

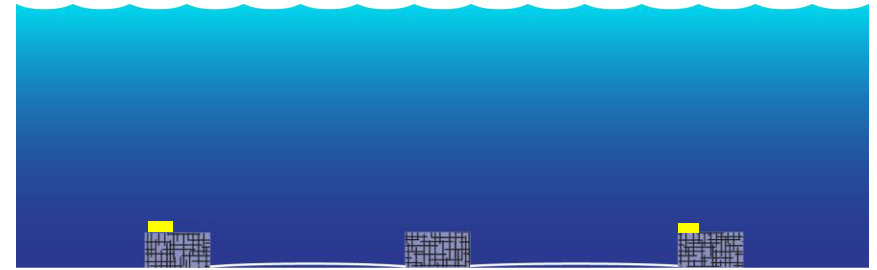
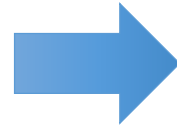
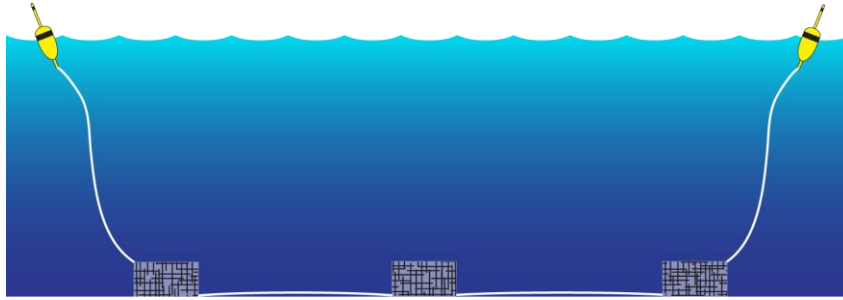
# Ropeless Gear

A brief summary by Fran Recht, PSMFC

See the final report, presentation 8 on the <https://ropeless.org/>

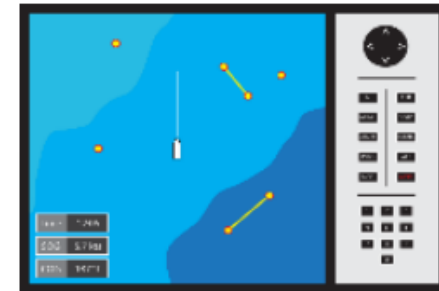
From the Woods Hole Feb 1, 2018 Ropeless Gear Workshop  
for more information

