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## 1. Introduction

While "open source software" is not a new concept in general, it is fairly new to EUROCONTROL.

I would therefore like to expand a little bit on the EUROCONTROL current policy and possible ways ahead.

Before doing this, however, I would like to mention a few words on some terms, which are often referred to in relation with open source software.

## 2. Terms

When looking for open source software one usually comes across the words "free software" and "open source software". Just a few words on these terms:

### Free software

The free software movement was launched in the early 80ies by Richard Stallman a former MIT student and IBM employee. Manufacturers had stopped at that time to distribute source codes, which prompted Richard Stallman make in the early 80ies his announcement for the GNU operating system a complete free software system, upward-compatible with Unix. ("GNU's Not Unix"). This was the birth of the free software movement.

Free software is characterised by the following four freedoms:

*Freedom 0:*     *The freedom to run the program, for any purpose.*

*Freedom 1:*     *The freedom to study how the program works, and adapt it to your needs. Access to the source code is a precondition for this.*

*Freedom 2:*     *The freedom to redistribute copies so you can help your neighbour.*

*Freedom 3:*     *The freedom to improve the program, and release your improvements to the public, so that the whole community benefits. Access to the source code is a precondition for this.*

### Open source software

The open source software movement has been promoted by Eric Raymond in 1997. Eric Raymond also former MIT student and adept of the free software movement further developed the concept and articulated the reasons why he believed that open source licenses-licenses resulted in higher quality, less expensive software.

Open source software to be recognized as such need to fulfil the following criteria:

1. *Free Redistribution: the software can be freely given away or sold.*

2. *Source Code: the source code must either be included or freely obtainable.*

3. *Derived Works: redistribution of modifications must be allowed.*

4. *Integrity of the Author's Source Code: licenses may require that modifications are redistributed only as patches.*

5. *No Discrimination against Persons or Groups: no-one can be locked out.*

6. *No Discrimination against Fields of Endeavour: commercial users cannot be excluded.*

7. *Distribution of License: The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.*

8. *License must not be specific to a Product: the program cannot be licensed only as part of a larger distribution.*

9. *License Must Not Restrict Other Software: the license cannot insist that any other software it is distributed with must also be open source.*

10. *License Must Be Technology-Neutral: no click-wrap licenses or other medium-specific ways of accepting the license must be required.*

The definition of open source software is more detailed and requires more conditions to be fulfilled than free software. One can therefore say that all open source software is free software, while the inverse is not necessarily true.

For the purpose of this paper, however, it will be enough to align to the definition of open software as being:

- software built/developed and enhanced through public collaboration,

- Free in that it gives users an unrestricted access to the source code.

It must not necessarily be free of charge, though in general it comes along free of charge (downloads on the internet) and is not free of copyrights.

Copyright

Copyright is the right created by an author of publications in the literary, scientific and artistic domain, whatever may be the mode or form of its expression (including software). Under continental European law, the "droit d'auteur" or Urheberrecht (a moral right of the creator of software or text = 'author's right') is automatically created and belongs to the writer/developer of software and is inalienable. One remains free, of course, to try make money out of this right and/or to enforce it or not.

Open source software while freely and generally available is usually copyrighted. While the copyright holder is not trying to make money of his rights, he will use copyright law to enforce the openness of the sources.

Copyleft

Copyright law is a way to restrict the right to make and redistribute copies of a particular work. Copyleft uses copyright law in order to ensure that every person who receives a copy or derived version of a work, can use, modify, and also redistribute both the work, and derived versions. This achieved mainly through the General Public Licences.

In a non-legal sense, copyleft is the opposite of copyright.

General Public Licence

Free software and open source software are distributed to anyone, but are subject to the adherence to a general public licence. Several models exist (of which the GNU licensing scheme is probably the best known) and aim at ensuring that users adhere to the 'conditions' listed earlier and to make sure that further developments are made available as open source as well.

Private copies and developments made for private use and which are not further distributed do not fall under the obligation of redistribution.

Patents

Patents are probably the biggest enemy of any open source software movement, as they tend to block the free use of inventions by third parties.

The approach to patentability of software is a rather different on both sides of the Atlantic. The United States have taken a more 'liberal' approach and are granting regularly patents for software as such.

Software patents in Europe have suffered a set back, earlier this year, when the European Parliament massively rejected with 648 to 14 votes the Computer Implemented Inventions Directive, which would have paved there way for software patents.

But one needs to be lucid about that this may only be a temporary setback.

Software has already been and will continue to be patented in Europe.

