Title: Underwater Stereo Cameras for 3D Reconstruction
Brief Description:

Package two commercial stereo camera systems for underwater use; adapt and extend existing 3D software to perform realtime reconstruction.
Sponsor: UW-APL Science and Engineering Group (SEG)
Project Owners: Aaron Marburg (UW-APL)
Project Manager: Aaron Marburg
Project Mission (what is the goal and how will you measure it?):

Create a basic capacity to capture stereo imagery underwater (in limited circumstances), and to process that imagery into 3D reconstructions.

Project Description (what is being created or changed and why?):

Procure two commercial stereo cameras: a Sterolab Zed and a two-camera Elphel camera processor. Package them for underwater use and capture test imagery. Leverage and extend existing reconstruction software packages can use to produce 3D models from the test video.

Deliverables:

- For each stereo camera, a complete design for a packaged underwater housing w/ one working instance.
- Sample imagery from both cameras for subsequent testing and advertising.
- Intrinsic camera calibrations for all cameras in the water.
- Demonstrated capacity to produce 3D reconstructions from the camera video under a limited set of circumstances.
- Clear demonstration of the potential and further research challenges for underwater visual reconstruction.

High-Level Project or Product Requirements: (Do you need equipment, staff or consultants?)

- Mechanical and electrical engineering support for design and construction of underwater camera housings.
- Machine shop services for construction of camera housings.
- Personnel support for testing.

Values (operating guidelines):

Open source or publicly publish as much as feasible. Maintain focus on developing basic capacity — show that it can be done, with goal of getting continued work to pay for further iteration and refinement.

Boundaries (givens):

Fixed budget.

Barriers (need to overcome):

Limited time to work on project. Limited support (e.g. no other programmers).

Influencers:

- Andy, other APL PIs
- SEG leadership
- Potential sponsors (ONR?)

Summary Budget:

$18,813 total, as laid out in proposal.

Initial Risks (from leadership perspectives, what high level gotchas that can trip up your project?):

Adaptation of existing SLAM software will still be very time intensive, and may not work well at first. Starting again from first principles doesn't makes sense, but by adopting existing work there is a large start-up transient and still the need to make application-specific modifications to the framework.

Summary milestones (What are key dates? Regulatory, political, seasonal, payment dates, major project work completion dates):

Febuary 2016	Project kick-off
June 2016	In-pool imaging of RSN equipment in the OSB test tank.
Sept 2016	Completion of project report.

Success Indicators (what is the definition of success for the sponsor and owners?):

Demonstrate and publicizing (academic or otherwise) a capacity for underwater stereo imaging and 3D reconstruction.

Order of priorities in the iron triangle (scope,cost,schedule)?

Cost > schedule > scope?