Inshore bottom longline fisheries: novel methods to reduce availability of hooks to seabirds

Project: MIT2011-04

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background

- seabird risk assessment work showed high potential risk that small vessel (inshore) bottom LL fisheries pose to seabirds, including the black petrel & FF shearwater (Richard et al 2011)
- despite application of mandatory mitigation measures (BSL, line-weighting, NS, offal discharge management) there still remains the need to substantially reduce bycatch in these fisheries

- 2011 work carried out on line-weighting regimes Inshore Bottom LL fisheries
- some initial sea trials to test and develop a novel mitigation device, the Kellian line setter
- trials showed the device to have utility but problems with fouling of hooks, line-weights and snoods identified

Goad et al (2011)

Project focus

Development & testing of the *Kellian Line Setteran*

an underwater line setting device initially designed by Dave Kellian & further developed by Dave Goad

Kellian Line Setter:

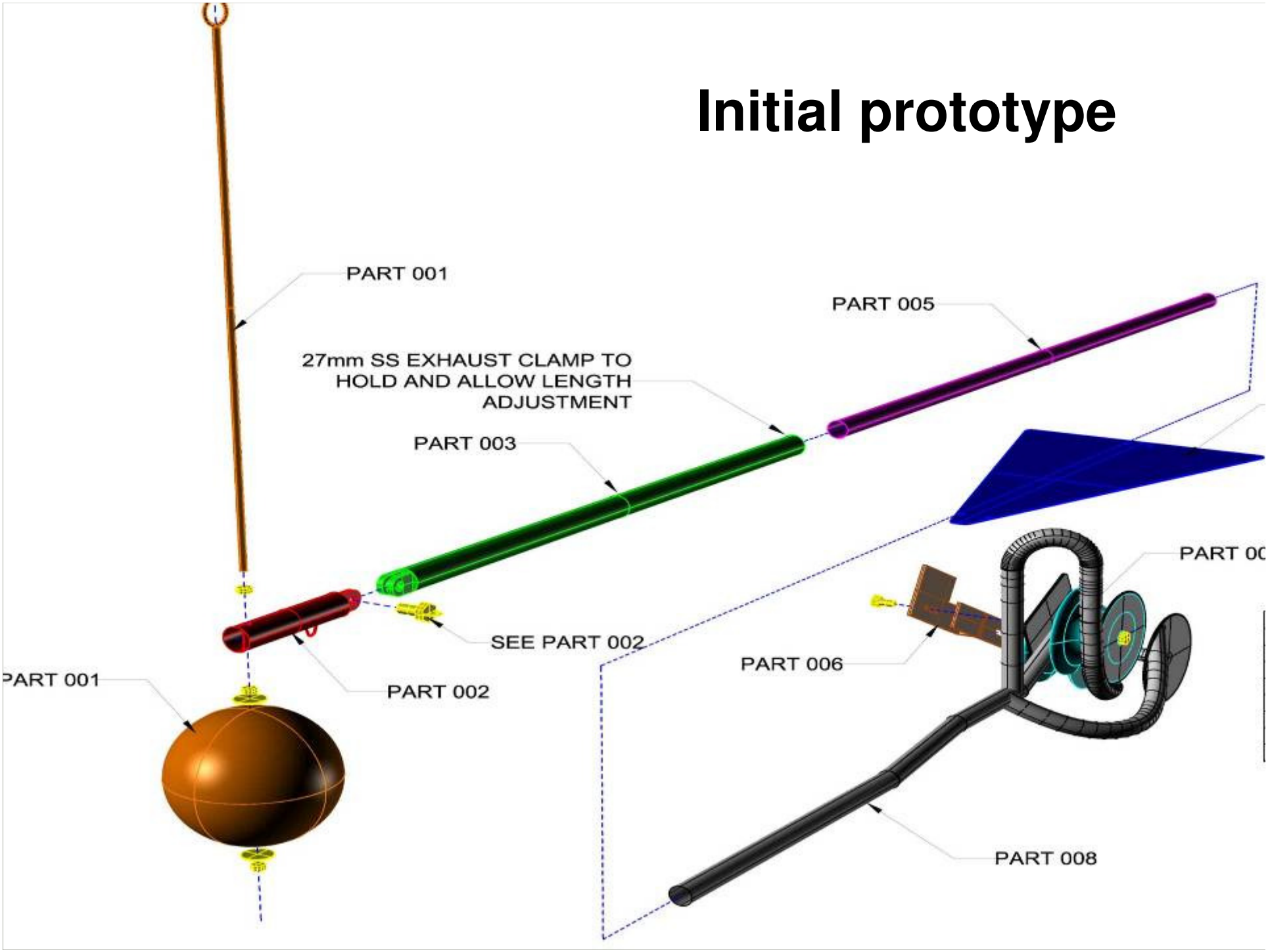
- developed by fisherman Dave Kellian, to mitigate catch of black petrels & FFS in NZ's inshore snapper fishery
- towed device
- could be easily applied to any demersal LL operation, incl. autolining
- design needed refining to resolve technical issues - gear fouling on rollers

Initial prototype

Line setter is a towed device, consisting of :

- an adjustable stainless steel tube c.1.5 m in length
- a lead ball at one end
- two rollers & snood & weight guides attached to other end
- paravane fixed to mid section of steel tube to assist in maintaining stability
- wire cable, attached to the end of the steel tube & lead ball, is used to deploy the line-setter & determine setting depth.

Initial prototype



methods

- assess existing prototype in short at-sea trial
- develop research plan after at-sea assessment
- develop drawings based on professional engineering & naval architecture advice;
- fabricate a new prototype
- refine design in AMC flume tank to achieve a performance standard of set hooks through the line setter without foul ups.

Flume Tank

- Circulating water tank (flume tank) at AMC, Tasmania play a major part in refining design
- Used to test the behaviour of structures in currents for oil & gas, fishing industry, defence u/w military technology
- Dimensions:

