

SARC Kick-off Workshop



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Brazilian Swedish Cooperation in Aeronautics

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June 18, 2018

Overview of BRA-SE Cooperation in Aeronautics

The Role of ITA

The Role of UFSC and CERTI

Opportunities for the Future



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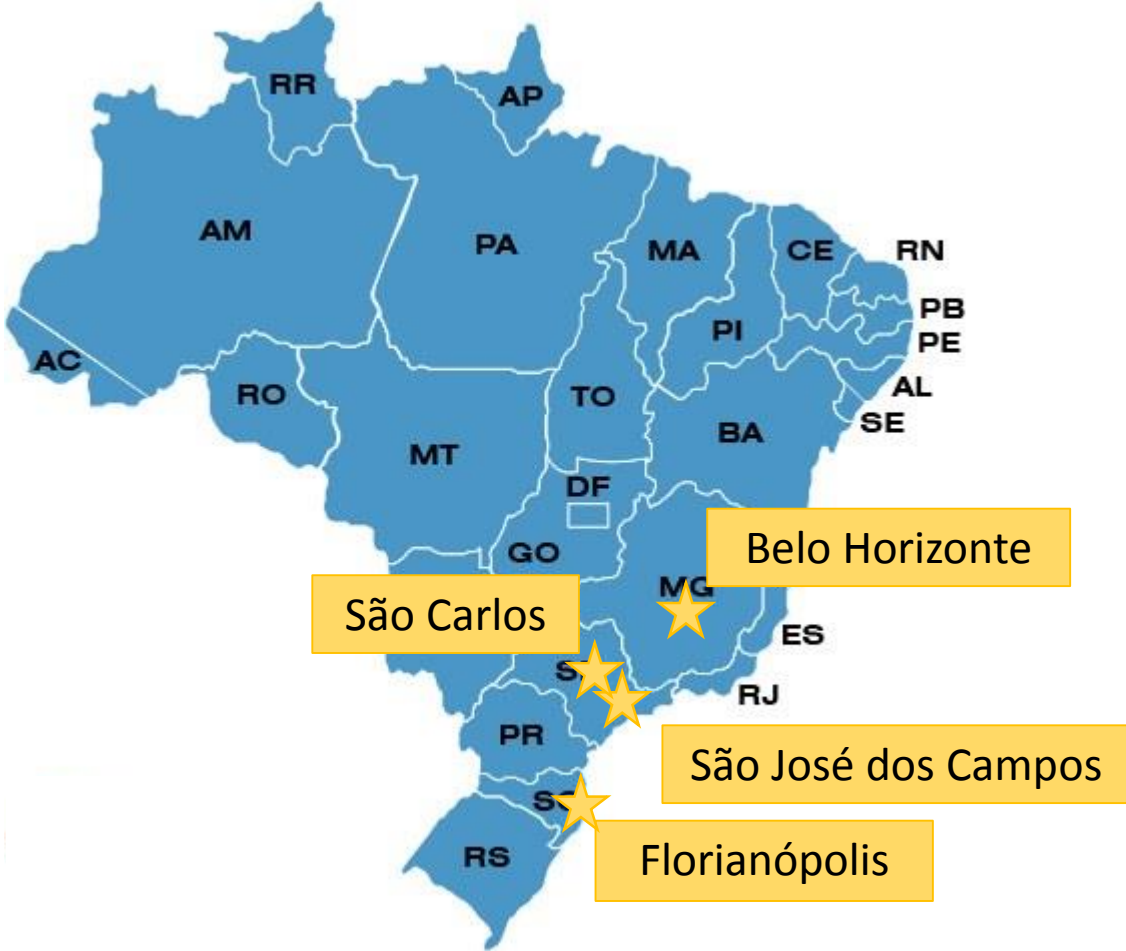
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R&D in Aeronautics in Brazil



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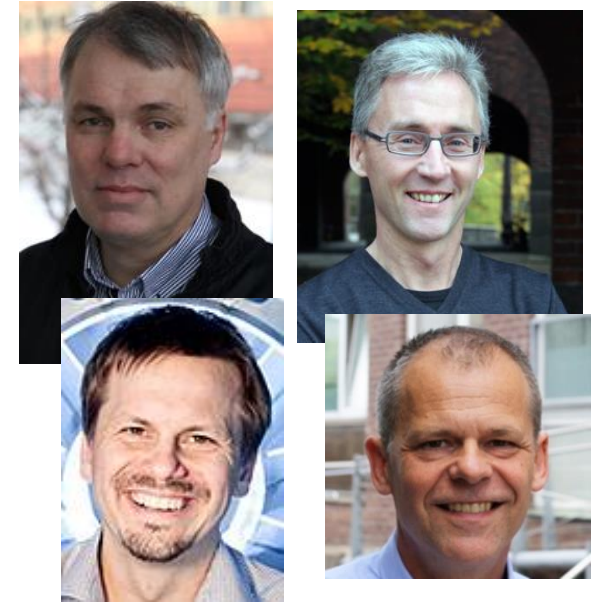
Swedish-Brazilian Cooperation in Aeronautics



