

Extra-Vehicular Remotely Operated Vehicle
EVROV
With Stereoscopic Operator Vision



» EVROV Team Members



EVROV Team

- **Johnathan Harris** team leader and computer specialist
- **David Olivares** CAD designer and builder
- **Norma Irigoyen** electrical specialist
- **Eduardo Fernandez** construction specialist
- **Bianca Rodriguez** pneumatics specialist
- **Faridodin "Fred" Lajvardi** adult sponsor



» EVROV Rationale



EVROV Rationale

- Allows for visual EV inspections of space craft
- Allows for completion of simple EV tasks
- Allows for EVA assessment of tasks ahead of time to save time for astronauts in EVAs, thereby decreasing risk and increasing productivity
- Allows for redundant monitoring and recording of EVAs by astronauts, as well as adding another layer of safety



» EVROV Features



EVROV Features

- Wirelessly operated via radio-wifi
- Quick to deploy
- Uses compressed nitrogen to maneuver
- Two hi-def cameras for 3-D stereoscopic vision
- Robotic arm to use as manipulator
- Video and data recording at operator station
- Inexpensive & safe for visual reconnaissance
- Easy recharging and thruster refueling



» EVROV Development



EVROV Development

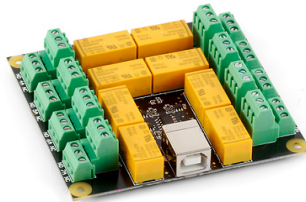
- Research robotics in space
- Draw on previous water based ROV designs
- Design a CAD model
- Build a full scale cardboard mock up
- Acquire components
- Build a prototype phase A
- Test components
- Evaluate EVROV
- Make components "space worthy"
- Build prototype phase B



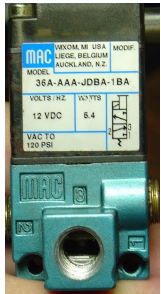
» EVROV Key Components



EVROV Key Components



- Fit PC Computer
- IP Cameras
- Wireless router & bridge
- Pneumatic valves
- Joysticks
- USB controlled relays
- Fiberglass frame
- 3-D Vision system
- Laptop