## Instead of surface buoys and lines— using acoustics to mark gear locations

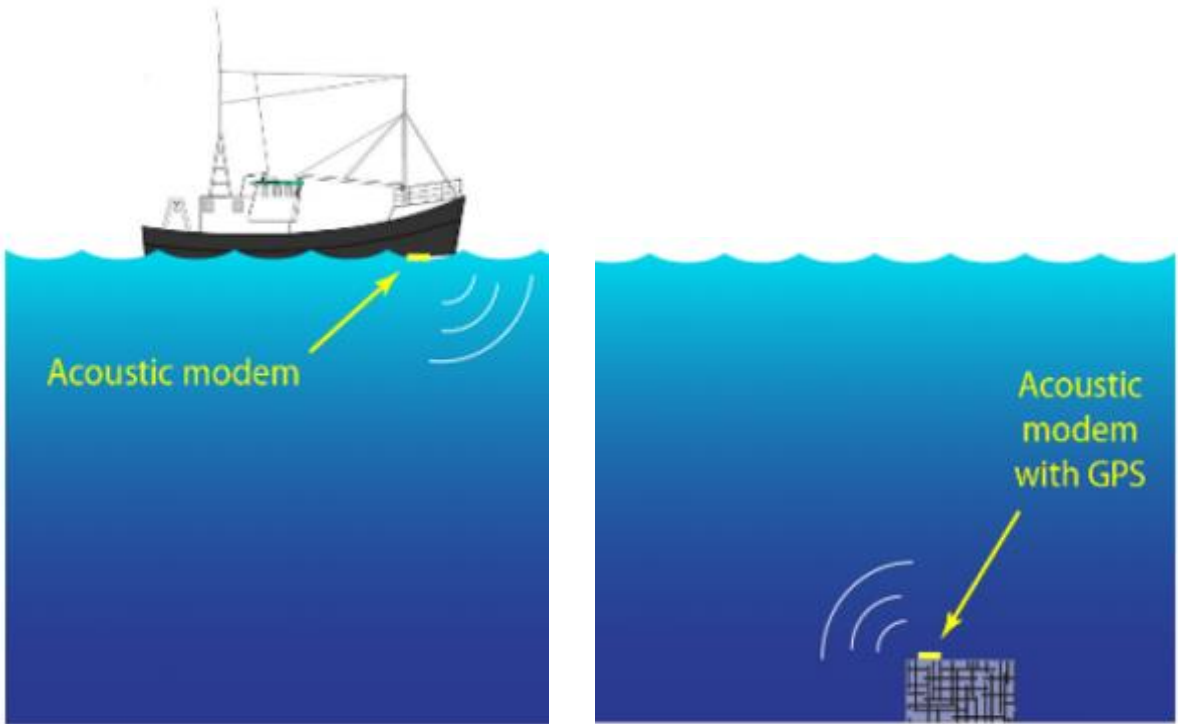


### Requirements

- The position and orientation of traps (singles) or trawls must be available to fixed and mobile fishermen
  - Trap/trawl positions should be available to non-owners only when on scene near the gear
- Enable commercial chart plotters to display the positions of acoustically marked fixed gear so fishermen don't set/run over other's gear
- Registration/permit information must be available to enforcement



- Acoustic modems allow data to be passed through water via acoustical waves (the way cell phone modems allow data to be passed through air via radio waves)



**Data sent from ship to trap:**

Date/time  
Position of ship  
Ship identifier

- **Modems are installed on boats that are fishing fixed or mobile gear**
- **Modems on the traps report information to the modems on passing boats**
- **Information is relayed to a data warehouse when a ship returns to shore**



# What Owner/Enforcement can see

## Data sent from trap to ship:

### Public data

Last known position of trap (GPS/ranging)

### Private (encrypted) data

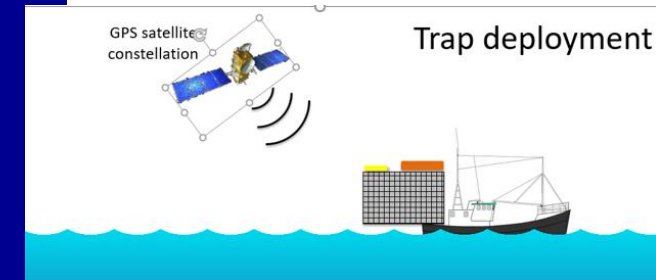
Last surface date/time

Fisherman's registration number

Unique device identifier

User-designated identification number

Sensor data (e.g., trap occupancy)

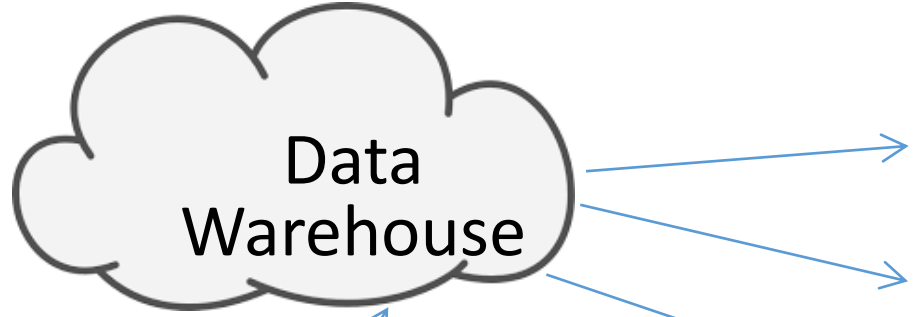


# What other vessels see (on plotter)

## Data sent from trap to ship:

### Public data

Last known position of trap (GPS/ranging)