  17.2 m X 5.0 m X 2.5 m deep

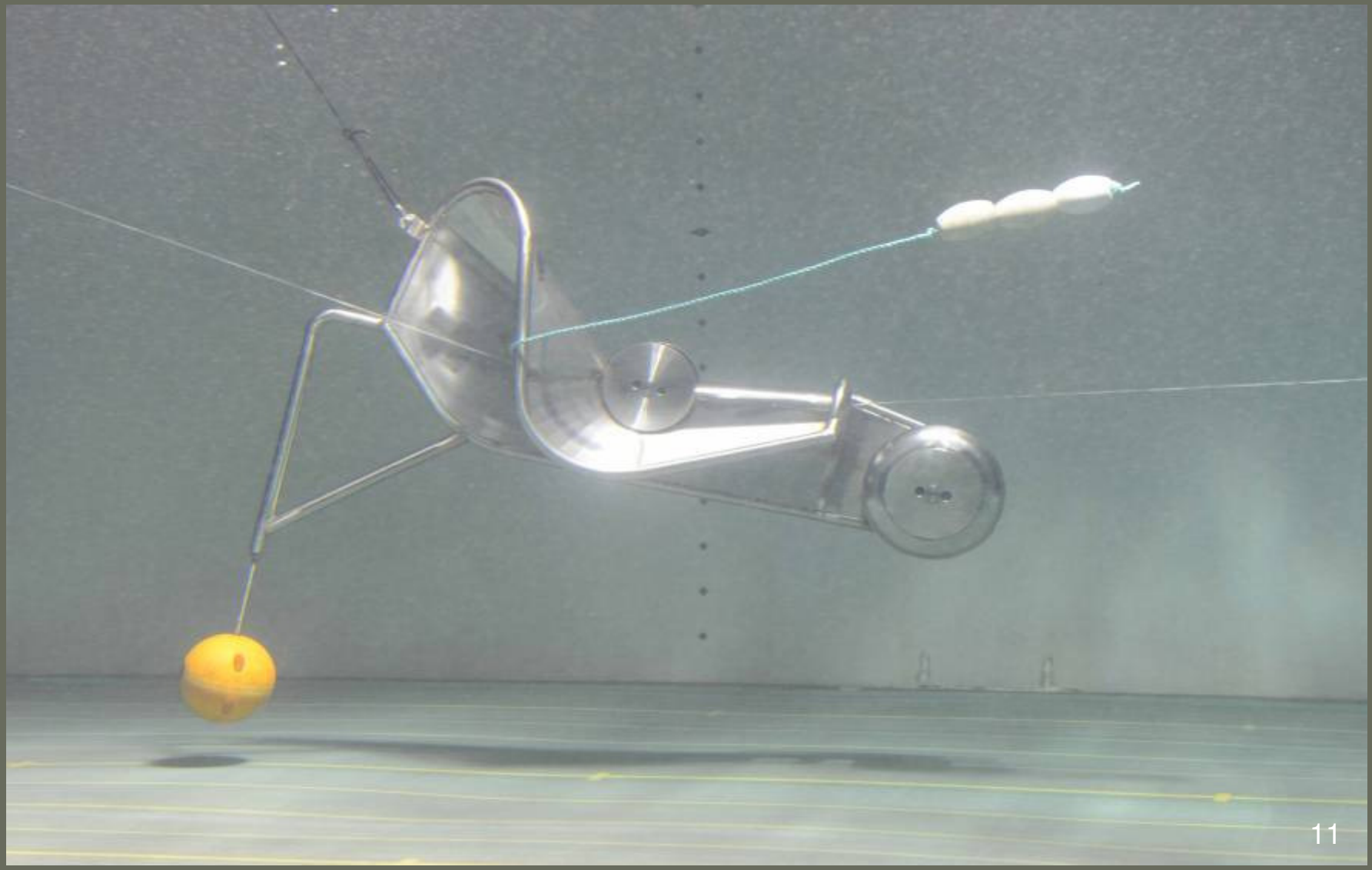
  water speed 0 to 1.5 m/s

  Observation window 11.5 X 1.5 m

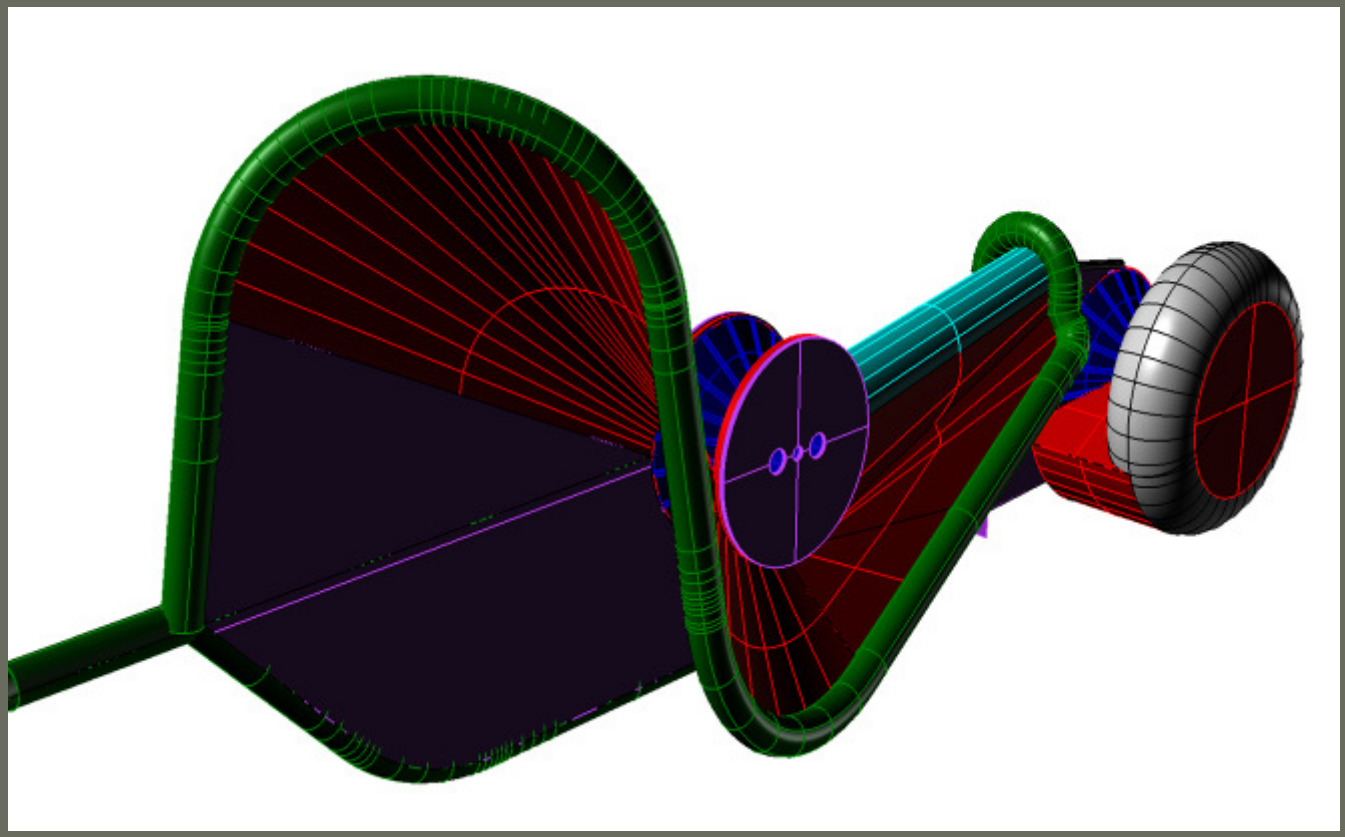
Issues with KLS prototype 1

- primary focus of redesign should be to minimise hook-ups & refine design
- redesign to focus on preventing branch lines stopping at the front roller,
- removing all potential for hook-ups
- reducing the lead weight or providing grab points for crew to move device safely.

New KLS prototype

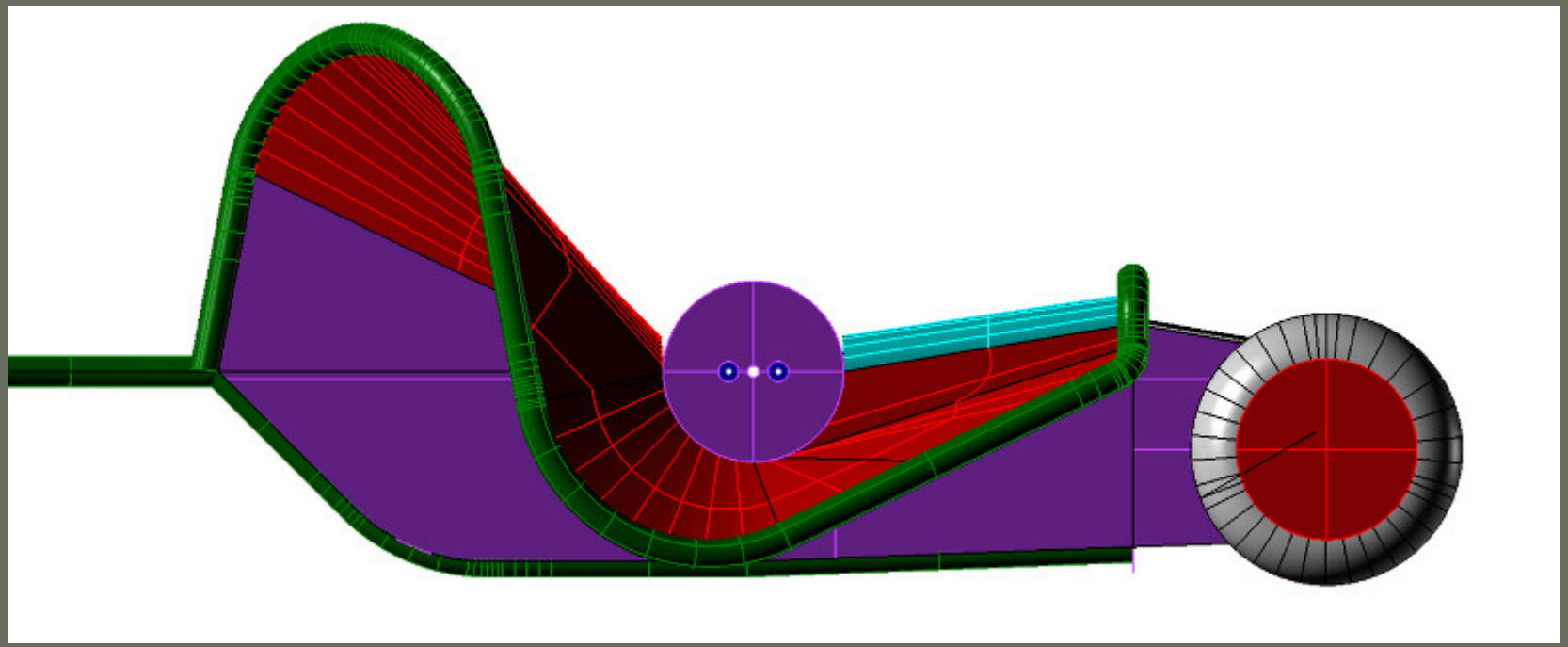


key features of re-design



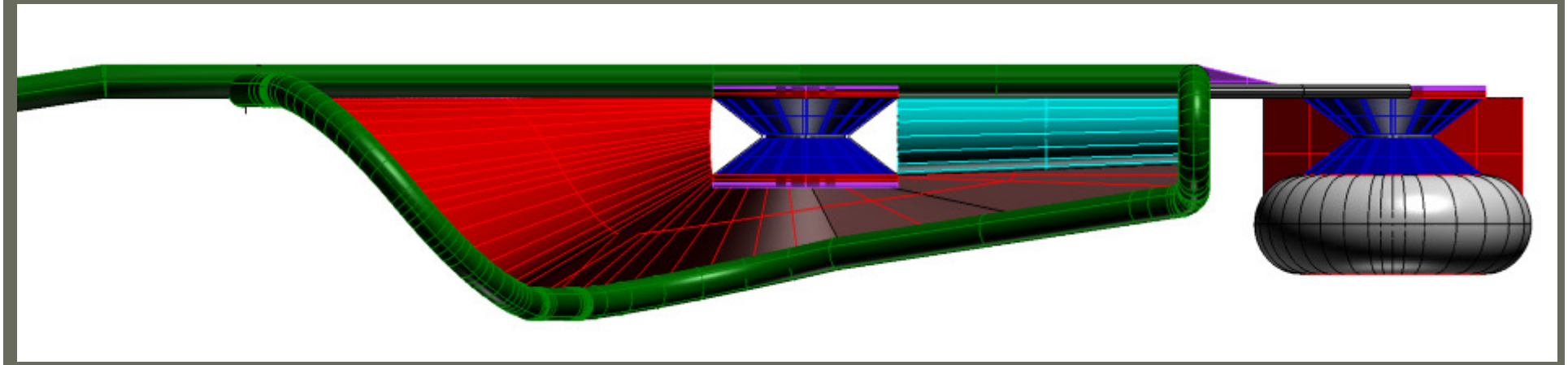
- Reduced projected area to minimise drag.
- Has a constant rearward angle on inlet to allow floats through the system easily, & to ensure hooks are swept back quickly

side view



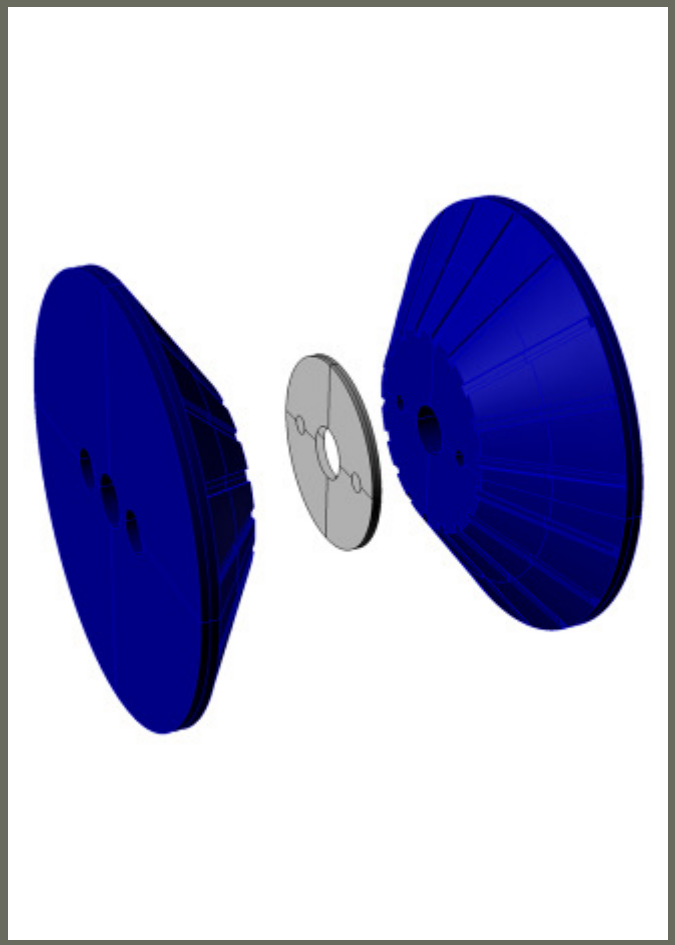
Rollers have teeth & rubber insert to improve traction on mainline. Also has ability to connect the rollers so that they are always driven

