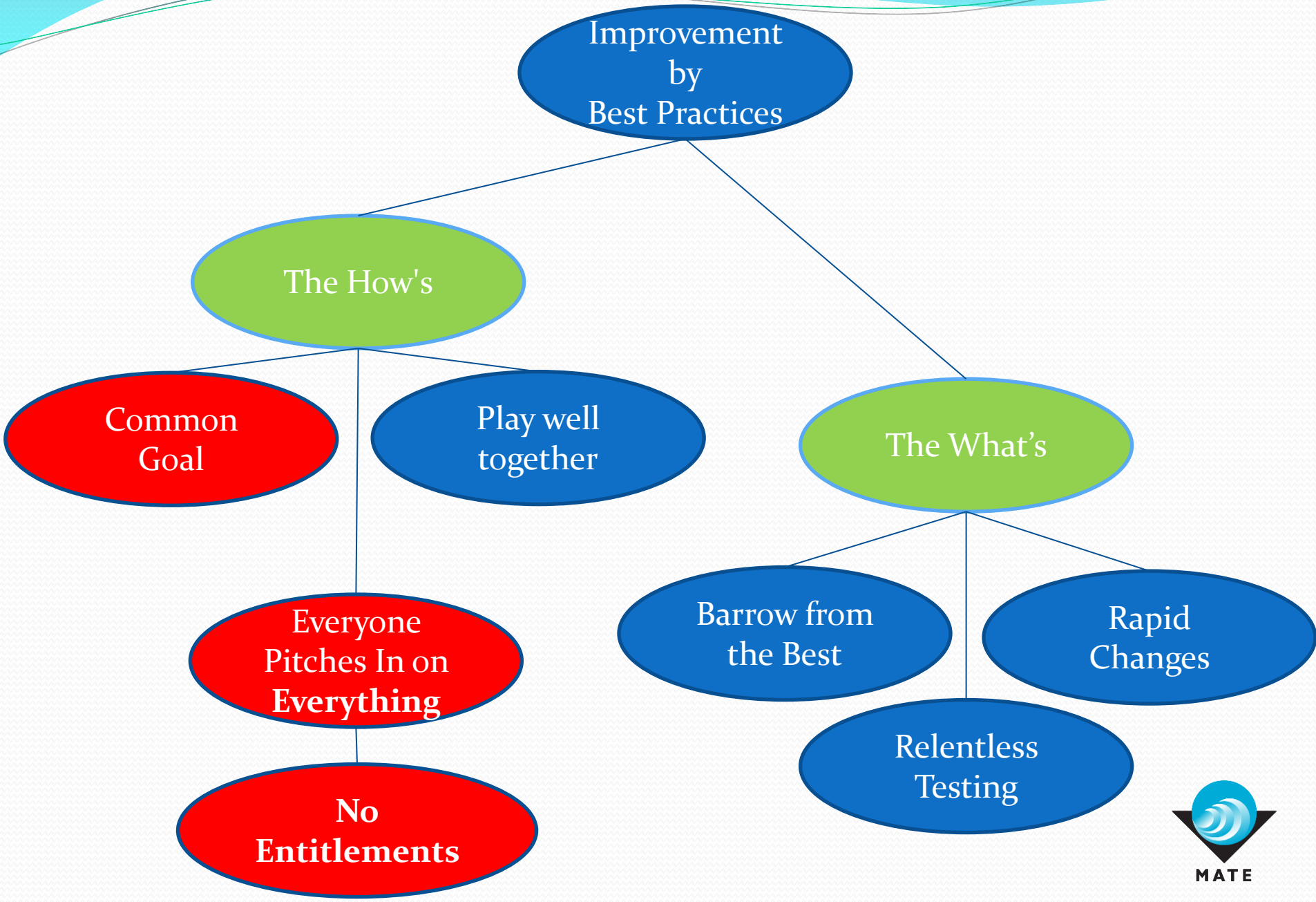




How Do Navigator/Ranger Entrepreneur Companies Improve?

Observations from 2015 International Competition



Leader? No, Be a Follower

Offices have plenty of leaders and now seek people who can follow; 'Followership' is the new buzzword

doormat or a docile sheep, but taking responsibility for shared goals, being a self-starter and telling leaders the awkward truth when they mess up.

It isn't an easy sell. When consultants

says he often butted heads with previous bosses. He also clashed recently with a fellow board member at a nonprofit organization where he volunteers as an instructor. "The harder I pushed, the harder he pushed back," Mr. Donaldson says.

By SUE SHELLNBARGER

**Followership = Teamwork = ACTIVE Participation
NO Boundaries**

We hear a lot of talk in the workplace. But few people aspire to be followers.

Most offices are populated with too many leaders and too few followers as a result. Now, some employers are training people in "followership." That doesn't mean being a

Hurwitz or "Leadership is Half the Story." Employers, Mr. Hurwitz adds, say "Can you call it something else, like 'leader support?'"

