Open ScienCe Aeronautic & Air Transport Research

Open Science and Intellectual Property: Cross Stakes in the Field of Air Transport

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Marie-Claire Coët (ONERA), Valérie Hachette (SAFRAN)

Cécile André (ONERA)

ONERA THE FRENCH AEROSPACE LAB

SAFRAN

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Table of Contents

Open Science and Intellectual Property: Cross Stakes in the Field of Air Transport

Number one aerospace player in France

- Innovative solutions for industry
- Expert advisor to the Government
- Shaping the future
- Strategic thrusts for Aeronautics, Defense and Space
- World-class test facilities (Wind-tunnels)

www.onera.fr

"All the major civil and military aerospace programs that have given to our industry its current technological and economic strength, and through it to France and Europe, contain a very strong dose of "ONERA INSIDE"

Bruno Sainjon, CEO of ONERA

Open Science

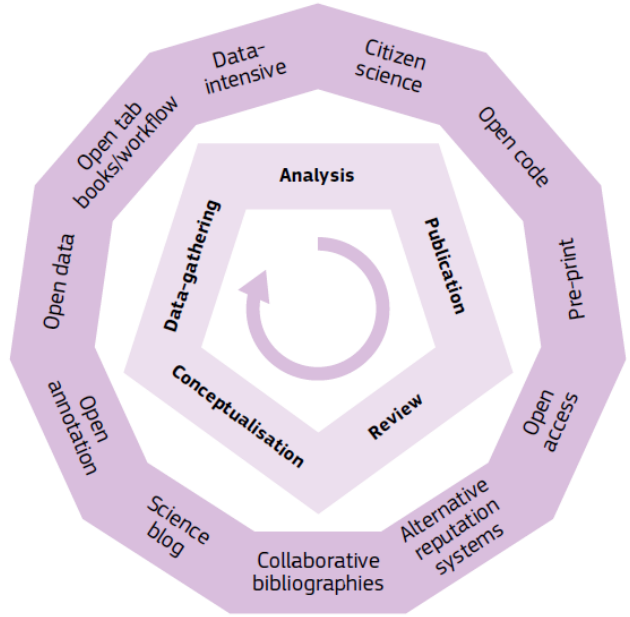
"Open Science represents a new approach to the scientific process based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools"

From: Open Innovation - Open Science Open to the World
a vision for Europe / ISBN 978-92-79-57346-0 / doi:10.2777/061652

Open Science

The Open Science movement aims to build an ecosystem in which science is more cumulative, more strongly data-driven, more transparent, faster, and universally accessible.

- Open science does not only refer to open access to publications.
  It also concerns free access to research data as well as to calculation codes, algorithms, etc.
- Publications can all be freely accessible; the case of preprints is specific.
- Data should be *"as open as possible and as closed as necessary".*
  A lot of data is already protected: by intellectual property, trade secrets, confidentiality, etc.
- Open Science is an important and disruptive shift which affects the whole cycle of doing science and research, from the selection of research subjects, to the carrying out of research and to its use and re-use, as well as all the actors involved (scientists, universities, institutions, librarians, publishers, etc.).



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More generally, Open Science is a question of opening up the whole research process.

Stakes of opening up science

- *Science regarded as a common good* with achievements accessible to everyone
- Public money ? → Public data !
- *Economic efficiency*: irrigate all innovation sectors (small organizations, SMEs, and communities, NGOs etc.) which don't necessarily have access to scientific literature
- Greater *impact*: more readers and citations for open publications
- Avoid *duplication and redundancy*: science should be cumulative
- Data *preservation*: the first beneficiary of Open Science is the researcher himself who, ten years later, can retrieve his data because he shared or opened them
- *To favor* and *catalyze innovation*: interdisciplinary crossing
- To contribute to *scientific integrity*, with more transparency and participation, in particular:
  - ✓ the opening of data is encouraged for the purpose of transparency and proof
  - ✓ Open Science is a lever to strengthen the confidence of citizens

Scientific integrity is defined as "all of the rules and values that must govern research in order to ensure its honesty and scientific rigor" It is an ongoing consideration, essential condition for maintaining society's trust in research stakeholders

