan

Lansen (1st flight 1952)



Lansen

Draken (1st flight 1955)



Viggen

(1st flight 1967)

Viggen

Viggen

Viggen

Viggen

Viggen

Viggen

Viggen



Gripen



Gripen

Sharc

Gripen



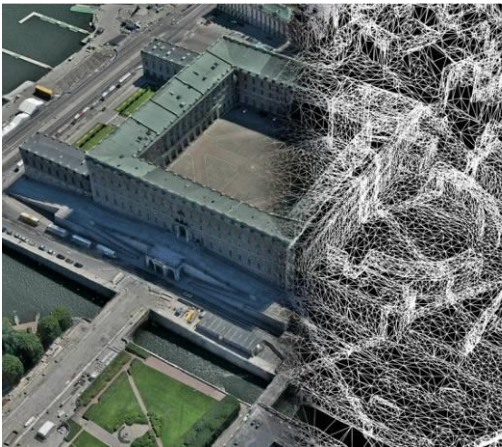
Gripen

Gripen



A HISTORY OF TAKING INNOVATION INTO OTHER SECTORS

- Innovations to other industry sectors, examples
 - Production technologies
 - Composites
 - Automotive Airbags
 - Telecom



3D mapping



Saab Tank Radar



Airbag



Mobile telephony



POSITIVE IMPACT ON THE SWEDISH ECONOMY

“The payback of the Gripen project to Swedish society is at least 2.6 times the initial investment, based on technology transfers alone.”

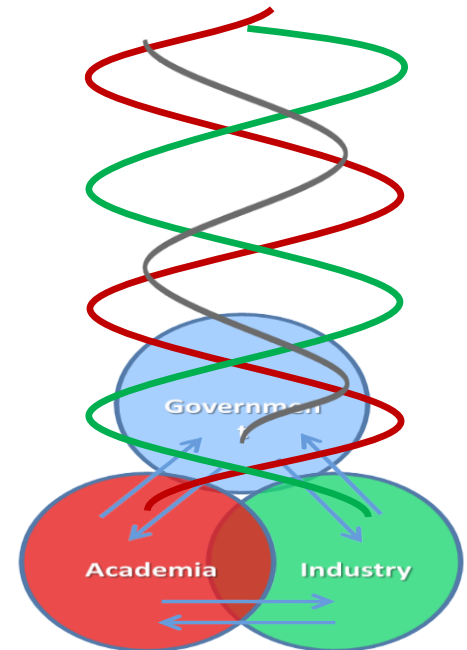
Gunnar Eliasson,
Professor Emeritus of Industrial Economics (EM)
KTH, Stockholm:
Visible costs - invisible profits
(2010, ISBN: 9789186203412)



NATIONAL RESEARCH & INNOVATION AGENDA



Written by Industry,
Universities and
Government Authorities
with Innovair as
Coordinating Forum