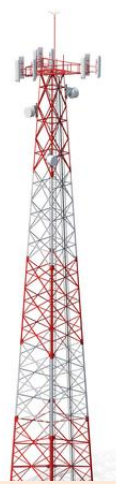
Fisherman-only  
their info

Enforcement

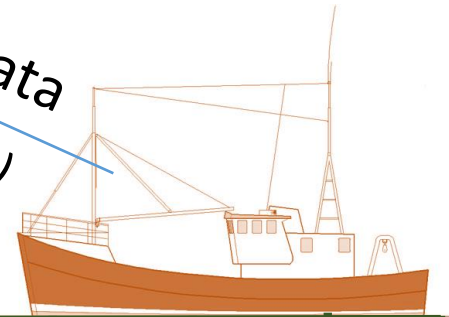
Regulators

**Gear that moves from its  
deployment location can be located**

- All vessels with modems automatically report to the data warehouse the locations and private data of all the trap modems with which they communicated while at sea



Trap modem data  
(public and private)



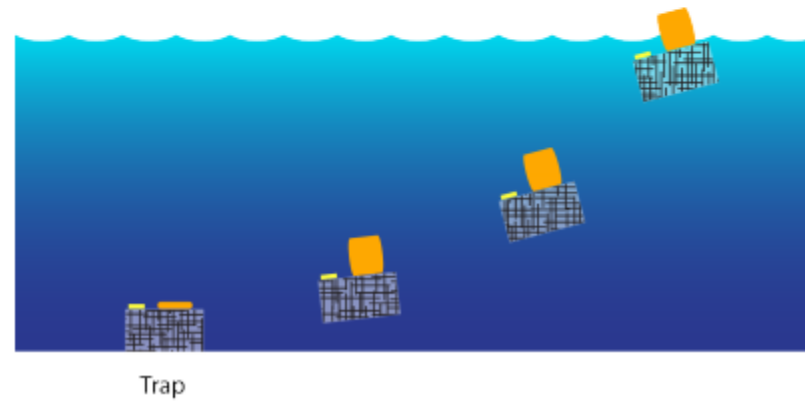
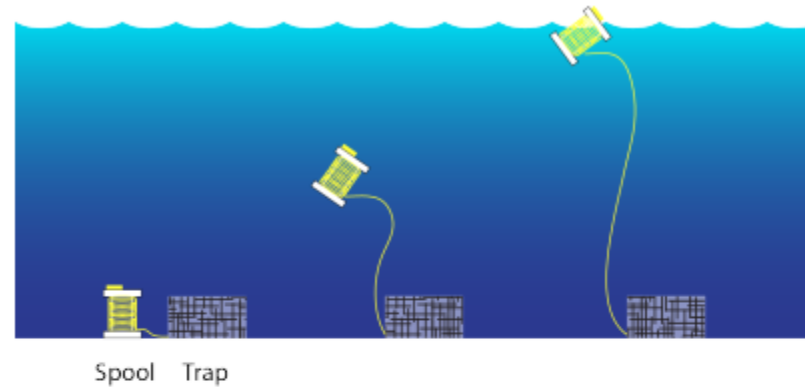
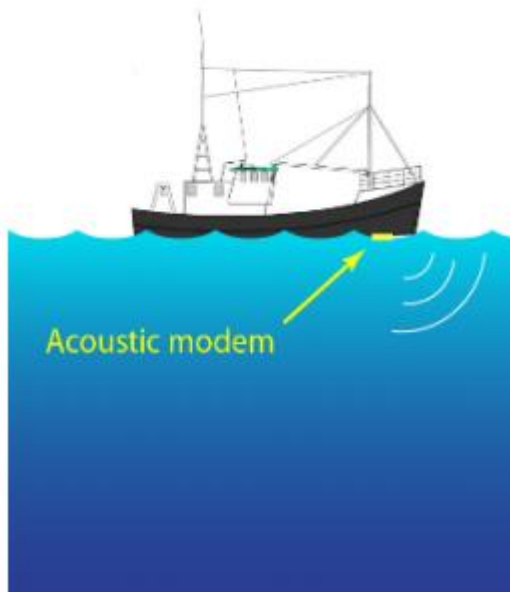
Data warehouse (cloud) operated by