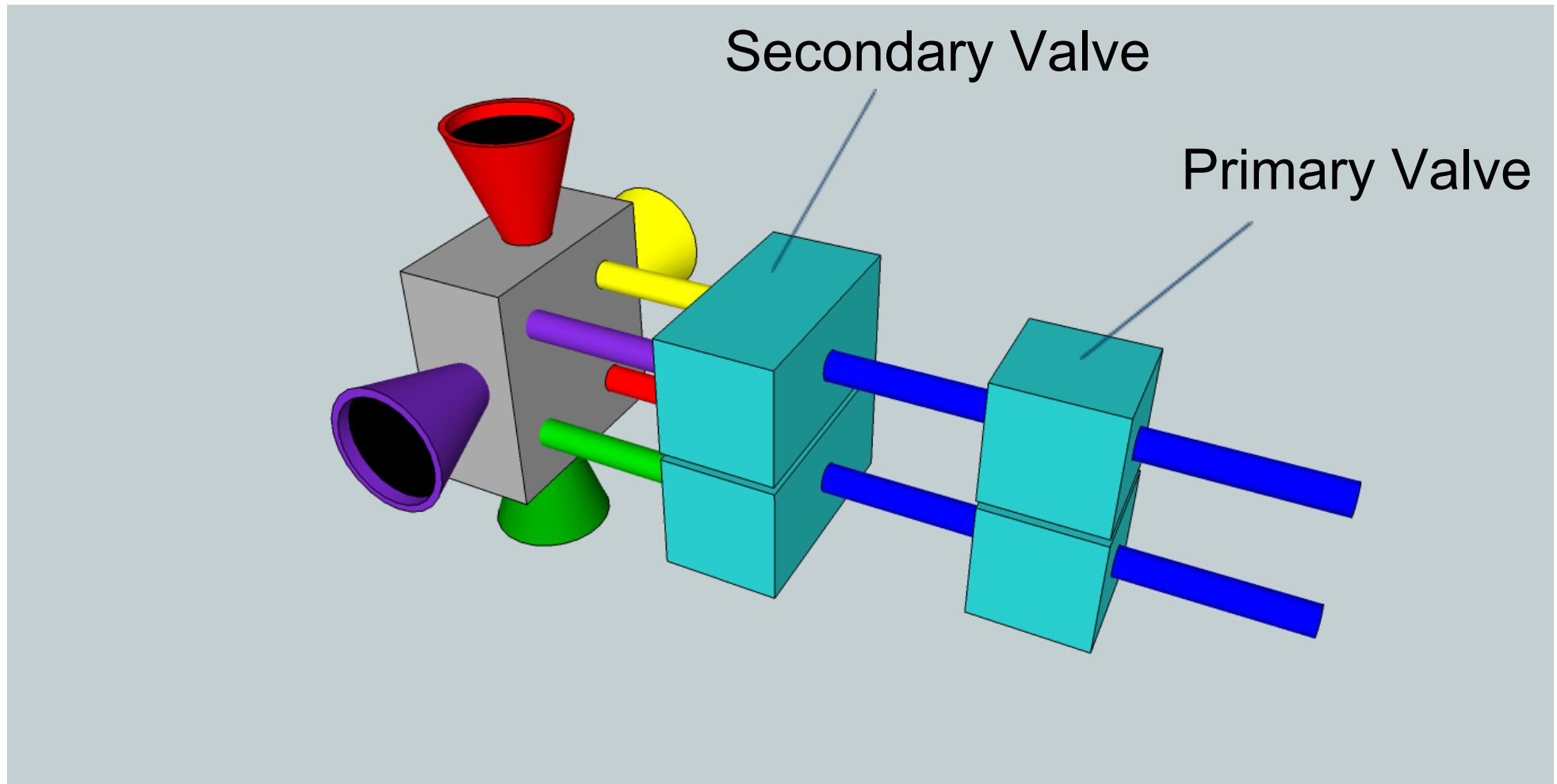




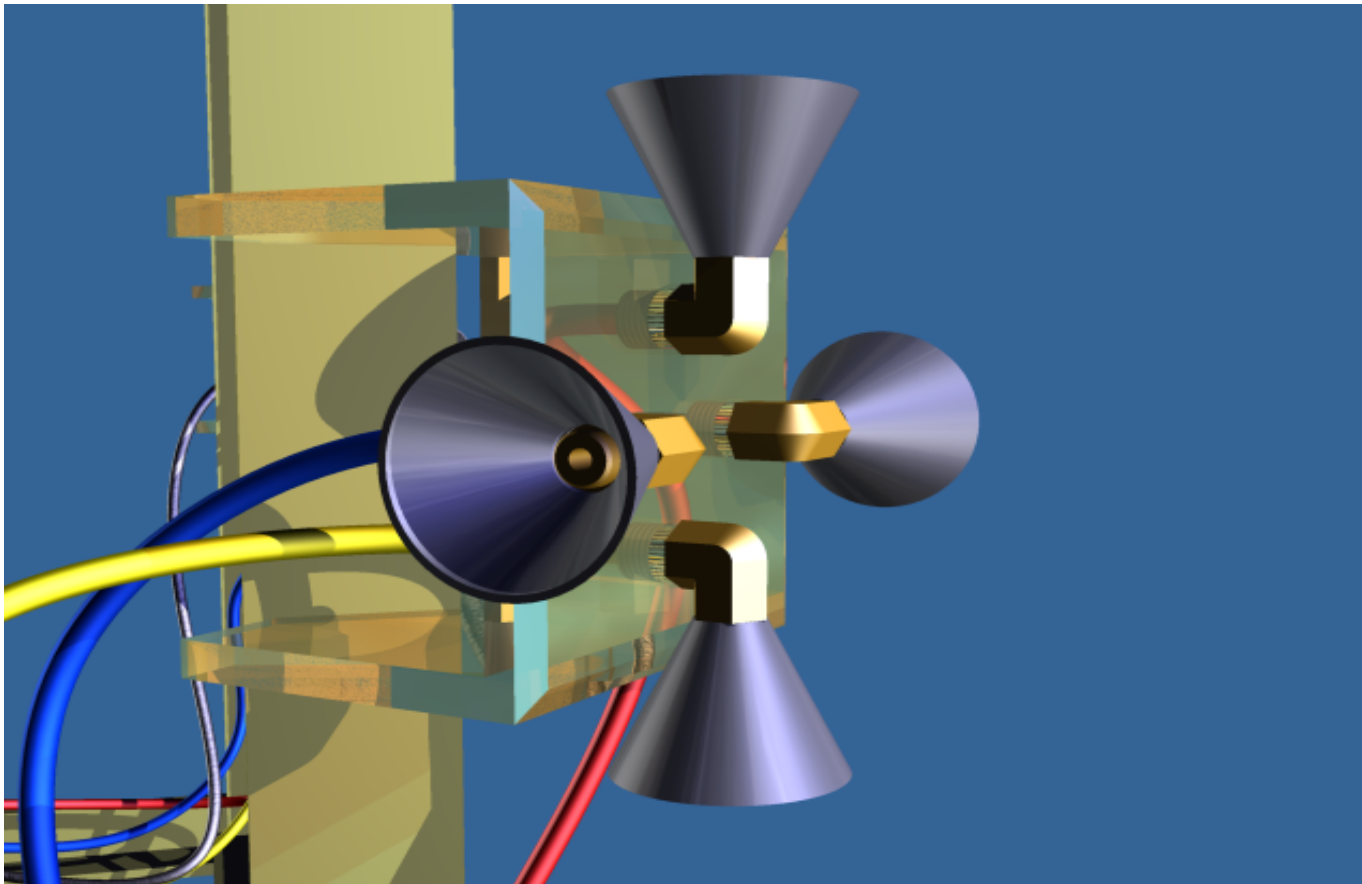
» EVROV Thruster Cluster



EVROV Thruster Cluster



EVROV Thruster Cluster

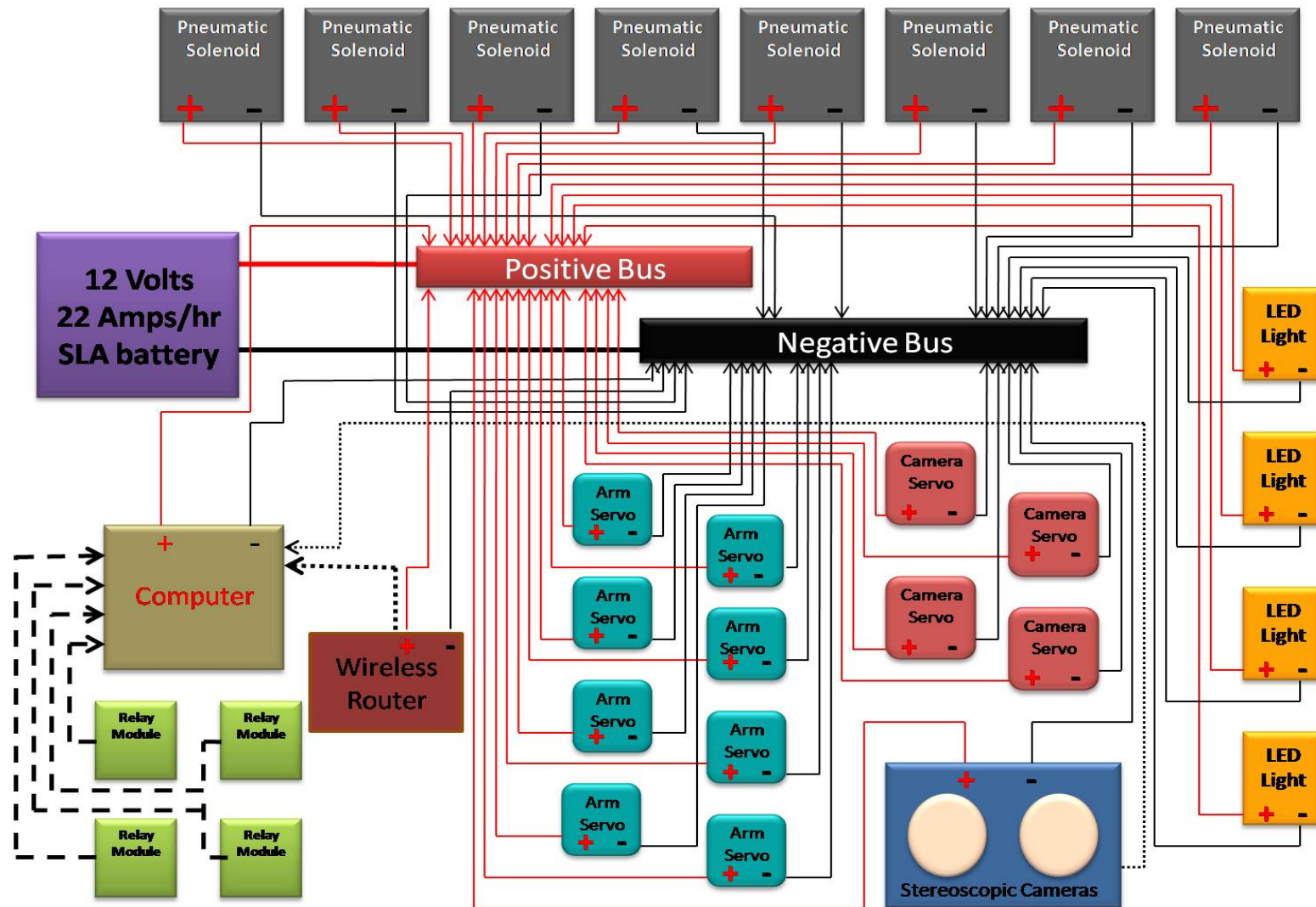