www.nriaflyg.se



Saab Roadmap

INNOVAIR

Product application



Double turnover in aeronautics

Development Programs and Full-scale Demonstrators



NEURON



MIDCAS



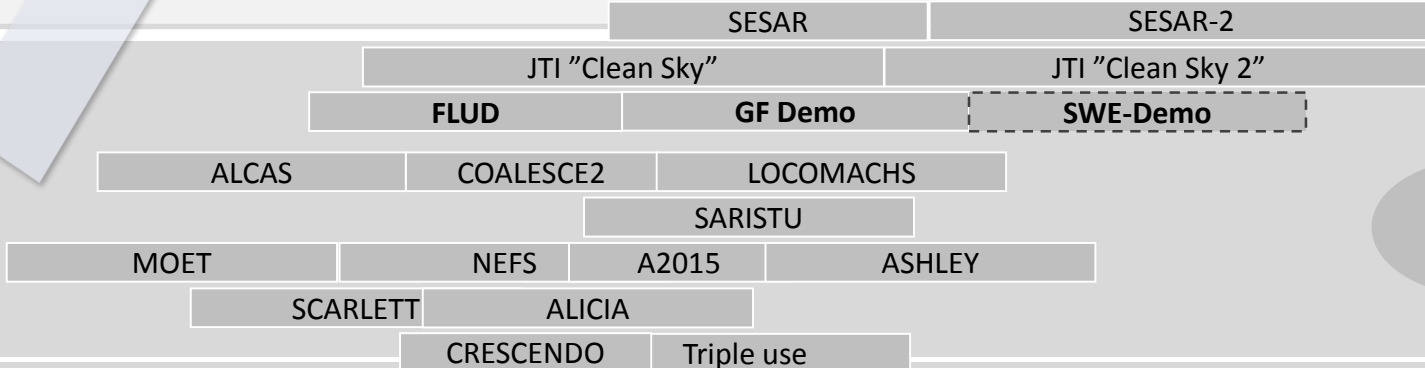
Remote technology



TRL 9

Verified Technology

International programs



TRL 6

Demonstrators

National programs



TRL 3

Technology

2005

2010

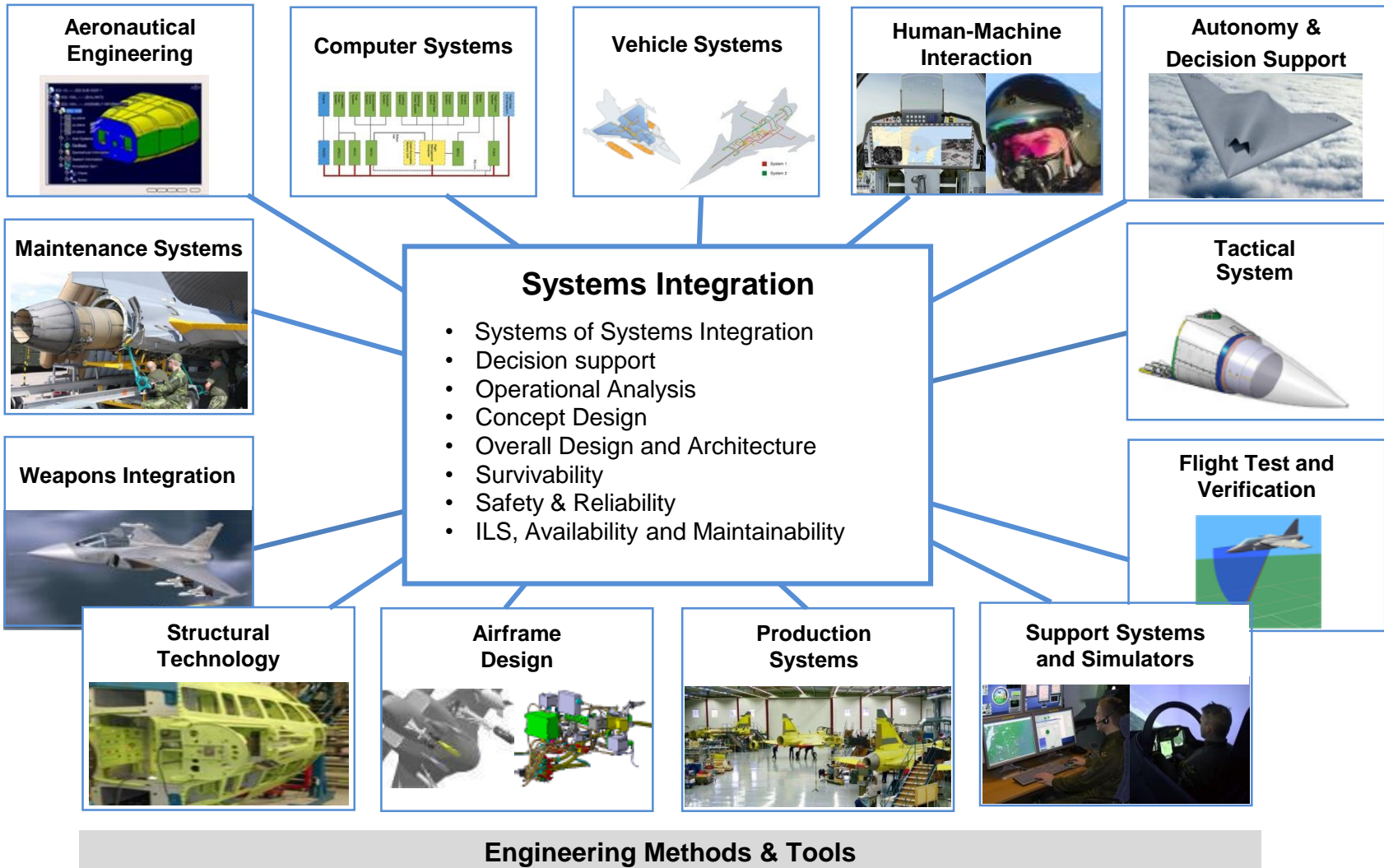
2015

2020

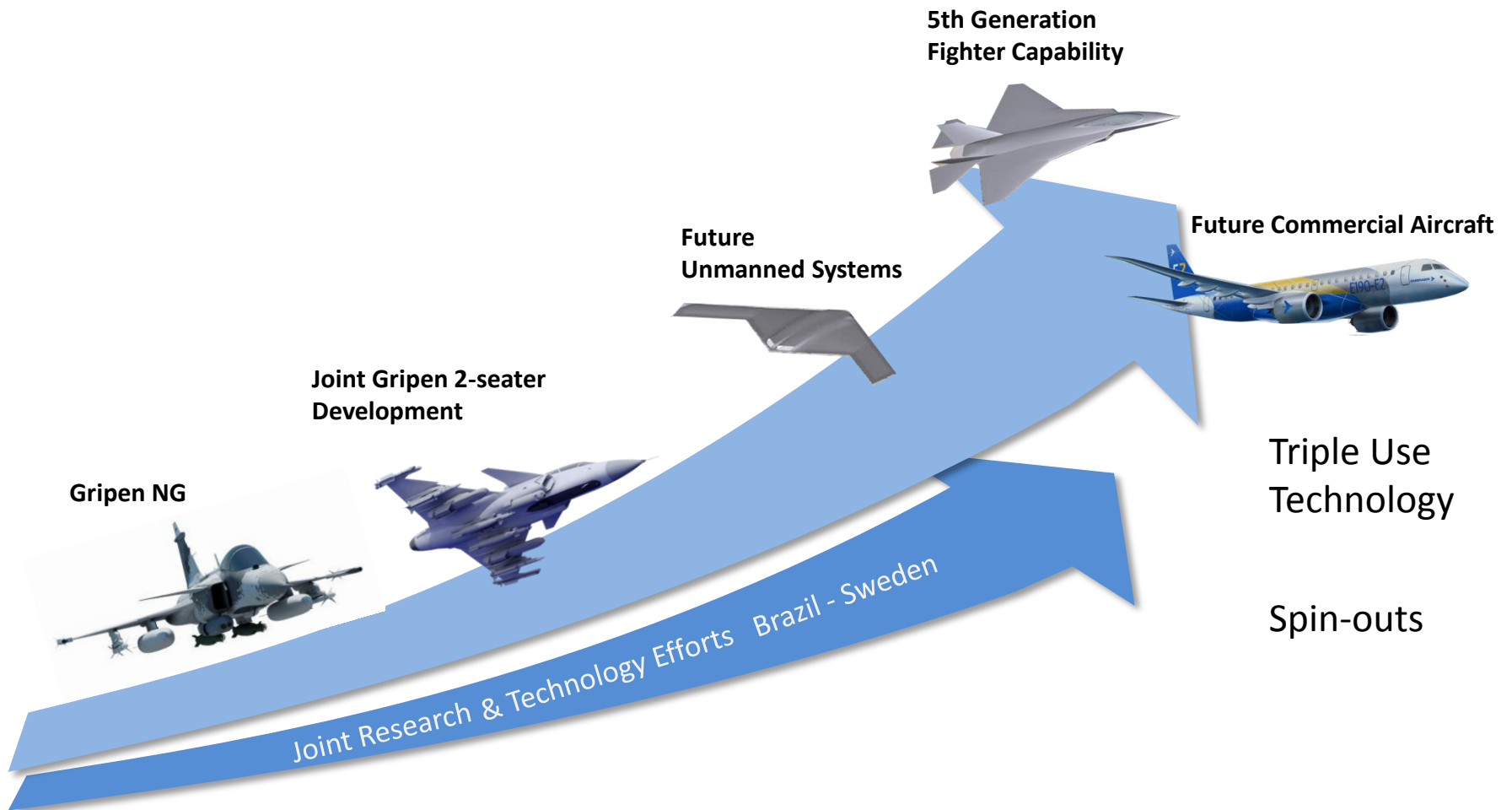
Time



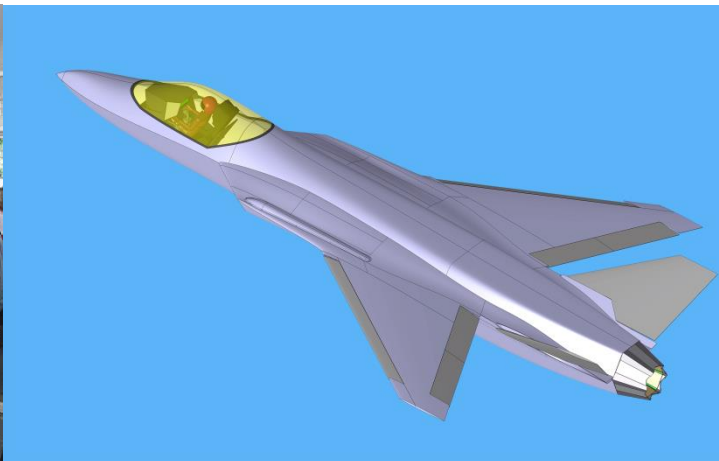
WHAT DOES AERONAUTICS CONTAIN ?



JOINT BRAZILIAN/SWEDISH R&D – VISION



WHAT WE HAVE ACCOMPLISHED SO FAR !



A flow of gradually more productive activities have verified the interest in bilateral cooperation. We have now reached a good status at low TRL (research). The challenge is to carry this further and include institutes and industries, with demonstrators and product development as further aims.