People who see themselves as leaders can have problems working together. Adventurous and assertive by nature, David Donaldson

practice leader at training and consulting firm. He tried supporting more of his fellow board member's ideas. After they stopped butting heads, meetings of the entire board went more

Please see FOLLOWERS page D3

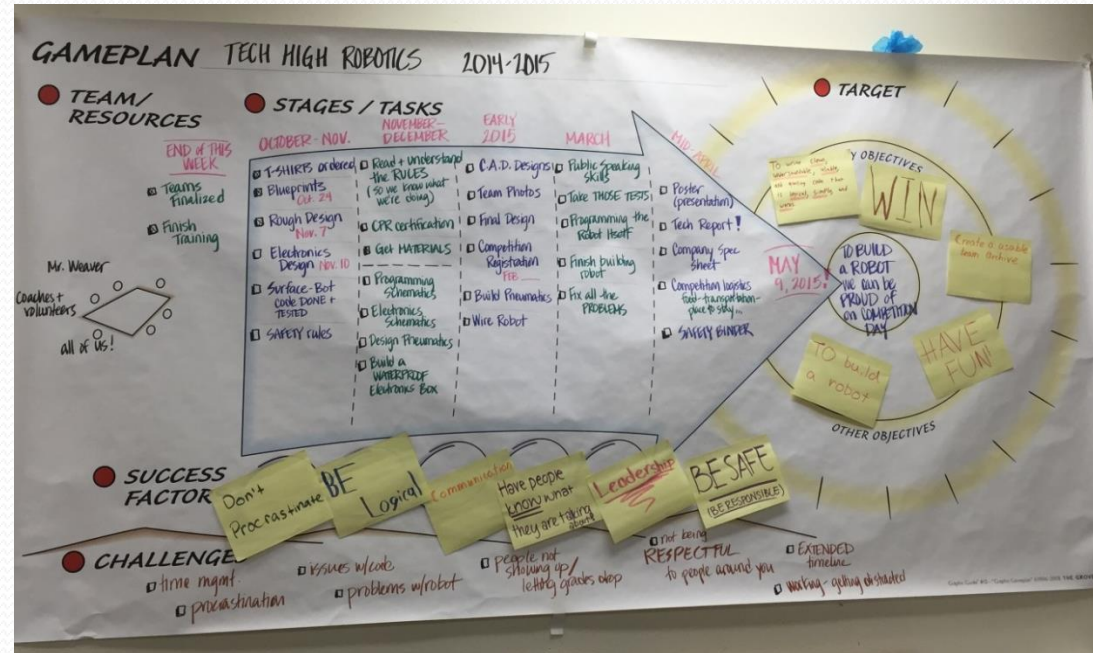
2015 International Competition Team Room

No one is sitting down



Organizational Best Practices

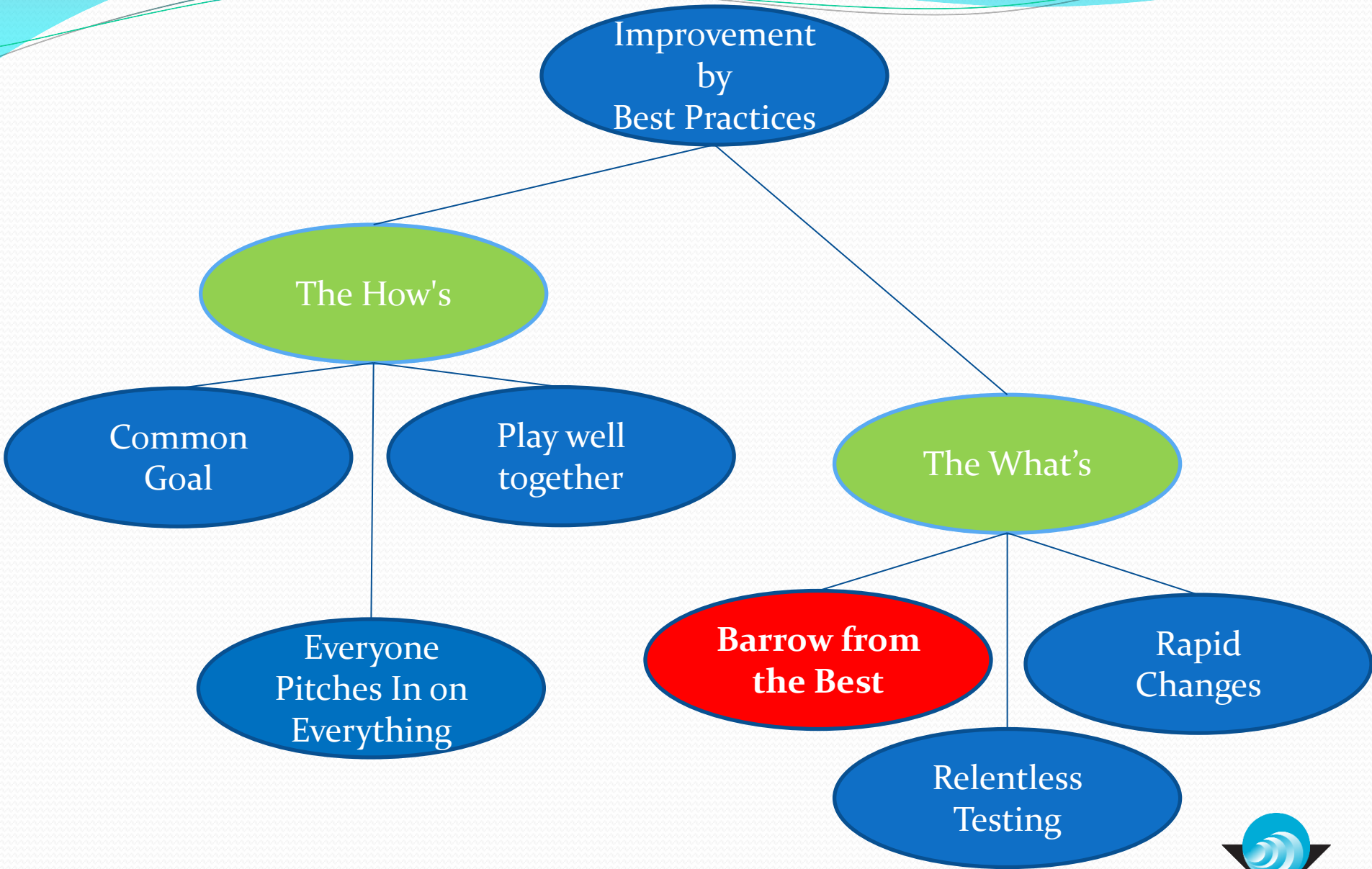
- Have a game plan
- Continually update training, design, and lesson learned
- Certify students in safe shop practices
- Fun traditions
- Attend MATE pool practices
- Senior may not be eligible for ROV Leadership – just too busy
- Student run and adult organized



