Establishment of the Swedish Aeronautical Research Center (SARC)

Ingo Staack, Linköping University
SARC is a national aeronautical research center hosted by Linköping University and funded by INNOVAIR, one of the first VINNOVA strategic innovation programs.
Globalization: Efficient Innovation

- Competitiveness via technology
- Shortened time from idea → product on market
- Internationalization
- The 3C challenge:
INNOVAIR's SARC vision

Swedish Aeronautics Research Centre SARC will:

- organize competitive education programmes at all levels
- establish contacts between all relevant actors (students, researchers, professors) such that they may cooperate nationally and jointly form strong teams for international research proposals
- work with the appointed cluster leaders from Saab and GKN to organize meetings between actors in each technical cluster
- contribute to state of the art technical summaries and proposed priorities for next and future NRIA
- be involved in Innovairs internationalization activities
Background

• Ensure Sweden's future **competitiveness**.
• Provide **complete** innovation system
• Strengthen **collaboration** between basic research and research on higher TRL levels
• Increased need for **research at low TRL levels** at universities
University – Industry – Government Interplay
The Role of Academy/Industry Research Programmes

University

Research Researchers

Research results
Domain knowledge

Education
Students

Phds

Industry

Engineers
University

Research
Researchers

Education
Students

Phds

Engineers

Industry

Research results
Domain knowledge

Straddlers

Cluster leads
Give Feedback and Strategic Decision for the National Aeronautical Research Projects (NFFP)
University

Research
Researchers

Education
Students

Research results
Domain knowledge

Phds

Cluster leads

Industry

Engineers

Straddlers
The Triple Helix

• Sweden with one of the most <digitalized> society
• Country of high innovation
• Interplay on different levels:
  – research centers, science parks, tech. transfer offices, incubators, etc.
• **Specialty**: Dual (or even triple) use research financing
• Social pay-off of the Gripen E/F:
  – 2.6-fold return on public investment!
Prediction of Research/Technology Maturity

- TRL well established index
- BUT:
  - product development VS research VS market
  - scaling effects
  - fails short on complex System of Systems (SoS) applications
TRL Alternatives

• MRL := Manufacturing Readiness Level
• BRL := Business Readiness Level
• IRL := Integration Readiness Level
• SRL := System Readiness Level
Collaborative Research Project

• Generate a SARC-common evaluation method of the environmental (and social) impact of future technologies

• SARC target:
  – sustainability goals: UN, European (e.g. Flightpath 2050) and National goals
  – enable comparison of assessments
    ➢ more robust decision making
    ➢ identification of strategic low TRL research fields
    ➢ research financing, lobbying and collaboration with SIPs etc.
SARC Activities
Four SARC Fields of Operation

I. SARC.RESEARCH
II. SARC.ACADEMY
III. SARCINTERNATIONAL
IV. SARC.EDUCATION
SARC.RESEARCH Initial Activities

• Kick-off meeting 18-19/6 at LiU with >100 participants

Ongoing work:
• Establishment of dialog arenas with the 15 industrial cluster leads
SARC.ACADEMY

- Expertise from earlier graduated schools
- National high-quality course program
- Creates a network among PhD students, both nationally and also internationally

- Fundamental courses in Aeronautics for all NFFP PhD students:
  - *Create understanding for relations at system level. This is important in order to understand how individual projects relate to top level requirements.*
SARC.ACADEMY Kick-off: S4: "SARC Short Summer School"

- Daniel P. Raymer: *Aircraft Design: A Conceptual Approach*
- Preliminary date: March 18-22, 2019
- Location: Florianopolis, Brazil
- Participants: 20 Swedish + 20 Brazilian PhD students
SARC.INTERNATIONAL

• Center gives Swedish universities an arena to strengthen internationalization
  – Initial focus on Brazil, UK and Germany
  – Both countries have strong academic focus on aeronautics

• The national Graduate school will prioritize activities that make international collaboration possible
  – International competitions (e.g. SAE BRASIL AeroDesign project)
  – Double degree programs
SARC.EDUCATION

• Exchange of experiences
• Sharing of know-how and infrastructure
• Wider international reach of Sweden's aeronautical education competence / attractiveness
• Investigate possibilities for collaboration between master programs e.g. course sharing
http://www.sarc.center

SARC
Swedish Aeronautics Research Center
The National Network of Aeronautical Scientists

SARC.RESEARCH
Foster your research cooperations

SARC.ACADEMY
The Swedish aeronautic Ph.D. academy (forskningskolan).

SARCINTERNATIONAL
Intensify your international research relations
How it started

2013
The SAAB Gripen contract with Brazil
The SAAB Gripen contract with Brazil including aeronautical technology transfer set needs for a tighter academia-industry relationship and enhances the importance of international collaborations.

2015
Professors of Aeronautics at ITA / CIBS
To tighten the Brazilian-Swedish collaborations within aeronautical research, three Swedish aeronautical professors Petter Krus (LIU), Dan Henningson (KTH) and Tomas Gronstedt (Chalmers) get the endowed Chair at ITA in honour of the Peter Wallenberg Stiftelse.

2016
First Center Foundation Work
First ideas within INNOVAIR for a national aeronautical research organization as a complement to industry were formulated.

SARC is born...
Everybody has to prepare before take-off, also SARC. Basic ideas and the foundation were actually already established within the Swedish aviation sector before SARC was born. Read more about this exciting times below.

2017
Industrial Cluster Leads
The establishment of fifteen industrial competence clusters within aeronautics (with cluster leads from GKN and Saab AB) strengthens the need for an academic complement.

2017
Center preparation work
Center preparation work commenced. Dan Henningson, Petter Krus and Tomas Gronstedt are assigned by INNOVAIR to work out a proposal of a national aerospace research organisation/cluster. During 2017 several work meetings were arranged at KTH, LIU.

2018-05-21
SARC is born!
The Swedish Aeronautics Research Center (SARC) is born! LIU’s principal, Mrs. Helen Dammelius, signed the center establishment contract at Linköping University as the host. Executive director of the first year is Dan Henningson (KTH/LIU). Chairman is Anders Bjorn (INNOVAIR).

2018-06-18/19
SARC Kick-off
SARC is presented to the public with a two-day inauguration event at Linköping to over 100 participants from academia, industry, agencies and politics.

Heading for education...
Tack så mycket!