- Private company
- Fisheries commission
- Government



# Trap recovery

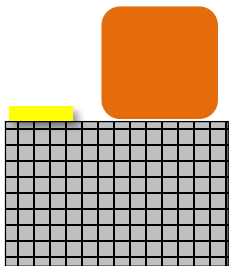
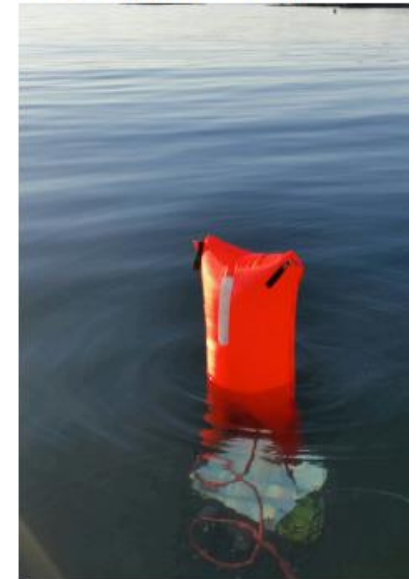
Same acoustic modem allows gear to be retrieved by owner only



WHOI



Lift bag (SMELTS)



**PROTOTYPES STILL IN EXPERIMENTAL DEVELOPMENT—VERY EXPENSIVE  
AND CURRENTLY NOT PRACTICAL OPERATIONALLY FOR EXISTING WEST COAST FISHERIES  
(long reset times, software for other boats to “see” gear not operational)  
though a company Desert Star, has a system that is being fished in New South Wales, Australia**

Manufacture needed equipment

- Who pays for this?
- If government signals there will be a market for rope-less, manufacturers with venture capital may help to subsidize costs
- If not, this will need to be funded by government or private foundations.

| Units     | Cost per unit |
|-----------|---------------|
| 1         | \$18,000      |
| 10        | \$9,000       |
| 100       | \$4,500       |
| 1,000     | \$2,250       |
| 10,000    | \$1,125       |
| 100,000   | \$563         |
| 1,000,000 | \$281         |



Estimate \$3000 total per trap modem, release, and equipment to move the gear from the sea floor to the sea surface. For a fisherman fishing 40 trawls with devices on both ends of the trawl, this means \$240K per fisherman. For 15 fishermen, this is \$3.6M per fishery.



## But Need To Act Here Too...

### The ropeless gear information got California and Oregon fishermen thinking...

- What if the buoy/line was just to mark the location, not to pull the gear? (weak line) paired with Timed galvanic releases –
  - Buoys/line come to surface in 1, 3, 5 days etc. (Buoys would have to be the hard buoys used on trawls—different sizes, number to get lift).
- What about pelican hooks or salmon downriggers- where weak line is just used to release the stronger line/buoys that are coiled near the pots? Manila line that doesn't stretch.
- What about only the first 10 fathoms being the weak line, with additional break-away or degrading swivel – pull first 10 fathoms slowly than like normal?
- What about a telescoping trailer line– like a yo-yo... if main buoy submerged, at a certain tension unspools the trailer buoy
- What about deep water long-lining? Might make it worthwhile to pay for buoyless gear? Used to fish 50 pots at a time. Floating line between pots a concern... could neutral line be used?
  - OTHER IDEAS? Need your innovation. Funding available for testing.  
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# Other work being done

- Line profiles (with and without swivels, Pete Nelson)
- Load testing (what is load when gear is being pulled, Pete Nelson)
- Smart Buoy (to detect motion when whale gets entangled, Blue Ocean Gear)
- Forensic review of gear in August (with Dan Lawson)