» EVROV Electrical Systems



EVROV Electrical Systems





» EVROV Docking Station



EVROV Docking Station

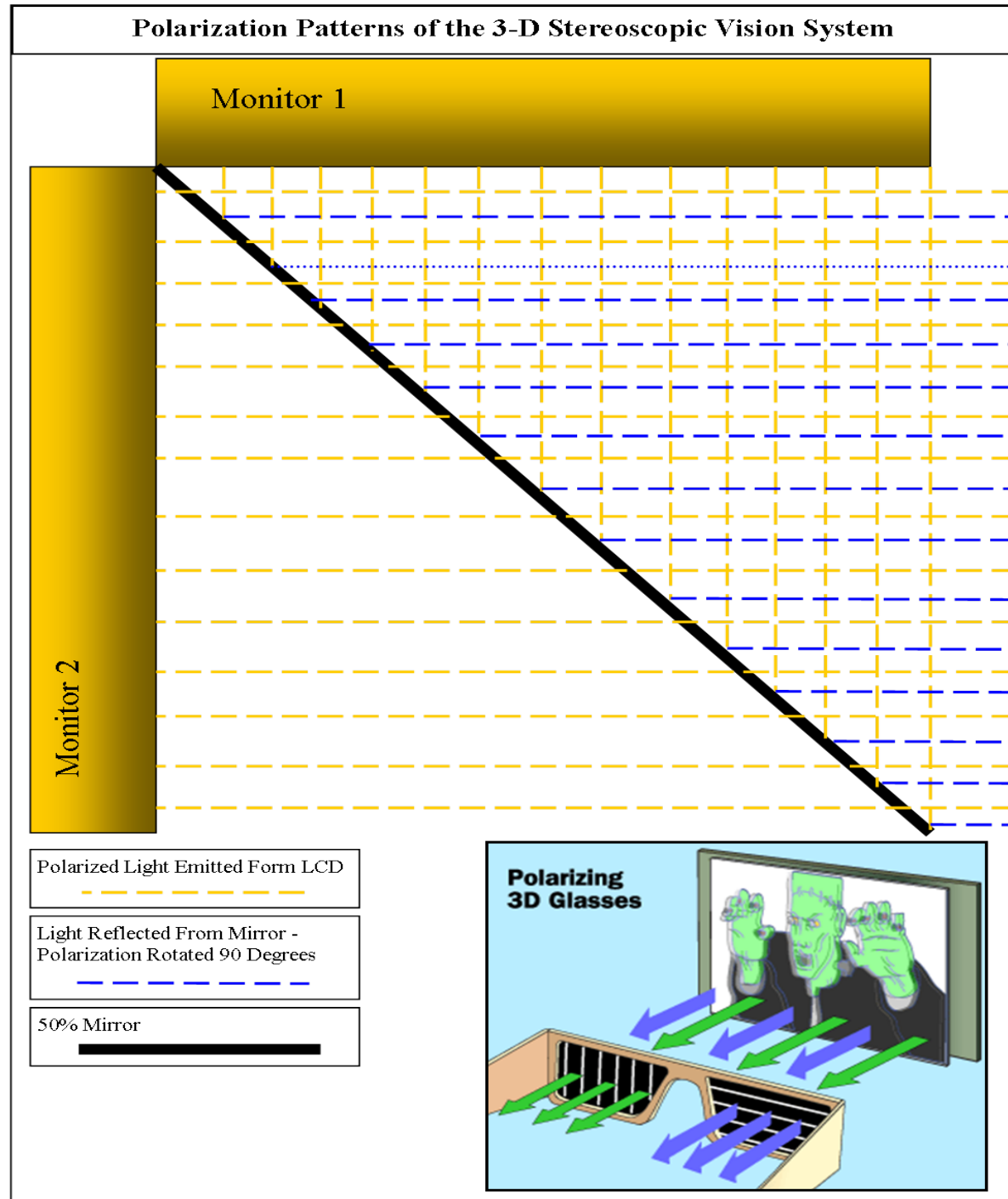
- External to space station or space ship
- Eliminates the need for airlock
- Rapid deployment and retrieval
- Charge the vehicle batteries
- Charge the Nitrogen gas tanks
- All EVROV monitoring can be done through dock



