

INNOVAIRS ÅRSKONFERENS

Internationellt samarbete Sverige-Brasilien



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FRAMTIDEN

- Allers Veckojournal 1927
- Framtidsbild år 2000





OBJECTIVE & VISION



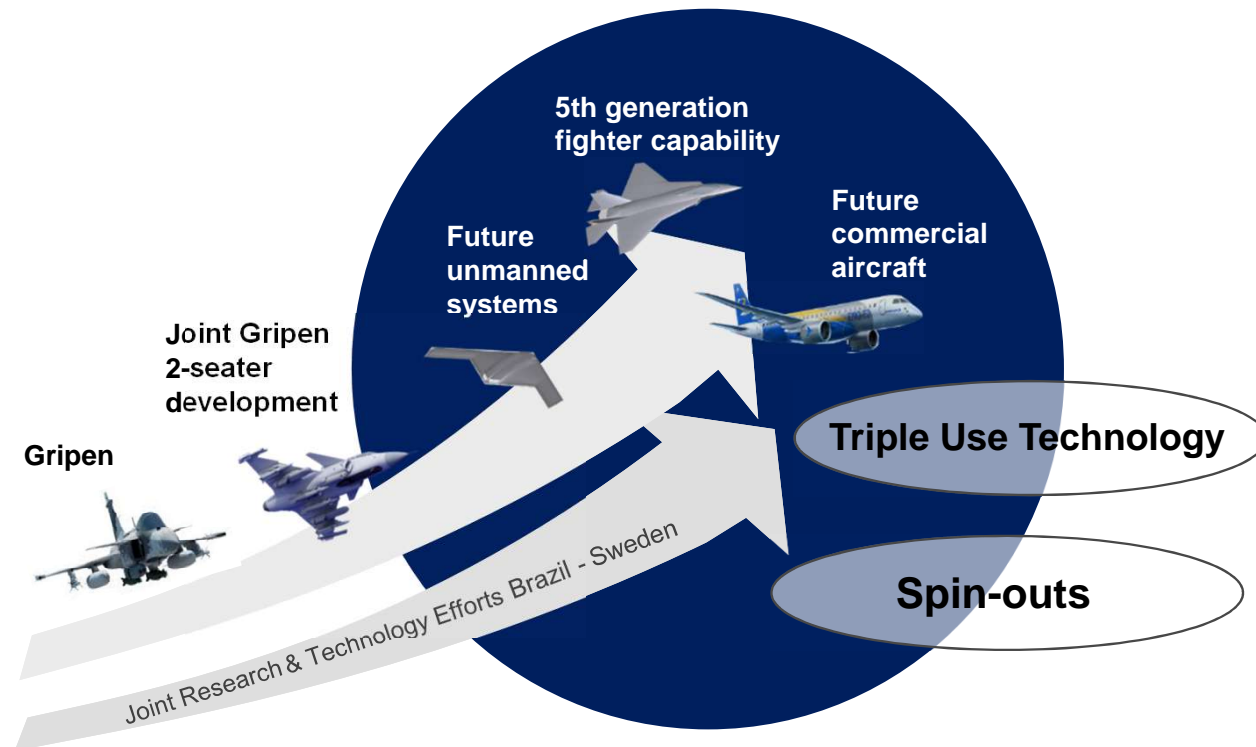


BILATERAL TECHNOLOGY PARTNERSHIP

Brazilian – Swedish Aeronautics Vision

Partnership Drivers

- Trade
- Technology
- Cost



CORNERSTONES OF AERONAUTICS SE-BR BILATERAL R&T PARTNERSHIP



Governance

COLLABORATION ON ALL LEVELS

- Swedish-Brazilian Workshops in Aeronautics
 - 1-2 per year
 - Workshop 8, October 10, 2019 in Stockholm
- Swedish-Brazilian Executive Committee on Aeronautics
 - Initiates and follows up activities decided by the HLG e.g. workshops, bilateral development projects
 - Proposes strategic plans for the cooperation.
- Swedish-Brazilian High Level Group on Aeronautics
 - Led by the ministerial level to outline the strategic direction of the cooperation. The HLG consists of representatives from government, industry and academia in both countries.
 - State secretaries, Heads of R&D funding agencies, CEOs of the main aeronautics companies, Directors of the main aeronautics industry organizations, Airforce Chiefs and/or Head of Materiel Administration, representatives for Academia



"Infrastructure"