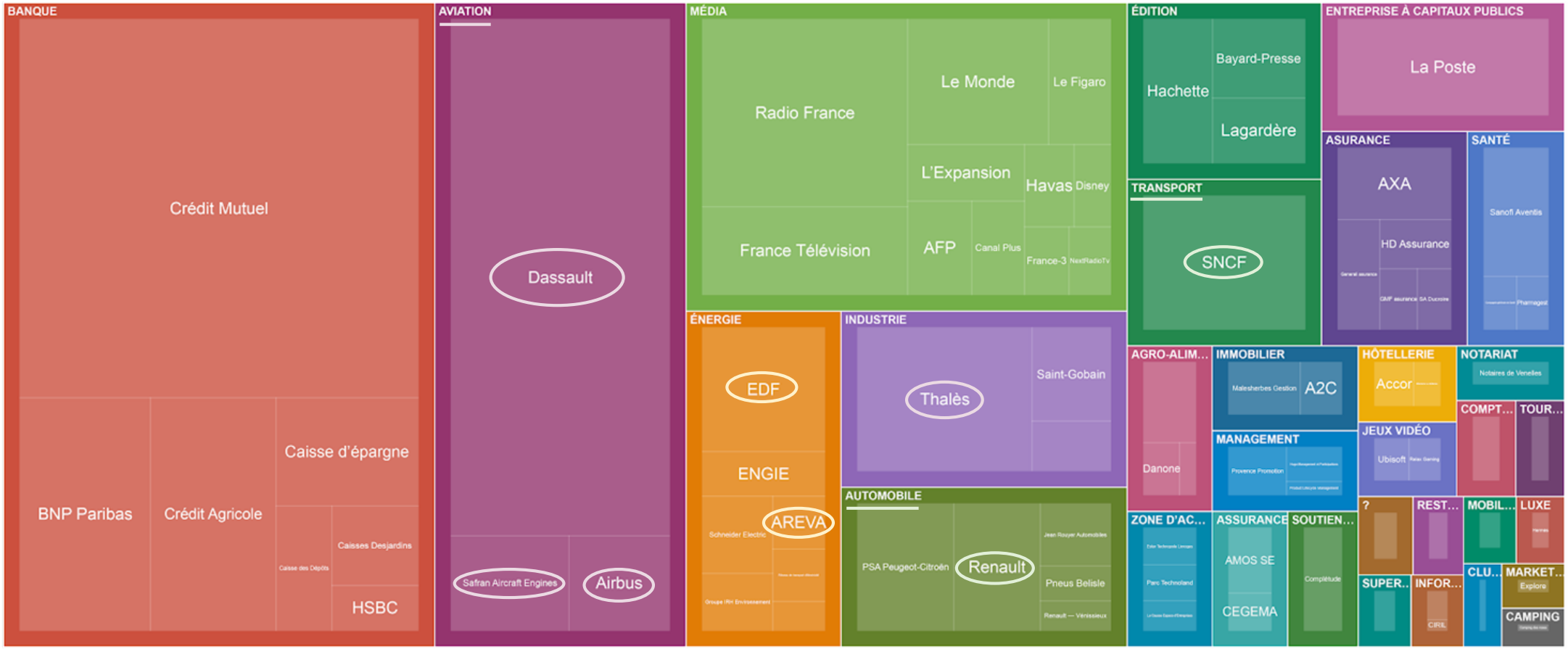
Inserm

Open Science at ONERA

- Recent creation of an “Open Science" mission at ONERA
- Open access: Institutional deposit of ONERA publications on the open archive HAL
- Edition: a diamond scientific journal: Aerospace Lab Journal
- Communication: many awareness and training actions to promote open science (research data)

A conference by M. Dacos at ONERA - February 13, 2020
Online video on YouTube - English subtitles

Decompartmentalization, serendipity and unexpected reader



Thanks to Open Access, the OpenEdition platform, dedicated to Human and Social Sciences, is consulted by companies in many sectors of activity

(Identified access in companies among the 5000 IP most consulting OpenEdition)

Thanks to Marin Dacos

Open ScienCe Aeronautic & Air Transport Research

https://oscar-h2020.eu/ https://cordis.europa.eu/project/id/824350

A European Union's Horizon 2020 Coordination & Support Action launched in January 2019

A 30-months-project, which addresses the current perception, acceptance, and implementation of Open Science in the field of European AAT research and in other fields interacting with European AAT research issues

"Pave the way towards Open Science in European aviation research by detailed analysis of the landscape and by developing, validating, and promoting a suitable Open Science concept."

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Open ScienCe Aeronautic & Air Transport Research

https://oscar-h2020.eu/ https://cordis.europa.eu/project/id/824350

7 partners / 5 countries

Main goal:

To initiate and to deliver an OS concept suitable to the European AAT research environment

... meaning ...

→ An analysis of the current OS situation in the European aviation sector
→ An OS concept promoted and known in the European aviation sector
→ A balance between OS approaches and IPR requirements
→ Implementation guidance by means of a Code of Conduct
→ Validation of the OS approach in selected test projects

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Open Science and Aeronautics & Air Transport Research

What do people in the AAT community think about Open Science?