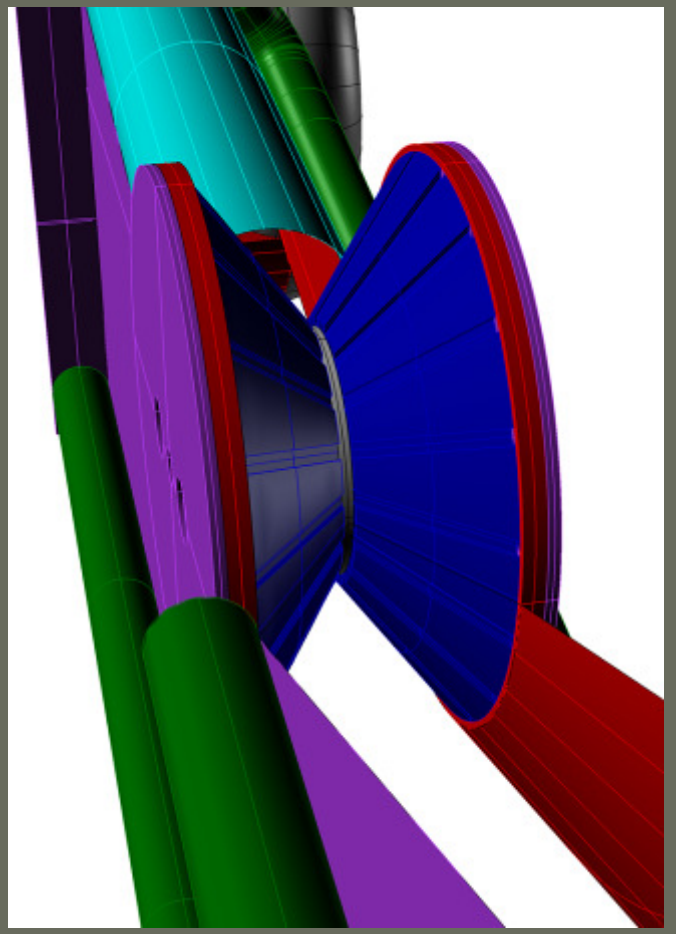
top view



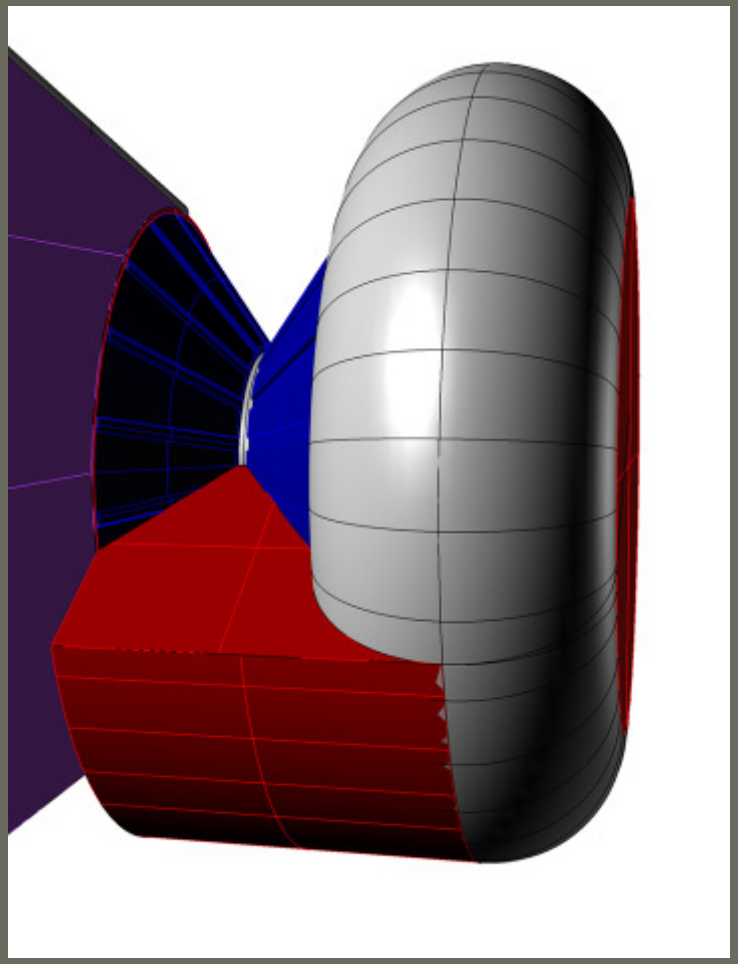
Rear roller is used to keep line in when weights go though the system, may require modifications to current weights, based on Dave Kellian's advice.

:Roller detail. Cheeks are made of plastic, with 4mm thick rubber centre disk to grip backbone.



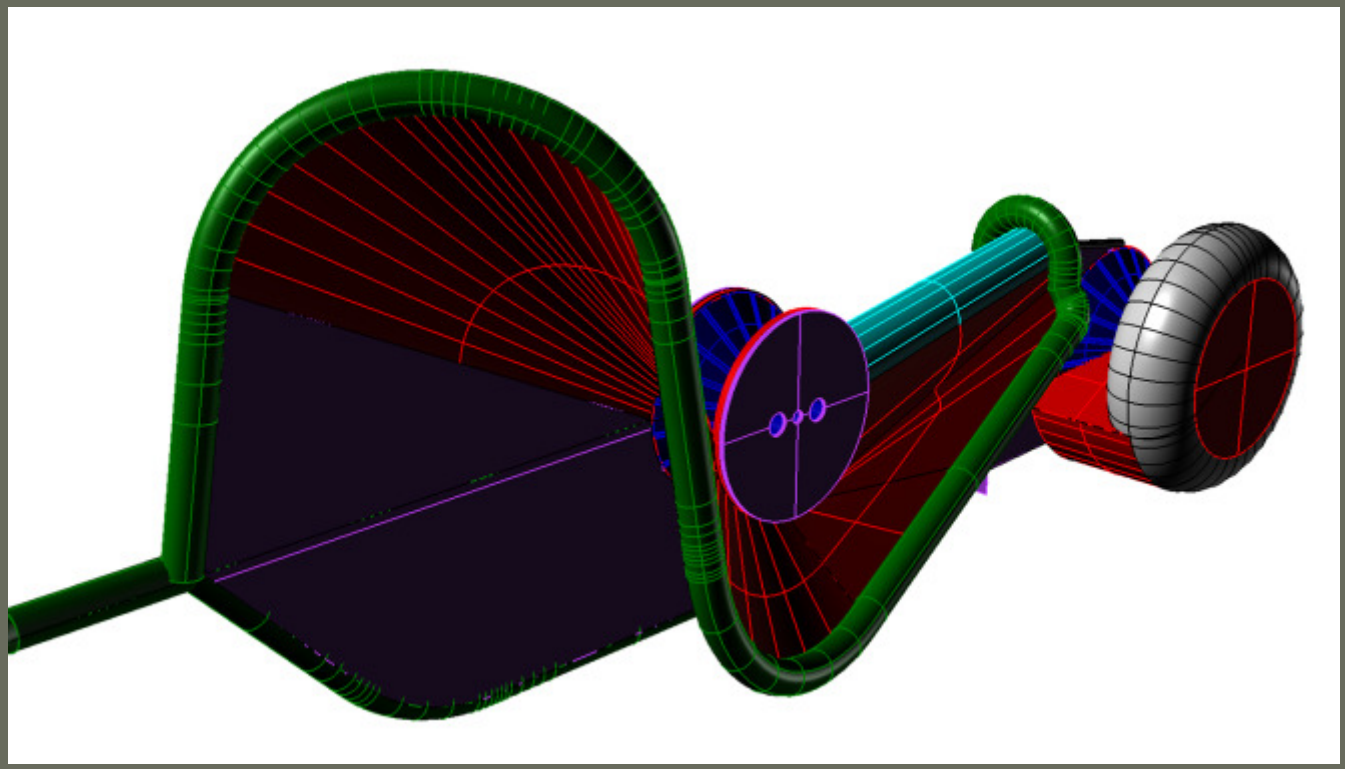


rear roller



- used to keep line in when weights go though line setter
- easily removed to facilitate testing
- may require modifications to current weights used in fishery

key features of re-design



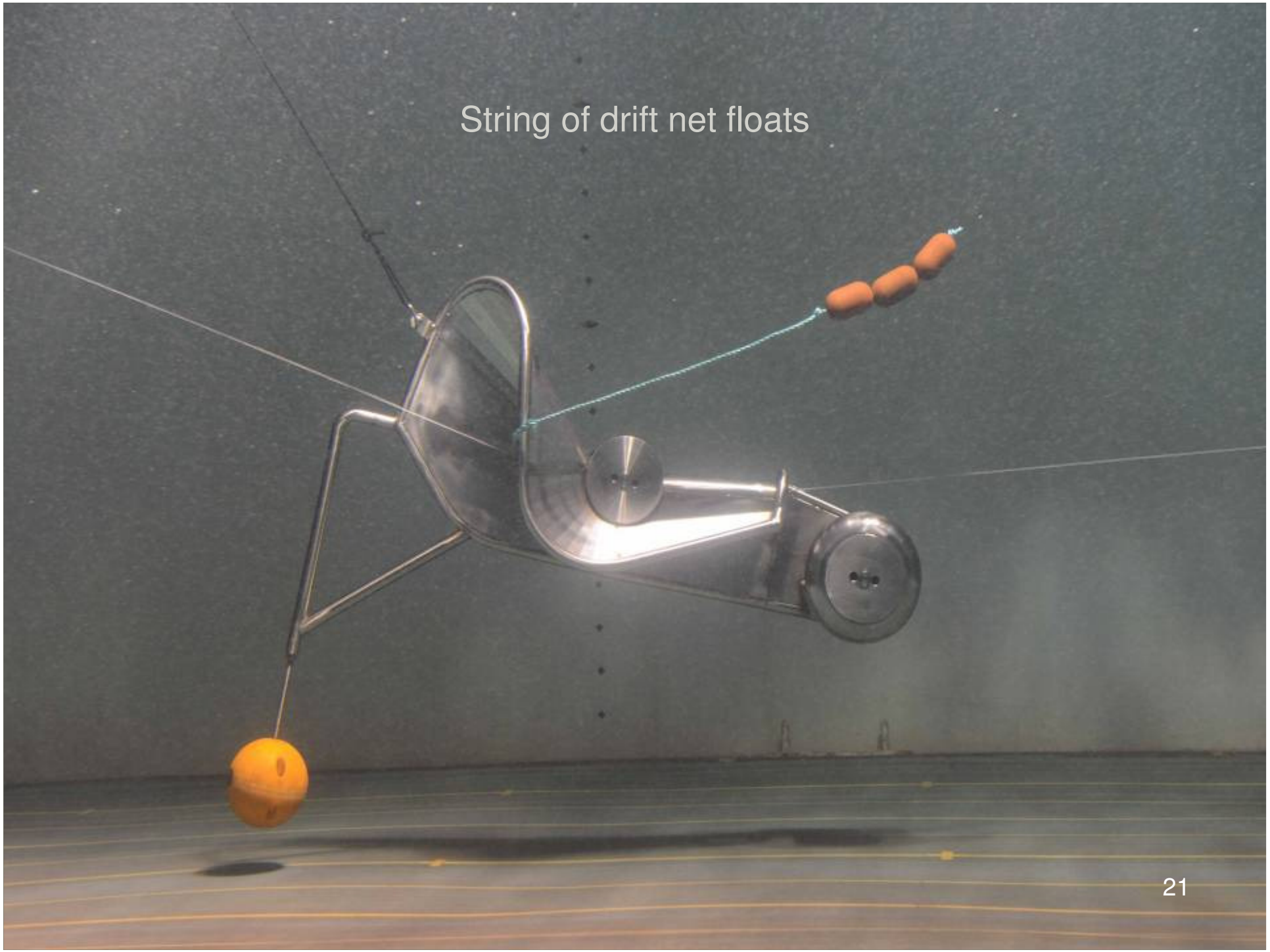
- constructed in 316 Stainless Steel.
- paravane & lead weight final size will be based on tests in the Flume Tank.

