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Evaluation of Performance Assessment Procedures for a Floating River Energy Converter

Prepared for: IEC TC 114 Canadian National Committee
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Background

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- Challenges were encountered during development of 62600-200 (Tidal Performance Assessment):
  - How to measure velocity on floating tidal energy converters (typically able to move)

    → device or seabed mounted
  - Specifying suitable profiler location envelope for turbines of non-circular cross-section

    → Location based on 2-5 “equivalent diameters” upstream, or 1 equivalent diameter on either side of the turbine

Objectives

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- This project investigates these knowledge gaps by:
  - Assessing the design and procedural challenges encountered when deploying an ADCP upstream of a floating turbine
  - Analyzing the impact of the TS-recommended current profiler locations on performance assessment of a hydrokinetic turbine
- The work will inform Ad-Hoc Group 4 (maintain tidal performance TS) as well as 62600-300 (river performance assessment)

- Budget: $19000 cash + $4800 in-kind
- Field work to coincide with field testing of Mavi's Mi1 20 kW turbine deployed at CHTTC

Mavi Mi1 Turbine

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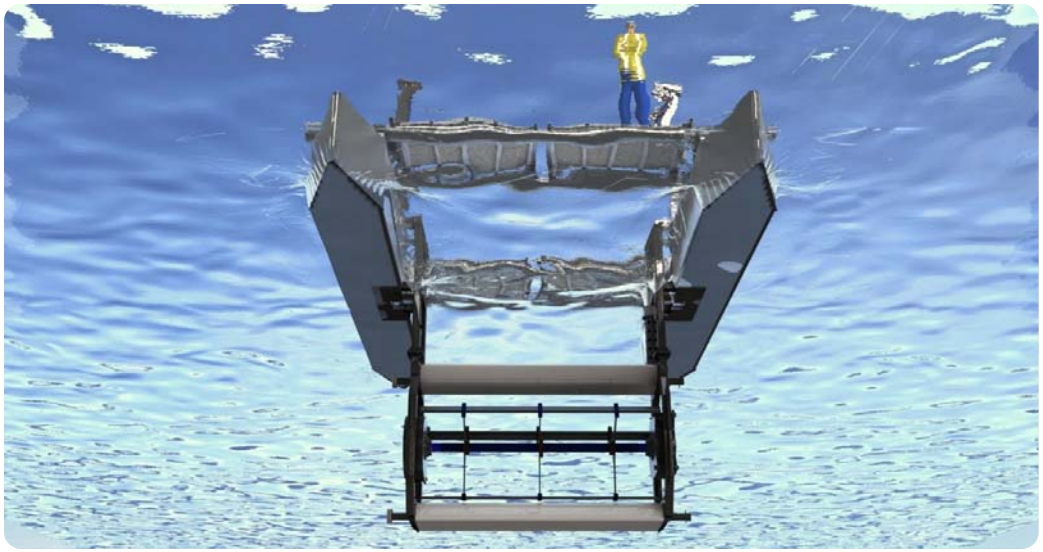
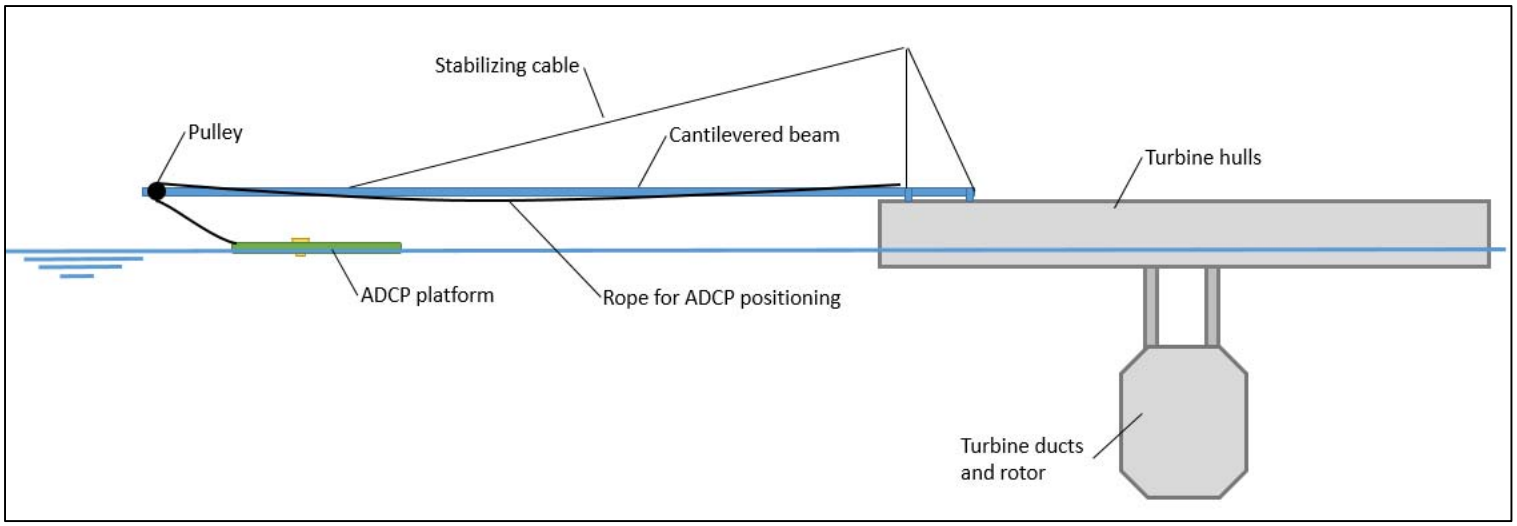