Joint workshops in
Brazil and Sweden



Professors and students
in Sweden

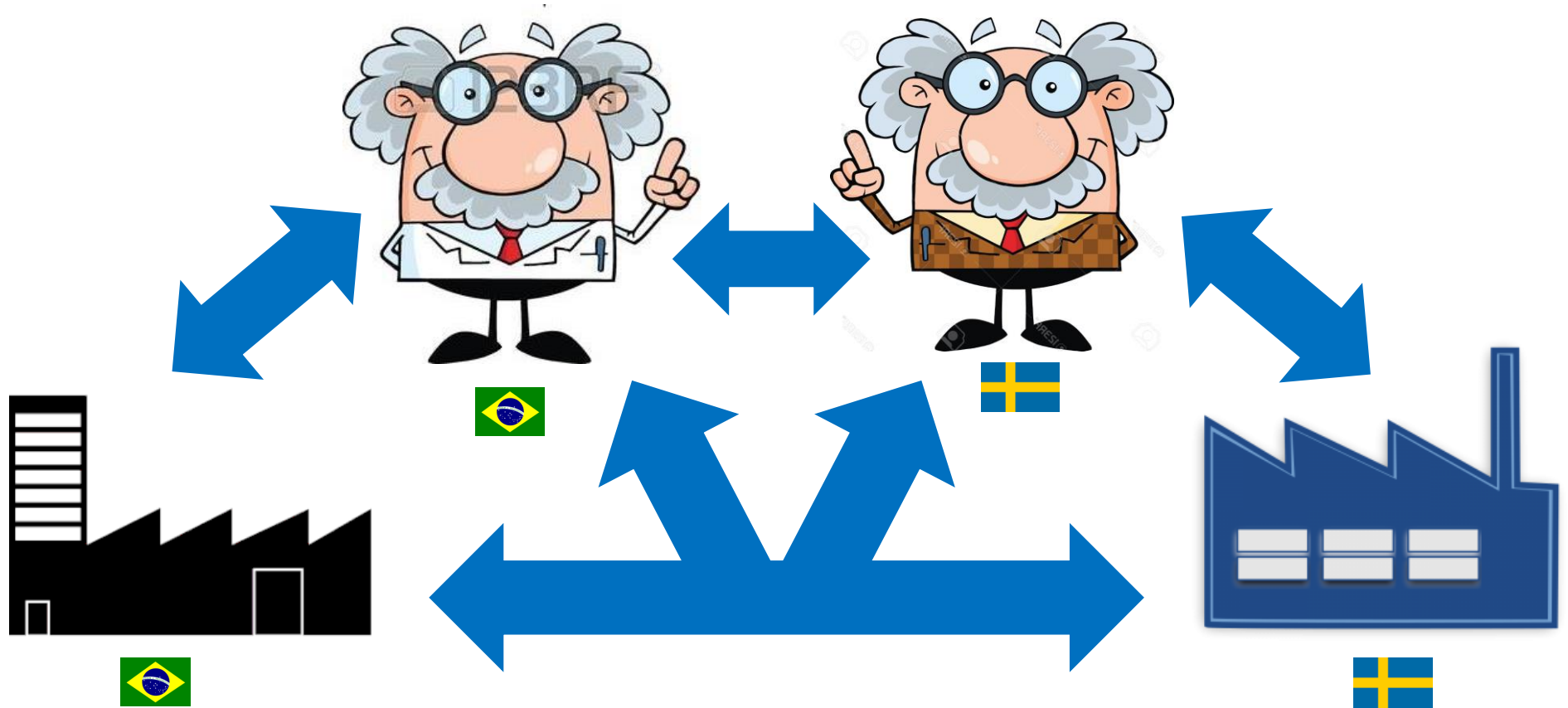


CISB/SAAB Professor Chairs
@ITA



Joint research projects

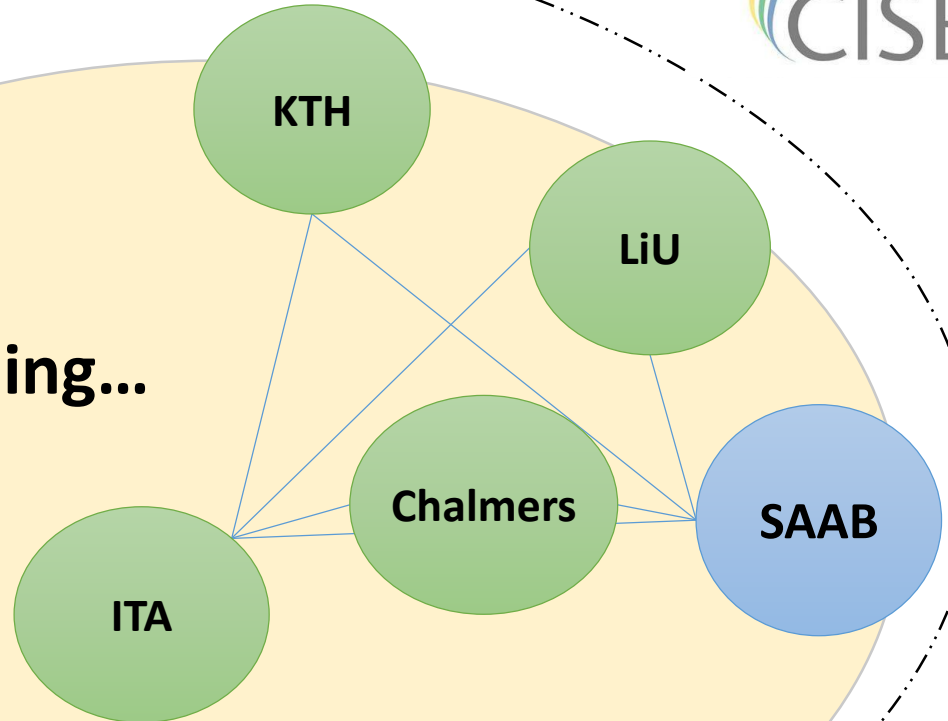
