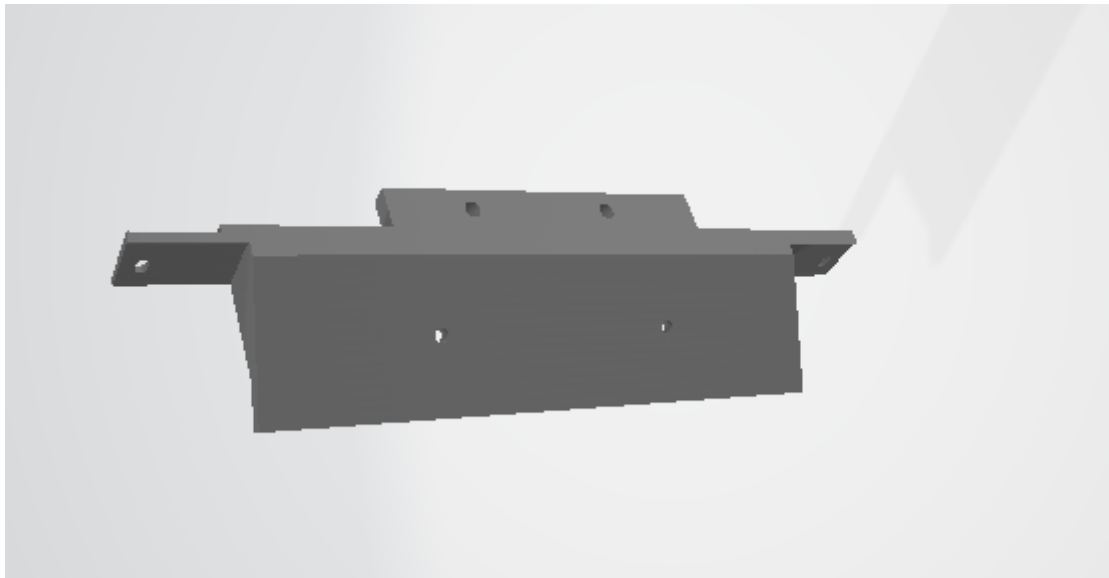**WEEKLY REPORT DE BENEDETTI MATTEO**

WEEK 3: 16/09/2019 – 20/09/2019

CAMERA MOUNT

A new camera mount was designed in solidworks and printed with one of the 3D printer available in the lab (Ultimaker 3 Extended) and then mounted on the ExoTer rover

The design is inspired to the previous one, with the addition of a reinforcement on top to avoid it would break again in the same way and to make it stronger and sturdier.

This modification and the error seen so far in the VO required to compute again the transformation from the body reference frame to the left camera reference frame.
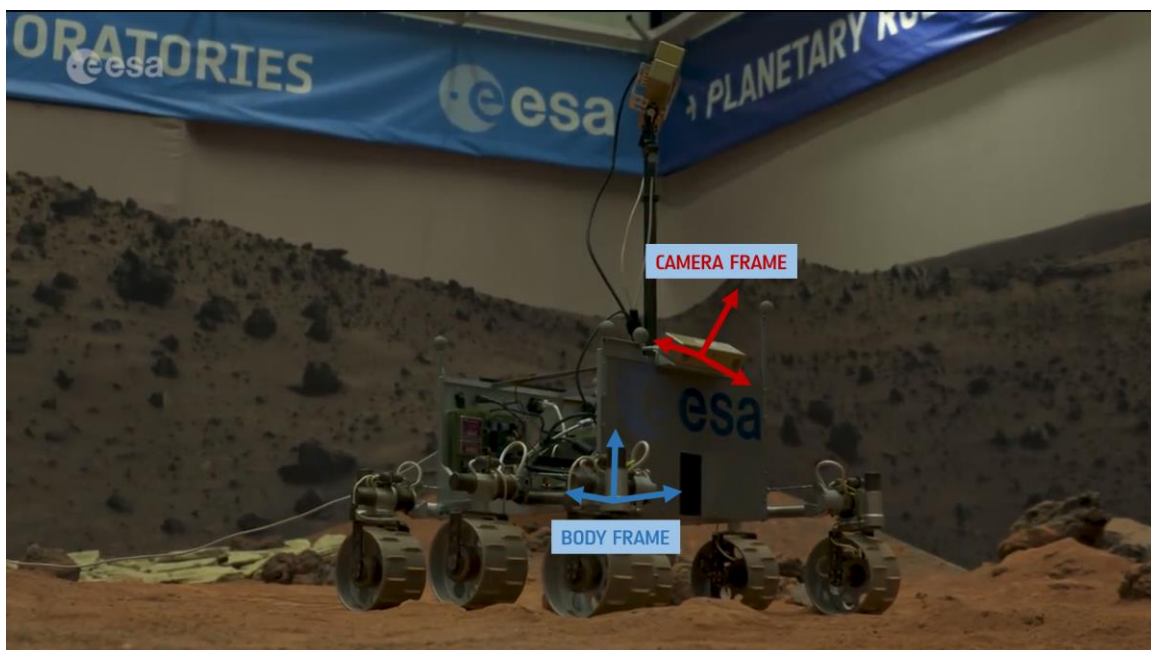
Initially, assuming the other angles and the position would not have varied significantly with the new mount, only the pitch angle was measured using a digital inclinometer.
The performances of the Visual Odometry were then tested and there was no noticeable improvement.

So it was decided to compute the transformation as accurately as possible using the Vicon Tracker [1] system in the lab.
A total of 4 markers was placed on the camera, where the axis of the camera ref frame will be and a script that logs the pose (xyz positions and quaternion) of the camera and the rover was written [2].
The log is then used in a Matlab script to convert the 2 poses in the single transformation that the configuration file of the Visual Odometry script (xyz positions and Euler ZYX angles).

The new obtained body->camera transformation was very close to the previous one and, again, did not show improvements in the Visual Odometry performances.

FUTURE OBJECTIVES

The lack of improvements refining the body->camera transformation led to believe that the problem might instead be in either the camera intrinsic/extrinsic parameters and/or a in the parameters of the VO algorithm implemented in the rover [3].

The objective of the next week will be to study these parameters and see if any improvement can be achieved.

BIBLIOGRAPHY

[1] https://www.vicon.com/software/tracker/

[2] esa-prl github link (not yet available because my branch is only local until I get authorized to push on the remote branch)

[3] Viso2 Library http://www.cvlibs.net/software/libviso/