Everyone gets to drive the ROV at practice, the Competition Pilot will emerge

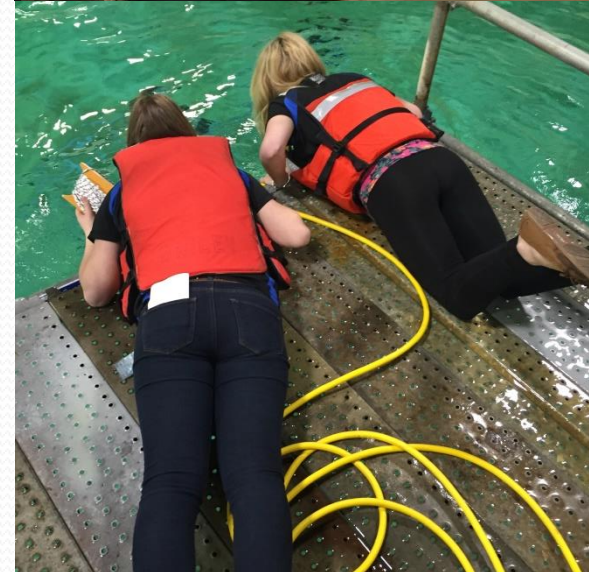
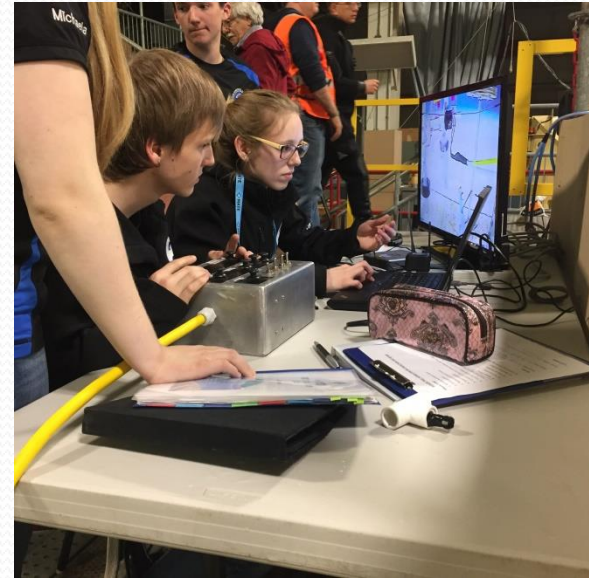
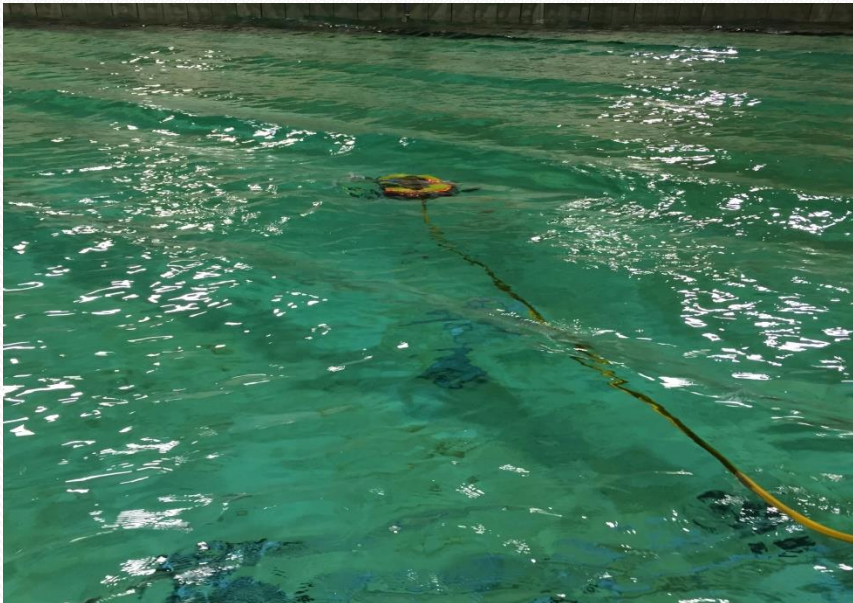
“The team of entitlement never wins titles”