The Role of Academic Cooperation in a Long-term Partnership



CISB-SAAB Chair – Example of the Catalyst Effect



The beginning...



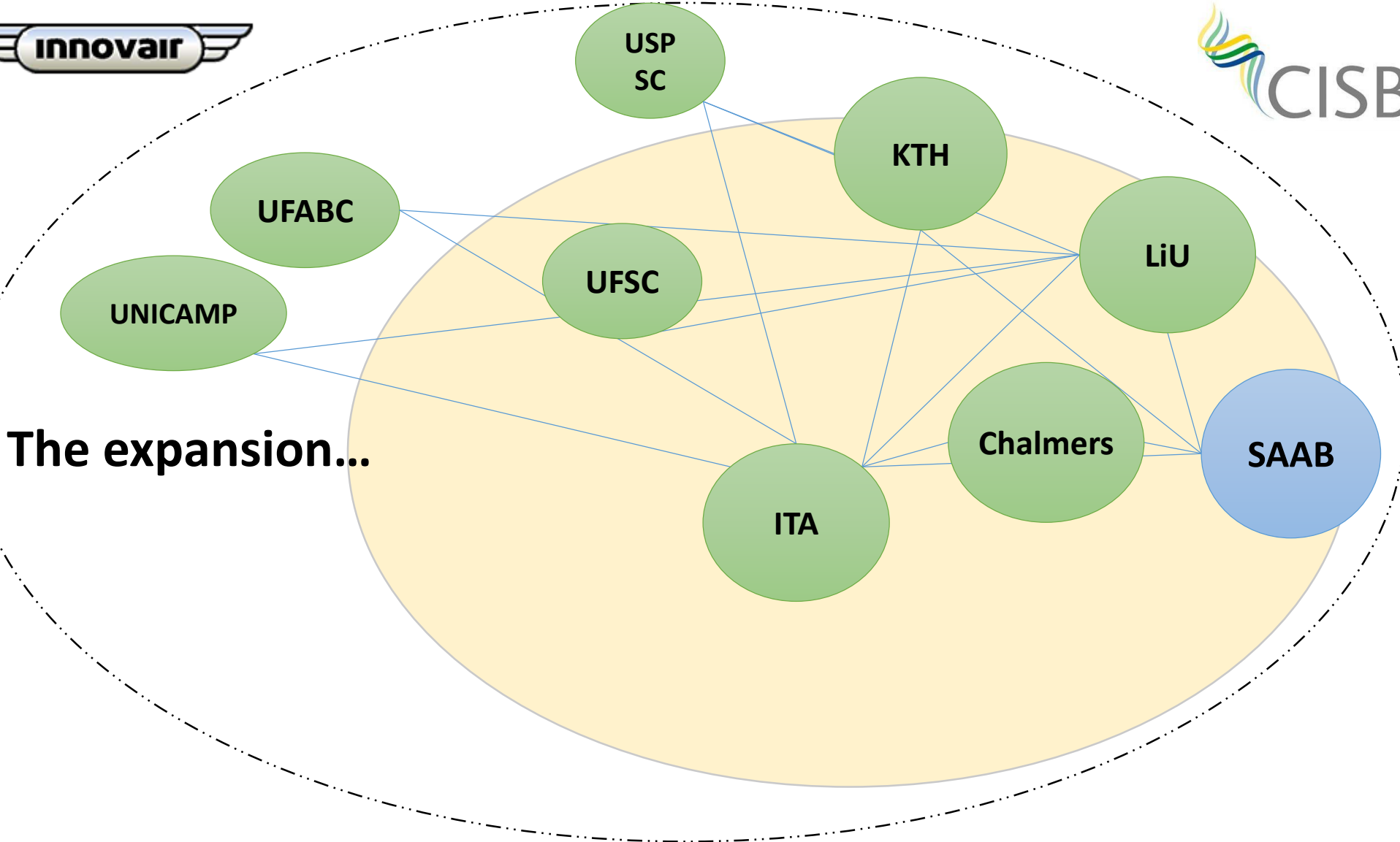
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CISB-SAAB Chair – Example of the Catalyst Effect