Tasks

- Review existing CFD Data
- Specify/design mechanical equipment
- Test plan development
- Deployment and testing
- Analysis and reporting

Current Status

- Equipment Specification
  - Work with CHTTC to select ADCP suitable for river performance measurements
  - Assessed ADCP deployment options



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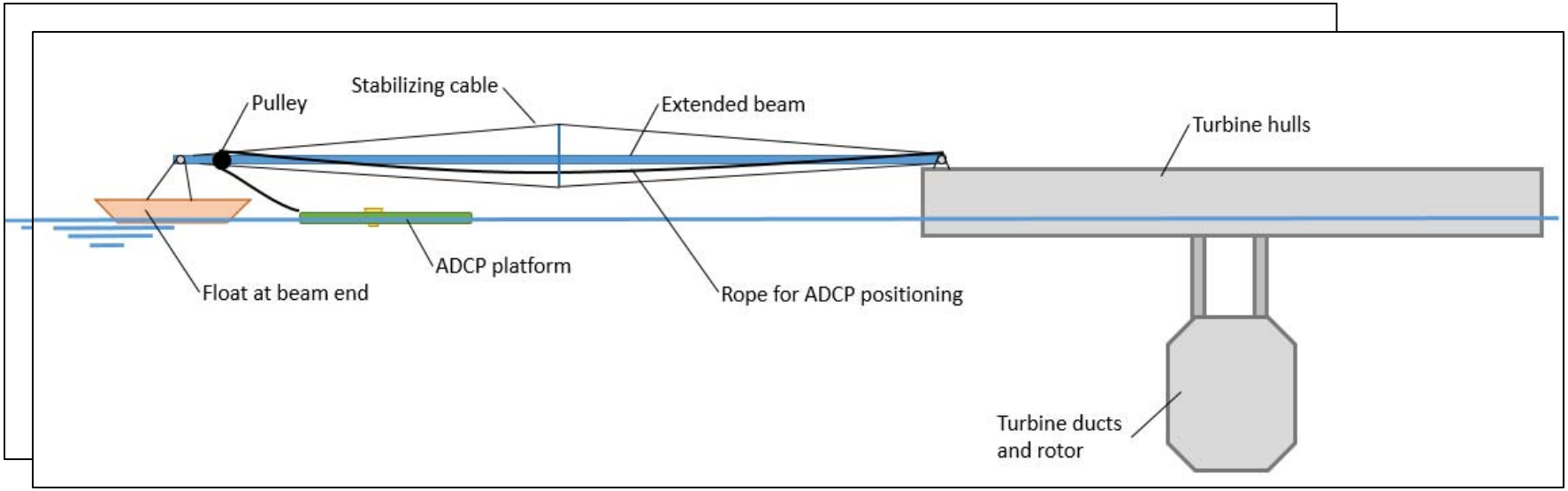

