# THESIS PROPOSITION

Please fill out all requested data and send back the form to emaro-adm@irccyn.ec-nantes.fr before 9th May.

<table>
<thead>
<tr>
<th>Subject:</th>
<th>Control of Multiple Autonomous Underwater Vehicles Towing a Streamer</th>
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<tbody>
<tr>
<td>Supervisor(s):</td>
<td>Giuseppe Casalino, Enrico Simetti</td>
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<td>Laboratory:</td>
<td>GRAAL</td>
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<td>Field of research:</td>
<td>Marine robotics; Dynamic Control</td>
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**Motivations and general objectives:**

The WiMUST (Widely scalable Mobile Underwater Sonar Technology) project [1] aims at expanding and improving the functionalities of current cooperative marine robotic systems, effectively enabling distributed acoustic array technologies for geophysical surveying with a view to exploration and geotechnical applications. Recent developments have shown that there is vast potential for groups of marine robots acting in cooperation to drastically improve the methods available for ocean exploration and exploitation. Traditionally, seismic reflection surveying is performed by vessel towed streamers of hydrophones acquiring reflected acoustic signals generated by acoustic sources (either towed or onboard the same vessel). The main idea of WiMUST is to replace the big ship towing the streamers with multiple AUVs doing so.

The aim of this thesis is to investigate having multiple AUVs towing the same long streamer, implementing the dynamic model of the vehicles and the streamer, and implementing the required dynamic control to have the set of AUVs making the streamers perform some given manoeuvres.

The expected results are:

1. Dynamic model of the AUVs coupled with the streamer
2. Kinematic and dynamic control laws to perform the set of given manoeuvres.
3. A detailed analysis of the obtained results

**Proposed work plan**

The student is expected to carry out the following tasks:

1. Get acquainted with the literature on modelling underwater vehicles and streamers
2. Implementation of the dynamic model in MATLAB
3. Implementation of the proposed controller in MATLAB
4. Validation of the proposed technique through different simulations
5. A detailed analysis of the results

The student will be strongly encouraged to propose innovative solutions leading to scientific publications.

**List of bibliographic references**


**Contacts**

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Signature of the local coordinator

Date