progress so far

- fabrication completed of new prototype
- cost c. AUD $5,000
- prototype tested in flume tank
- prototype adjusted to maximise performance
- now ready for testing at sea

future work

- preliminary trials at-sea (set 10,000 hooks), to assess if further development required:
  - dropping of mainline
  - effect of different floats and weights on performance at sea
  - retention of bait
  - ease of operation re manual handling (wgt 32 kg)
- more extensive trialing under fishing operations


String of drift net floats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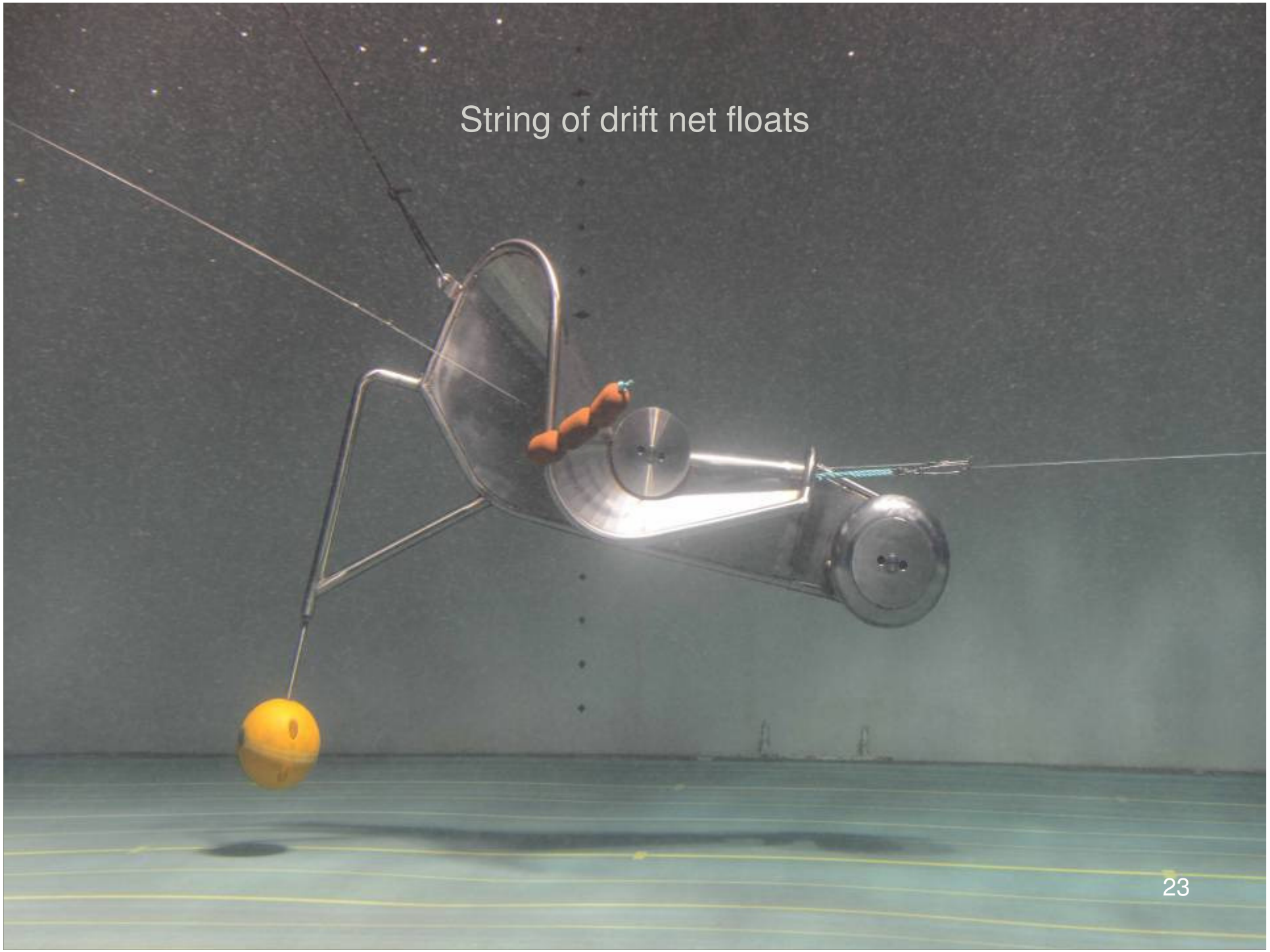
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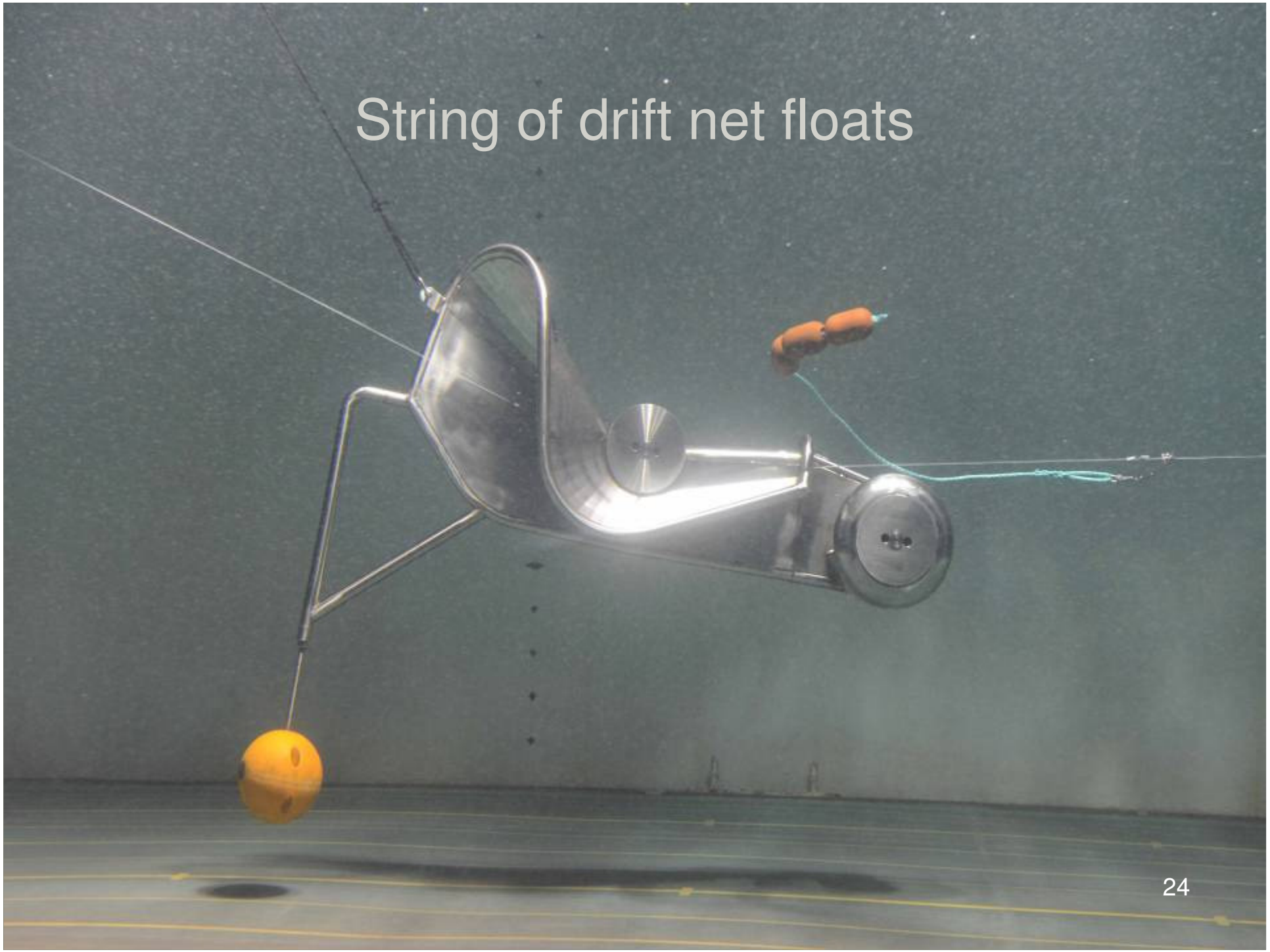
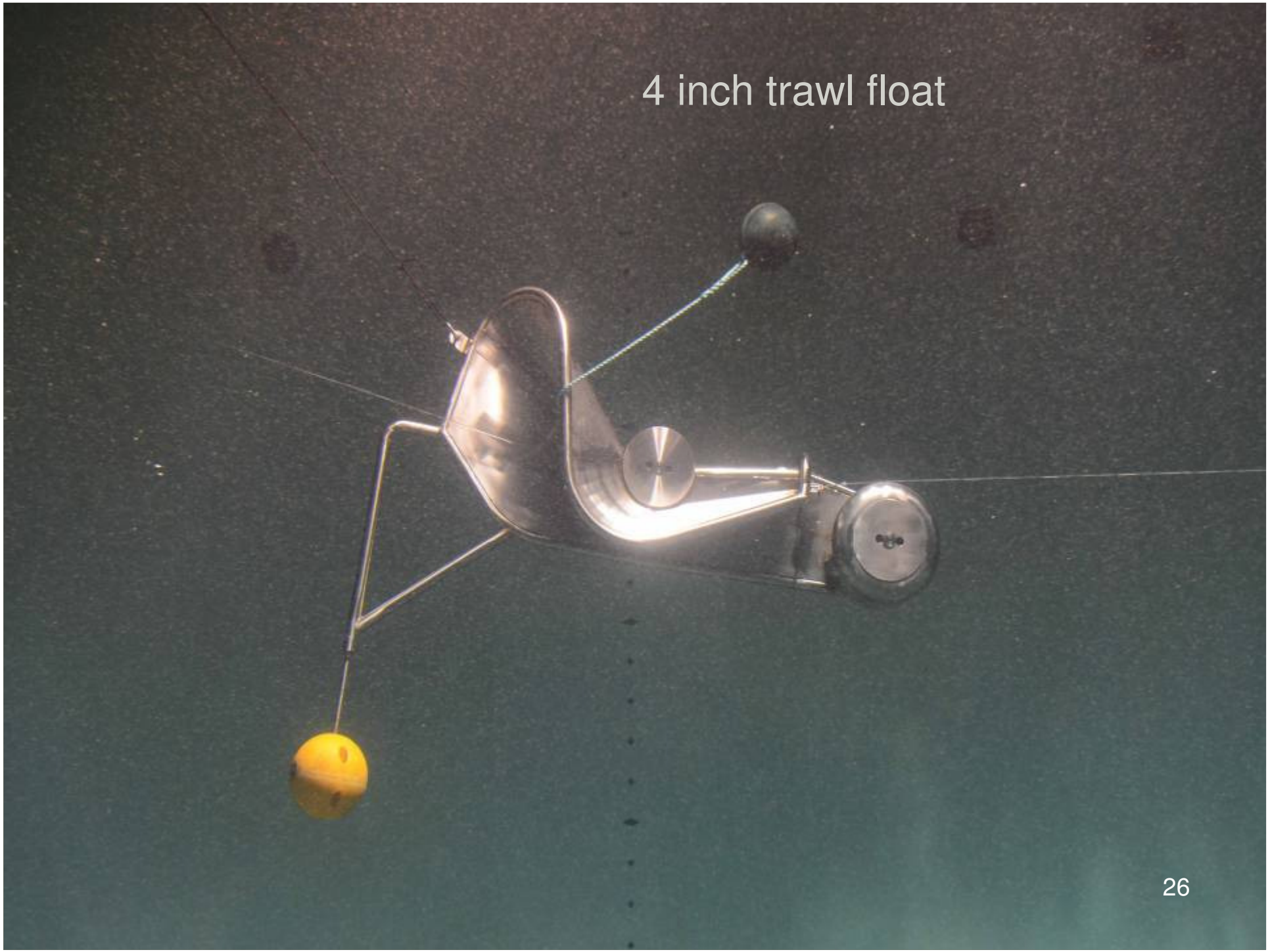
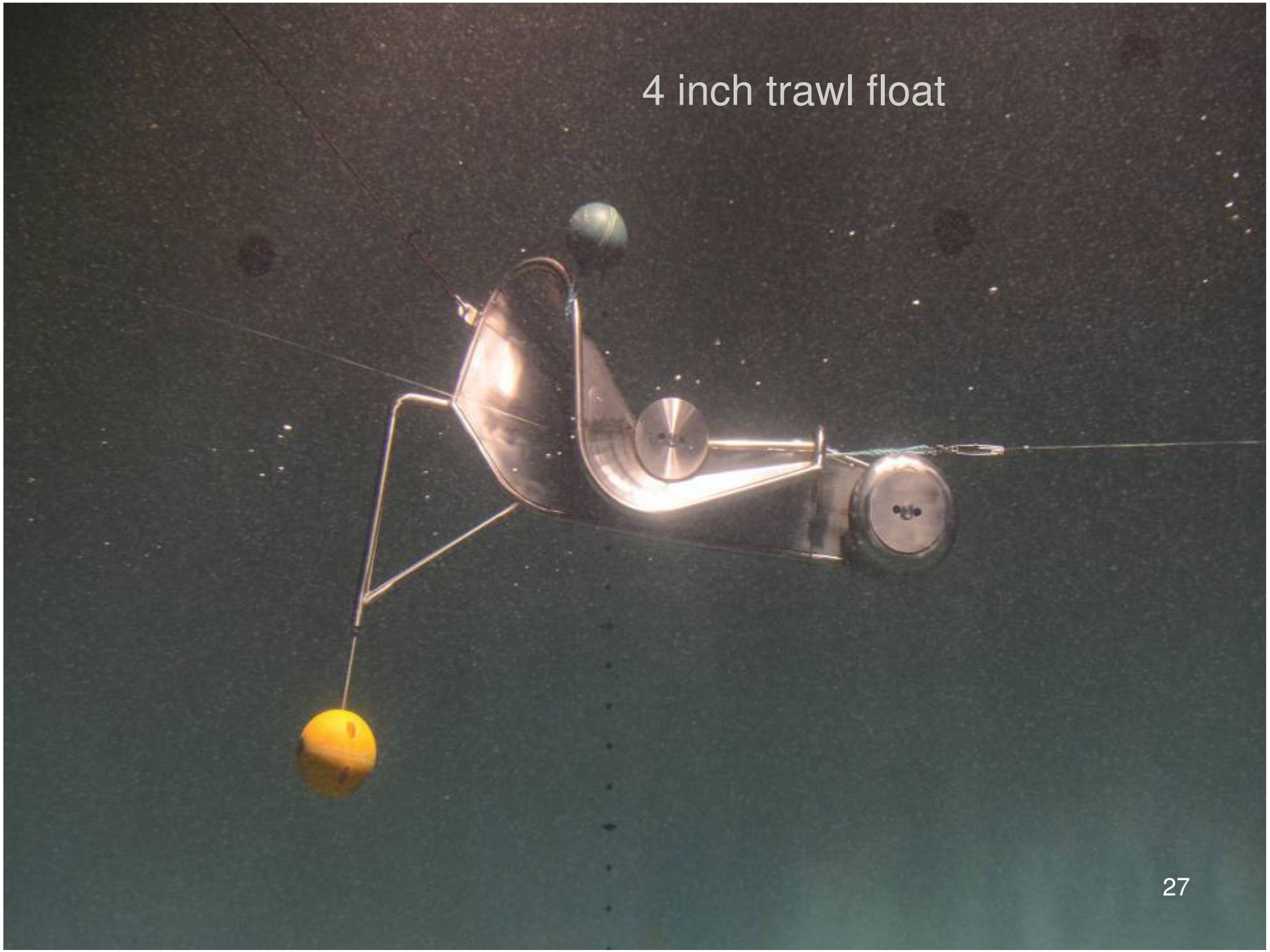