MoU for cooperation High level Meetings - Vinnova and ABDI	Swedish – Brazilian pre-study projects (Vinnova)	CISB founded in SP Swedish CISB office	Industrial Guest Research Scholarship - CNPq, CISB & Saab	Innovation Training for Defence and Aeronautics - CISB	SE-BR Research initiative 1 st Workshop ITA 500+ participants CISB Travel Grants	Swedish Endowed Prof Chair at ITA Workshops arranged by CISB, ITA, Innovair
2009	2010	2011	2012	2013	2014	2015



WHAT POSSIBILITIES CAN FURTHER COOPERATION CREATE ?

**Future needs in
Brazilian and
Swedish
Aeronautics
Industry**



**Brazilian
universities
+
Swedish
universities**

Research in BR+SE:

- Autonomous systems
- Decision support
- Sensors and sensor networks
- Materials technology
- Production technology
- Communications
- Software

+ Possible cost sharing in demonstrators

Auto-
motive

Mining

Robotics

Software

Telecom

Manu-
facturing

Civil
security

Forestry



SUGGESTIONS FOR WAY AHEAD

1. Establish the Brazil-Sweden High Level Group to enable and direct strategic cooperation
 - Relevant ministries to initiate MoUs for Aeronautical R&D, to set purpose & areas of cooperation
2. Formalize working group
 - Aeronautics Committee (existing)
3. Give assignments to working group
 - Continue ongoing bilateral Aeronautical R&D activities
 - Define and suggest funding mechanisms on different levels
4. Communicate results from the above to all relevant actors in both countries



UPCOMING EVENTS

- October 11 – 12, 2016: AEROSPACE TECHNOLOGY 2016, Stockholm

Some 180+ abstracts received, with 80 from Brazil or joint Brazil/Sweden



- October 18, HLG meeting in Brazil