» EVROV

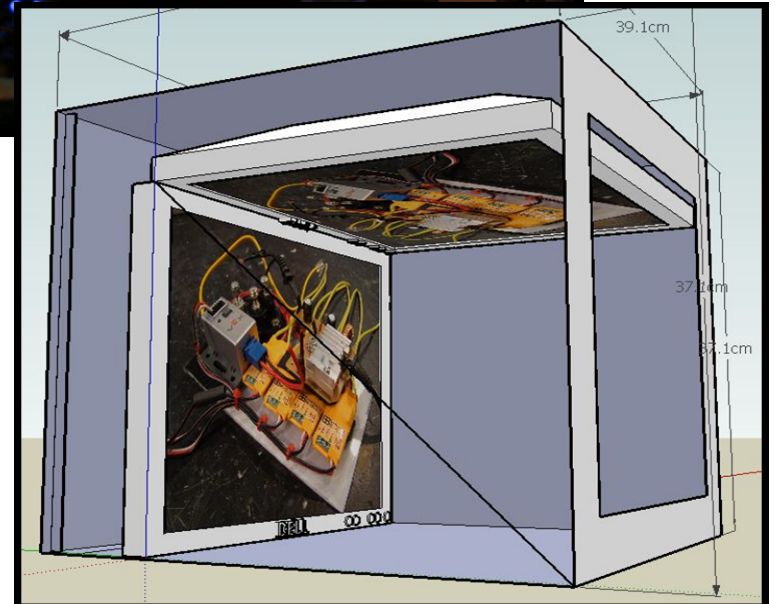
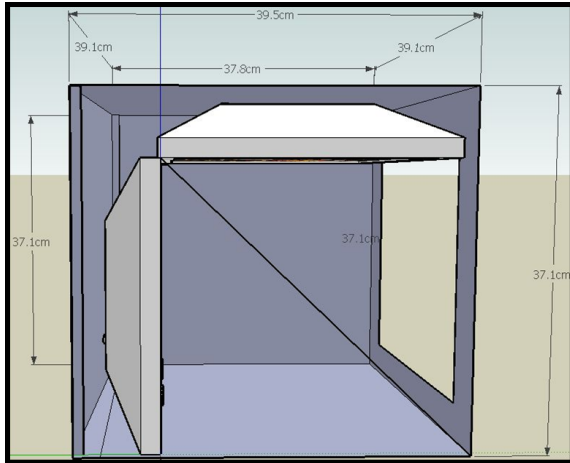
3 - D Vision Sytem