CISB A HUB BETWEEN BRAZIL & SWEDEN

- Swedish-Brazilian Research and Innovation Centre (CISB)
 - Private non-profit association
 - Acts as an international hub to promote dialogue and aims to create unique collaboration opportunities between industries, academy (education and research) and government.
- CISB's focus areas
 - Aeronautics, Defence and Security, Sustainable Energy, Transport and Logistics, Urban Development
- Members & Supporter
 - Swedish and Brazilian companies, universities, institutes, funding agencies, governmental institutions etc



PROFESSORS-CHAIR AT ITA

- Purpose
 - Networking
 - Research cooperation
 - Promote student exchange
- Content
 - 4 Swedish Professors alternating in place at ITA in Brazil
 - 3-4 months/year during 3-4 years
- Financed by
 - Swedish & Brazilian companies, universities, funding agencies



100 RESEARCH SCHOLARSHIPS

- 2011 – Gift from Saab to Brazil
 - 100 scholarships
 - Sandwich, PhD
 - 6 to 12 months of studies in Sweden
- 60 completed
 - Brazil CnPg – Science without Borders program
 - Tutors from Swedish universities and Saab
 - Applications from > 17 Brazilian universities
 - Swedish Universities KTH, Chalmers, LIU, Luleå, Skövde, Blekinge, Acreo



Business

GRIPEN BRAZIL



BILATERAL AGREEMENTS SWEDEN-BRAZIL

- The Brazil-Sweden Strategic Partnership New Action Plan (Oct 2015) states that
 - "Brazil and Sweden reaffirm their satisfaction with the bilateral cooperation in defence matters, greatly strengthened by the industrial and technological partnership currently being established on the basis of the Gripen NG project. Both countries recognise the potential for expanding cooperation in this field, and express their commitment to identifying new initiatives of mutual interest."
- One such initiative was establishing a High Level Group (HLG) on Aeronautics.
- The Protocol of the first meeting of the Brazilian-Swedish High-Level Group on Aeronautics on 19 October 2015 states "During the Brazilian-Swedish Joint Committee on Economic, Industrial and Technological Cooperation held in Brasília on 21 May 2015, Brazil and Sweden agreed to establish a High-Level Group (HLG) on Aeronautics, at Deputy Minister level, in order to broaden and extend the strategic collaboration in the field of Aeronautics. The HLG, formed under the additional protocol on innovative high industrial cooperation from 2009, is a sign of the shared ambition to develop and deepen the bilateral cooperation in Aeronautics, not only regarding military projects, but, regarding civil and dual use projects as well."


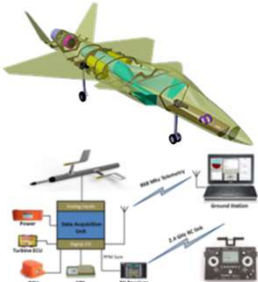
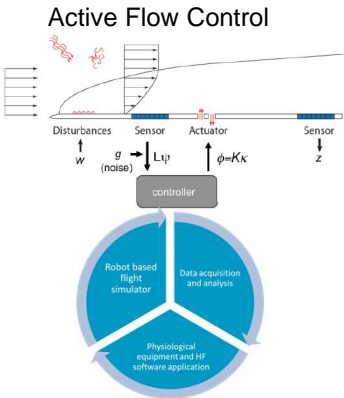
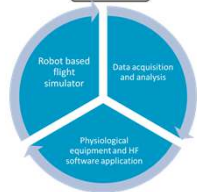
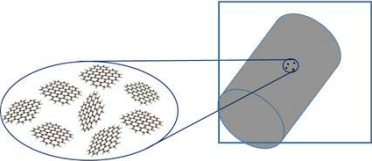
1) Brazil-Sweden Strategic Partnership New Action Plan, confirmed in Stockholm 19 Oct. 2015.
2) Protocol, Swedish Min. of Enterprise and Innovation, ref no N201508122P0F, dated 29 Oct. 2015.



RESEARCH PROJECTS



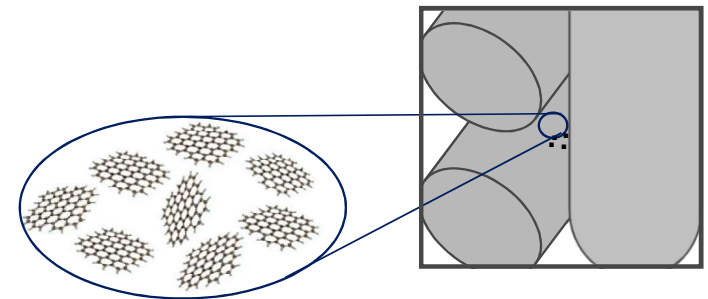


Pilot Projects Financed by  Brazilian funding by own academic means	Illustration	Participants (SE)	Participants (BR)
Methods for sub-scaled demonstrator and control law testing (MSDEMO) <i>Under NFFP6 financing</i>		Saab LiU	ITA USP
Pre Laminar Flow Design (preLaFloDes) <i>Under NFFP6 financing</i>		Saab KTH LiU	ITA USP
Human Factors lab for Future Air Systems (HFlabFAS) <i>Under NFFP6 financing</i>		Saab LiU	ITA
MultiGraph <i>Under SIO Graphene financing</i>		Saab Chalmers Blackwing 2DFab	UFABC