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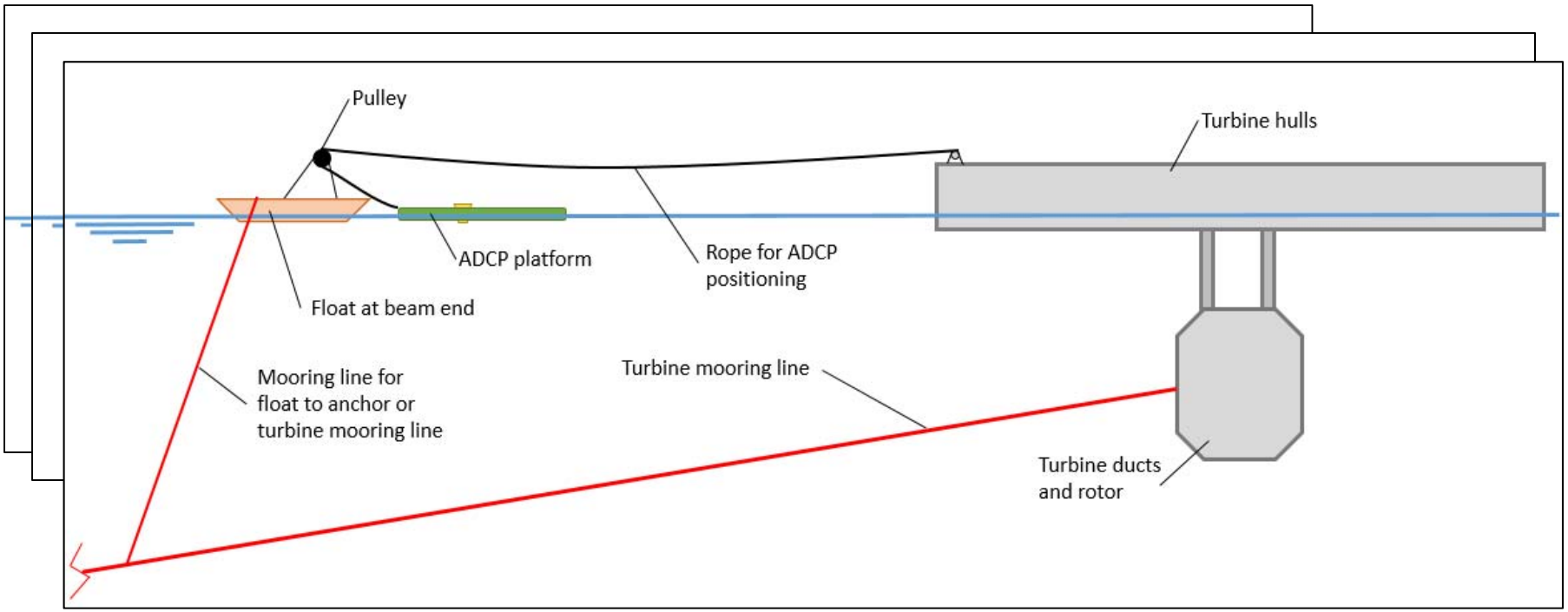

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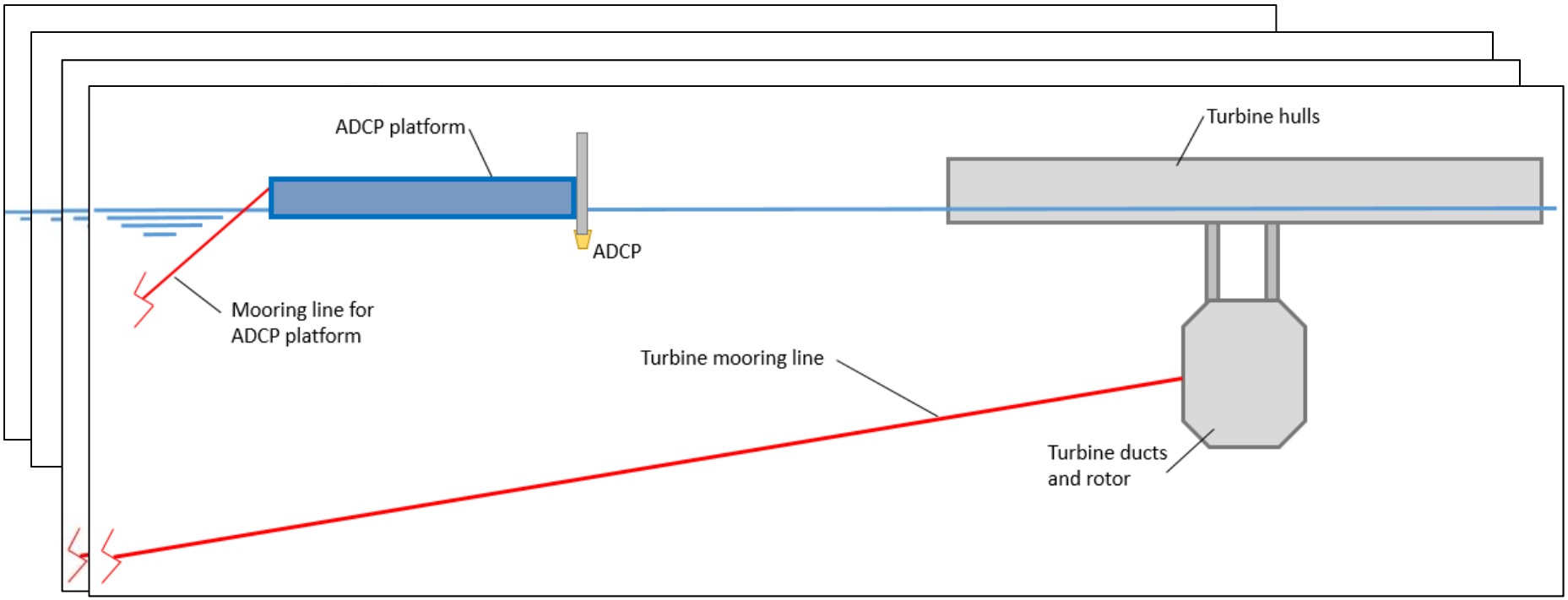

