

# Integrated Marine Point Absorber Control Tool - IMPACT

## Introduction

The IMPACT project is part of the stage 2 control systems call and has the aim to develop and test a control tool for designing, testing and implementing controllers for point absorber style WECs. The tool allows control models to be easily developed that can then be used to design and implement an Optimal Velocity Tracking (OVT) type controller

## Project Overview

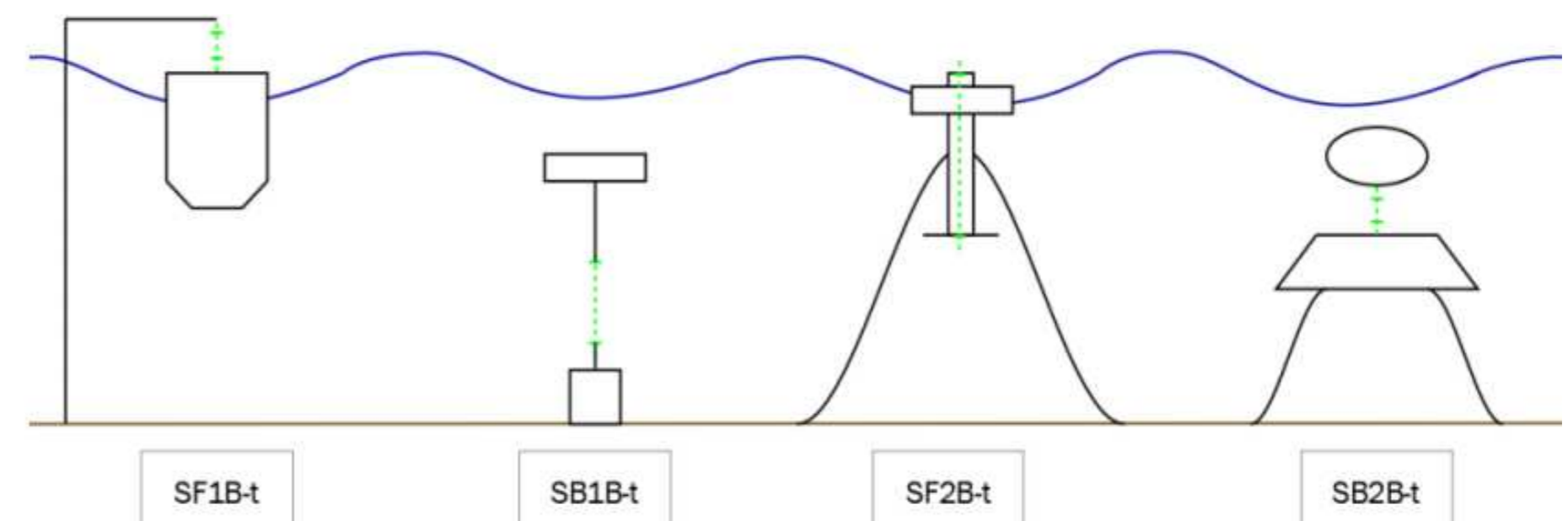
In stage 2 the following milestones have been or are due to be completed:

- **Milestone 1**
  - Development of 4 “exemplar WEC” models
  - Design basis for controller design
  - Controllers for WEC types 1 and 2 plus report
- **Milestone 2**
  - Controllers for WEC types 3 and 4 plus report
- **Milestone 3**
  - Open source control tool for model development and controller design
  - User manual for the control tool
- **Milestone 4**
  - Physical testing FEED report
  - Controller hardware FEED report
  - Implementation on a software model of a real WEC
  - Final reporting

The IMPACT team (SgurrControl and their subcontractor Cruz-Atcheson) have had valuable additional input from their industry advisory board and also particularly from Carnegie, who have provided much of the required information for the activities in Milestone 4.

