Development of a Web Interface and API for Networked Control of Multi-Vehicle Systems

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Background

- We have a low-cost platform for development and testing of network-controlled multi-vehicle networks called Herdbots, consisting of a single-board computer (SBC) and digital signal processor chip (DSP).
- We would like to put together a development platform for it.

Goals

- Develop a simple API for developing software for and interacting with the Herdbots.
- Develop an online interface allowing for simple scripting of the Herdbots at a level understandable by high-school students.
- Make the API and the scripting safe to prevent damage to the Herdbots and their systems.
- Both the API and the online interface should be easily extendable and thoroughly documented to ease further work.

Fundamental Questions/Challenges

- Should extensions be made to an existing scripting language, or should a new one be written?
- What languages should be supported by the API?
- What kind of technologies should be used in the online interface to make it modern, functional, and easy to extend?

Research Plan

- Build from the ground up — write new interfaces in order to abstract away implementation details.
- Experiment with different interpreted scripting languages to find the one most suitable to the application.
- Find a server model that allows it to be easily extended into a web application.

Research Results

- Herdbot SBC runs client written in C.
- Server computer runs software written in C or Ruby.
- Server software provides a RESTful web service for online interaction with the Herdbots, with an HTML/JavaScript front-end.