4 inch trawl float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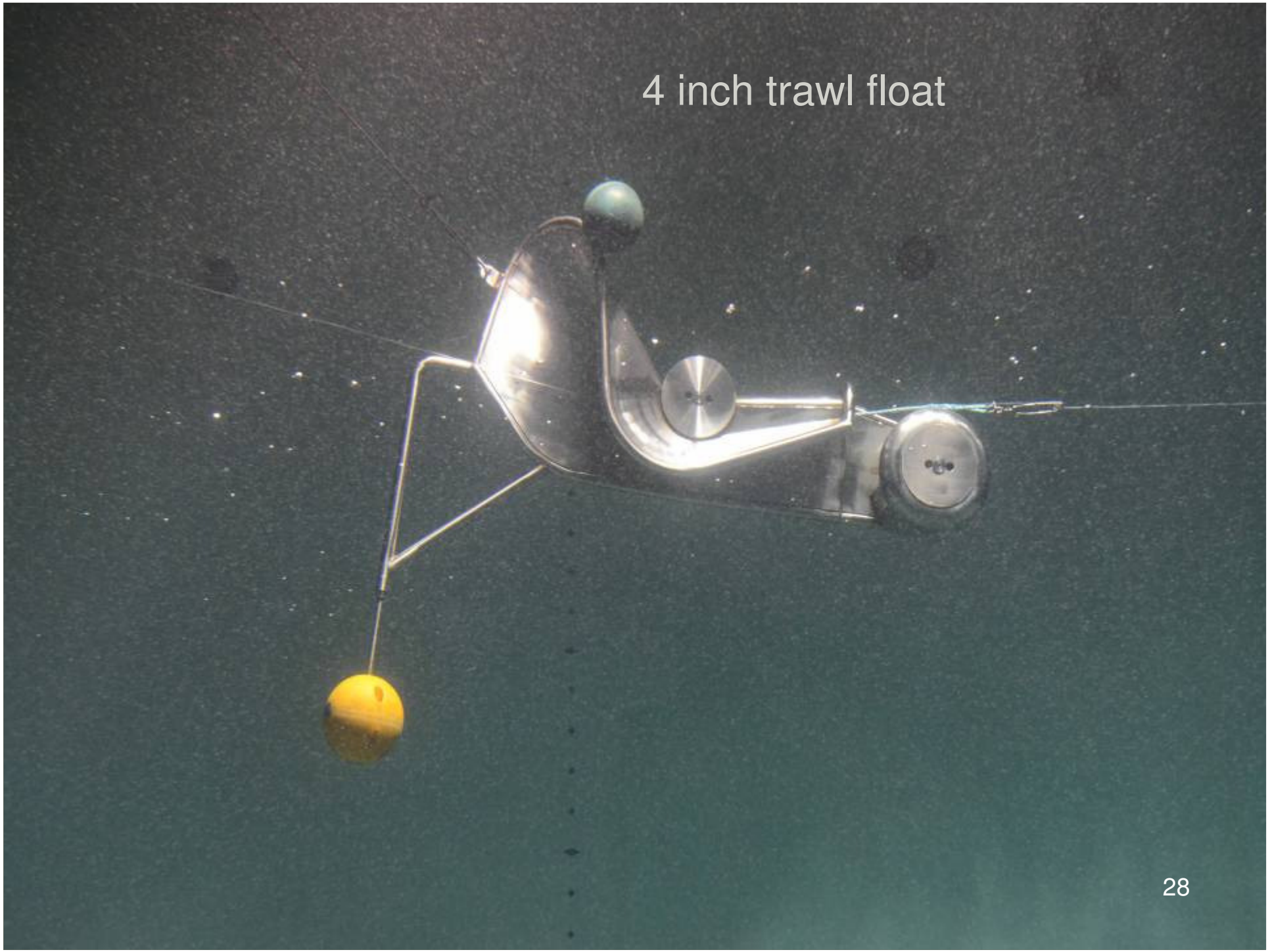
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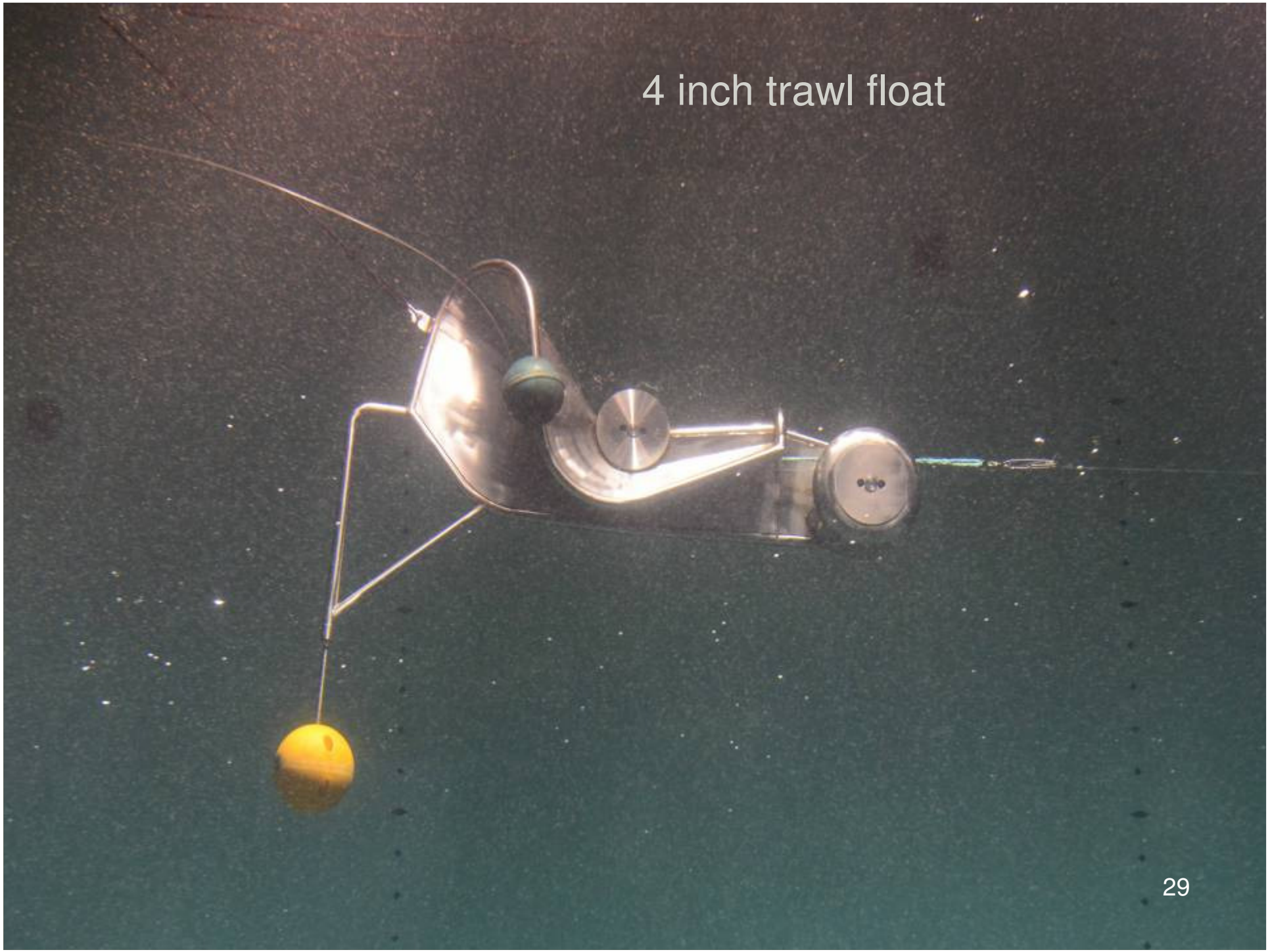