Jerry Wainwright, Coach Fresno State Basketball



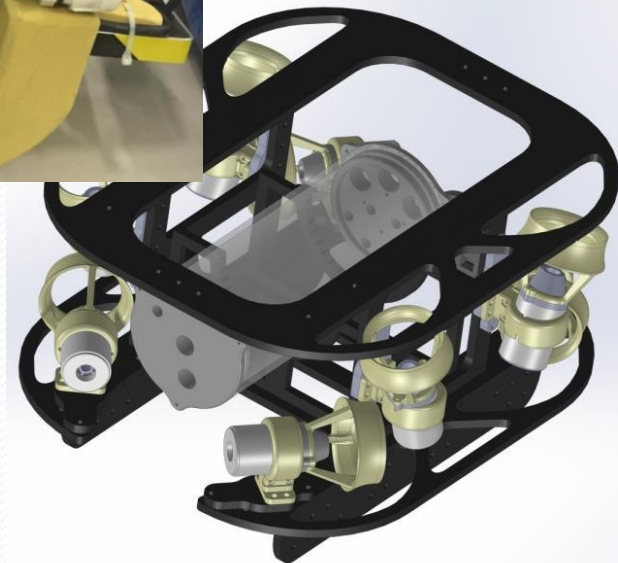
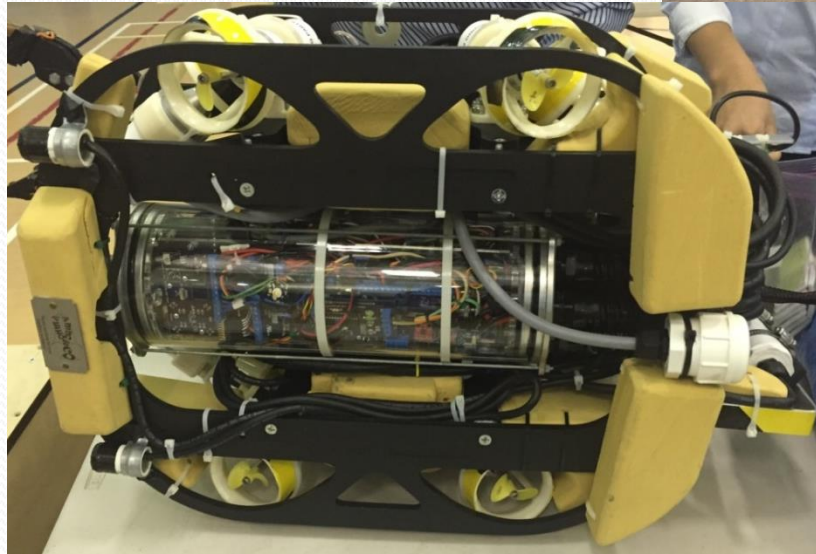
Teams - Mission Best Practices

- ALL team members know the mission tasks
- Mission execution is scripted with crew chief explaining next steps to judges, Pilot, and Crew
- Handle the unexpected



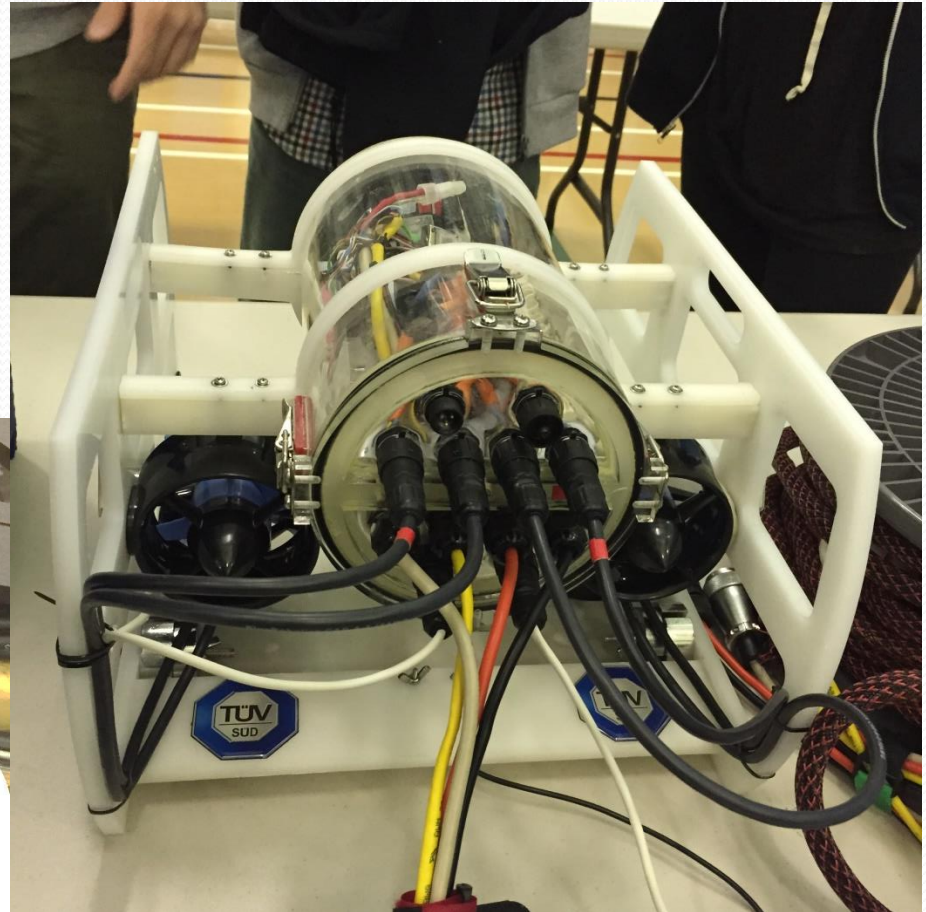
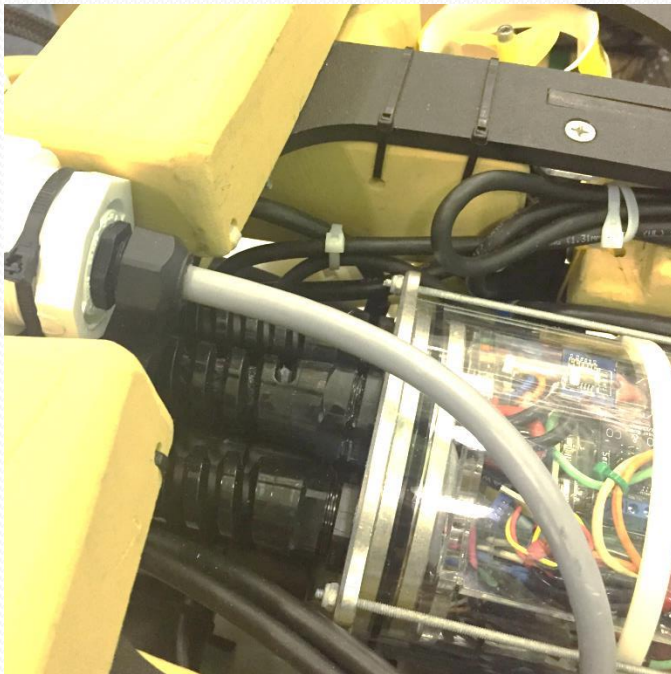
ROV Best Practices Frames

