Software Governance and Licensing at ESA

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List of Topics

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IPR at ESA: Main governing principles

- Article III of the **ESA Convention**: the Agency shall **ensure** the Member States' (MS) right to access and use all data, information and Intellectual Property (IP) resulting from its activities. Specifically, ESA has an **obligation to make available** to the MS data, information and IP that the Agency **owns.**

- **Part II** of the **General Clauses and Conditions**: even when ownership is left with industry (standard regime), ESA has the right to **grant sub-licences,** for the Agency's Own Requirements, on IP generated in the frame of ESA-funded industrial contracts.

- "MS" includes "persons and bodies" under each MS's jurisdiction.

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Constraints / criticalities

- According to the rules currently in force (see GC&C Clause 49), each **transfer outside the ESA MS** of "ESA-funded IP" or "ESA-owned IP" or of any **product** containing the above must be submitted to the ESA ATB for recommendation (std.) or decision (ESA-owned IP).

- Whilst exercising the rights acquired through its industrial contracts, ESA strives to **balance** its overall objectives with the need to safeguard the commercial interests of its industrial partners (e.g.: Background IP).

- **Technical and legal risks** potentially jeopardising the Agency's, as well as Industry's, work due to (involuntary) **infringement of third-party rights**, e.g. in the case of **SW re-use**.

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WARNING!

- Within the Space sector, hundreds of contracts foreseeing some SW development are placed by ESA and within industry;

- Such developments very often constitute building-blocks of much larger projects, within which many different actors may need to be given access to a single SW product. Whoever (ESA, Primes, ….) will need to grant the corresponding licences, **must have full visibility** on the conditions inherited through re-use to be able to avoid liability for infringement of third-party rights;

- ESA, as well as industry, grant but also receive licences to **use** SW as is. They also often need to grant/receive licences allowing the **re-use**, **modification and further distribution** of a software product;

- If the **full mapping of the applicable licensing conditions** is not known and thoroughly analysed, the risk of infringement is extremely high and we may discover, too late, that the licensing scheme, and hence the use, we envisaged for our development is meaningless.

Constraints / criticalities

SW re-use is fairly common practice. However, existing SW, especially when originating from third-party sources, comes with **licensing conditions** which must be <u>carefully checked beforehand</u> for **compatibility** with the new development's intended **objectives (e.g. use, licensing scheme, etc.)**.

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Constraints / criticalities

- Whereas the need for such checks is (should be) more obvious in the case of re-use of SW made available through "traditional" licensing schemes (commercial / proprietary SW, etc.), the same is not true for SW which can be easily downloaded e.g. from internet as **"free software"** and comes, <u>**apparently**</u>, <u>without a proper, enforceable licence</u>.

    ➢ In fact, even though not a traditional one, to be signed on paper by one "Licensor" and a "Licensee", a licence is virtually always there, imposing a number of constraints, sometimes rather substantial ones, on users/"licensees";

    ➢ Such licence agreements are typically entered into by downloading the SW;

    ➢ This applies to many SW categories, including SW available as **Open Source**.

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ESLB

As part of the effort to establish a consistent Governance of the Agency's SW development and SW licensing activities the **ESLB - ESA Software Licensing Board** was recently established to, a.o.:

- Promote internal measures and standards aimed at acquiring full visibility on
    1. the actual **components of a software product**, including any re-used element, delivered under an ESA contract;
    2. the **licensing conditions** relative to re-used elements;
- Identify any potential legal risk arising from the presence of the above;
- Establish and enforce an internal procedure to obtain, prior to any internal approval of a new procurement cycle, all information available on the development and purpose of a software intended for (sub)licensing;
- Authorise (sub)licensing of SW as per the GC&C;
- Create and maintain a **database of "licensable" ESA software**, including any associated legal constraints.

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ESLB

One of the ESLB's first initiatives has been to coordinate with internal stakeholders (initiating Directorates, TEC-SW, HSO-G, etc.) to introduce, as part of all ESA SW procurement, standards allowing ESA to:

- convey explicit requirements on what type of information is expected from industry w.r.t. SW to be re-used (during tendering and development);

- acquire **early** (i.e. during the **tendering** and the **development** phases) **visibility** on SW re-use and the related licensing implications;

- coordinate with industry to find suitable alternatives in case any licensing constraints resulting from re-use are incompatible with the objectives set by ESA for the development itself;

Internal work is on-going to define an ESA-wide approach.