MULTIGRAPH

- Vinnova (SIO Lighter and SIO Graphene) (BR partner own financing)
- 2 year project
- Addition of graphene flakes into carbon fiber reinforced plastic.
- Strength enhancement in bolted joints and enhanced conductivity
- Dispersion techniques. Suitable graphene amount in relation to mechanical strength and dispersion defined
- Models in place for simulation the mechanical behaviour of the graphene enhanced laminates
- Good collaboration, strong consortium
- Agreement approval taken some time



CHALMERS
UNIVERSITY OF TECHNOLOGY



SAAB

BLACKWING
SWEDEN



Universidade Federal do ABC

2D fab AB

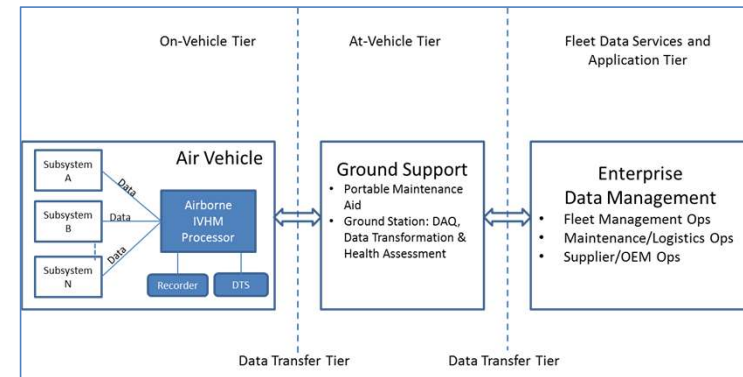


Projects Financed by	Illustration	Participants (SE)	Participants (BR)
Inflow Prop		Chalmers GKN	Embraer ITA
Methods for Subscale Flight Testing and Analytics (MESTA)		Saab LiU	ITA FT Sistemas
Digital Hydraulic Actuator (DHA) for Aeronautics for flight control <i>Brazilian financing by Fapesc</i>		Saab LiU	UFSC Certi Akaer
Integrated health management and pilot performance analysis for future aircraft systems (IVHM-HFA)		Saab LiU	ITA Konatus



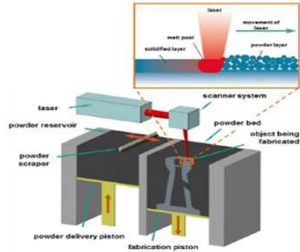

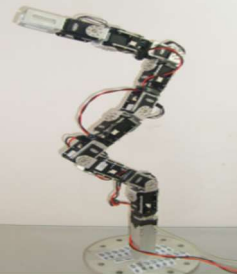


VEHICLE HEALTH MANAGEMENT AND PILOT PERFORMANCE ANALYSIS

- Vinnova – Senai financing
- 2 year project
- Lead by Saab and Konatus
- Vehicle Health Management – by analyzing data from aircraft systems to predict support and maintenance
- Pilot Performance Analysis – based on assessment of pilot workload
- Diagnosis of Modelica Models (LiU)
- Statistical and machine learning methods for failure detection (UFMG Guest researcher)
- Influence of pilot behaviour on fault classification (ITA Guest researcher)

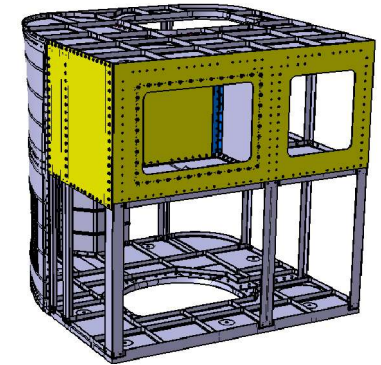




Projects Financed by  	Illustration	Participants (SE)	Participants (BR)
Tools and Methods for certification of Additive Manufacturing fabricated parts for aerospace applications (NDT-AM)		Swerea KIMAB Saab Cobolt	Senai Akaer ITA
Flexible automation for cost effective aircraft manufacturing (FlexAM)		Swerea Sicomp Saab Prodtex X-Laser	Senai Akaer ITA
Airframe Sealing Automation Using Snake Robot (ASASR)		Saab LiU	Senai Intelectron Engemovi ITA

