

Space Weather Prediction Center

Support of NASA Open Code Policy

Short Summary: The Space Weather Prediction Center (SWPC) supports the benefits of a NASA open code policy, but also recognizes potential drawbacks. SWPC advocates for the following considerations to address the drawbacks: (1) “right-sized” licensing, (2) clear roles and responsibilities, and (3) code management.

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The Space Weather Prediction Center (SWPC) supports the benefits of a NASA open code policy but also recognizes potential drawbacks. The benefits and pitfalls of such an open code policy are well documented, and as a user of and contributor to NASA supported space weather models, SWPC advocates for the following considerations: (1) “right-sized” licensing, (2) clear roles and responsibilities, and (3) code management.

Many policies, reviews and analyses have been conducted on the value of open code approaches. The benefits are clear: accelerated code evolution, increased community trust in the code base, and increased code longevity. Repository management systems, e.g., GitHub, have arisen to support the mechanics of large-scale collaboration. Likewise, the pitfalls are well described, particularly for government organizations. Some examples include: Sensitivity to ITAR controlled information, Bayh-Dole Act implications for software developed in part by contractors or grantees, and mixed licensing for different components of an overall system. For users in highly controlled operational or sensitive domains, open source licensing may preclude adopting open source code.

The Space Weather Prediction Center is highly involved in the transition of research models into operations (R2O) and the provision of critical feedback to researchers which guides the future evolution of said models (O2R). While SWPC does not seek to reiterate the generally known benefits and issues of open source codes, this paper highlights lessons learned from our experience of working with a variety of models from partners in academia, government, and industry. Each of the major models SWPC has worked with - WSA-Enlil, Geospace (SWMF), and WAM-IPE - have presented their own unique challenges in terms of intellectual property rights, code access, and code management. However, none of these codes were cultivated under the auspices of an open source policy.

Issues for the committee to consider:

- 1) **“Right-sized” Licensing**: First and foremost, SWPC believes that a uniform, “right-sized” licensing policy should be adopted. By right-sized we seek to avoid the legal impediments of copyrighted, proprietary or otherwise IP restricted

codes. These types of constraints limit collaboration opportunities and slow the evolution and improvement of model codes. Uniform application of licensing is also needed and ensures that multiple licenses do not apply across code elements in a project.

- 2) **Clear Roles and Responsibilities:** To understand the “sweet spot” of collaboration with our partners, SWPC conducted interviews with software professionals and scientific staff. A clear point emerged that good collaboration with partners was not dependent on an open source model. It was dependent instead on a clear understanding of roles and responsibilities as well as behaviors and tools that facilitate collaboration. Knowing who is the owner of a code and having the repository management tools in place to permit proper and timely review is indispensable.

- 3) **Code Management:** If a full open source approach were to be taken by NASA, it would be imperative to have a rigorous code governance approach to ensure code quality and security. Examples of strong and comprehensive governance can be seen in NCAR’s Weather Research and Forecasting (WRF) model which has a formal Developers Committee and Release Committee. NCAR’s Community Earth System Model holds semi-annual meetings to review code changes and releases. Governance like this requires resources and the financial backing to support those resources. If an open code / open model approach is recommended for NASA, it must come with a recommendation to fully fund and support a governance infrastructure.

From SWPC’s perspective as a user of models, we support computer codes that follow an open source paradigm. For an open source initiative to thrive at NASA, it is essential to have uniform licensing, clear roles and responsibilities among developers and code base managers, and a fully funded and well defined governance approach.