P9- Experiment Procedure “Ardunio rover”

GENERAL INFORMATION

Principal Investigator	
Author(s)	Dr. Seda Özdemir-Fritz and OeWF education team
Version number	1
Last edited on	27-Oct-2024

SHORT EXPERIMENT DESCRIPTION

The ardunio Rover works similar to the Mars rover and hence lets students experience an analogue Mars mission from a more scientific and technical approach: In this toolkit, students will “see” the world around them through sensors and will furthermore familiarize themselves with the fundamental concepts of programming.

Resources:

Rover website (amongst other things provides a guide for rover software setup): https://galaxy-rvr.rtfd.io – can also be found in the rover kit’s manual

HARDWARE CHECKLIST

- ☐ ardunio rover kit
- ☐ Scissors
- ☐ Different obstacles (books, stones, etc.)
- ☐ Electronical device with App Store or Google Play

PROCEDURE

ardunio ROVER

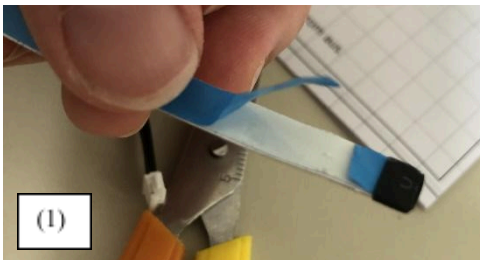
IMPORTANT NOTE**: Rover MUST be disassembled and repackaged the exact same as upon arrival. This is part of the exercise

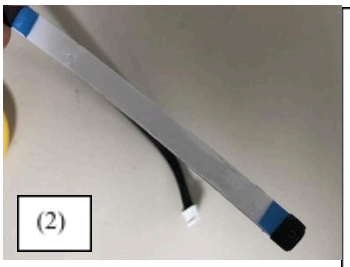
Step	Action	NOTES	Duration	Check
1	Put together the rover (you may choose between the two “Finish” options “solar panel” and “Acrylic plate”)	**Follow the instructions already provided by the rover kit**	3 h.	
2	Download program / software for rover via App Store or Google Play		3 min.	
3	Let students try out different programming options Let rover perform tasks (= control rover via electronical device)	Tasks could include putting different-sized obstacles into the way of the rover and analyzing them with the help of the sensors To challenge students a bit, let them set up a little experiment for the rover and carry it out	1.5 h.	
4	Educate students on the functioning of the rover’s sensors □ step 3 and 4 can be switched in order	Also inquire students and let them share their thoughts on how the sensors of the rover function Let students reflect on how the data obtained through the sensors contribute to an expansion of the frontiers of space science	25 min.	

Note: Below, you are provided some alternative suggestions concerning the rover’s manual setup, as in some cases setting up the rover is easier when the order of the instructions included in the rover kit is switched up.

ASSEMBLE:

- Step “22” can already be performed after step “1”
- Step “8” can already be performed after step “3”
- Step “14” can already be performed after step “8”. Note that three motors need to be fixed on each side of the rover, which means that step “14” needs to be done six times in total.
- For step “23”, the only thing that needs to be cut is the blue foil on top of the RGB, see pictures below:

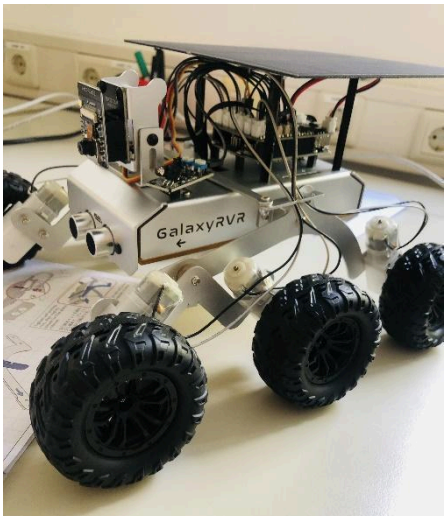




(1) The blue foil has to be lifted a bit, e.g. with the help of your nails. Then insert the scissors into the small “hole” so you can cut the blue foil. This step needs to be repeated on the other side of the RGB strip. If done, the RGB strip should look like (2).

FINISH:

- For option “A4”, it is recommendable to first screw the screw before fixing the solar panel on top of “Plate L”.
- For option “A”, the rover should look like the assembled one, see picture on the right:



CHARGING THE ROVER:

- A USB-cable is included in the rover kit. However, there is no plug for charging it at the plug socket. Thus, the rover either needs to be charged via connecting the USB from the rover to a computer or by connecting the USB cable to a suitable plug before placing the plug into the plug socket.
- Alternatively, the rover can be charged using the solar panels.

SCREWING AND USING THE CROSS WRENCH AT THE SAME TIME:

If the rover is to be assembled by one person alone, it is helpful to put the rover into a position where the cross wrench can be held with one hand whilst at the same time screwing the screw. To make this suggestion clearer, see picture provided below: