



DARPA ARM-S Preliminary Interface Document

What this document is:

This document is intended to give the proposers a preliminary idea of what the Application Programming Interface (API) to the hardware components will look like.

What this document is not:

This document is not a final interface document, or any sort of guarantee of what the final interface will be. This is also not a complete picture of what all internal interfaces will look like. This only presents information that may be relevant for the proposal submissions.

System Architecture

The ARM GFE software architecture will consist of a set of software nodes in individual processes that will communicate with the sensors and manipulator hardware. These nodes will communicate via IPC (Inter-process communication), using a framework such as ROS (Robot Operating System).

It will be the team's responsibility to write a software node or set of nodes that will consume the data coming from the sensor nodes, and produce commands that will be sent to the commandable nodes.

In addition, to facilitate testing, a Dashboard node will be created by the ARM GFE Team which will produce commands that will step the team's software through each test.

Dashboard Node

Will produce the following data:

- Command to do team-specific calibration
- Command to Load Task
- Command to Start Test
- Command to Stop Test

Will consume the following data:

- Diagnostic information from the team about their progress on the task (Percent Completion, for example)

Barrett WAM Arm Node

Will produce the following data:

- Current joint positions
- Current 6 DOF pose of wrist

Will consume the following data:

- Desired joint torques
- Desired joint positions
- Desired PID gains

End-Effector Force Torque Sensor Node

Will produce the following data:

- Current 6-axis Forces/Torques at the wrist

Barrett Hand Node

Will produce the following data:

- Current finger joint positions and spread
- Current strain gauge data
- Current pressure sensor data from 3 fingers and palm

Will consume the following data:

- Desired joint torques
- Desired joint positions
- Desired joint velocities

Neck Control Node

Will produce the following data:

- Current pan angle
- Current tilt angle
- Current “translation” position

Will consume the following data:

- Desired pan angle
- Desired tilt angle
- Desired “translation” position

Color Camera Node

Will produce the following data:

- Video stream (format, resolution & frame rate are tbd)

Range Camera Node

Will produce the following data:

- Range at each pixel
- Amplitude at each pixel
- Confidence measure at each pixel

Stereo Camera Node

Will produce the following data:

- Stereo disparity map (format tbd)
- Raw video Stream(format tbd)

Microphone Node

Will produce the following data:

- Audio stream (format tbd)