AIRFRAME SEALING AUTOMATION USING SNAKE-ROBOT

- Vinnova and Senai call
- 1 year Feasibility Study
- Develop the existing design of a snake-robot reduce the end-effector for automated sealing (reach TRL4 and aim for a continuation project of TRL6)
- CAD-models of airframe structure supplied
- Conceptual design with CAD-models and kinematic models of the robot and sealant dispenser
- Good teamwork where all partners are contributing, BR partners shows high competence in designing the robot system
- Webex/Skype meetings are very useful





EXPERIENCES, FUTURE





COOPERATION EXPERIENCE

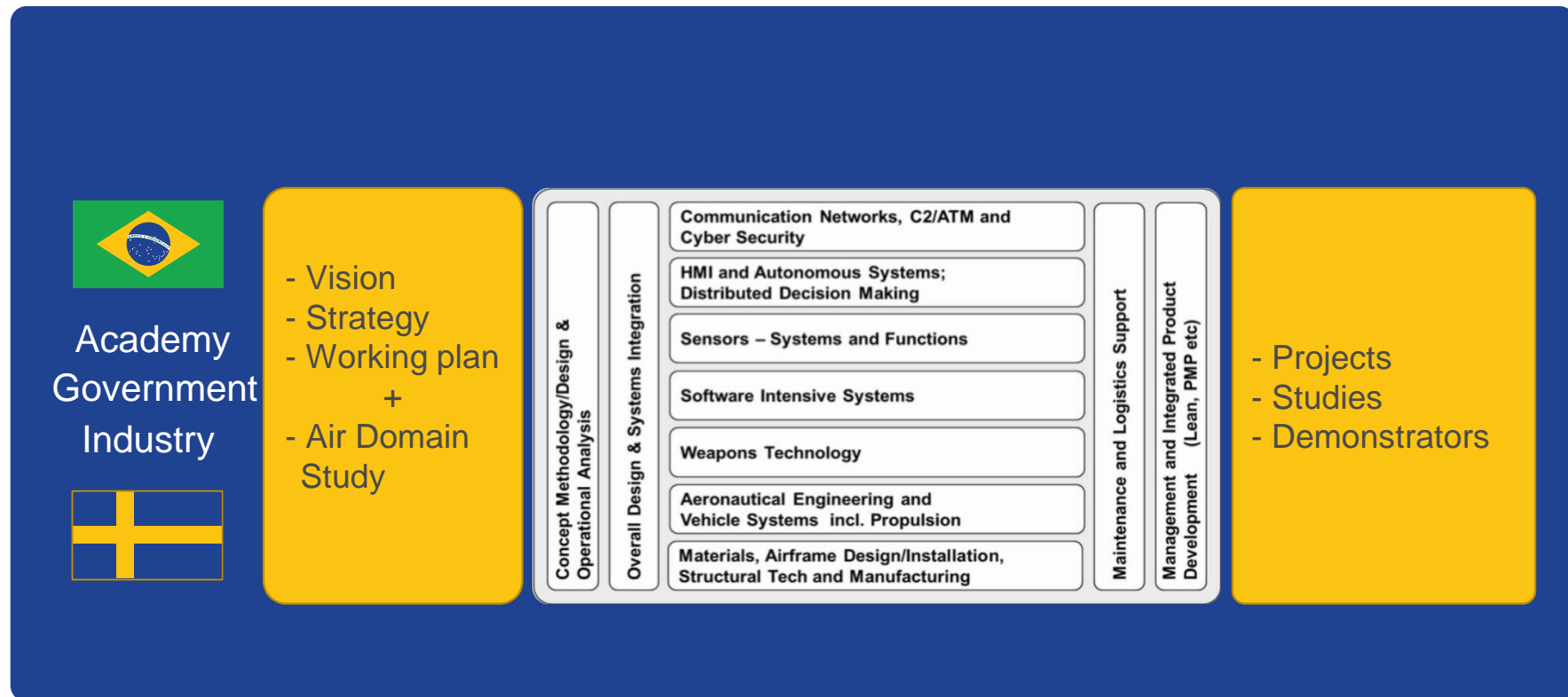
- **Innovation system** – SE triple helix, BR more actors
- **Relations** – build trust, visits, video conference, Skype
- **Agreements** – existing commercial support, language
- **Rules** – funding differ, bureaucracy, law interpretation
- **Communication** – actors have different rules
- **Continuity and Endurance** – CISB, Professor's chair, Vinnova etc
- **Financing** - equal level of investment

If the parties all have something to gain on cooperating, it will overcome the struggle reaching an agreement





