Fire, Smoke, and Open Source Hardware

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Shepard Test Stand as OSHW Case Study

• Successes

• Lessons Learned

• Future Work
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Open Source Hardware Advocate

Founder of Mach 30: Foundation for Space Development
- US non-profit dedicated to developing OSHW for spaceflight
- Lead developer for the Shepard Test Stand (OSHW Certificate US000006)
- Presented at the 2012, 2013, & 2015 Open Hardware Summits

Chief Architect and Project Manager for Open Design Engine
- An all inclusive web application for hosting OSHW projects
- Kickstarted development of initial release
- Currently focused on effective development, collaboration, sharing, and remixing of OSHW projects
Developed Openly and Collaboratively on ODE
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Developed Openly and Collaboratively on ODE
Received One of the First OSHWA OSHW Certifications

OSHWA is a US Non-Profit

- Conferences and community events
- Educate general public about OSHW
- Organize the OSHW movement
- Collect, compile and publish data on OSHW movement
- Provide a painless way to indicate that products meet a standard for OSHW
Received One of the First OSHWA OSHW Certifications

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Jones Boys Rocketry Forked Shepard

Welcome

Join Christopher’s rocketry website. I’ve been building little rockets since before Christopher was born but it was only after he got old enough to go watch them fly that we started launching them. That got me interested in rocketry again and I got my Level 1 High Power certification in 2005. In the following years, however, our activity waned and we only launched occasionally. Then we did a couple competitions, placing second as a team in one and taking first and second individually in another. This piqued Christopher’s interest and we’ve been building rockets like nobody’s business since then.

Now we’ve joined a local model rocket club and NAR. I’ve gotten into building high power rockets again and hope to get my Level 2 cert before the end of the year. UPDATE: 12 missions accomplished! (See the story here.)

This site chronicles some of our adventures in rocketry. Check out photos from the launches we attend and a database of our rockets and flights.

Shepard Test Stand

Calibration and Modification

Added by JC Jones about 9 years ago

Hello,

I’m helping my son with a science project on rocket motors. We have constructed a test stand and are trying to use your Arduino setup and software for the recording apparatus. We need to calibrate our load cell and it doesn’t look like your Calibration Utility is working yet. How should we go about calibrating the setup so that we’re getting accurate readings? Also, we also need to modify the scale of the measurements to accommodate higher thrust loads.

Thanks for your help.

John

Replies (12)

Re: Calibration and Modification - Added by Jeremy Wright about 9 years ago

Hi John,

Glad to hear that you and your son are doing a rocket science project.

What version of the software are you running? The version 1.0 DAQ software repository if you haven’t done so already.

Also, what version of the circuit did you build? There are known issues with the current circuit and procedures (mainly with the Arduino Fritzing diagram). Make sure that you read the rest of the mistakes that you’ll want to avoid. The circuit outlined there will be your calibration procedure that we’re using right now is outlined as well. The rest of the Estes motor documentation.

Please let me know if you need any other help.

Photo credit Jones Boys Rocketry

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Jones Boys Rocketry Forked Shepard
“Open Source Hardware (OSHW) is a term for tangible artifacts — machines, devices, or other physical things — whose design has been released to the public in such a way that anyone can make, modify, distribute, and use those things.”

from “The Definition of OSHW”
open source hardware
Distributed OSHW Framework (DOF)

J. Simmons - jrs@mach30.org - Version V0.1.6, 8/6/2021

Distributed OSHW Framework (DOF)

A. Simmons <jrs@mach30.org> - revnumber: v0.1.6 - revdate: 8/6/2021

Introduction

Mach 30 launched Open Design Engine (ODE) in 2012. Since then we have run our own OSHW projects on ODE, observed other groups host OSHW projects on ODE and other sites, and held numerous conversations on and offline about the nature of hosting OSHW projects. Our conclusion after all these years and experience is the same one we held back in 2012: the OSHW community is still searching for a project hosting solution that meets the needs of hardware projects (where documentation is part of the source code).

What has changed is our approach to addressing OSHW project hosting. This time we are starting with the development of a tool independent methodology for developing and sharing OSHW, the Distributed OSHW Framework (DOF). What do we mean by methodology?

The Distributed OSHW Framework will be a systematic approach identifying:

- What needs to be shared
- How it should be shared
- The relationships between the various kinds of shared content

Note how developing a methodology is different from identifying best practices, covering case studies, and creating definitions. A methodology is something one follows: it is a fully defined process. And by targeting tool independence, we hope to make it easier for people to host their own OSHW projects.
What is the source of an OSHW project?

1. Bill of Materials (BoM) **Data** ⇐ Keep the Project Source DRY
2. Assembly Instruction **Data** ⇐ Humans are the Compiler
3. Supporting Materials ⇐ Except when the 3D Printer is the Compiler
Branches, Forks, and Merges – Oh, My!
It’s Files All the Way Down
Defining DOF – Modeling OSHW
Defining DOF – Tooling & the Vision

npm install arduino-uno

OR

yarn add arduino-uno

https://github.com/modelb-llc/trrs-wssm/blob/master/dist/assemblyInstructions.adoc
Supporting Aerospace @ OSHWA – m30ml

• DOF team is developing a base schema for DOF called m30ml

• m30ml supports capturing more generic concepts such as
  • Terms
  • Actors
  • Activities

• m30ml will enable the definition of open source standards to support certification of open source aerospace systems
DOF Reference Tooling

Existing Tools
- Git
- npm/yarn
- Rendering Layer
  - Pandoc
  - Jinja2
  - Markdown

New Tooling Focus Areas
- Data Creation
- Data Maintenance
- Query/Content Extraction
  aka CRUD operations
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from “The Definition of OSHW”
What do you think?