Team Icarus: Scope Document

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UPDATE (Jan 2017):

From January of 2017 there have been changes to the sub teams to reflect the new work that has been generated from previous tasks. These changes are as follows:

Jonathan Balakumar and Callum Newman are responsible for the laser gimball system that shall be used to guide the DaNI in conjunction with the Kinect sensor system. Josh Crawford and Chris Gunn have taken responsibility for this system.

Luke Cattle has taken responsibility for innovations within the project and is looking to integrate voice control and IMUs into the final solution whilst maintaining a level of autonomy deemed suitable by the PST.

Ben Peall has been working on the Tri-Track as well as developing object recognition software that will be implemented in the Tri-Track system so as to help identify the black box and control panel that the Tri-Track is expected to manipulate.

Project Overview:

The project involves developing an autonomous system that shall be able to operate in an 'underwater' environment; the system will be capable of performing a number of tasks and should aim to do so with as little human control as possible (i.e. autonomy). The system will consist of a DaNI robot and a Tri-Track robot, as well as an ROV above the water.

The task involves controlling a valve on board a mocked up plane fuselage as well as locating and transporting to safety, a black box flight recorder. The system should demonstrate robust communications along with autonomy and the purpose of this document is to define the boundaries of the project as well as the boundaries of the various sub-teams.

Team Overview:

During a team meeting on the 21st of October 2016 it was decided that team Icarus, comprising of 6 members, will be split into three sub-teams. These teams will take overall responsibility for various aspects of the project, with regular full team meetings taking place so sub-teams can report progress and any issues that may affect the work of the other sub-teams.

It is expected that throughout, though especially towards the latter stages of, the project there will be a large amount of overlap between sub-teams due to the need to integrate the various sub-systems; therefore, this document should be considered a guide as to what each sub-team's scope is, rather than a hard and fast standard. In any case, communication as a whole team should be sufficient that any scope overlap can be dealt with between sub-teams.

The system in its entirety will be designed in such a way so that each team member understands the solution and then is responsible for implementing this solution within their respective sub-teams. Working within sub-teams in this way will not compromise the project from an integration point of view.

Tri-Track:

Ben Peall and Jonathan Balakumar comprise the sub-team that shall be responsible for implementing the solution where the tri-track robot is concerned. This robot is expected to be used to perform the physical tasks outlined in the project brief.

The Tri-Track team will be responsible for any accessories developed for the robot as well as its control systems, it shall be there responsibility to interact with the DaNI team with respect to integration as at this point in the design the Tri-Track is expected to be dependent on the DaNI for route finding.

DaNI:

Callum Newman and Chris Gunn comprise the sub-team that shall be responsible for implementing the solution where the DaNI robot is concerned. This robot is expected to act as a route finding robot and shall need to have the capability to find a hazard free route for the Tri-Track to negotiate so that it may complete the tasks outlined in the project brief.

The DaNI team will be responsible for any accessories developed for the robot as well as its route finding capabilities; it shall be there responsibility to interact with the Tri-Track team with respect to integration as at this point in the design the Tri-Track is expected to be dependent on the DaNI for route finding.

Communications:

Luke Cattle and Josh Crawford comprise the sub-team that is responsible for allowing the DaNI and Tri-Track to communicate with one another, as well as the ROV. This will ensure that the team members are able to monitor vital stats concerning the two robots, as well video streaming (possibly) on the Tri-Track.

The communications sub-team will be responsible for interacting with both the Tri-Track and DaNI sub-teams, as a suitable solution must be found to allow both robots to communicate with each other, as well as allowing them to communicate with the ROV.

Around the 1st of November it was discovered that a LAN will be setup and the robots shall communicate through RF technology. As a result of this it became clear that the communications aspect of the project would become smaller than anticipated and therefore both Josh Crawford and Luke Cattle will lend themselves to other areas of the project where necessary. They shall also lead project administration; this includes preparation of PST meetings as well as gateway meetings, as well as preparation of documentation and a focused awareness of project deadlines and gateways.


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