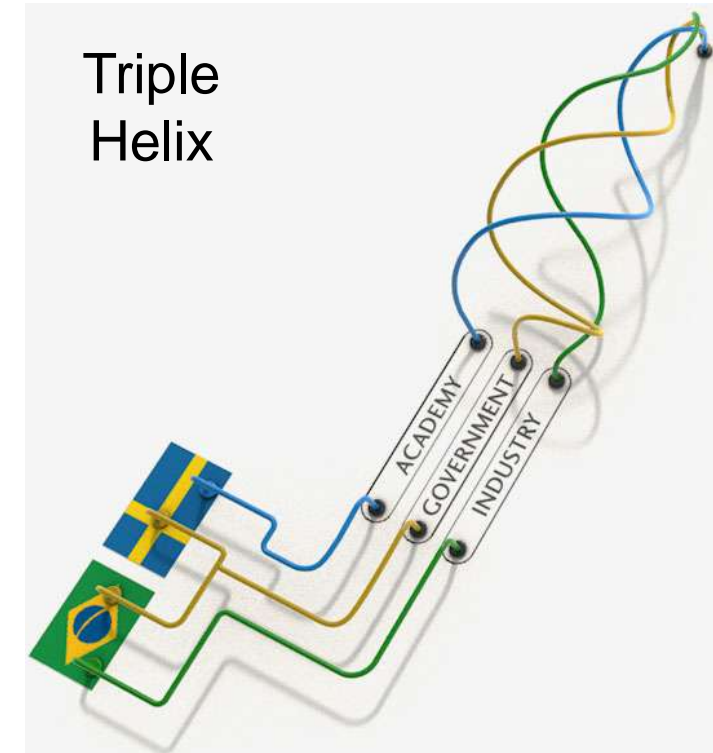
THE FRAMEWORK FOR BILATERAL COOPERATION





A BASE FOR THE COOPERATION

- In Dec 2013, the Brazilian Government declared the intention to buy Gripen as the next fighter system
 - In 2014, CISB started a series of Workshops in Aeronautics. The workshops have continued: totally five in Brazil and two in Sweden – 7th Workshop in Belo Horizonte 14 Sep 2018
 - In 2015, a High Level Group on Aeronautics (HLG) was established, led by Vice Ministers/State Secretaries
- Decisions in the HLG:
- 2016, HLG2 – Terms of Reference and Working Plan
 - 2017, HLG3 – Long Term Strategic Plan
 - 2018, HLG4 (21 Nov) – Air Domain Study (proposed)