The European Patent Conventions lists as conditions for the patentability of an invention:

- It must be new,

- It must be possible to apply it industrially, and

- It must involve an inventive step.

National legislations in Europe have the same requirements.

The European Patent Convention explicitly excludes the patentability of computer programmes (software) as such. Software is, however, considered to be patentable if it has a technical character. This means that an invention must use technical features and solve a technical problem (i.e. if it causes a technical effect when running on a computer). This effect must be more than the "normal" physical interaction between program and computer. Software is in such cases considered to be more than a "program as such" and patents have been granted.

Provisional text: Authentic version to be delivered orally
**The contents of this paper are the view of the speaker does not necessarily reflect the official views or policy of EUROCONTROL.**

Public Domain

Public domain is any material that is uncopyrighted, i.e. whose copyright has expired, or is uncopyrightable. This can include government publications (depends on the state), factual data (measurements, heights of mountains, telephone numbers etc.), jokes, titles - and ideas and which are available at large.

Most items said to be 'public domain' are actually not. Being freely and generally available does not mean that there is no copyright.

Freeware

Often when referring to public domain, one probably means freeware. Freeware is software made available free of charge. It is copyrighted by its developer, who retains the rights to control its distribution, to modify it and to sell it in the future. It is typically distributed without its source code, which prevents modification by its users it therefore is certainly not open source.

Freeware is usually distributed with a license that permits its redistribution to some extent, for example allowing users to give copies to friends. However, there may be restrictions, such as limitations on its commercial use. Some licenses permit the software to be freely copied but not sold.

## 3. **EUROCONTROL**

EUROCONTROL as the European Organisation for the Safety of Air Navigation, an international intergovernmental organisation is constrained by a range of rules and regulations most of which are contained in the EUROCONTROL Convention and the Contract and Finance Regulations. These regulations have been drawn up and approved by the Member States with a view amongst others to guarantee that the funds made available by the Member States are managed in careful manner.

As from the 80ies industry realised the potential value of software as a highly profitable asset.

In 1995 intellectual property rights guidelines were established and adopted by the governing bodies of the EUROCONTROL Organisation.

The guidelines can be summarized as follows:

**1)** Software created, developed and produced by or on behalf of EUROCONTROL (under a contract) become and remain the exclusive property of EUROCONTROL, who is free to seek appropriate legal protection of the intellectual property rights in that software.

**2)** Where software is created, developed and produced in the course of a co-operation programmes resulting intellectual property rights would be owned by all parties involved.

**3)** Software nowadays regularly builds on pre-existing software (background software) developed by contractors prior to 'contracts'. Such background software is reused in the production of a deliverable. Of course ownership for such pre-existing software cannot be claimed. But EUROCONTROL has to try to obtain all relevant rights to use and distribute this background software together with the foreground software specifically developed for EUROCONTROL.

**4)** Licences

   a) EUROCONTROL makes available to its Member States and the appropriate ATC entities software, subject to the conclusion of appropriate licence agreements usually free of charge.

   b) Restrictive licences are granted to third parties for software, subject to appropriate, the licence agreements shall contain a clause ensuring a return of information (feedback) to be used by the Organisation for its own purposes and subject to the payment of licence fees/ royalty fees.

**5)** Intellectual Property Advisory Group

   The Intellectual Property Advisory Group composed by a number representatives of services of the Organisation monitors the application of the Guidelines and discusses cases on IPR requests which lie outside the policy and issues its opinion the Director General.


EUROCONTROL and the Open Source Software movement.

EUROCONTROL is in very early stages in this respect at least from a point of view of official rules and regulations.

Open source software may already have been used in some experimental projects, but there is no general policy on the use of open source software or to participate in such endeavour.

EUROCONTROL as an international organisation is not as free as industry may be and cannot overnight change it policy, take its software and make it available as open source.

Nevertheless things are on the move. Some examples (not all really open source software though):

-   Many technical documents are freely available on the Internet; they are put into 'public domain'.

-   Some software tools is available free of charge (though with a number of restrictions attached to it and usually not with the source code).

-   There is one recent example of participation in open source case for the ADA Rule Controller. It seems to have been a rather positive example as eventually EUROCONTROL benefited by receiving a lot more evolutions than the one that actually was paid for and put in to open, source.


Experience with the sale of software

EUROCONTROL is a not profit oriented, the selling or commercialising of software is therefore not the prime objective.

Hence have been only few outright sales of software licences (or rights). In some instances deals were struck in contract negotiations where ownership has exceptionally been left with the supplier (subject to a reduction in the price). Sometimes licences are granted in return of free maintenance and or other in kind contributions valuable to the Organisation.