The Investigation

OSCAR Mini Survey

- getting responses from as many people as possible
- low barrier – quick and easy to answer
- highlighting the most…
  … important,
  … urgent,
  … controversial issues
- getting the „general mood“ of the AAT community

OSCAR Big Survey

- going to more details and depth
- less multiple choice, more options to differentiate and bring up own ideas
- capturing the various currents of opinion
- highlighting the needs, requirements, expectations and hopes of stakeholders

OSCAR Structured Interviews

- completing the picture gained by the Mini Survey and the Big Survey
- follow up on specific points which were raised in the surveys
- get individual answers on whether, why and how OS could work for aeronautics

Summary of Comments on OSCAR Surveys

Variety and pace of emergence of OA journals makes it difficult to judge credibility, value and relevance to publish there at sometimes **very high APC costs**

Information should be **correct** and **valuable forever**
independent organizations should be **supervised**

Open Science is viewed very **critically in AAT**

copyright and **protecting own funding** and **investment** is a key question

Due to **business competition** of major aircraft manufacturer it's important to **keep research experience confidential**

To build an European OPEN SCIENCE **only with the public bodies of EU Members States**

Open science is **not used** today

It is necessary to **end the domination** on the market of the **main scientific editors**

How to encourage and organize contribution to **Open Source** software for research is a difficult question

Open Science is very dangerous for Europe taking into account the **international competitiveness**.

Traceability from new research information to older

Quality of data is very important. Data should be able to get a "quality" stamp.

There is **no belief** in OS in AAT

Confidentiality of proprietary data is often an issue

Monetary support to publish my work on open access scientific journals

When, as me, you work on **military subject**, it is always difficult to know what can be classified as Open Science

Interviews: SWOT Analysis

Drawbacks

- More work, no support by management
- Open Science landscape is too heterogeneous to be efficient and fun to work with.
- Quality of content varies, cannot be depended on
- Access cannot be reasonably regulated (e.g. restricted to European orgs who also contribute)

Chances

- Making research better: more dynamic, efficient, interdisciplinary, disruptive,…
- State-of-the-art is easier to access: better for education, finding niches and open challenges,…
- Becoming more attractive for the “best & brightest” talents in a world of increasing barriers

Fears

- Losing the grip of one’s Intellectual Property: as a company (loss of competitiveness) and as a scientist (loss of reputation)
- Approach of EU will be too rigid, demanding, regulated, unbalanced and underfinanced to unlock the potential of Open Science

Hopes

- Open Science can be the driver to really address the enormous challenges aviation is facing
- Strengthening reason-based cooperation again across the frontiers which are being erected today
- Key to master the transition to a digital and greener society in Europe

AN INTERNATIONAL HIGH-TECHNOLOGY GROUP

4 CORE BUSINESSES:
Aerospace propulsion
Aircraft equipment
Aircraft interiors
Defense

WORLD'S No.3 AEROSPACE COMPANY
(excluding aircraft manufacturers)

