Surveillance products and Open Source Software
SPOSS2 study – Economics & Governance

Elements from the project developed for EUROCONTROL
FLOSS 4.0 conference / Jena (D)

Dr. David W. VERSAILLES – Univ. Paris 1 et I-Space Institute
Dr. Thomas LE TEXIER – Univ. Rennes 1 et Univ. Nice
Dr. Valérie MERINDOL – Univ Paris IX Dauphine (IMRI)
Consultants at Open Solutions SA/NV (Brussels)
Contacts – **Project staff**

Our website… [http://www.opensolutions.be](http://www.opensolutions.be)

- **Dr David W. Versailles**
  Project leader, Senior economist, Univ Paris I (PHARE) and I-Space Institute

- **Dr Thomas Le Texier**
  Deputy project leader, Economist, Univ Rennes 1 and Univ Nice

- **Dr Valérie Mérindol**
  Senior political scientist, Univ Paris IX Dauphine (IMRI)

- **Mr Marc Speltens**
  Senior ATM expert
  Managing director, Open Solutions SA/NV
Roadmap of the presentation

- The ATM and SPS ecosystem
  - Technological environment
  - The introduction of public actors in the ecosystem

- Business models options
  - Current situation: EUROCONTROL as owner and system integrator
  - Co-integration with an ATM system integrator in the industry
  - Mediation authority only
  - Procurement agency only

- Governance issues
  - Performance risks vs Relational risks
  - Governance drivers

- Business model options
  - Definition of services, and applicable charging options for each product
SPOSS 2 Study commissioned by EUROCONTROL

SCOPE OF THE STUDY
- Follow-up of the study dedicated to technological and safety aspects managed by a broad consortium, and in which OPEN SOLUTIONS SA has taken an active role.
- The SPOSS 2 project focuses on economic issues and about governance modalities.
- It aims at elaborating the elements of a business model suited to the new institutional arrangements to prevail (« user charging »).

METHODOLOGY
- Abductive methodology
- Close and recurrent interaction with the executives in charge of the Surveillance Products and Services Unit at EUROCONTROL HQ
- Interviews with the industry, with institutional stakeholders and with end-users, with the SPS staff and Surveillance product managers
- Investigation of EUROCONTROL internal documents
Technological environment

RMCDE/SDDS
Network system status of “public good”

ARTAS
Data Fusion system for Air Traffic Management (ATM) strategic asset at the kernel of the ATM public service

SASS-C v6 &v7
Tools for the Surveillance infrastructure performance assessment common reference “validated” by EUROCONTROL as “neutral” institution
## Roles in the ATM/SPS ecosystem

**ATM, AIR TRAFFIC MANAGEMENT: a Safety-critical Security-related mission**

<table>
<thead>
<tr>
<th>INDUSTRY</th>
<th>System integrator</th>
<th>Understanding of all modules provided by all actors; decision about specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Co-integrator</td>
<td>Strategic competence about components and modules; Responsibility over a sub-system</td>
</tr>
<tr>
<td></td>
<td>Specialized supplier</td>
<td>Dedicated competences on specific aspects, eg. Services suppliers, maintenance suppliers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ATM Service providers</th>
<th>END-USERS</th>
<th>Air national services providers (ANSPs): National (Often Governmental) bodies in charge of ATM responsibilities at national-level</th>
</tr>
</thead>
</table>

| REGULATORS | (Inter)national institutions | Bodies in charge of issuing aviation related regulations (eg: EC, EASA, NSA) |
Current situation

EUROCONTROL’s STAKEHOLDERS

Funding

Returns of Experience

SPECIFICATIONS

products

R&D procurement

R&D results

product procurement

products

SPS Owner and System integrator

Major ASD integrator in the industry or Specialized ATM integrator

END-USERS

ARTAS
SASS-C
RMCDE - SDDS

Dedicated products

R&D and production suppliers

Value Chain

END-TO-END USERS

R&D procurement

R&D results

product procurement

products
3 scenario options... in order to cope with institutional evolutions

The options are made possible because the reference to Open source software and to Open innovation processes allows for renewed business models and governance options: EUROCONTROL has it now possible to interfere with all stakeholders

- **Co-integration,** if the Agency preserves internal R&D capabilities and competences(ies) in its transition from the status of owner and system integrator

