Risk assessment report for group ICARUS

DaNI bot risks:

ID.	Risk	Description	Impact	Likelihood	Risk score	Last update	Mitigation to reduce impact and/or likelihood of risk and actions to be taken during the event of a risk arising
1	Kinect stops working so no image is received to process	In the event that the Kinect stops working it will no longer be able to detect where objects are and be at a high risk of crashing	3	1	3	09/11/2016	A full test procedure will be run to see if there is anything that can cause the Kinect to stop working. If anything is found action will be taken to prevent it from occurring If the Kinect disconnects during a demonstration an emergency protocol will be run. This may be a case of the robot navigating its way back to the base using information it already has collected and the Laser guidance system
2	Laser guidance system stops working	If the laser guidance system is to stop working during a demonstration the accuracy of the DaNI's known location will decrease	2	2	4	09/11/16	The laser guidance system will need to be tested during a test run with the DaNI bot to ensure the two systems have integrated properly. If the laser guidance system does malfunction during a demonstration the Kinect will have to take over navigation. The Kinect should be able to work out its location but the reliability of this information will drop.
3	Batteries losing all charge during demonstration	If the batteries lose power during a demonstration the DaNI bot will not be able to complete any more tasks	3	2	6	09/11/16	To ensure that the DaNI bot will not lose power all batteries will be fully charged the day before a demonstration If the DaNI does lose all power then the tri-track will have to complete its task with the information it has received

Tri-track

ID.	Risk	Description	Impact	Likelihood	Risk score	Last update	Mitigation to reduce impact and/or likelihood of risk and actions to be taken during the event of a risk arising
1	Batteries losing all charge during demonstration	If the batteries lose power during a demonstration the tri-track will not be able to complete any more tasks	3	2	6	09/11/2016	To ensure that the tri-track will not lose power all batteries will be fully charged the day before a demonstration If the tri-track does lose all power then the tasks cannot be completed
2	Camera not working during demonstration	If the tri-track camera stops working the users will not be able to see what the arm sees	3	2	3	09/11/2016	The camera will be tested before demonstrations to ensure communication is robust If the camera stops working an emergency protocol will be run
3	Doesn't have map of area as DaNI has malfunctioned	If the DaNI malfunctions the tri-track will not have a map of the area and may not be able to navigate around debris	3	1	3	09/11/2016	During the event that the tri-track has an incomplete map it will have to navigate using what it already has The tri-track can be fitted with some sensors to ensure it stops before hitting an object

Communications

ID.	Risk	Description	Impact	Likelihood	Risk score	Last update	Mitigation
1	Loss of communication to the main hub from DaNI	If the DaNI cannot communicate with the main hub a map of the area cannot be formed	3	1	3	09/11/2016	To ensure communication does not fail a robust system will be created If connection is lost an emergency protocol will be engaged
2	Loss of communication between to the main hub from Tri-track	If the tri-track cannot communicate with the main hub the arm cannot be operated	3	1	3	09/11/2016	To ensure communication does not fail a robust system will be created If connection is lost an emergency protocol will be engaged

3 (high)	3	6	9
2 (medium)	2	4	6
1 (low)	1	2	3
	1 (low)	2 (medium)	3 (high)

Impact vs likelihood

Action plan:

DaNI bot:

A full test procedure will be created to ensure that all parts of the DaNI are communicating properly and that they will not malfunction during a demonstration. The will also be an emergency protocol created for if the DaNI does malfunction. This will most likely be to follow its path that it has already completed back to the main base so the malfunction can be sorted. All batteries will be fully charged before any demonstration.

Tri-track:

The batteries will be regularly checked to see if the batteries have power; the team will also be fully charged the day before the demonstration/VIVA and made sure the batteries are not used until the assessment. The team will also have an extra set of batteries, fully charged, and may be used for pre-demonstration tests and checks but will also be used as the backup power supply (will have a backup power unit for each voltage).

The camera for the tri-track will be checked in the pre-demonstration tests and made sure that it is working successfully. If the camera stops working during the VIVA an emergency protocol will be activated to allow the tri-track system to conduct itself to do the work; this is as the camera feedback does not affect the work of the system due to its level of autonomy, but the protocol will inform the tri-track system that the users have no ability to see what it is doing.

In the case of not being able to receive data from the Dani system, the tri-track system will use the data already gathered by the Dani and also use its sensors to avoid hazards and complete its tasks.

Communications:

The Network will be continuously tested through the whole project timeline. The integration of everything over coms will be done with plenty of time for testing. If things go wrong, procedures will be in place to allow us to acknowledge the loss of coms and try to fix it. Also, protocols will be in place for the system to do as much as it can without coms, due to it being autonomous.

Part of the assessment is to demonstrate loss of coms.

Before action plan is implemented			
Risk ID.	Impact	Likelihood	Risk score
DaNI.1	3	1	3
DaNI.2	2	2	4
DaNI.3	3	2	6
Tri-track.1	3	2	6
Tri-track.2	3	2	6
Tri-track.3	3	1	3
Communications.1	3	1	3
Communications.2	3	1	3

After action plan is implemented			
Risk ID.	Impact	Likelihood	Risk score
DaNI.1	3	1	3
DaNI.2	1	1	1
DaNI.3	3	1	3
Tri-track.1			
Tri-track.2			
Tri-track.3			
Communications.1			
Communications.2			