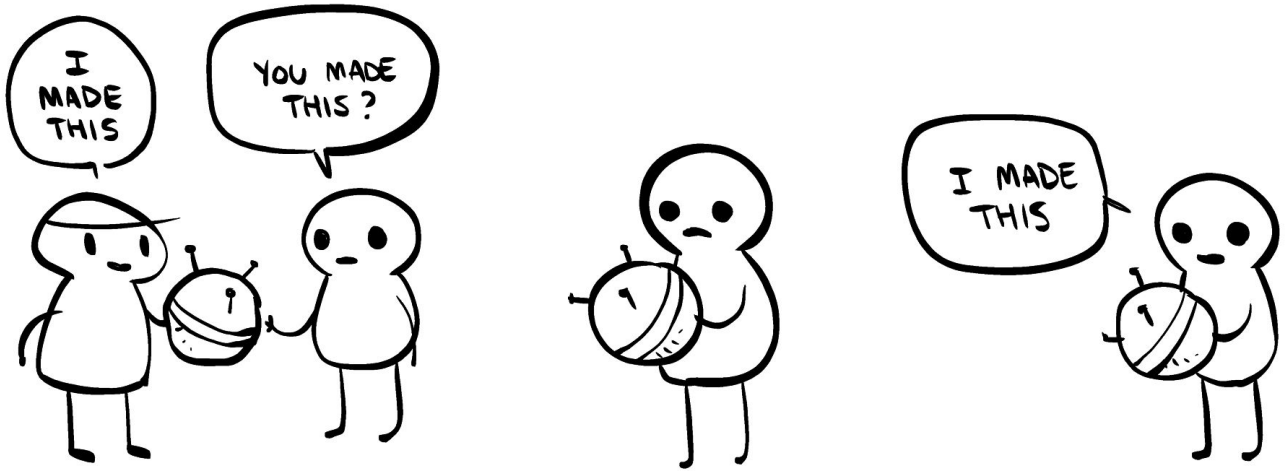
OpenMBEE

An open source Model-Based Engineering Environment

Presented by Sean Marquez

Overview of open source

«disclaimer»



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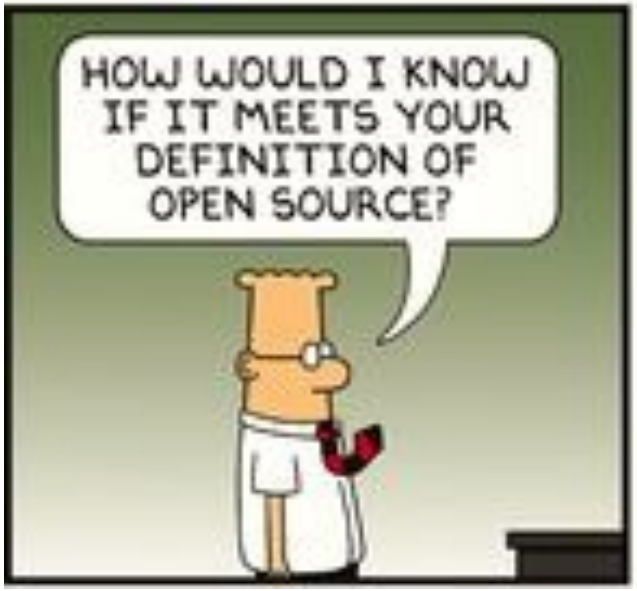


Open source extends copyright privileges (via T&C of the license)

- ❏ Software must be **free to use**
- ❏ Allows access to **source code**
- ❏ Allows for **derivatives works**

licenses must be approved by the Open Source Initiative (OSI)

opensource.org

Case for open source

- **Code quality** and **security**
  "Given enough eyeballs, all bugs are shallow" - Linus's Law

- Invites new **use cases** and **control** via access to source code
  "I think open source is the right thing to do, the same way I believe science is better than alchemy. Like science, Open Source allows people to build on a solid base of previous knowledge, without some silly hiding." - Linus Torvalds

OpenMBEE vision

Provide an open portfolio in a shared environment that seamlessly connects engineers developing missions and systems.

