

The case for MONSOON Open Source development.

Document purpose.

This document summarizes the considerable advantage that can be obtained by releasing technological developments to an open user community. In particular the argument of this paper considers the case for releasing the NOAO MONSOON development in this way. Generically, this form of technology release is called “Open source licensing ” and is by no means a new or unique endeavor; Bruce Perens wrote the first draft of an open source licensing agreement in 1997. Since that time, over sixty companies of commercial and ‘not for profit’ nature have successfully used public open source license agreements to enhance market penetration, accelerate product development, and reduce support burden.

Objectives of Open Source.

The objective of open source licensing, especially for software products, is well documented at <http://opensource.org> et. al. A few excerpts are reproduced here which capture the essence of the objective:

1. From the developers point of view:

*It's a way that many companies and individuals can collaborate on a product that none of them could achieve alone. It's the rapid bug-fixes and the changes that the user asks for, done to the user's own schedule. The open-source model also means increased security; because code (and design *) is in the public view it will be exposed to extreme scrutiny, with problems being found and fixed instead of being kept secret until the wrong person discovers them. And last but not least, it's a way that the little guys can get together and have a good chance at beating a monopoly. Of all these benefits, the most fundamental is increased reliability.*

2. From the clients point of view

Beyond all the reliability and quality gains, the open-source model has one overwhelming advantage for the software customer: you aren't a prisoner. Because you can get access to source (and design), you can survive the collapse of your vendor. You're no longer totally at the mercy of unfixed bugs. You're not shackled to every strategic decision your vendor makes. And if your vendor's support fees become exorbitant, you can buy support from elsewhere. For this reason alone, every customer should absolutely demand open source and refuse to deal with vendors who close and shroud their code. It's a matter of controlling your own destiny.

(*- Modified for the context under discussion.)

Specific references to system open source licensing (which include hardware designs) can be found at <http://opencollector.org/Whyfree/> and

With particular regard to the NOAO MONSOON project, the objectives can be re-stated as:

1. Market (or application) penetration. Technological advances in astronomy are dominated in this epoch by collaborations that enable the funding and skill sets required to complete complex projects. These collaborations are legally exhausting and carry a large administrative burden to administer the project. By releasing the MONSOON

design as open source, many projects can access, evaluate and use the technology without entering into a binding conformal contract with a collaborator, without the administrative burden, and in the knowledge that they themselves control their particular development schedule. Additionally, the application area applicable to MONSOON (Image acquisition systems) is very small. It is a historic fact that a single source for such a specialized application forces instrumentation designers to either accept the available product on faith and with its' inherent shortcomings for any particular application, or be forced to absorb the disproportionate expense of developing a one off system for their purposes.

2. Product development. The current mandate of the NOAO Major Instrumentation (MI) Group does not provide any incentive to produce products that can be freely marketed to other institutions except through specific collaboration agreements for instrumentation. This places the MI group in a position where it faces the dilemma outlined above i.e. To purchase image acquisition systems from an exterior single source or to develop a system for every instrument built by the group. MONSOON development is rapidly maturing to accommodate the current instrumentation needs however, there are large and enticing future applications for MONSOON (NOAO) that are presenting design challenges now. The group does not have the resources available to pursue these opportunities in a timely manner since our efforts are concentrating on the immediate needs. It is a fact that these immediate needs are the same as many of our colleagues face at other institutions and it is also true that their expertise is made available through an open source agreement when they adopt, adapt, and mature a particular application of MONSOON to their purpose. This allows the community of MONSOON users, including NOAO, to access a larger, more specialized (and therefore more suitable) product line, without the burden on resources at NOAO that this would normally require.

3. Advantages to MONSOON users. In one word; Ownership. With access to multiple sources of information at their disposal within the user community, and the completeness of information for their particular image acquisition system; Many support issues become much easier to integrate into their existing infrastructure. In addition, modifications to optimize or re-use the system can be engineered in confidence and without having to negotiate for information with a particular vendor of the system.

Characteristics of Open Source licensing.

In agreement with work carried out for open source hardware by Graham Seaman (1998): The conditions for Open source licensing require that:

1. The interface to the hardware must be explicitly made public, so the hardware can be used freely.
2. The design of the hardware must be made public, so that others can implement it and learn from it.
3. The tools used to create the design should be free, so that others can develop and improve the design.

In addition, since MONSOON is a technology built from hardware, firmware, and software elements, additions to these clauses are required to include software and firmware elements; Namely:

4. Free Redistribution. The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.
5. Source Code. The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost—preferably, downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program.
6. Derived Works. The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.
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.

These basic characteristics become the basis of a license agreement with which transfer of technology for MONSOON to other community users would take place. Many examples of suitable (and tested) license agreements are available through public open source organizations (see <http://opensource.org/licenses/>) from which such a license for MONSOON could be provided.

One important aspect of any open source license agreement is that all such licenses use terminology to exempt the authors from any liability or responsibility through the use of the technology. An example of such an inclusion (from the University of Illinois Open Source License) is: *THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE CONTRIBUTORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS WITH THE SOFTWARE.*

Implementation methodology.

In an effort to promote the technology and to maximize the return to NOAO as principle authors of the technology the following implementation is envisioned.

1. Continue the development of MONSOON within the NOAO MI group to fulfill obligations to existing and future instrumentation needs in NOAO.
2. Establish an explicit communication path for MONSOON using web based public publication of technical documentation on NOAO web space and a restricted access user community access through a BSCW server.

NOAO Internal Essay

3. Release all top-level design documentation associated with MONSOON to the public access space. This space will also contain a copy of the open source license release document and an invitation to join the community (i.e. the restricted BSCW server).
4. Release all detailed design documentation to the community space. Access to this information will require the acceptance of the license terms by the community member. There will be no cost associated with joining the community and NOAO engineers will moderate the community space.
5. NOAO will supply, under the license, hardware designed and manufactured by the MI group to other users who wish to employ these modules in their implementations of MONSOON at some cost plus overhead value.
6. Community members who develop specific hardware and software should, under the license terms, submit their detailed design to the community server for posting. In addition it is hoped (but not specified) that they also will supply hardware to other community members.
7. If deemed appropriate, the NOAO MI group can act as a systems integrator for selected and awarded contracts to implement the MONSOON solution for other institutions requiring turn key products. The terms of the general open source license will allow NOAO (and any other community member) to use community intellectual property to perform this function.

Summary.

Technical developers in the astronomical community eagerly await the MONSOON development to provide the capabilities required for future instrumentation. To facilitate product development and user acceptance, MONSOON should be offered to a users community under an open source license agreement. This community exists to provide tools to scientists for the exploration of the physical universe. Science involves risk and demands openness in technological developments to minimize this risk and to optimize the return on investment. Science cannot be served by any censorship employed on designs to protect corporations from perceived risk or used for reasons of commercial advantage. Risk minimization begins with mutual understanding between parties achieved through communication of objectives and capabilities. The open source licensing methodology for MONSOON promotes such an understanding and brings other benefits to the community. The community and science will be best served by a common image acquisition system design, shared between multiple developers and users, rather than any one single source of design.

Additional reading.

1. Legal commentary on open source issues and some history
<http://www.denniskennedy.com/opensourcedmk.pdf>
2. Open source legal resource page
<http://www.denniskennedy.com/opensourcelaw.htm>
3. NASA Open source initiative (Federal Government)
<http://news.osdir.com/article448.html>