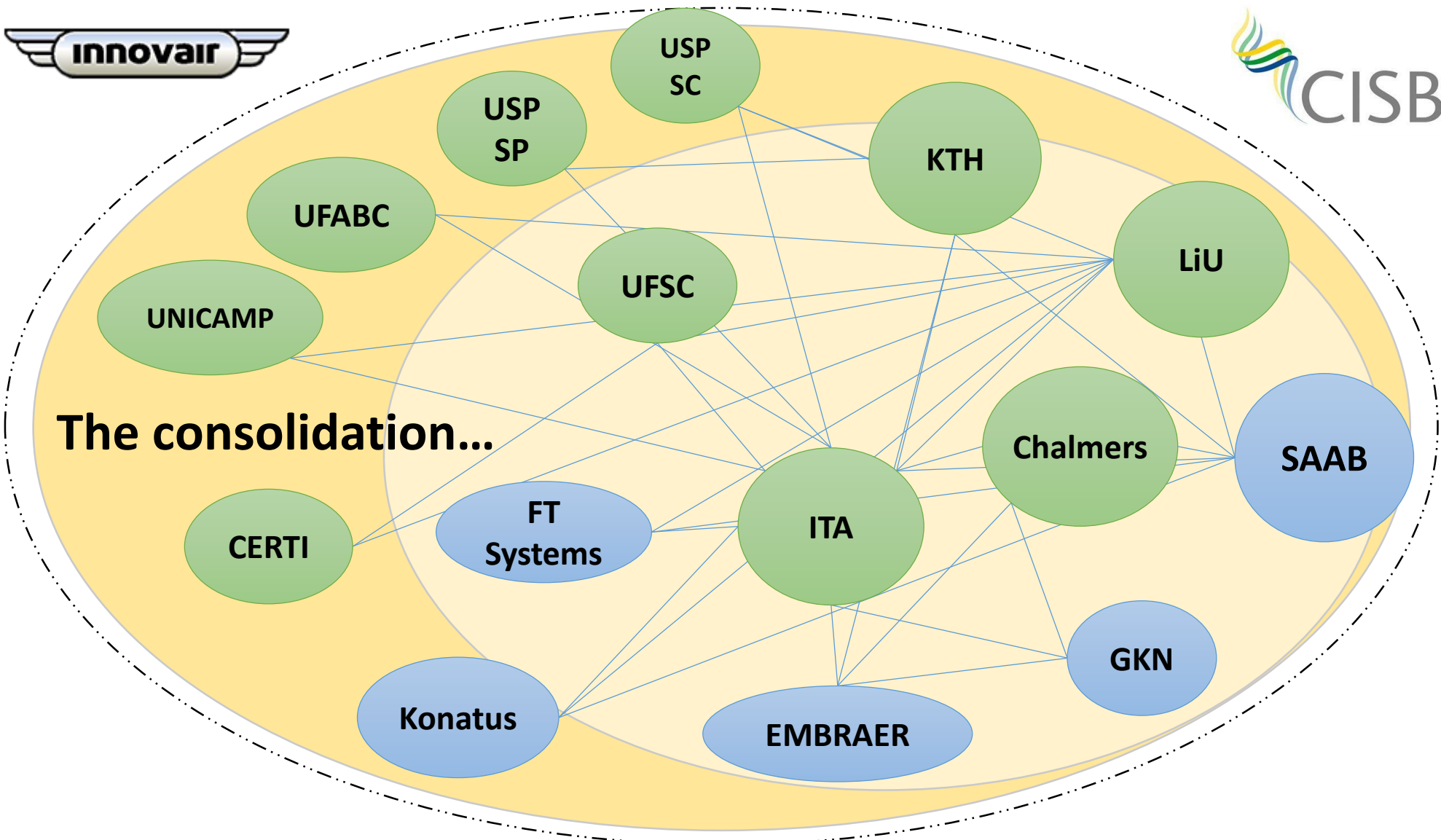
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CISB-SAAB Chair – Example of the Catalyst Effect



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The High Level Group and its Executive Committee