EVROV 3 - D Vision System



EVROV

3 - D Vision System



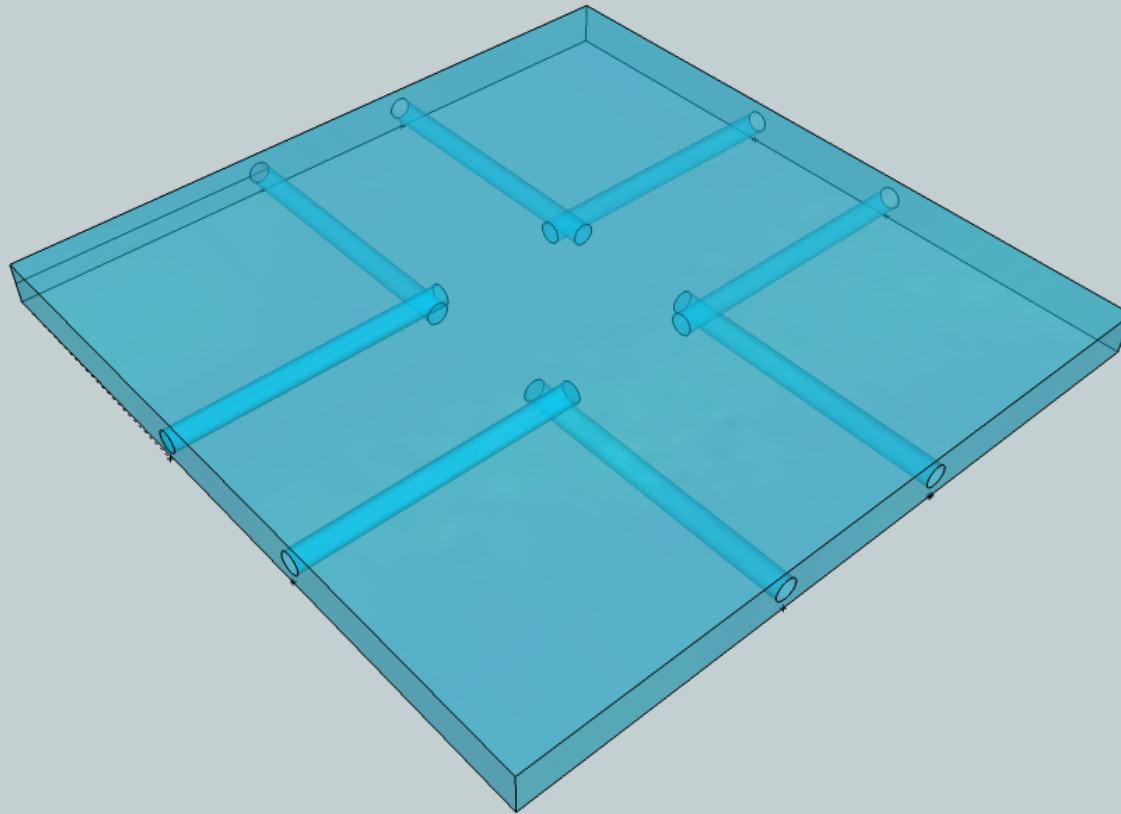
4-09-10 for SOIA Competition



» EVROV Thermal Sytem



EVROV Thermal System

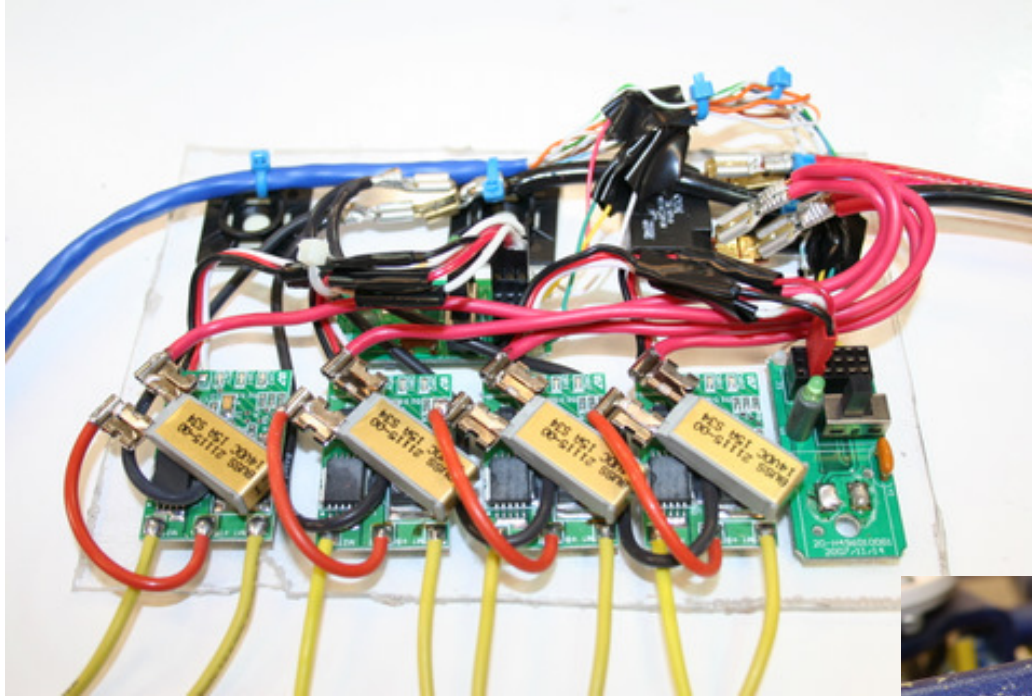


Heating or cooling can be transferred to electronics via aluminum plate with channels & a pump