More than **84,000 EMPLOYEES** in **30 COUNTRIES**

€24.6 BILLION
in revenue*

€3.8 BILLION
in adjusted recurring operating income*

€1.7 BILLION
in R&D expenditures*

More than **1,200 FIRST PATENTS APPLICATIONS**
filed*

*as of 12/31/2019

INNOVATION AT SAFRAN

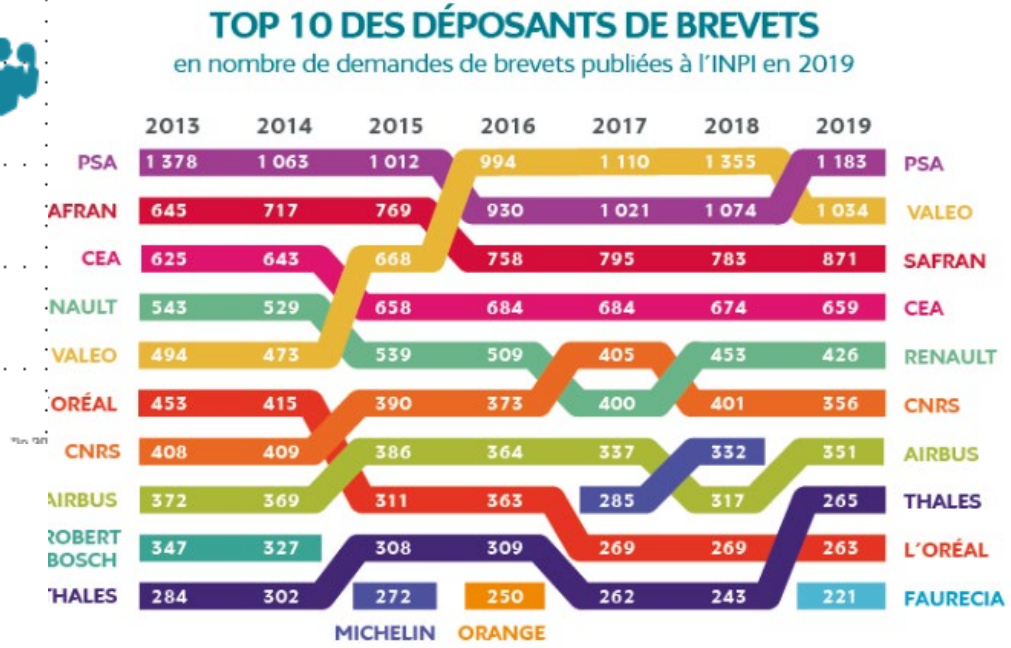
€1.7 BILLION IN R&D EXPENDITURES

16% OF EMPLOYEES INVOLVED IN R&D

1,300 EXPERTS IN THE GROUP*

More than **1,200** FIRST FATENTS APPLICATIONS FATENTS FILED

Safran is ranked among the **TOP 100** GLOBAL INNOVATORS by Clarivate Analytics

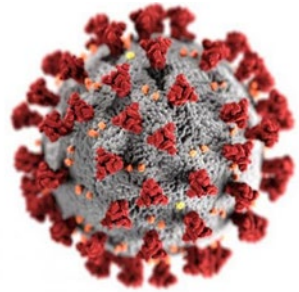


AAT sector specificities with regards to IP protection

- Sector with high level of expertise on cutting-edge technologies
- Development of sensitive technologies under national defense interest or potential dual-use technologies
- Long-term development and exploitation cycles (long-term life-cycle of programs)
- AAT is subject to stringent requirements (such as security or energy transition) which require significant R&DI investments
- Sector highly competitive : highly competitive area for Europe against China and US and highly competitive specific know-how

It requires a high level of protection either by patents or by confidentiality

Open Science & Industry



We support the objectives of Open Science :

- Data constitutes the raw material of scientific knowledge
- Sharing data shall contribute to a science of better quality, avoid duplications and create opportunities
- Industrials contribute to the scientific progress and co-innovate with academic institutions
- The AAT community has to face new challenges where open science may significantly contribute

Open Science can be the driver to really address today's big challenges that aviation is facing

Reconciling mobility & climate change requires a truly cross-cutting approach across disciplines (fundamental physics & chemistry, chemical engineering, social sciences, biology, etc.) and to do so in better processes of research (more dynamic, integrative, holistic, etc.)

What's the place for the industry?

- Industrial R&D aims first at **preserving a competitive advantage** …
  - For the industry, data is a potential asset and shall constitute a competitive advantage
  - We support strong RD&I investments driven by product applicability ⇒ expectations of commercial value of the results
  - Research data such as technical data may be IP ⇒ **data is an intangible asset**
- For the industry the most complex element of Open Science to manage is definitely the open access to research data
- At european level, Open Science seems to be implemented under a « one size fits all » approach :
  - Whatever the level of fundings, the maturity of development, the sector considered, the scientific disciplinary, the nature of data, the type of projects…
  - Openess is the principle, opt out is possible under exceptions
  - Only a certain type of license if applicable (CC By 4.0 or CCO.1.0) to share data ⇒ the most permissive of CCL
- The interests of all stakeholders including the industry have to be better taken into consideration

Open Science v/ IP

Open science should not limit Intellectual property

Due to business competition of major aircraft manufacturer it's important to keep research experience confidential

Does IP contradicts with Open Science?

- IP contributes to the scientific knowledge ⇒ state of the art
- IPR are made publicly available ⇒ either by publication of the title (patent, design..) by an office or by disclosure (ex: artistic work)
- IPR give you an exclusive right: the right to authorize or to prevent the use of the IP
- That's the key point: to keep the right to decide about the conditions of the sharing
  - Open science should not be a black or white approach
  - Open science is not about opening any kind of data but managing the openess of data : no dissemination of know-how
  - Criteria may apply: scientific displicinary, maturity of developement, sector considered, nature of data..
- A balanced approach between open science and IPR shall be encouraged ⇒ more flexibility could be an incentive for private stakeholders

Manufacturers are constantly adjusting know-how they have to open up so to maintain the competitive edge on one hand and be customer-focused on the other. Open Science will not change the way this is being handled as stakes are too high

Some recommendations

Open Science should be more promoted

- This is the main objective of our recommendations to adjust the final version of the OSCAR code of conduct
  - Who is concerned by Open Science? Not only academia research institutions, not only researchers
  - Who will benefit from Open Science?
  - What is Open Science? The concept of Open Science and these different aspects have to be better explained to stakeholders, what is subject to Open Science? How Open Science and innovation are matching together
  - How Open Science is implemented ? What about the legal rules, technical barriers and international reciprocity?
  - Deliver positive and concrete examples of benefit for the AAT sector

The OSCAR code of conduct shall reveal the added value of open science to the AAT community

Thank you!

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