Matrix for Strategic Cooperation in Aeronautics

No	Technology Area (from figure in ToR -- see below)	Time period Short-term = up to 4 years Medium-term = 5-12 years Long-term = over 12 years	Preferred TRL for cooperation, in the respective time interval		BR-SE bilateral working group common view Cooperation subjects suitable for the initial period
			Dual/Triple Use		
			BR	SE	
1	Communications Networks	Short Term	Med	Med	Communication and network solutions for unmanned/autonomous applications
2	Autonomous Systems	Short Term	Low	Low/Med	Collaboration between manned and/or unmanned platforms, including decision support and dynamic replanning. Connection to Human Factors and single pilot cockpit. Concepts of operation / levels of automation / on-board intelligence / autonomy / sense-and-avoid / airworthiness / certification.
3	Aeronautical Engineering	Short Term	Low	Low/Med	Methodologies for evaluation of unsteady aerodynamics in the transonic regime and the use of such methodologies in aeroelastic analysis and dynamic loads prediction.
		Short Term	Low	Low/Med	Laminar Flow: active technologies for flow control; sensor and actuator network architectures; concepts for laminar wing design.
4	Propulsion	Short Term	Low	Low	Heat management, cooling and aero-acoustics. Bio fuel.
5	Materials	Short Term	Med	Low/Med	Characterize nano-reinforced multifunctional materials for aeronautics applications.
6	Human Performance	Short Term	Low	Low	Including HMI, human factors - aviation safety, workload / stress / situational awareness / new generation cockpits / crew coordination.



Selected Areas for BRA-SE Cooperation

- Communications networks
- Autonomous systems
- Aeronautical engineering
- Propulsion
- Materials
- Human performance

Creation of HLG (2015)

Protocol
20 October 2015
(List of participants enclosed)20215/06122/POF

REGIERINGSKANSLIET
Ministry of Enterprise and Innovation

Protocol of the first meeting of the Brazilian-Swedish High Level Group meeting on Aeronautics on 19 October 2015

During the Brazilian-Swedish Joint Committee on Economic, Industrial and Technological Cooperation held in Brasilia 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.

The HLG held its first meeting on the occasion of H.E. President Dilma Rousseff's visit to Sweden on 19 October 2015. The meeting was jointly held by the Swedish Deputy Minister for Enterprise and Innovation, Olof Stenstrom, together with the Swedish Deputy Minister for Defence, Jan Salestrand, on the Swedish side. The Brazilian Commander of the Air Force, General Nivaldo Luiz Rosseto, was head of the Brazilian delegation.

During the HLG meeting on 19 October, Brazil and Sweden jointly agreed to:

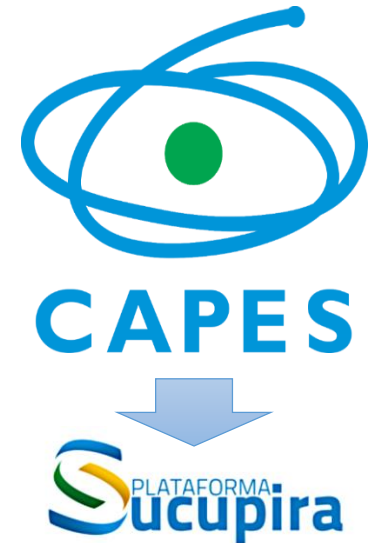
- Appoint two contact points for the HLG. Initially these positions will be held by:
 - o Swedish contact point: Olof Stenstrom, state secretary, assisted by Hanna Bergdahl and Anna Terner, Ministry of Enterprise and Innovation
 - o Brazilian contact point: Jose Augusto Crepaldi Affonso, Brigadier-do-Ar, Ministry of Defence



HLG Meeting (2017)

Financial Support to R&D in Brazil

- CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior)
 - Under the [Ministry of Education \(ME\)](#)
 - Supports and evaluates [PhD and MSc Programs](#)
 - Supports students and professor mobility in specific and generic calls
 - Proposes the [CAPES PrInt Call](#), in replacement of the Science without Borders
- CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico)
 - Under the [Ministry of Science, Technology, Innovations and Communications \(MCTIC\)](#)
 - Supports academic researches, INCT and Industrial PhD
 - Maintain the [CV Lattes Platform](#) and CNPq research grants




Financial Support to R&D in Brazil

- **FINEP** (Financiadora de Estudos e Projetos)
 - Supports R&D with industrial partners
 - Had a call with VINNOVA in 2016


- **FAPs** (Fundação de Amparo a Pesquisa do Estado de ...)
 - **FAPESP**, from the São Paulo State, has just signed an agreement with VINNOVA
 - **FAPEMIG**, from Minas Gerais, had a call with VINNOVA in 2016
 - **FAPESC**, from Santa Catarina, is supporting CERTI and UFSC



Budget Challenges

		
	R\$	Kr
MSc student (50%)	0 ~ 1,500	0 ~ 3,500
PhD student (80%)	0 ~ 3,000	0 ~ 7,000
Post doc (100%)	6,000	14,000
Professor (10%)	0 ~ 2,000	0 ~ 4,700