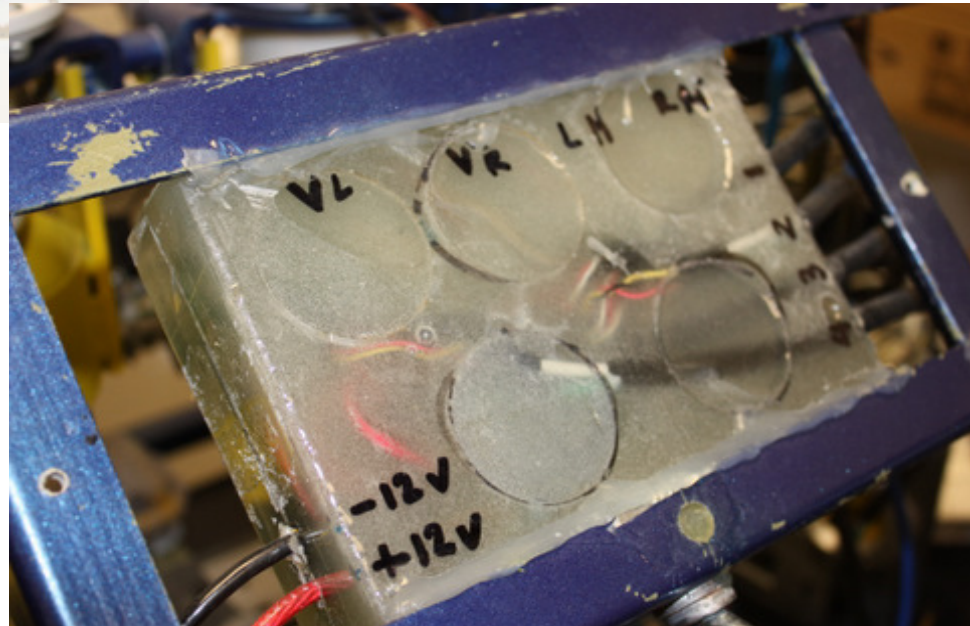
» EVROV Epoxy Applications

EVROV Epoxy Applications



Sample of circuitry pre-Epoxy

Same circuitry in glass filled epoxy



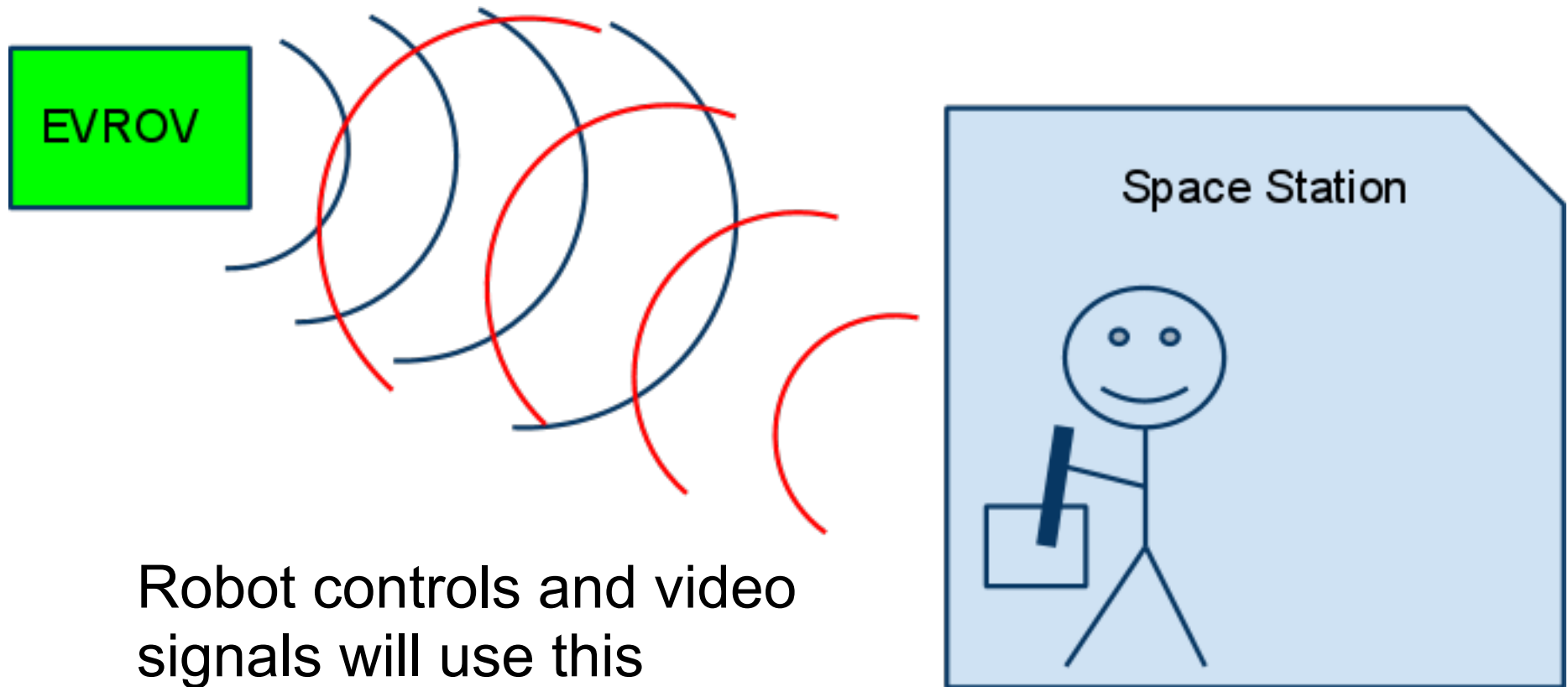


» EVROV Wireless Network

EVROV Wireless Network



IEEE 802.11 is a set of standards carrying out wireless local area network (WLAN) computer communication in the 2.4, 3.6 and 5 GHz frequency bands.