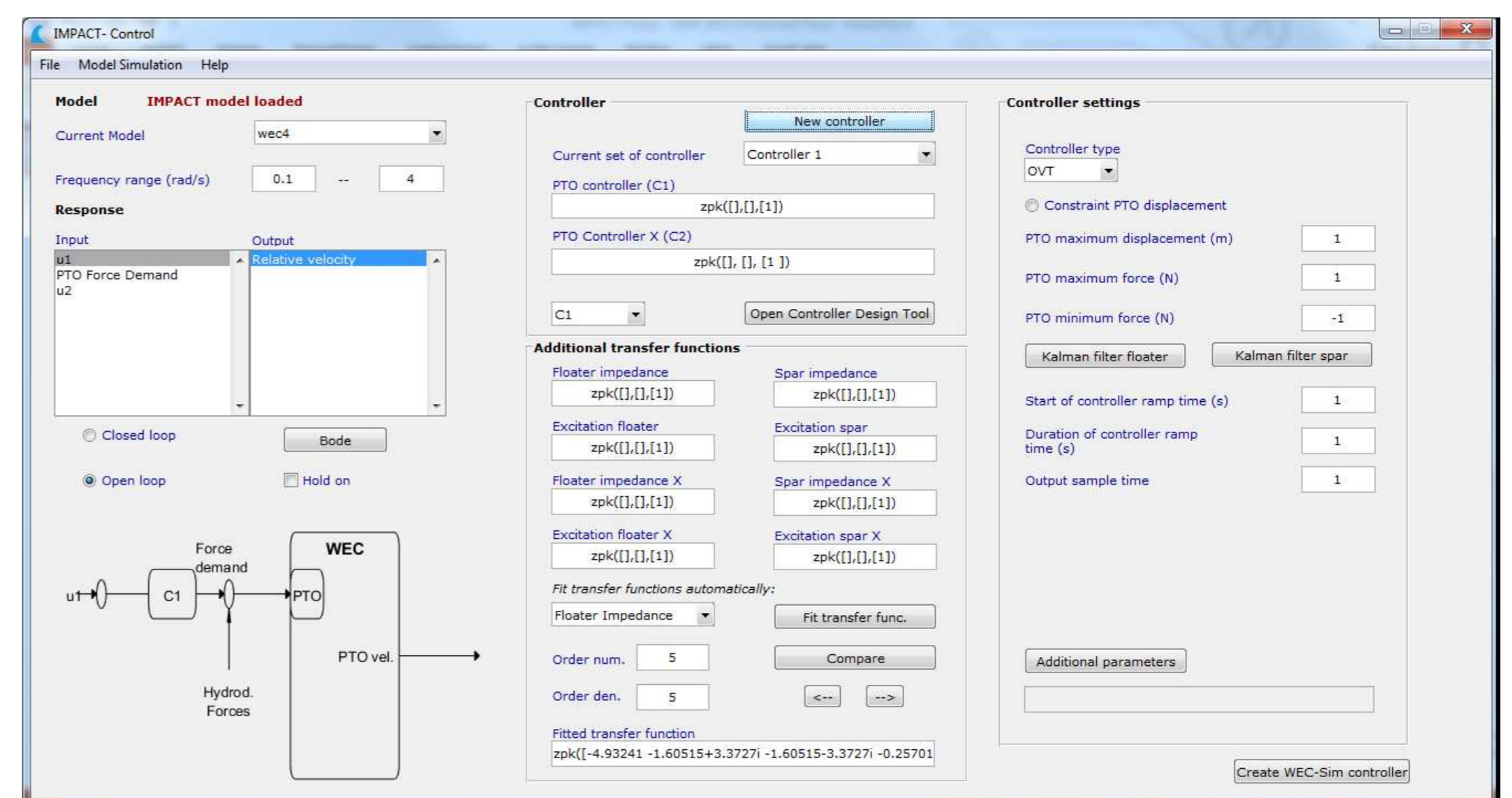
## IMPACT toolbox

IMPACT allows the design of Optimal Velocity Tracking (OVT) controllers for the four types of WEC shown below:



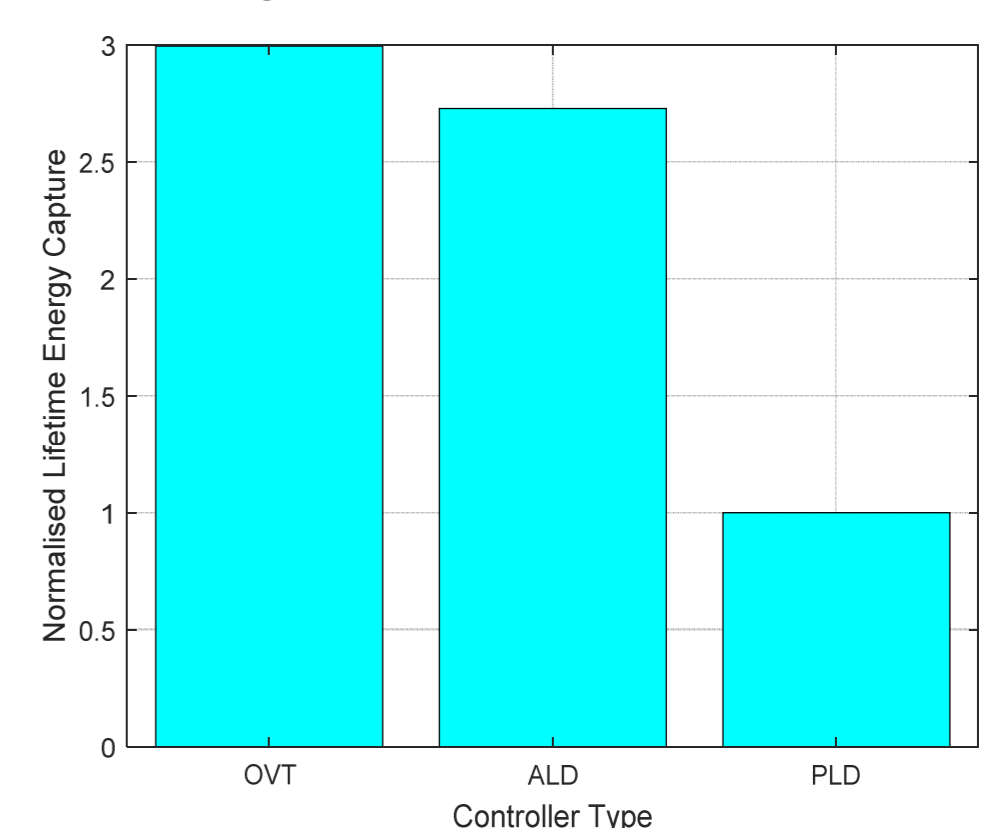
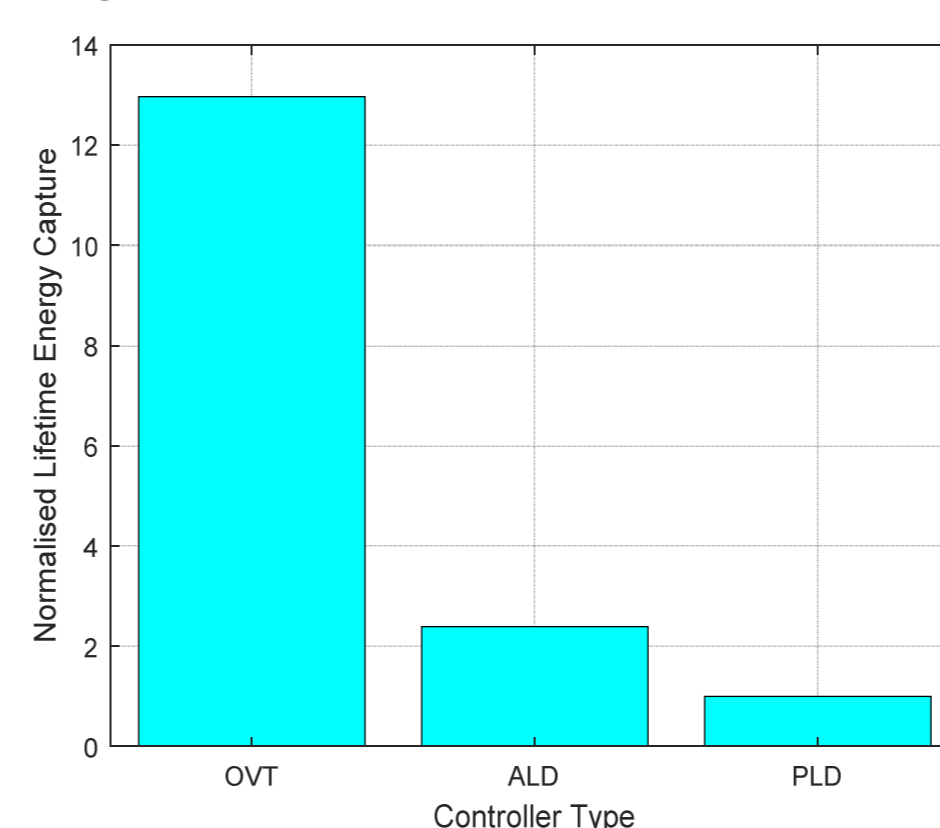
As well as OVT, adaptive linear damping (linear damping with a variable gain based on the sea conditions) can also be implemented.

IMPACT has an easy to use General User Interface (shown below) to allow control models and controllers to be quickly designed and assessed.



## Controller Performance

Examples are given below of the increase in energy output for OVT and ALD compared to passive linear damping for WEC types 1 (left) and 3 (right) over a typical range of Scottish waters sea conditions. It is clear that the WEC design has a large effect on the amount of extra energy OVT can capture



### Subcontractors

1. Cruz Atcheson