Different **project costs** should be taken into account by **funding agencies!!**

		
	R\$	Kr
PhD student (80%)	15,000	35,000
Post doc (100%)	28,000	67,000
Professor (10%)	4,700	11,000

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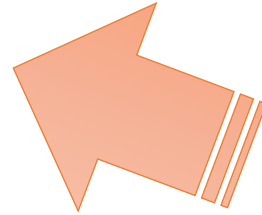
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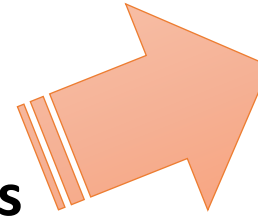
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São José dos Campos



São José dos Campos



INPE
National
Institute
for Space
Research



DCTA Department of Aerospace Science and Technology



ITA
Aeronautics
Institute of
Technology



IAE
Institute of
Aeronautics
and Space



IEAv
Institute for
Advanced
Studies

...



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EMC-UFSC

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ITA Research Areas

1	New aircraft concepts
2	Air Transportation Engineering
3	Manufacturing, automation, production and innovation management
4	Autonomous systems and embedded systems
5	Aerospace propulsion and sustainable energy
6	Advanced materials, multifunctional materials and aerospace structures
7	Nanotechnology and surface engineering
8	Command & control, electronic warfare, cyber-security
9	Logistic and system engineering
10	Space science and engineering
11	Aeronautics infrastructure
12	Basic research in physics, chemistry and mathematics

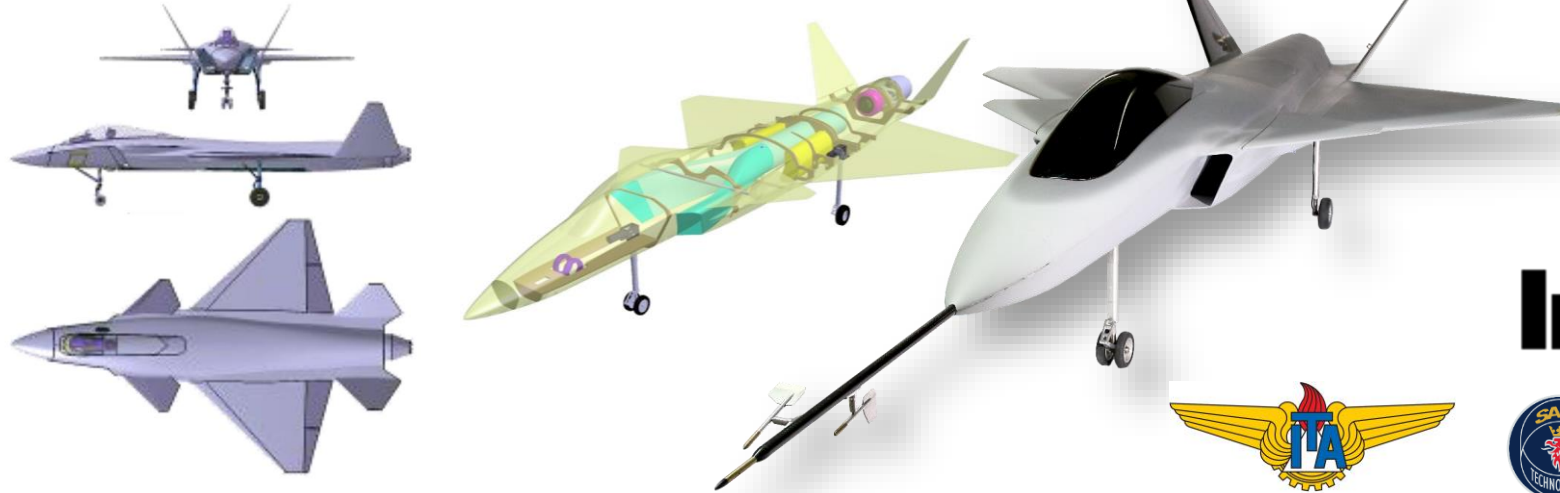
Main Areas for Internationalization

1. Green aviation
2. Space
3. Autonomous systems
4. Mobility and sustainability

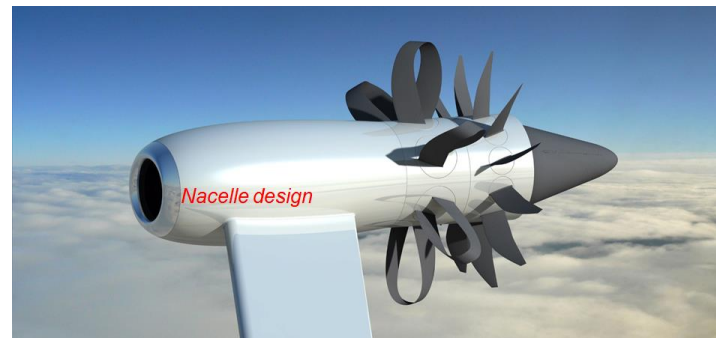
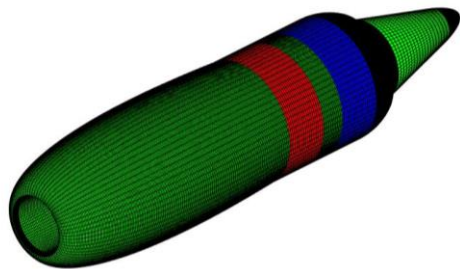
Brazilian Swedish Collaboration @ ITA