- No PVC in frames
- ROVs are tightly packed
- Motors are vectored
- **PASSIVE** buoyancy is evenly spread
- CAD tools used



ROV Best Practices - Waterproofing

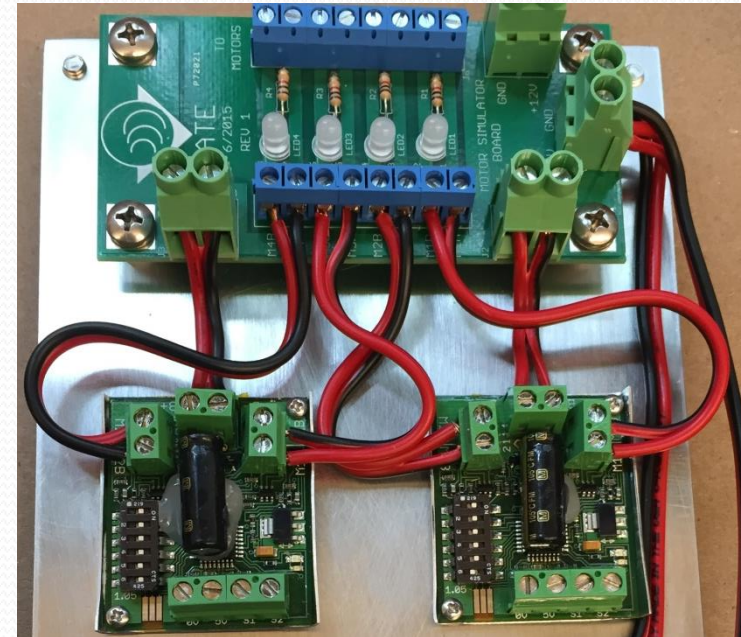
- Glands on Tethers for pressure relief and water tight seals
- Pressure Vessels are round