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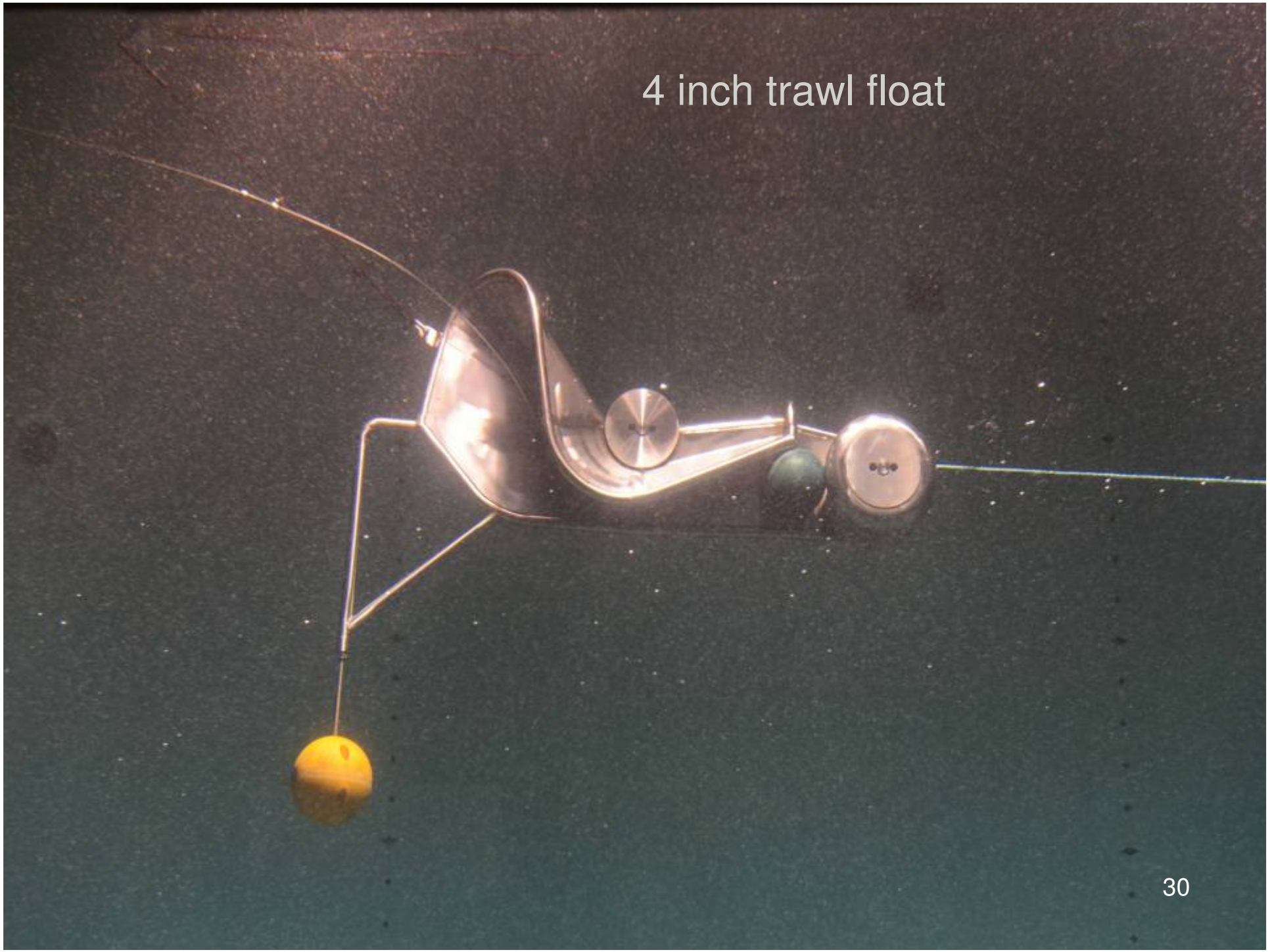
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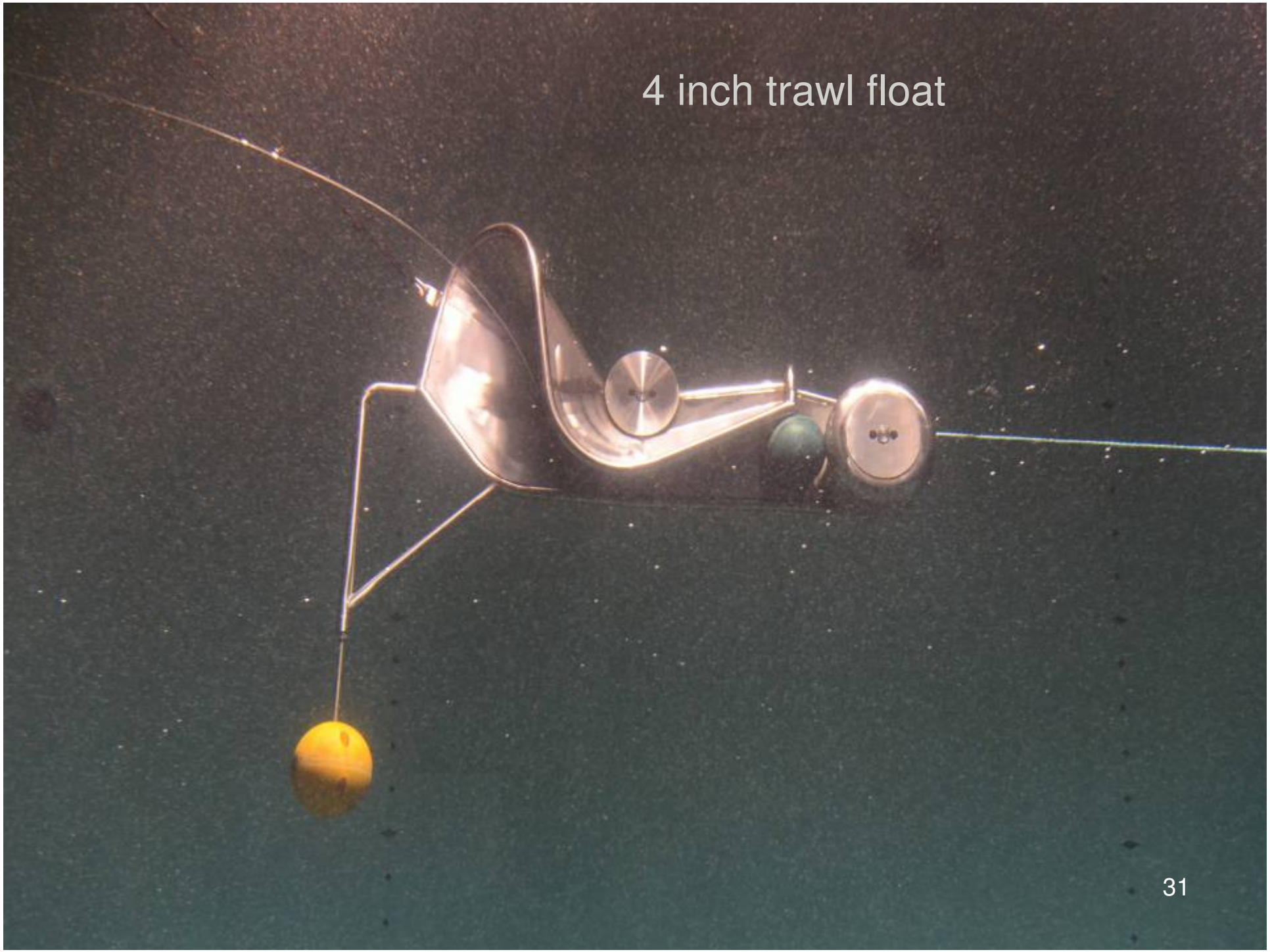
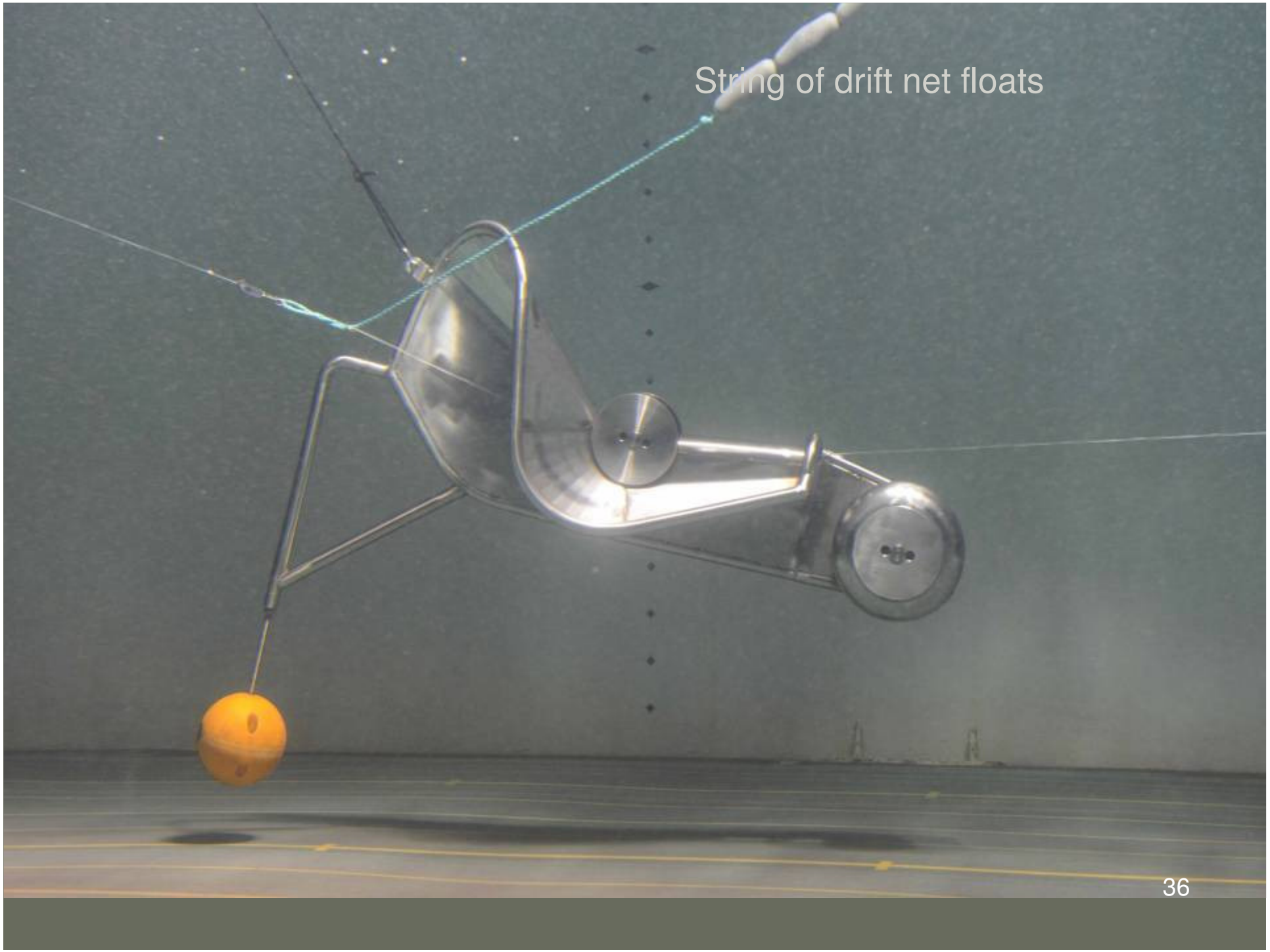