Example of the standard used in the ARTES20 Management Requirements

4.1 Software Reuse File (SRF)

The Software Reuse File (SRF) shall be composed of the following two sections:

1. SECTION 1, dedicated to present the analysis carried out to decide about the reuse (or not) of existing software taking into account the technical, operational and commercial requirements of the project. Furthermore the analysis shall cover the way the reused software will be embedded and/or integrated with the software to be developed in the project. The reused software shall be described in accordance with the information listed below (SRF List).

2. SECTION 2, to characterise the deliverable software in terms of constituent elements and the associated licensing schemes. The deliverable software (i.e. including developed and existing reused software) shall be described in accordance with the information listed below (SRF List).

SECTION 1 of the SRF shall be presented at CDR for discussion and approval, and an updated version shall be provided at SAT.

SECTION 2 of the SRF shall be delivered at the FR.

a. software item name and main features;
b. developer name;
c. considered version and list of components;
d. licensing conditions;
e. industrial property and exportability constraints, if any;
f. implementation language;
g. development and execution environment (e.g. platform, operating system);
h. applicable dispositions for warranty, maintenance, installation and training;
i. commercial software necessary for software execution, if any;
j. size of the software (e.g. number of source code lines, and size of the executable code)

Types of software procurement → licensing

1. **GENERAL CASE**: **IPRs generated** under a contract remain **with industry**, no specific ESA requirements on IPR except the standard right to use, modify, sub-license, etc. for the Agency's Own Requirements;

2. **OPERATIONAL SW**: IP ESA needs to control in order to fulfil its institutional mandate. **All IPR are typically required to vest in ESA**;

3. **OPEN SOURCE**: depending on the selected **scenario***, ESA may
   - require that the delivered SW be **licensed**, by industry, as Open Source under ESA-PL or a TBD licence type;
   - require that existing Open Source SW be **used** by industry to develop the required SW;
   - decide to directly distribute the SW (a type of Operat. SW)
   - optionally, ask for assignment of IPRs;

* See following slides

ESA operational software

Software critical for the Agency's ability to fulfil its institutional mandate, for which ESA requires to have **full control on IPR**. ESA normally grants traditional licences on Operational SW to industry.

The following conditions are, therefore, mandatory:

- water-tight contract conditions to be used in procurement actions for Operational Software (to **get a "clean"** software IPR-wise);

- extended acceptance process to ensure that the delivered software complies with the IPR related clauses (i.e. **it is clean**) ➔ E.g. use of the **BlackDuck tool** to verify the presence of OSSW in the code;

- ability to manage 3rd party SW licences (incl. OSSW) in view of the general principle whereby ESA is expected to (sub)license software it owns to "Persons and Bodies within its Member States";

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Scenarios for which ESA considers the use of OSSW licensing as beneficial

Scenario 1 Collaboration with Universities and Research Institutes

- Contributions to scientific initiatives based on sharing of software under an Open Source scheme.
- development of advanced software applications in collaboration with Universities and Research Institutes.

Scenario 2 Promotion of space international standards

- promote the widest possible use of open standards whose implementation and adoption is facilitated by supporting software development kits and applications..

Scenario 3 Mission Data Processing tools

- ESA, other participating Agencies, European institutions (EU, CERN, ESO, etc) and Education Centres (University, schools, etc), the science community, payload providers and industry involved in the procurement of the space system need to cooperate tightly together.

Scenario 4 Engineering Tools

- Specialised engineering analysis tools, for which only a very limited user community exists, and collaboration between the users to share the maintenance and upgrade of the tool.

Scenario 5 Industrial Commercial Interest

- For industry e.g. for promotion purposes or for economical and quality reasons (engaging a large user base to test and improve a product, to reduce maintenance cost since the open source community built around the product participates in the software validation and improvement, lucrative service contracts).

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Open Source and export control

- From the internal regulatory point of view, the main issue is how to harmonise the nature and requirements of OSSL with ESA's existing rules for **export control** (ESA ATB std. review procedure theoretically required for every licence "issued" ➜ different approach adopted);

- This is not compatible with the very nature of "proper" OSSL (each and every licensee may also become licensor in a "cascade" fashion) and **hardly controllable by ESA** past the first level of licensing;

- ESA has concluded that in many cases it is enough to apply the principles of OSSL within the territory of the MS by using a type of licensing scheme called "**ESA Community Software licensing**" (ECSL);

- ECSL is identical to OSSL with the exception of imposing limitations on the licensees' freedom to re-license, namely the limitation of re-licensing only **within ESA Member States territory**;

- Due to the abovementioned major non-compliance with the OSS model, ESA Community SW **cannot be considered to be OSS**.