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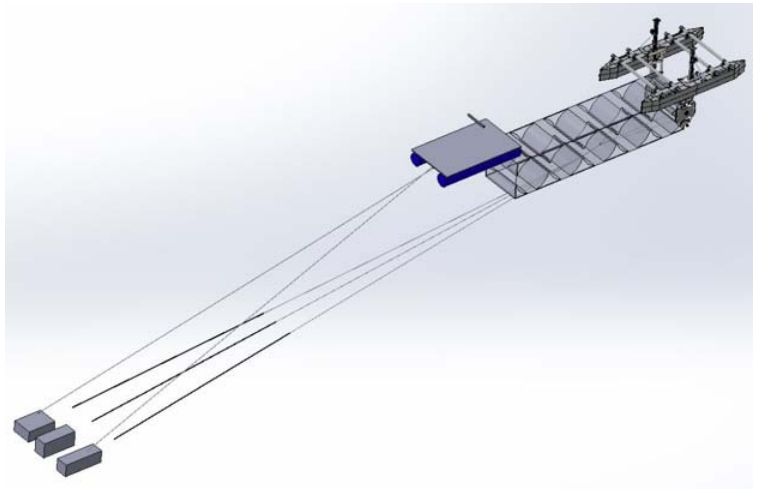
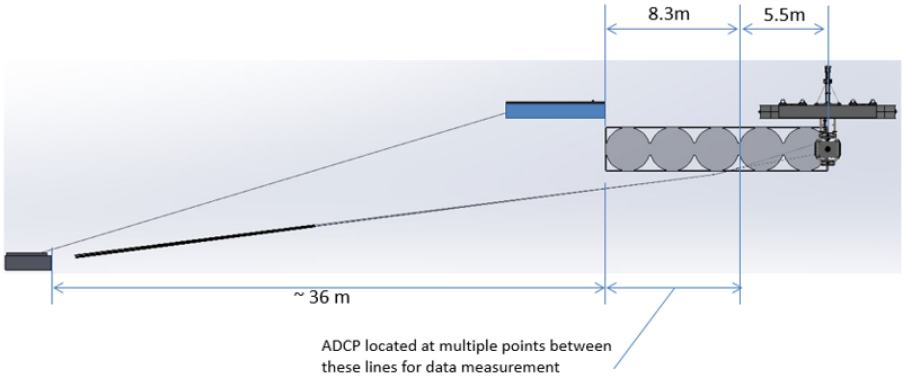
- ADCP deployment from pontoon boat upstream of turbine
  - Low risk mechanical design solution
  - Maximize use of CHTTC equipment + training for future applications
  - Meets requirements for collecting data (2-5 equiv. diameters)
  - Tidal considerations – relative movement
- CHTTC to investigate maneuvering of pontoon boat and ADCP deployment next week





Risks

- Timelines associated with turbine testing vs. pending winter weather
- Commissioning of new ADCP setup

Next Steps

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- Complete field work
  - Commission Mi1 turbine and ADCP setup
  - Collect experimental data
- Data analysis (incl. compare with computational models)
- Reporting

Thank you!