ROV Best Practices

Reliability

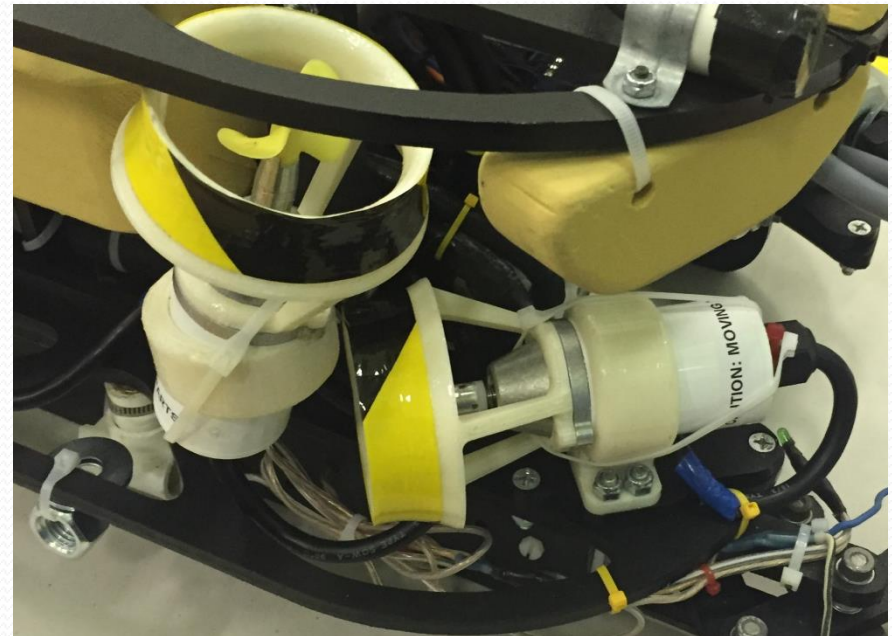
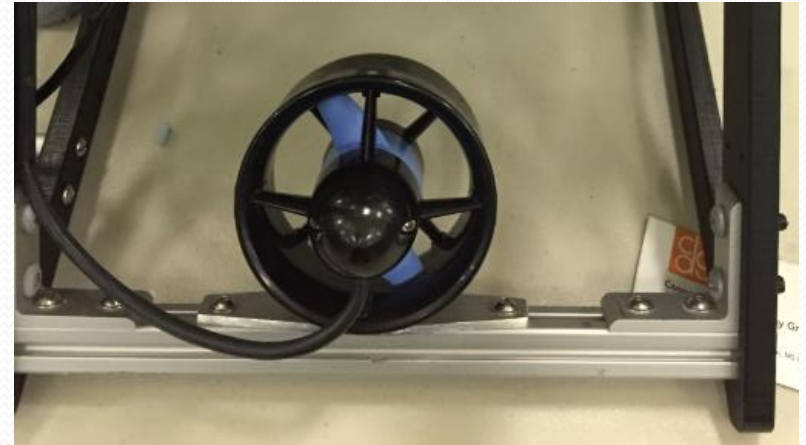
- Distributed controls for increased reliability
- Controls use simulator boards to test
- Controls can be reprogrammed in the can w/o removing from ROV
- Failed equipment (camera) easily changed



ROV Best Practices

Shrouds

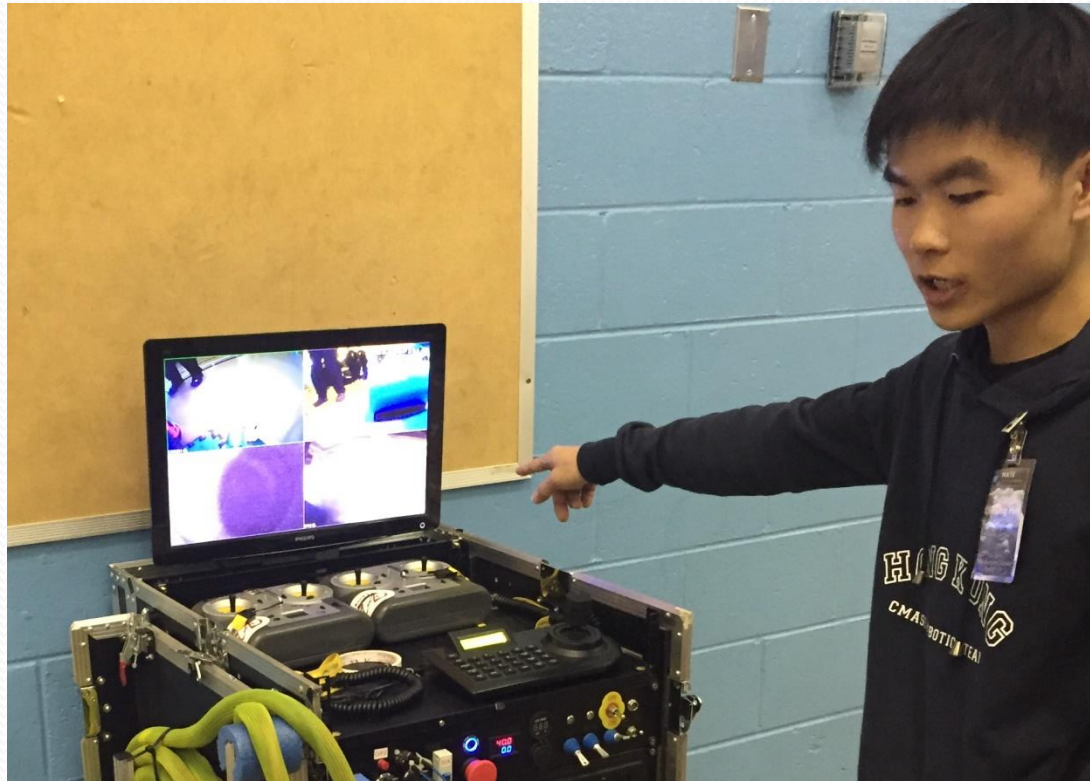
- Nozzles on Thrusters or hydro dynamic Shrouds