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Open Source and choice of licence

The main possible cases exist with respect to ESA SW developments for which OSSL may apply:

- **MODIFICATIONS TO EXISTING OSSW** (licensing Framework tends to be **inherited** if the original licence is a **"reciprocal"** one)
  - An OSS product exists that can fulfil ESA project needs after a proper qualification is carried out, which may imply modifications to the product to correct deficiencies or pass the qualification (e.g. the RTEMS case).

- **SOFTWARE DEVELOPMENT RELYING UPON EXISTING OSS** (licensing Framework tends to be **inherited** if the original licence is a **"reciprocal"** one)
  - International collaboration (GEANT4), diffused ownership, (relatively) small ESA contribution

- **NEW OSS DEVELOPMENT** (licensing framework imposed by ESA)
  - As per scenarios

Main characteristics of OSS licences

- The rights granted through the licence are granted by the Licensor and in addition **by each Contributor** in respect of its modifications or contributions.

- A licence can be **reciprocal** (strong Copyleft, weak Copyleft) or **permissive** (non-Copyleft):

  - "Reciprocal" licences, like all OSS licences, allow licensees to modify source code and build derived works. The condition is that the licensee may distribute such works only if they make the modified source code available (the work remains OSS) and they distribute under the same licence as the original code (i.e. licensees of the derived works have the same rights and obligations). Reciprocal licences also support the notion that publicly funded software should remain generally available for use and modification;

  - "Permissive" licences do not have the above condition. Licensees may distribute binary-only versions of modified works without providing access to the modified source code, and may incorporate the entire work into their own proprietary software which they can license as they see fit. permissive licences support the commercial exploitation by third parties.

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Main characteristics of OSS licences

- Reciprocal licences are also known as **"copyleft"** licences and can be of two types: **"strong copyleft"** or **"weak copyleft"** .

- The **strong copyleft** licences imply that the copyleft provisions can be imposed on all kinds of "derived works" with very few exceptions. The prototypical strong copyleft licence is the **"GNU General Public License (GPL)"**;

- **Weak copyleft** refers to licences where not all derived works inherit the copyleft licence. Only changes to the software licensed under weak copyleft software itself become subject to the copyleft provisions of such a licence; software linked to it does not fall under the OSSL regime (and can therefore be licensed under proprietary license conditions). OSS licences that use "weak" copyleft include the **GNU Lesser General Public License (LGPL)** and the **Mozilla Public License**.

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The ESA Public Licence – ESA-PL

- ESA has recently adopted its own Open Source licence: the **ESA Public Licence - ESA-PL**;

- The ESA-PL is "modular" and can be "configured" as a reciprocal (strong copyleft or weak copyleft) or a permissive licence ➔ Types 1, 2 and 3;

- The current version is 2.0 but a new revision is coming up;

- ESA has the intention to apply for OSI certification

The following mapping of the OSS scenarios with respect to licence is proposed as an indication:

- 1 Collaboration with Universities and Research Institutes: *reciprocal*

- 2 Promotion of space international standards: *reciprocal*

- 3 Mission Data Processing tools: *reciprocal*

- 4 Engineering Tools: *reciprocal*

- 5 Industrial Commercial Interest: *permissive*

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The ESA Public Licence - ESA-PL v2.2 update

- Three different license types:
  - **ESA-PL Strong** (similar to the GPL)
  - **ESA-PL Permissive** (similar to the BSD)
  - **ESA-PL Weak** (similar to the MPL)
- Revised **version 2.2** coming up
- Updated **compatibility** clauses
  - ESA-PL Weak: compatible with **GPL and CeCILL**
  - ESA-PL Strong: **no compatibility** (e.g. no GPL compatibility)
- Updated choice of law clause
  - Depending on the ESA Member State where the Licensor resides

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The ESA Public Licence - ESA-PL v2.2 update

- Copyleft scope of the **ESA-PL Weak**

  - **Separation on a source code level necessary** ("MPL style" Copyleft)

  - ESA-licensed source code files and modifications remain ESA-licensed

- Copyleft scope of the **ESA-PL Strong**

  - Strong Copyleft ("GPL style"), covers **all modifications** to the ESA-licensed software

  - Additional **"AGPL style" service provision clause**: Obligation to disclose the source code upon service provision

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