- **MSDEMO** - Subscale flight testing for early evaluation of new concepts



- **INFLOPROP** - Influence of the installation of propulsion system



CHALMERS



GKN AEROSPACE



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- **IVHM - HFA** - Integrated Vehicle Health Management (IVHM) and Human Factors Analysis (HFA) based on Big Data



KONATUS

li.u LINKÖPING UNIVERSITY



SAAB

- **SENAI – VINNOVA Projects**

- Flexible Automation
- Additive Manufacturing
- Snake Robot

INSTITUTO SENAI
DE INOVAÇÃO



SAAB

Prodtex



Cobolt

swerea
swedish research



li.u LINKÖPING UNIVERSITY

X-LASER
Systems in Sweden AB

akaer

EngeMOVI

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Florianópolis



Florianópolis & Joinville



Innovation Ecosystem



Centers of Reference in Innovative Technologies



Federal University of Santa Catarina (UFSC)



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Florianópolis

More than 600 technology companies
2 high quality public universities
15 graduate educational institutions
4 Venture Capital funds



1st Brazilian capital in digital inclusion
One of the best 10 cities to work and live in the world (*Newsweek*)
The best Brazilian capital in life quality
The friendliest city in world (*Condé Nast Traveler*)



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CERTI Ecosystem

- Founded in 1984 with the mission to support companies in developing advanced technology solutions for products and processes (innovation)
- Institution of Science, Technology and Innovation
- Private, independent and non for profit organization
- About 370 employees in the group
- Associated Institutions - Manaus e Brasília



Sapiens Park



CERTI - Headquarter



CELTA Incubator



CERTI - LabElectron



Cventures

UFSC - Federal University of Santa Catarina



Mechanical Engineering Department
67 Full time faculty
25 Laboratories / Research groups
About 15,000 m² building area

46,225 Students
2170 Faculty staff
3174 Technical and administrative staff
116 Undergraduate courses
61 Master programs
55 Doctoral programs



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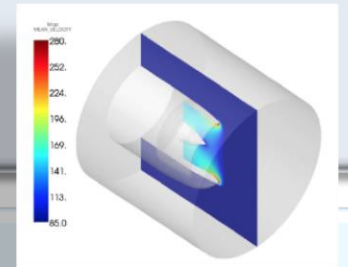


■ Acoustics and Vibration: **AIRCRAFT ENGINE NOISE REDUCTION**

- KTH - Marcus Wallenberg Laboratory for Sound and Vibration Research
- UFSC – Acoustics and Vibration Laboratory
- Topics:
 - Acoustic treatments for aeronautic engines (liners)
 - Numerical techniques in confined aeroacoustics

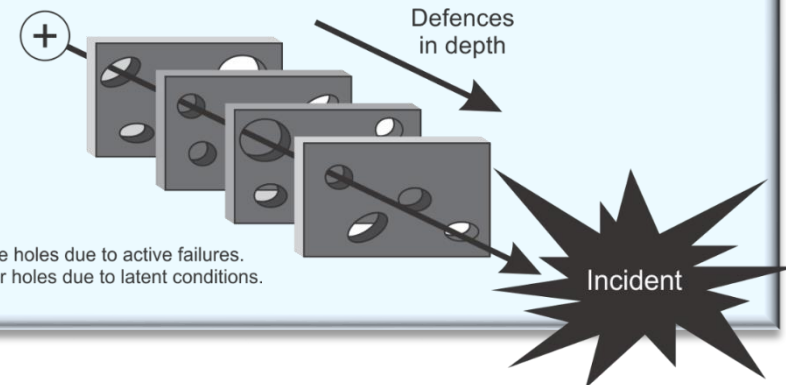


Swedish Research Council



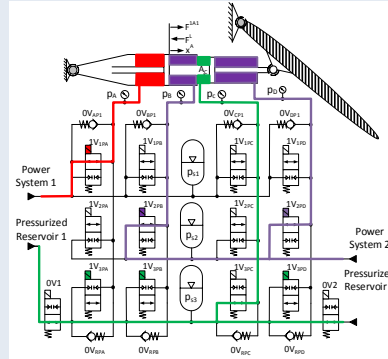
■ Design Methodology: **SYSTEM SAFETY AND RELIABILITY**