- **Open** - The portfolio that CAE provides is open in every sense of the sprit of open source. Our processes, code, apps, services and artifacts are accessible by JPL users as well as vendors and partners.
- **Shared** - CAE is more than a collection of licenses and tools, its a shared environment for engineering. The diverse community of users, developers partners and vendors are able to contribute innovation and work more effectively by reducing the overhead.
- **Connected** - the CAE Environment connects engineers allowing them to collaboratively construct and analyze the precision products needed to develop Missions and Systems at JPL using the CAE environment. This is done without the overhead of traditional manual exchanges of information. Engineers can connect with each other and find relevant engineering data and information reducing redundancy and increasing value of the engineering products and analysis produced by the flight project.

OpenMBEE mission

Develop the CAE environment from a user centered architecture leveraging vendor partnerships using robust life cycle processes.

- **Vendor partnerships** - CAE works closely with Vendors providing them crucial feedback and insight into how thier products are serving the needs of the
- **User centered architecture** - to achieve the vision of Open CAE, the technical architecture for CAE is driven by the needs of the practitioners who use the environment and the needs of the projects that are served by it.
- **Life-cycle process** - the life-cycle processes for CAE provide the integrity of the the applications services and support provided by cae.

Open MBEE Models and Software

- Models and Model Libraries
- Software

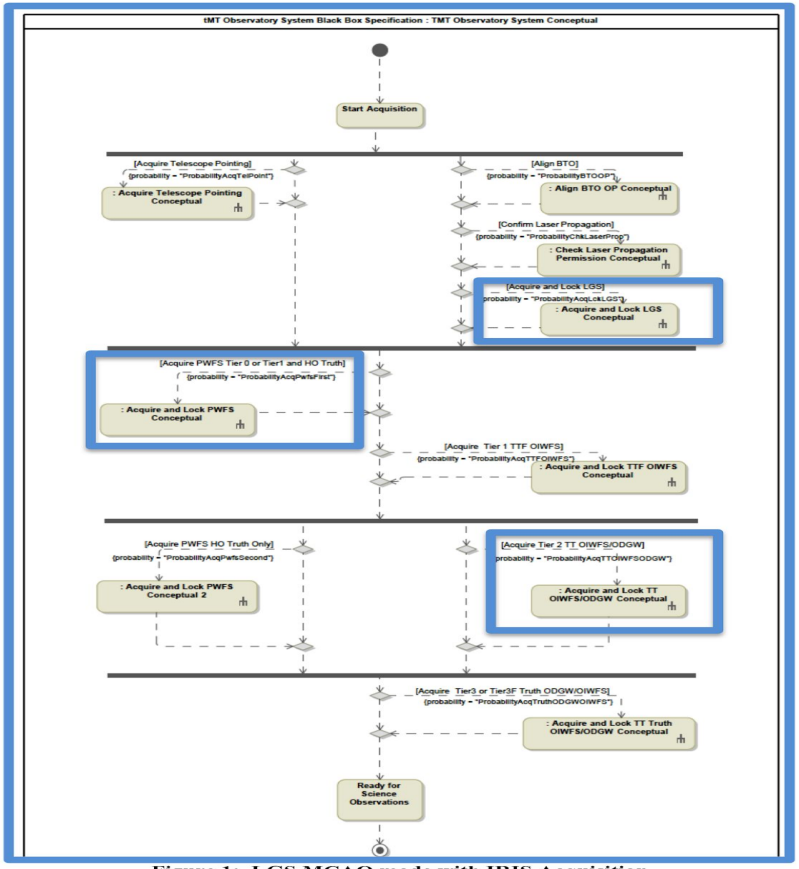
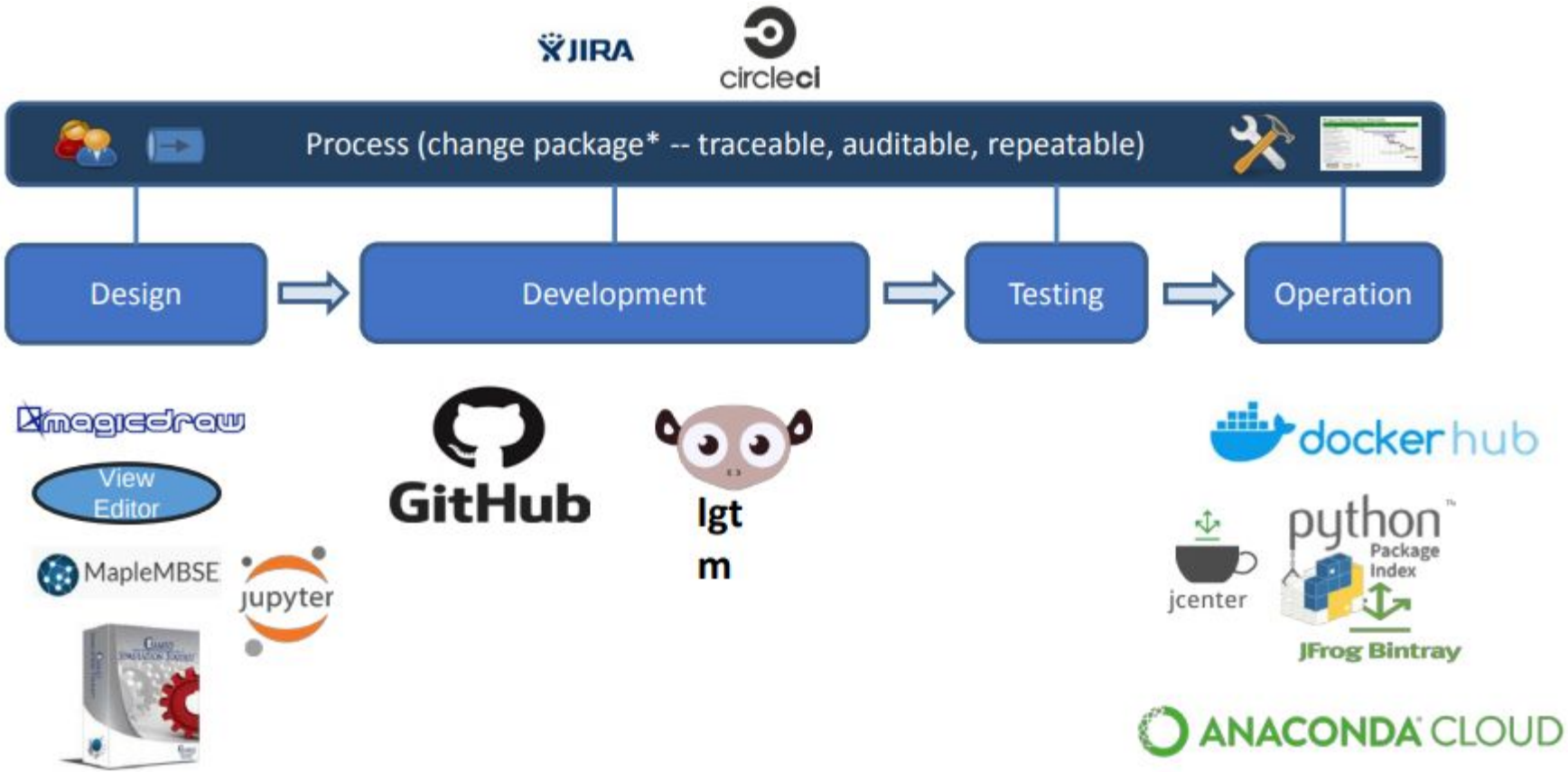


Figure 1: LGS MCAO mode with IRIS Acquisition

THIRTY METER TELESCOPE

TMT ConOps modeled in SysML

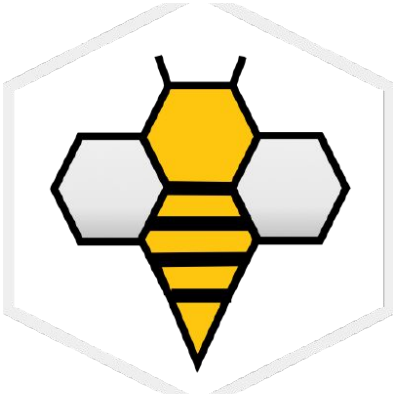
https://github.com/Open-MBEE/TMT-SysML-Model/



OpenMBEE Pipeline

MBSE Adoption Challenges & Success Metrics

- Chami, Mohammad & Bruel, Jean-Michel. (2018). A Survey on MBSE Adoption Challenges.
- T. Bayer, "Is MBSE helping? Measuring value on Europa Clipper," *2018 IEEE Aerospace Conference*, Big Sky, MT, 2018, pp. 1-13.



Join the community

http://www.openmbee.org/