- **Mediation authority,** if the Agency focuses on the management of users and producers communities, and of usage-led innovation processes

- **Procurement agency,** if the Agency is to cope with mutualized functions associated with procurement, procurement policy and IPR rules
Option: Co-integration with an ATM system integrator

ATM products

EUROCONTROL's STAKEHOLDERS

Funding

Returns of Experience

ARTAS
SASS-C
RMCDE - SDDS

END-USERS

Funding

R&D and production suppliers

Major ASD integrator in the industry or Specialized ATM integrator

The co-integrator's STRATEGY

Value Chain

The co-integrator's STRATEGY

CO-INTEGRATION

SPECIFICATIONS

- products
- R&D procurement
- product procurement
- R&D results
- products

R&D results

Dedicated products

END-USERS

Funding
Option: Mediation authority

EUROCONTROL's STAKEHOLDERS

Funding

Funding

SPS INTEGRATION

SPS products

ATM products

ATM integrator in the industry

ATM / SPS specialized supplier

SPS products

R&D results

products

R&D procurement

product procurement

R&D and production suppliers

Dedicated products

SPECIFICATIONS

SPEC.

RETEx

ARTAS

SASS-C

RMCDE - SDDS

END-USERS

Value Chain
Option: Procurement agency (pro-competition policy)

EUROCONTROL's STAKEHOLDERS

Funding

ARTAS
SASS-C
RMCDE - SDDS

Any ASD / ATM integrator

Funding

SPS INTEGRATION

SPS products

ATM products

R&D results

R&D procurement

Product procurement

R&D and production suppliers

Dedicated products

END-USERS

Value Chain
Governance issues

**Governance mechanisms:**

- Hierarchies based on authority
- Market related relations based on prices
- Communities based on trust

**Causes impacting the mechanisms**

- Technological competences (and « depth »)
- Managerial competences
- Complexity of the product
- Dynamics of innovation
- Performance risks
  - ie. The risks associated to the level of performance of the project, which depend on regulations, institutional aspects (and switches), technological evolutions, competition rules…
- Relational risks
  - ie. the interaction between Eurocontrol, end-users, and the industry
Governance mechanisms

- Substitution vs. Complementarity between governance mechanisms depend on relational and performance risks

- Market relations show that the current situation is based on budget, and not on prices
- Relational and community-based relations make explicit the « unity » of the stakeholders’ expectations
Limitations of business model academic references

- Most business models
  - are single-sided
  - are profit-driven
  - introduce linearity assumptions, from code elaboration to commercialization of OSS related products or services

- ATM/SPS services-related charges cannot only rely on the twofold reference
  - to communities
  - to the code “openness”
  - to the code ownership
  ...without introducing a reference to the (public) status of goods

The EUROCONTROL case is driven by:

- Transition from a free-of-charge budget-related system to an environment based on “user pays” mechanisms
- Cost-recovery mechanisms
- Close embeddedness between EUROCONTROL and end-users, who commit to decision-making processes and communities
- A responsibility over the preservation of systemic maximal Safety
Characterization of SPS services

- Characterization of services for each SPS product
  - Safety management
  - Quality management
  - Customer group management
  - Configuration management
  - Support management (incl. help-desk, maintenance)
  - Strategic management
  - Contract management
  - Training

- Our project requires an investigation of the combination between the charges applicable to services (for each product) and to SPS products

- Charges combine market-based, and community-based mechanisms

- Market-based mechanisms refer to the public status of goods/services
Contacts – *Project staff*

*Our website… http://www.opensolutions.be*

- **Dr David W. Versailles**
  Project leader, Senior economist
  david.versailles@opensolutions.be
  (gsm) +33-609 52 54 56

- **Dr Thomas Le Texier**
  Deputy project leader, Economist
  thomas.letexier@opensolutions.be
  (gsm) +33-619 34 66 31

- **Dr Valérie Mérindol**
  Senior political scientist
  valerie.merindol@opensolutions.be
  (gsm) +33-617 09 06 43

- **Mr Marc Speltens**
  Senior ATM expert
  Managing director, Open Solutions SA/NV
  marc.speltens@opensolutions.be
  (gsm) +32-475-247 715