- Linköping University – Department of Management and Engineering
- UFSC – Department of Mechanical Engineering



Hydraulics and Pneumatics: EFFICIENT HYDRAULICS FOR AIRCRAFTS

- Linköping University - FLUMES
- UFSC – LASHIP
- CERTI
- Topics:



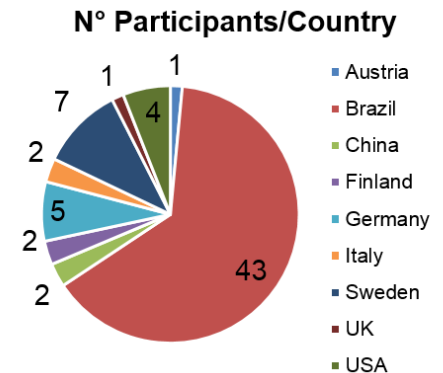
SAAB



- Focus on flight control actuation
- Hydrostatic transmission for wind turbines

WORKSHOP ON INNOVATIVE ENGINEERING FOR FLUID POWER

- WIEFP 2012, 14, 16. 4^o Edition: November, 2018



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■ SC2C.Aero - Santa Catarina's Center of Convergence for Aerospace Technologies

- **SC2C.Aero is a technical networking group** created in 2017 with the objective to connect companies, government agencies and technology institutions in the aerospace sector.
- Resulting from the ongoing collaboration with Linköping University, KTH, and Saab

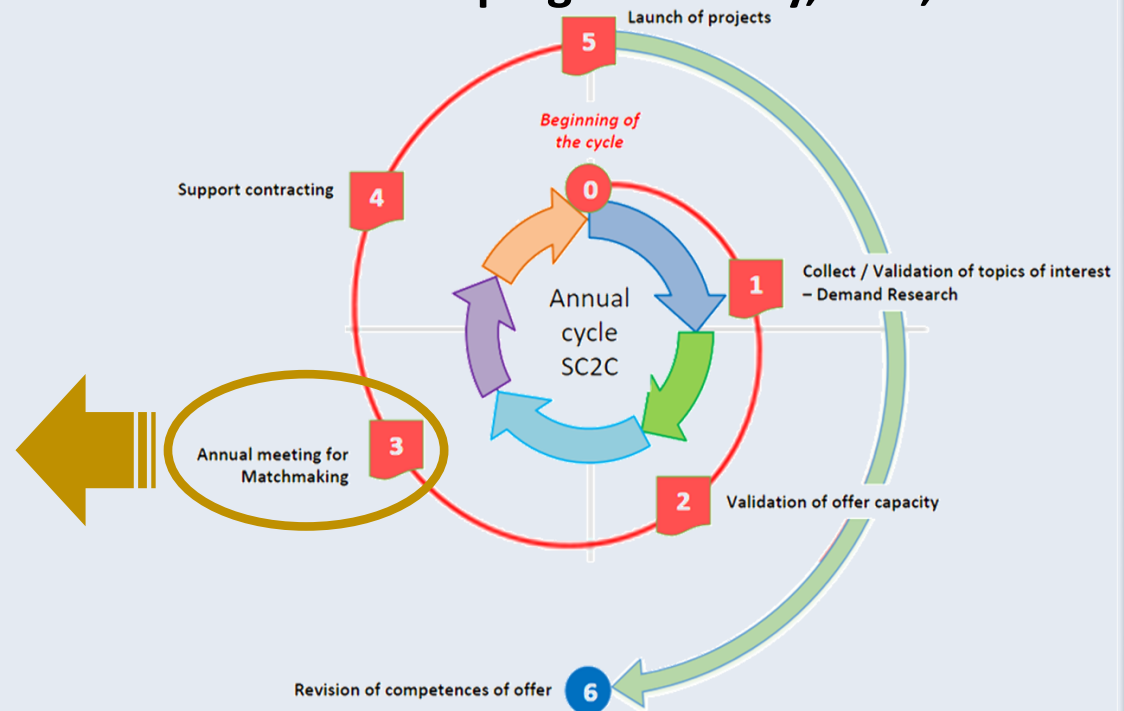
1st Workshop SC2C.Aero

MAY 3 - 4, 2018 • FLORIANÓPOLIS/SC • BRAZIL

Organization



Support



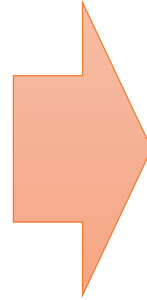
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Opportunities for the Future...



New call for **Post-docs** and **PhD sandwich** students expected for August 2018



31st Congress of the International Council of the Aeronautical Sciences
Belo Horizonte - Brazil



7th BRA-SE Workshop
September 14, 2018



Opportunity to visit us at UFSC and ITA!

ITA entrance authorization: send us a copy of your passport 1 month in advance!!!





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Tack så mycket!

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