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# Electronic Monitoring Innovation Projects

Alaska Fisheries Science Center

Fisheries Monitoring and Analysis Division *in partnership with*  
Pacific States Marine Fisheries Commission

UW Electronic and Computer Engineering Department  
FishNext Research

# Objective:

To develop and integrate computer vision algorithms into cost-effective electronic monitoring systems.

The AFSC applies for project-specific funding through NMFS Office of Science and Technology's Fisheries Information Systems (FIS) and National Observer Program (NOP).



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# 2020 Research Foci

1. Trawl fishery camera chute systems for species identifications, counts, and sizing for catch accounting purposes
2. Hook-and-Line systems for automating analysis of video to count, identify, and measure catch using vendor camera systems
3. Preliminary investigations on approaches to automate review on slinky pot catches
4. EM systems to validate reporting of salmon bycatch at processing plants



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# Camera Chute



## 1. Halibut measurement: detect, identify, and measure fish that are put through the chute prior to discard

1. Intent is to speed discard and census accounting for deck-sorted halibut, assisting with observer data collection
2. 2 volunteer catcher-processors (F/V Arica and F/V Seafreeze Alaska)
3. Hardware repairs couldn't be completed due to COVID-19 related travel restrictions

## 2. Species Identification and measurement

1. Collaboration for a trial application of an EMI-developed camera chute and algorithms for tracking, segmentation, measurement and species identification
2. Monitor discards from a west-coast bottom trawler in cooperation with a project led by the Environmental Defense Fund (EDF)
3. Volunteer catcher vessel F/V Cape Windy
4. UW modified and augmented existing routines to allow tracking, segmentation, classification, and measurement of the discarded fish



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# Hook-and-Line Automation

1. Automation of counting, identifying, and measuring catch
  1. 2 volunteer longline vessels and the NMFS Sablefish survey
  2. UWEE began converting the stereo rail algorithm to a single camera rail algorithm to identify to species classification and estimate length
2. Lab testing camera systems designed specifically for machine vision and learning applications
  1. Units couldn't be deployed to the field due COVID -19 travel restrictions



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# Slinky Pots

1. Very early investigations on how EMI could be applied to slinky pot catches
  1. In beginning stages; collecting images and annotations



# Processing Plants

1. EM systems to validate reporting of salmon bycatch at processing plants
  1. No new data could be collected on this project due to Covid-19 travel and access to plant facilities for non-essential personnel
  2. Arrangements to collect additional data and begin pre-implementation trials of salmon compliance validation



# New 2021 EMI Foci

1. Investigate integration of identification algorithms in operational data review
  1. Reduce review time and expense
  2. Provide data to NMFS more rapidly
2. Publication of Technical Memorandum on 5 years of EMI Research



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