ROV Best Practices

Controls

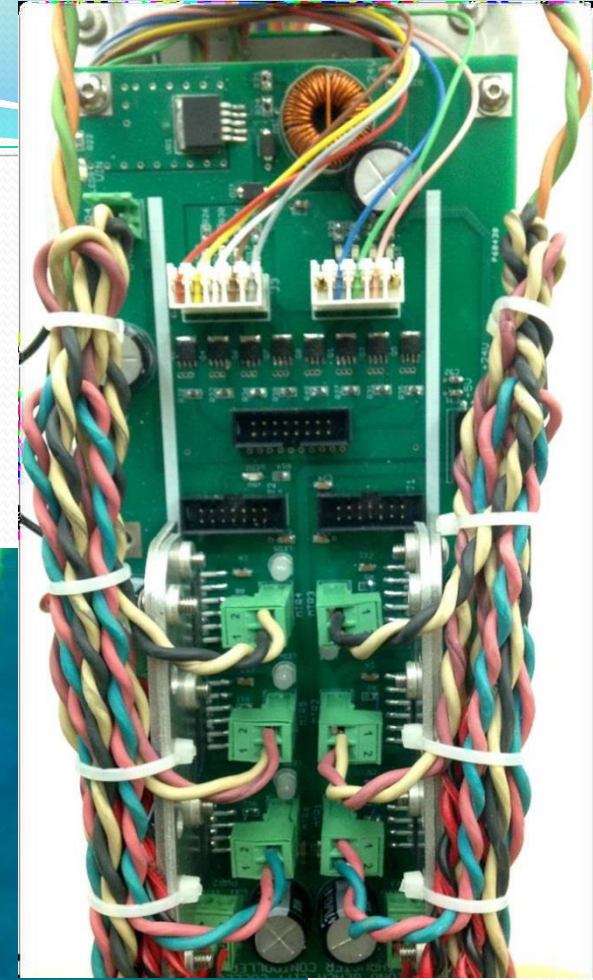
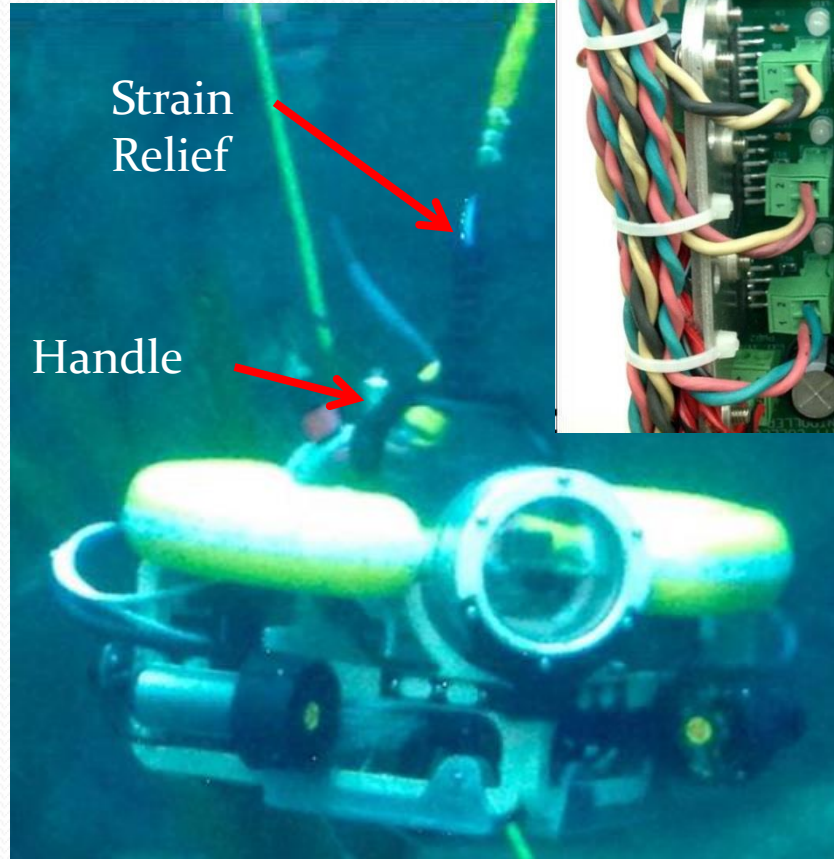
- Control Layouts are clean
- Large Video Screens