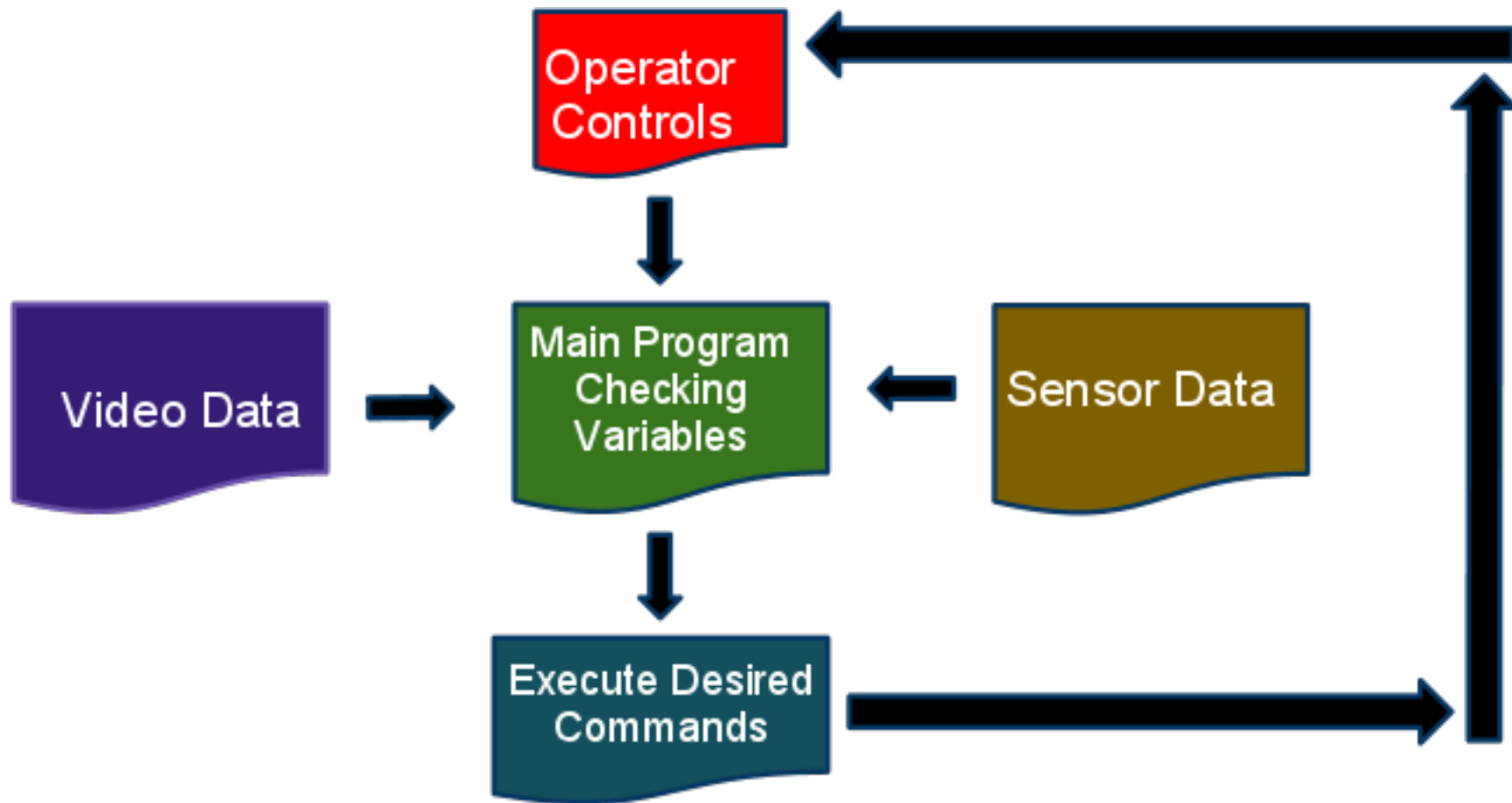
Robot controls and video signals will use this format



» EVROV Programming Flow Chart



EVROV Programming Flow Chart





» EVROV Summary



EVROV Summary

- Reduce risk to astronauts
- More efficient use of time
- Lower operational costs
- Extra layer of safety
- Private space agencies can afford
- Expendable