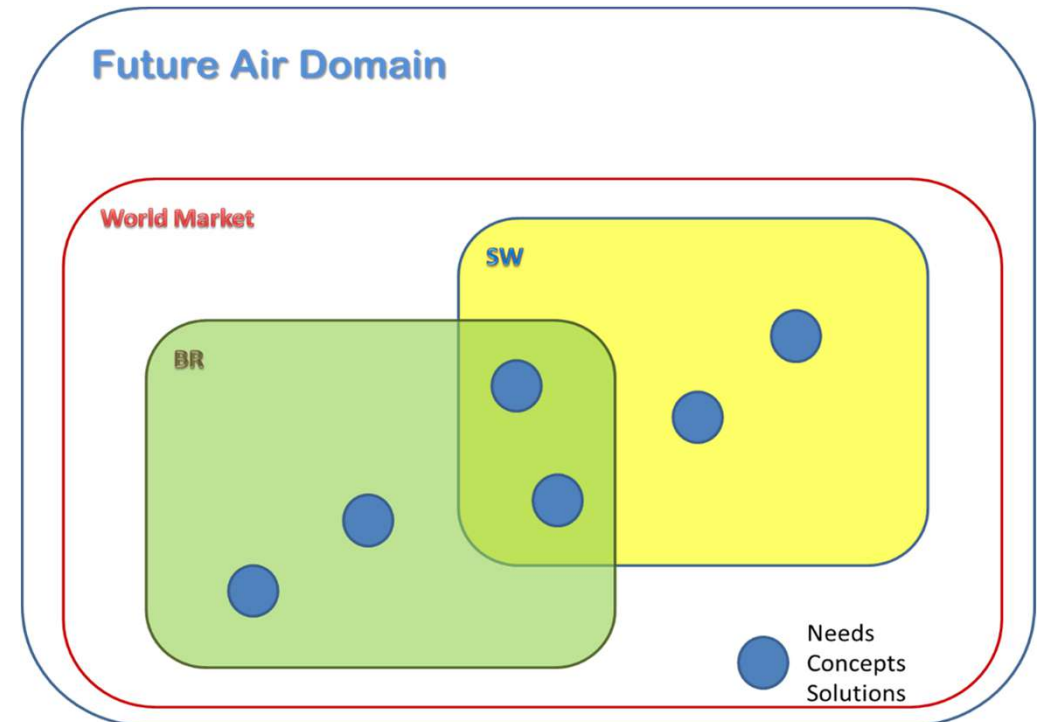
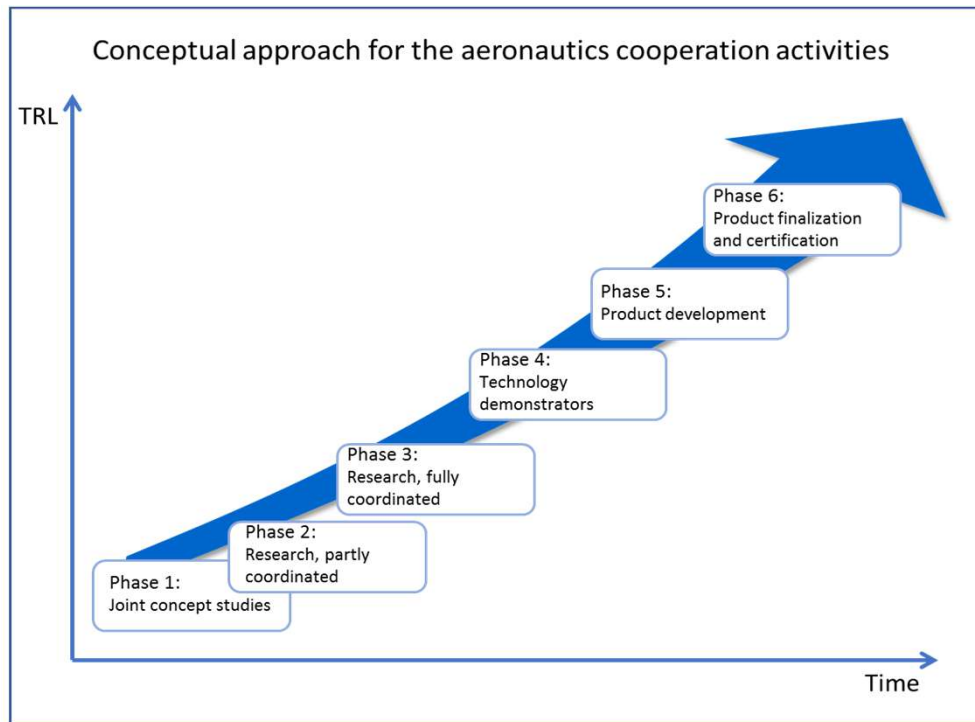


