ALFA Task 1: Debris Modeling, Detection, & Mitigation

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Task Objective

• Develop and test methods for quantifying debris at potential marine energy sites
• Develop models capable of simulating debris impacts on marine energy infrastructure
• Develop cost effective detection and mitigation strategies to minimize impact of debris on MECs
Goal: Preventing damage to marine energy converters

- Enable successful demonstration projects in early adopter communities (e.g. in Alaska)
- Develop technologies to decrease O&M costs for grid scale projects
Debris disrupts operations, creates maintenance and safety issues.

**Examples:**

- Ruby 5 kW turbine demonstration
- Eagle 25 kW AP&T Demonstration
- Fort Simpson 25 kW New Energy demonstration
Background

Interaction

Characterization

Mitigation
Background

PMEC: Tanana River Test Site
Accomplishments to Date

- Literature survey and report on methods of detecting debris and recommended mitigation strategies (Spring 2015)
- Design, construction and field testing of an autonomous sonar system for quantifying subsurface debris (Summer & Fall 2015)
- Currently investigating options for reprocessing sonar data to improve detection (collab. w/ J. Horne & E. Dewitt Cotter @ UW)
Accomplishments to Date

- Incorporation of buoyancy and drag into “Hydrokinetic Debris Impact Simulator” discrete element method model
Accomplishments to Date

• Preliminary FLUENT CFD model of debris diverter
• Collaboration with Adeline de Montlaur, Escola d'Enginyeria de Telecomunicació, Spain
• Next: coupling of the HDIS DEM to a OpenFOAM
Plans for future

• Coupling of the HDIS DEM to a CFD model
• Seafloor sonar debris survey off Cannon Beach, Yakutat
• Comparison of HDIS DEM output to ProteusDS