ROV Best Practices

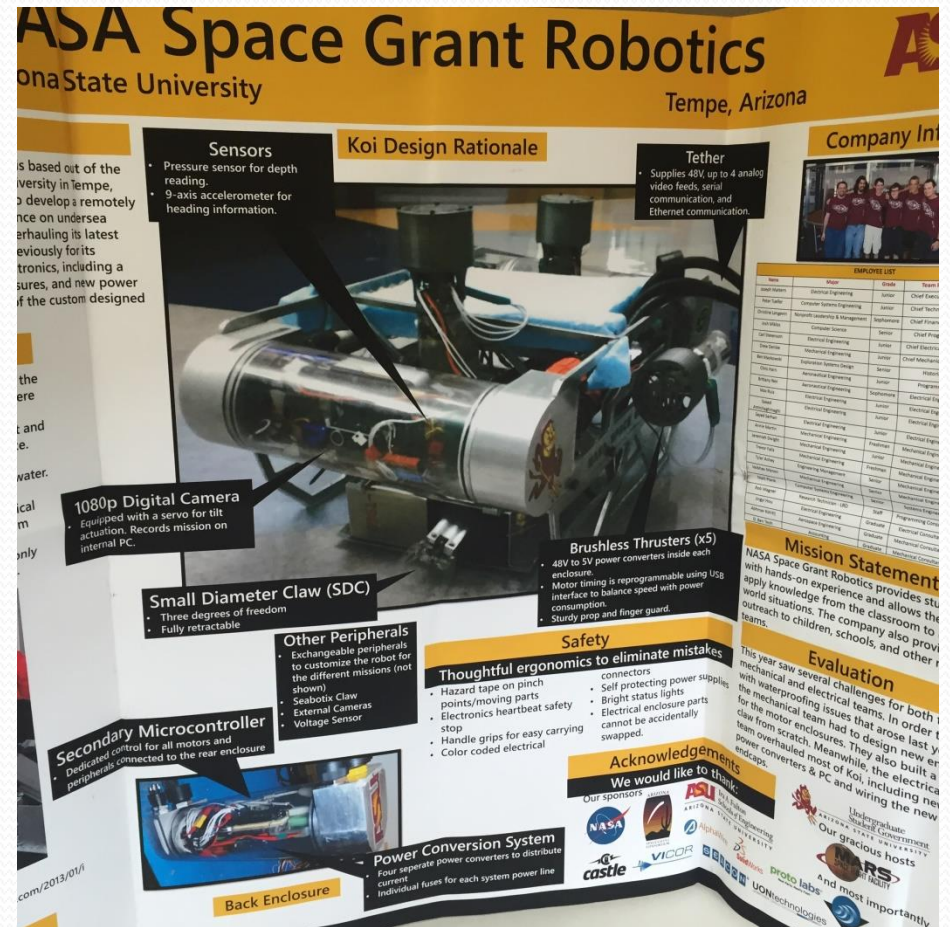
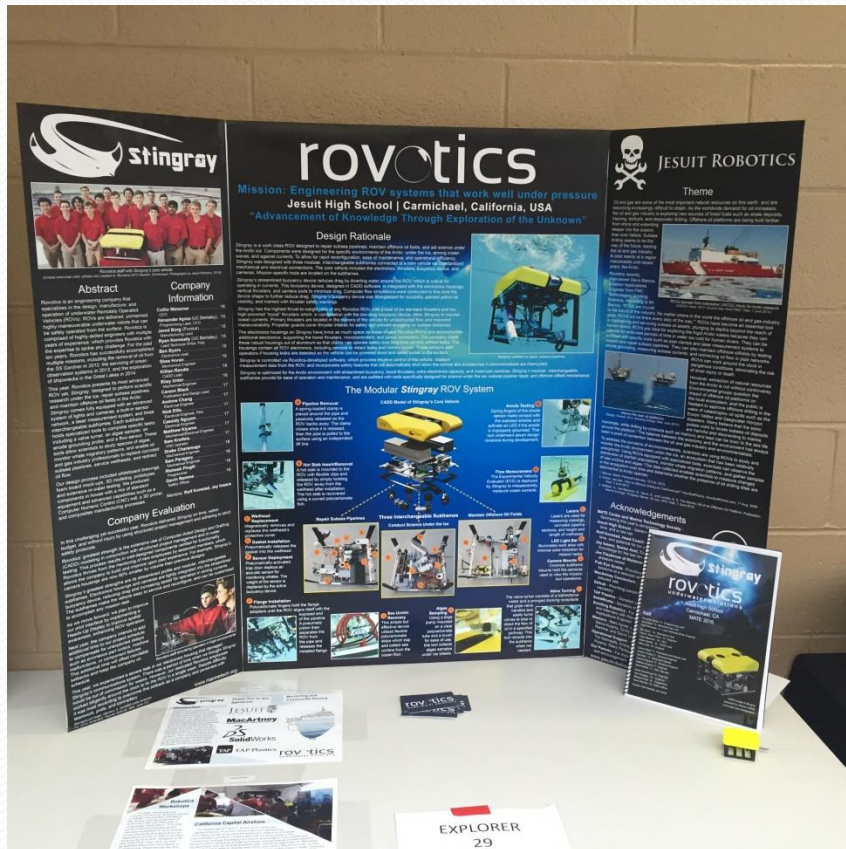
Wiring, Strain Relief, & Handling

- Wiring is neat and tied down
- Protective tethers cover or braided tether
- Strain relieved tethers come out of the top center of the ROV
- ROV has handle for easy transportation



ROV Best Practices

Presentations are comprehensive stories about the PRODUCT



Appendix

ROV Design for Performance

ROV Design for Performance

Constraints

- Amperage is limited by MATE (25 or 15 amps)
- Voltage is fixed by MATE Power supply (assume 12 volts)
 - Hence Power is fixed (Amps X Volts = Watts, for DC)
 - Same as saying you do not have infinite energy (Power = Energy/time)
- **Mission Task Time is limited**

Optimize Speed = More time for mission tasks

- Less ROV mass = faster ROV
- Less Tether mass = faster ROV
- More mass topside rather than bottom side = faster ROV
- Fastest = the direction you will spend the most time going, usually forward



ROV Design for Performance

Minimize Losses

- Fluid Drag is a force that slows down the ROV;
Total Drag = ROV Drag + Tether Drag
 - Frontal Area, in direction of flow, is the main contributor to ROV drag
 - Tether drag can be more than ROV drag
- Electrical loss in tether motor circuit due to wire resistance and sloppy connections.
- All of these can be measured.

Advance concepts

- Maneuverability depends on vertical distance between center of buoyancy and center of mass.
 - COB is high, COM is low
- Real world ROVs go down once and up once per flight; think mission task strategy.
- **Design for partial failures.**



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MATE

You are welcome to email me or call me with questions though I ask you share ALL information with ALL team members.