Bearing in mind our special status, EUROCONTROL needs to be a cautious, as:

- EUROCONTROL cannot and does not wish to compete with private industry (this could and would be seen as unfair competition) and

- Software is very rarely developed from scratch and often bases on pre-existing proprietary software (background information), hence it is not possible to make such a tool (often involving third party software) available as open source software without facing severe risks of violating third party rights.

While commercializing software and thus patenting are not EUROCONTROL's prime aim, it is important to ensure that third parties are not patenting software or developments based on our ideas, works and would thus bar the ATM community to use such developments (or allow it only at high prices). Hence, we should pursue a large openness, as this would "destroy" novelty, which is one of the indispensable criteria for patenting).

## 4. FUTURE

Other areas seem to have adhered more quickly to the open source software movement than the ATM environment. This may be due to the fact that:

- ATM is a highly safety critical environment (and one may be reluctant to use software which has been developed/modified by third parties not very well known).

- Open source developments can be very quick (perhaps too quick) and the ATM environment needs a certain stability, linked mainly to hardware and systems which are very expensive and which cannot be changed/updated at liberty.

- The warranty and liability issues are not very clear. Software used so far is provided by suppliers, warranty and liability issues have been addressed and arrangements are in place. Such arrangements would no longer be applicable if open source was to be used and this could have an effect on liability/insurance.

- The ATM field requires special skills and expertise which comes a long rather expensive and may perhaps not be found in large numbers in the open source community

In addition one has always to bear in mind contractual and/or legal restrictions that hinder a free distribution of software with open sources:

- There are often pre-existing software/rights which EUROCONTROL contractually committed to respect, they cannot of course be put as open source and neither any development based on them as their functioning depends on the pre-existing software.

- But there are also legal restrictions, the best known are probably the US Export Restrictions.

Nevertheless, open source software has obviously also advantages, which could prove interesting to ATM:

- It allows a quick efficient change (especially for bug fixing)

- It is cheap (usually no licence fees)

- No vendor lock-in (as this is probably the most negative element of proprietary software). One is locked-in forever unless you change system in go into a new dependency (usually at enormous cost).

- The entire issue of background and foreground software would probably become obsolete. On paper this seems quite an easy concept, in practice things can become rather complicated though and impossible to separate.

How could open source work for research and development?

In principle nothing would really change from a procurement/contract point of view, as we usually request to become owners of the proprietary rights created, and would therefore be entitled to use them as we deem fit, including putting it into 'open source'.

It would be, however, prudent and fair to indicate in our contracts to make suppliers aware if we were to adhere to open source movement. This could result in a certain risk as industry might be scared to see their intellectual property assets becoming available to the public at large…hence this would probably have impacts on the price and or the way software is being developed and/or made available. Some companies are extremely worried to see their know-how / intellectual property rights being disclosed to competitors.

In any event to be successful and recognised in open source software the following conditions would need to be met:

- There needs to be an active, motivated and capably community interested to pursue this.

- There needs to be a well known easily accessible forum / portal

- The community would need to be guided administered. For this you would an authority which is, and is seen to be, neutral, competent and reactive/proactive.

- For the ATM community to enhance credibility and acceptability, any initiative would need the active involvement of ATC entities of the member states, and possibly industry as well.

As an international organisation independent from industry and/or particular member states and thus any particular interests other than the safety of air navigation, EUROCONTROL might have a role in such an open source software initiative in ATM.

**5.     Conclusions**

Open source as a concept is an interesting concept, and certainly worth further studying, still there will be no way around to study the implications so as to ensure not to violate any third party rights.

EUROCONTROL is starting to direct its attention the open source initiative and it is not by accident that this round table takes place at the EUROCONTROL Experimental Centre organized by our Innovative Research Unit.

While policies take a bit of time to accepted and changed there is hope that this may happen in the future

The nature of R&D and Experimental Centres would probably be the areas where an open source initiative seems the most promising as a start.

Thanks for your attention

# Open Source Software and evolution of Intellectual Property Rights at EUROCONTROL

*Sources:*
*European Patent Office:*           *www.epo.org*
*Free Software Foundation:*        *www.fsf.org/*
*The GNU Project:*                  *www.gnu.org/*
*Open Source Initiative:*           *www.opensource.org/*
*Wikipedia:*                        *http://en.wikipedia.org*
*www.brochure-design.com/brochure-design-publishing-terms.html*
*http://www.bellevuelinux.org/freeware.htm*
*http://computing-dictionary.thefreedictionary.com/shareware*
EUROCONTROL Material

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