AERONAUTICS LONG TERM STRATEGIC PLAN



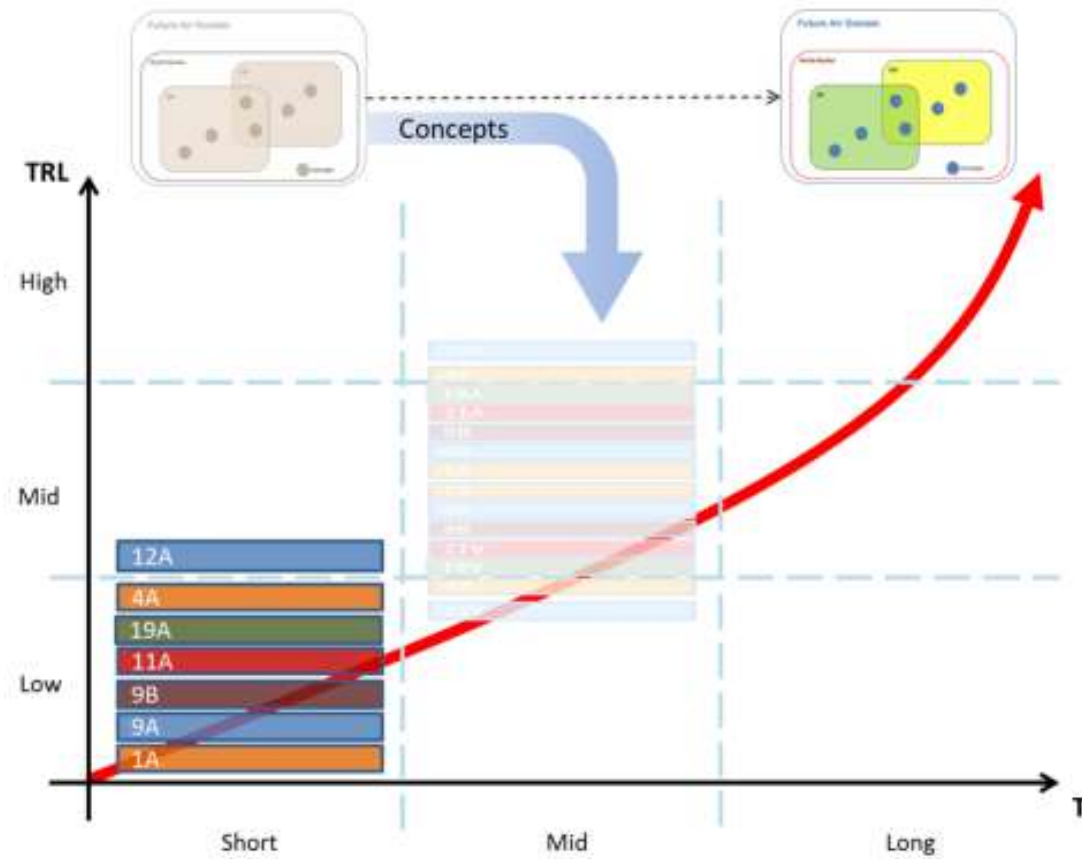


MAJOR CONTENT IN THE PLAN





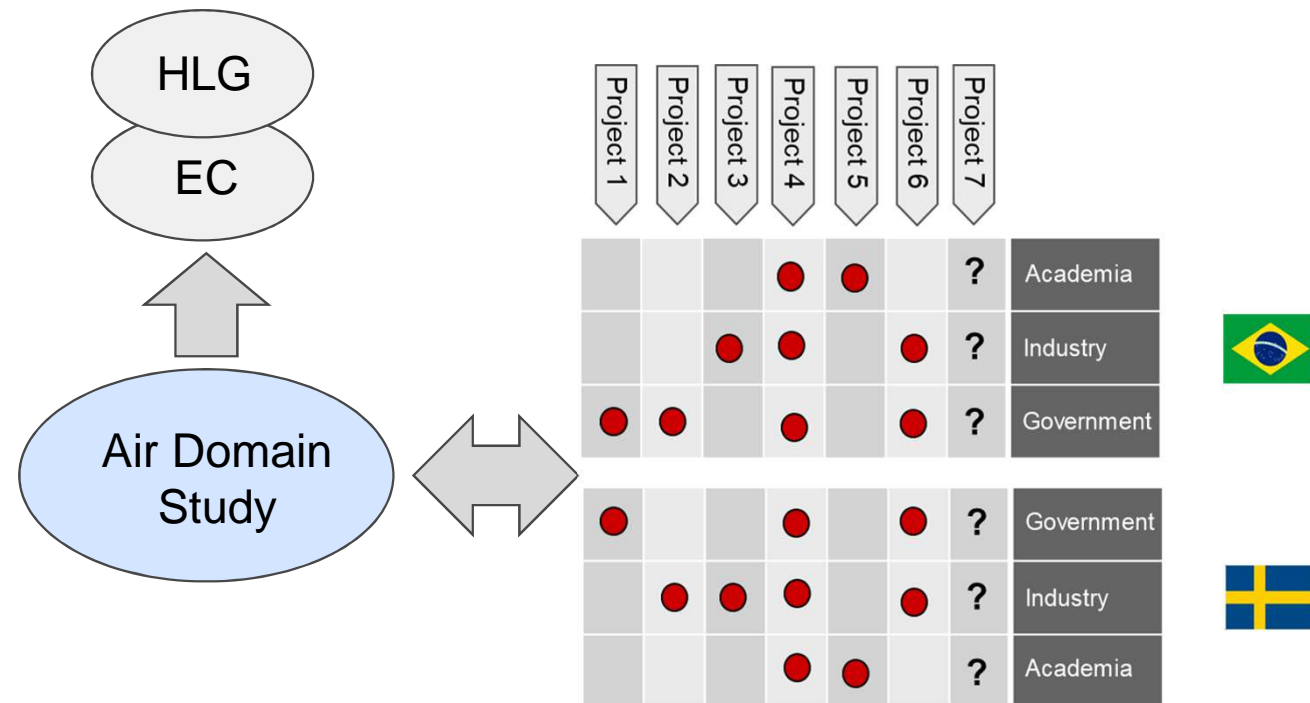
MAJOR CONTENT IN THE PLAN





JOINT AIR DOMAIN STUDY - OBJECTIVES

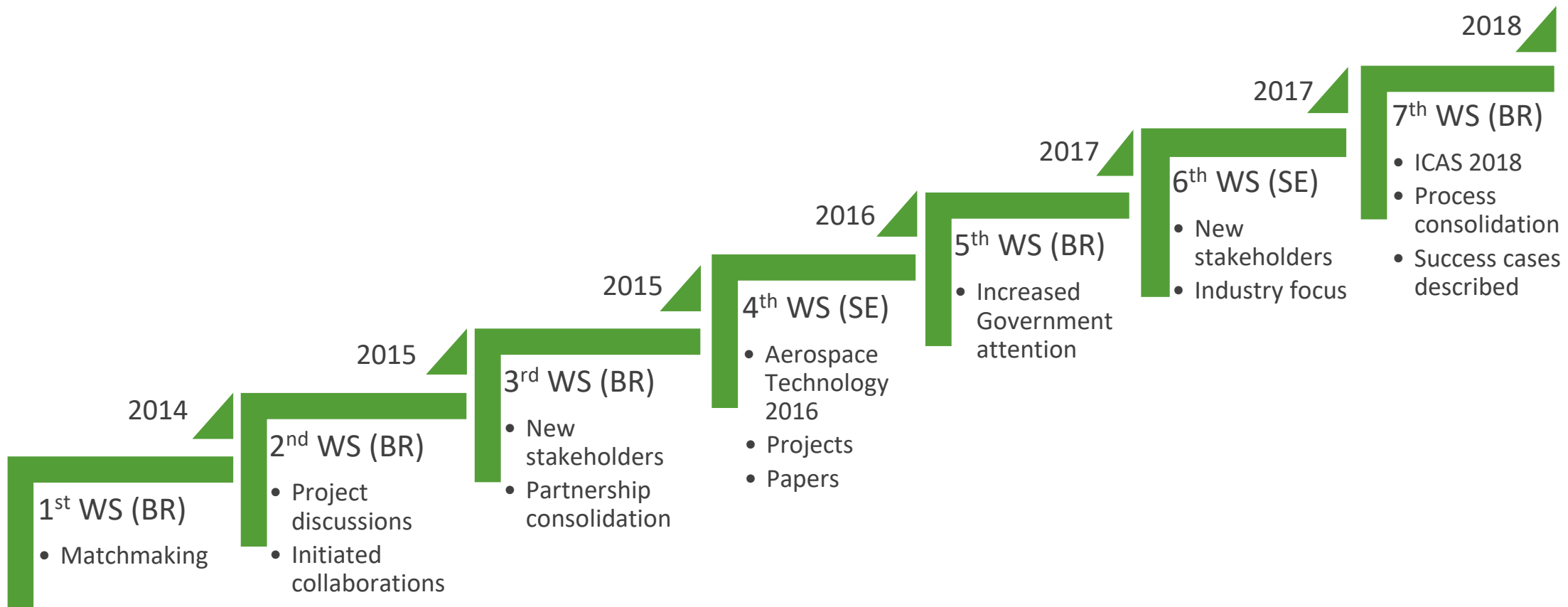
- To explore and assess future joint Brazilian and Swedish Government and Industry needs, options and solutions in an Air Domain System of Systems context
- To establish long term national strategies in selected areas
- To assess and prioritize Research and Technology development including demonstrator roadmaps to enable the strategies



The Air Domain Study will start with a Scenario and Concept analysis, including simulations



BR-SE WORKSHOPS IN AERONAUTICS – EVOLUTION





QUOTES FROM LAST WEEK IN BRAZIL (ICAS + WS7)

SARC (Swedish Aeronautics Research Center) newly inaugurated would probably not have happened if the Professor's chair at ITA would not have existed. So in some sense we went to Brazil and one outcome of it was SARC.

(Dan Henningson, Professor, KTH at the 7th Workshop) Aeronautics



"The new gold is knowledge and the new mining tool is collaboration"
(Daniel Moczydlower, Vice President Technology, Embraer at the ICAS-conference last week in the former gold mining state of Minas Gerais)

SAVE THE DATE



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Save the dates!

AEROSPACE TECHNOLOGY CONGRESS 2019

SUSTAINABLE AEROSPACE INNOVATION IN A GLOBALISED WORLD
STOCKHOLM WATERFRONT CONGRESS CENTRE, OCT 8-9, 2019

ft2019.se



IMPORTANT DATES

- >> Call for Papers & Invitation Sep. 1, 2018
- >> Abstract deadline March 1, 2019
- >> Selection of Abstracts June 1, 2019

ft2019.se

SAVE THE DATE



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The 8th SE-BR Workshop in Aeronautics
will be arranged
in Stockholm
October 10, 2019
(directly after FT2019)





Welcome to Stockholm, Sweden

33rd Congress of the International Council of the Aeronautical Sciences
4–9 September 2022



 **Stockholm**
The Capital of Scandinavia