4 inch trawl float


4 inch trawl float &
rear roller

Rear roller


Potential hang up point
on rear roller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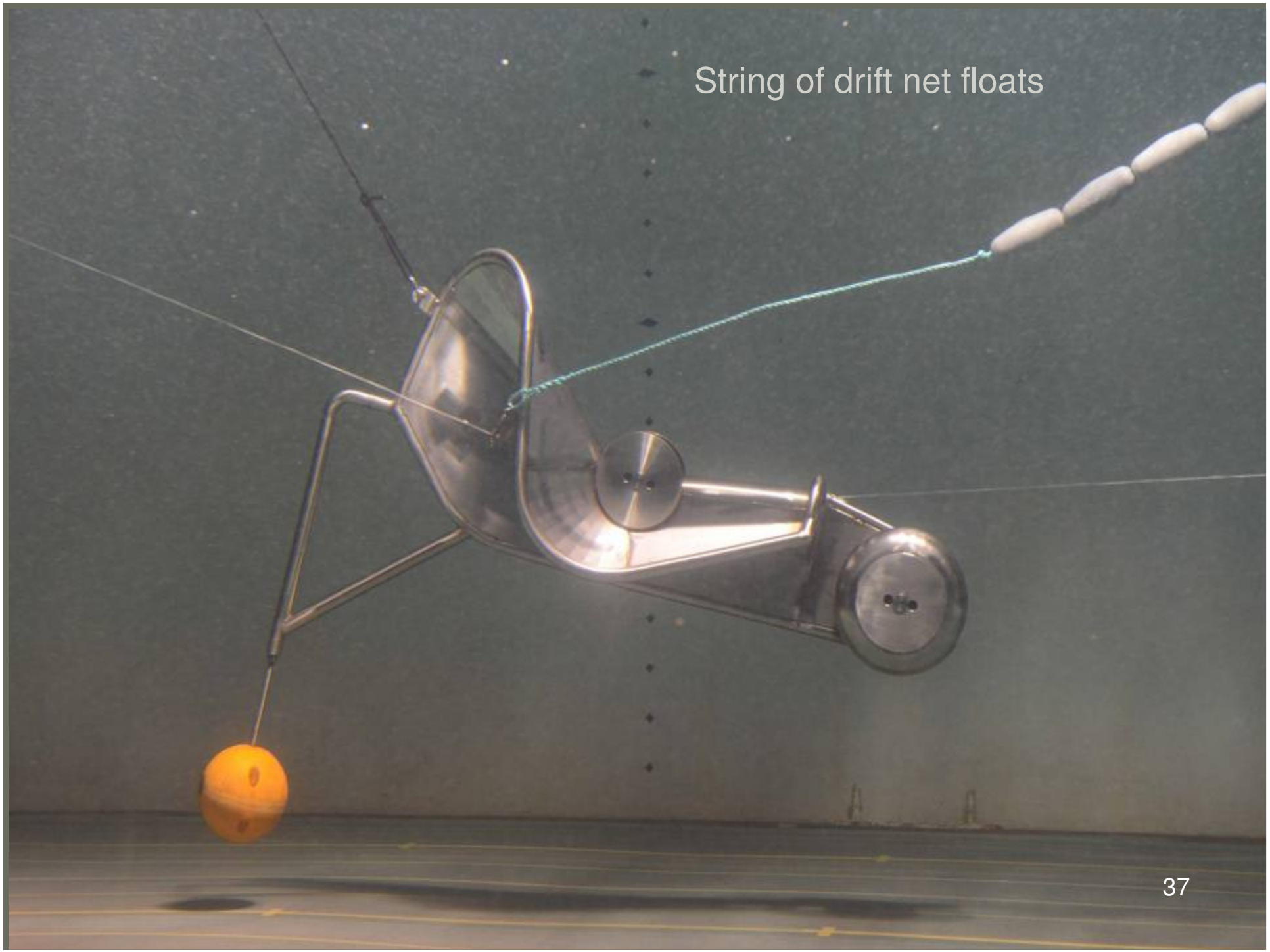
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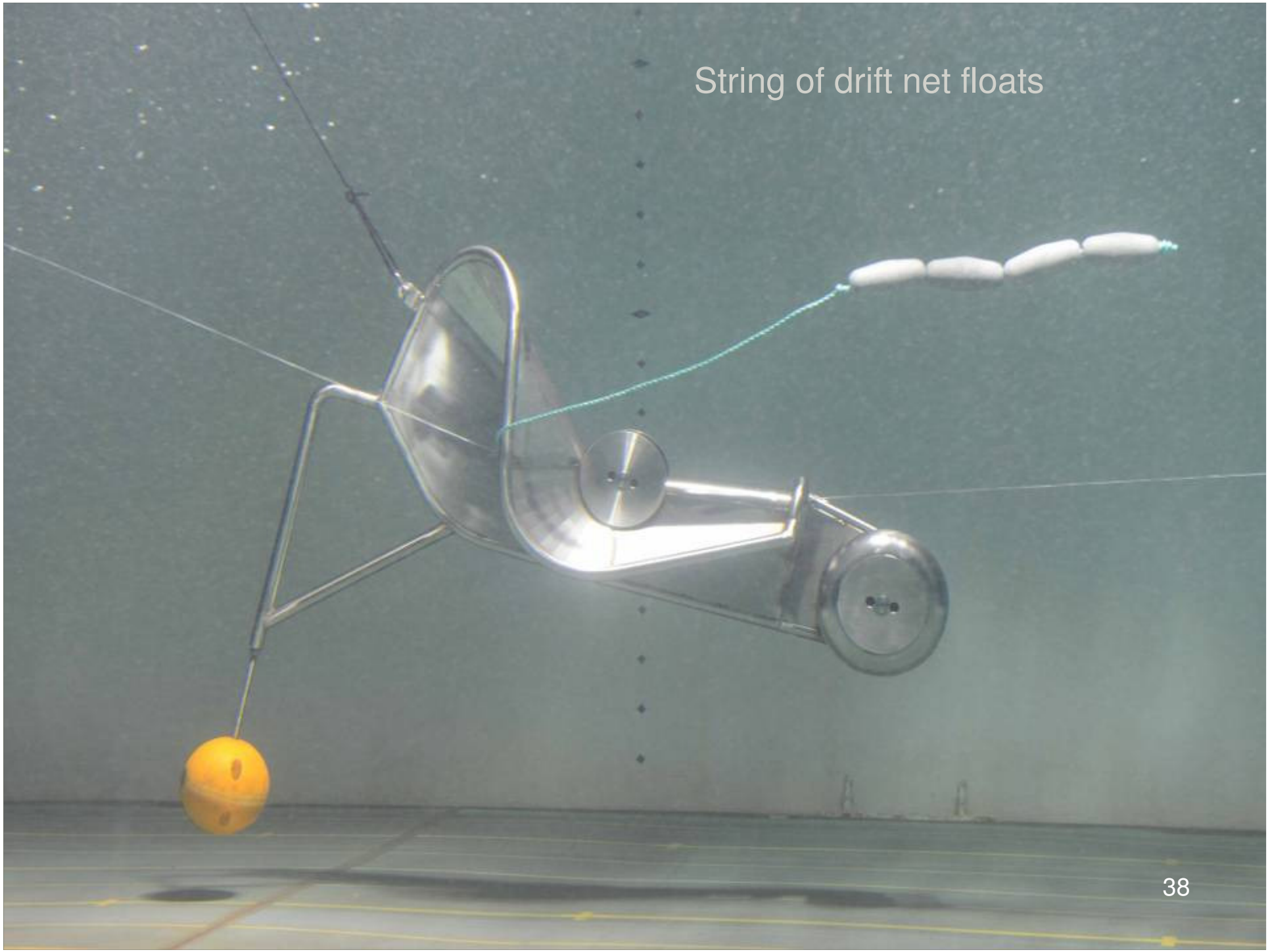
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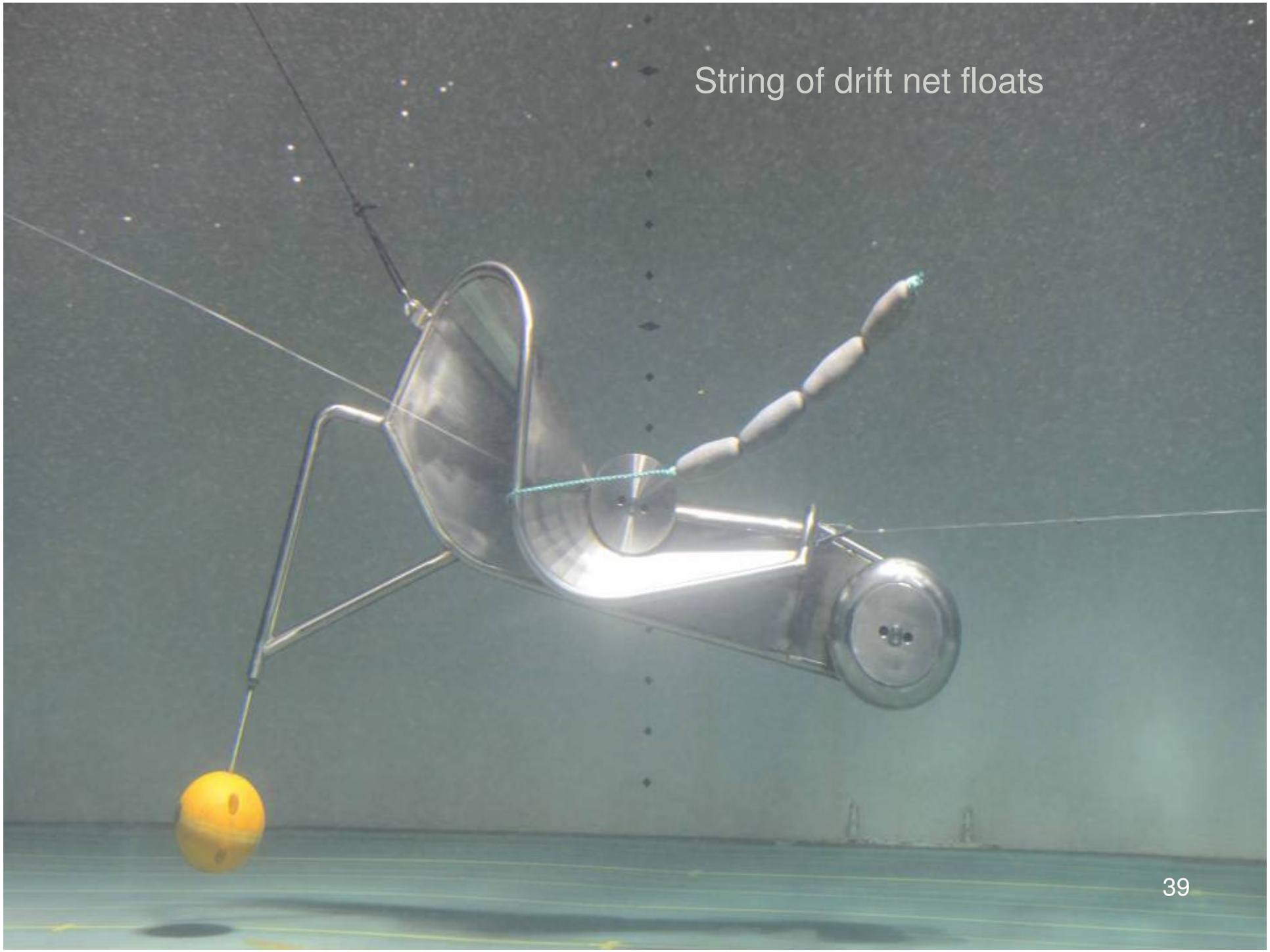
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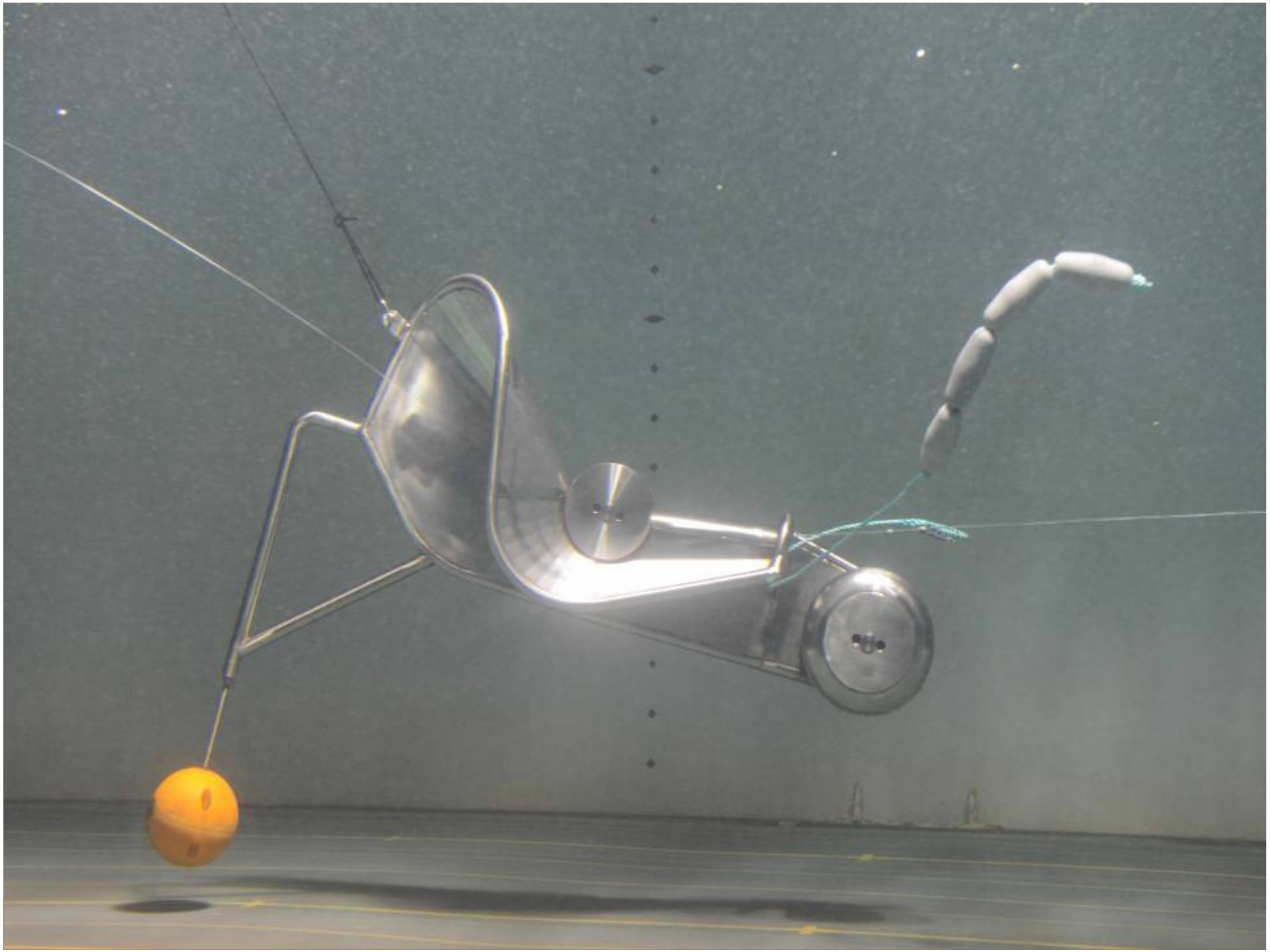

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