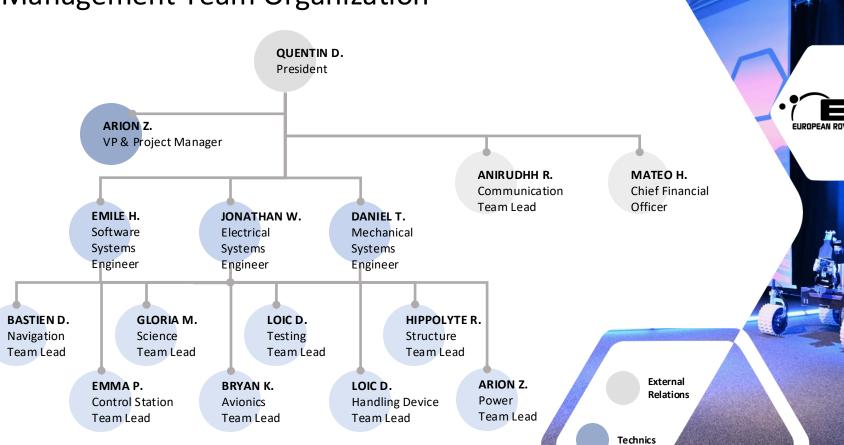


Team Introduction



Management Team Organization



ERC 2022

Technical Team Organization

EMMA P.

Team Lead

ROMAN D.

CHRISTIAN M.

Back-End

Engineer

Front-End

Engineer

GEORG S.

Telemetry

Engineer

Control Station



XAVIER N.

Lidar Engineer

NIKUNJ S.

Mapping Engineer

ANTOINE B.

Lo calis ation Engineer

MICHAEL B.

Control Engineer

HAO Z.

Kalman Engineer

ANIRUDHH R.

LiDAR Engineer

GLORIA M.

Science Team Lead

Avionics Team Lead

Engineer

Avion ics

Engineer

PAOLO C.

Electronics

Engineer

Engineer

Routing

Engineer

VICENTE C.

YASSINE B.

BRYAN K.

MARIA C. Scientist

FLLEN D.

VINCENT N. Avion ics Science Software Engineer

PETER K.

Final State Machine Engineer

YUAN Z.

Final State Machine Engineer

MATTHIEU S.

Main Structure Engineer

NATHAN B.

Sample Delivery Engineer

LORIS C.

Trapping Engineer

ELIO M.

Container Engineer

LOIC D.

Testing Team Lead

EVAN M. Test Bench

Engineer

IAN D.

Test Bench Engineer

MIU S.

Test Bench Engineer

J. C. R.

Test Bench Engineer

MOUNIR R. VICTOR G. Communication

Test Bench Engineer

MARIE E.

Test Bench Engineer

Structure Team Lead

LOIC D.

Handling Device Team Lead

MATTHIAS S.

Inverse Control Engineer

ALI EL M.

Computer Vision Engineer

GREGOIRE L.

Arm Structure Engineer

EMILE C.

Arm Structure Engineer

AURFLE S.

Gripper Engineer

MATHIFU L.

Composite Engineer

HIPPOLYTE R.

ARION Z. Power

Team Lead

ALEXIA DE L. Wheels

Engineer DIEGO B.

Suspens io n Engineer

THEO P.

Service Module Engineer

JOE EL H.

Systems Integration Engineer



Electronics

Software

Mechanics



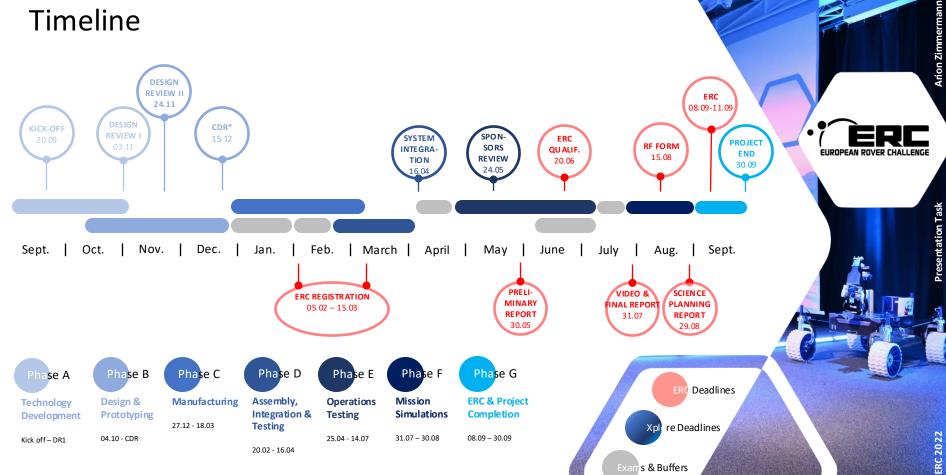
Project Management



ERC 2022 – Presentation Task

Arion Zimmermann

Timeline



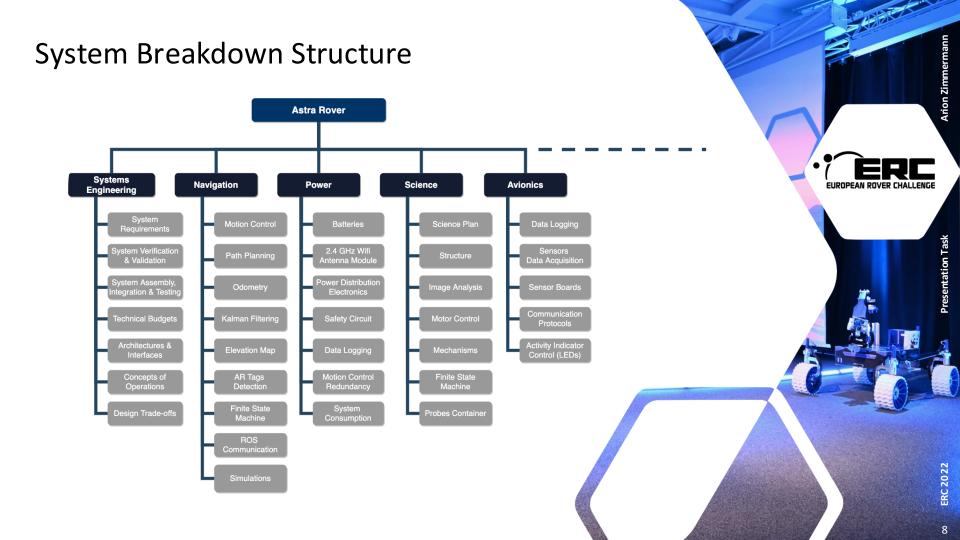
Exams & Buffers

6

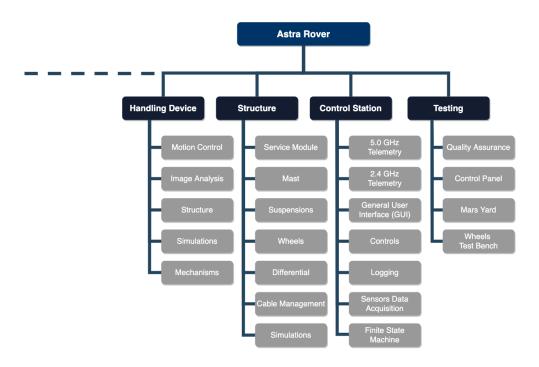
* Critical Design Review

Engineering Approach



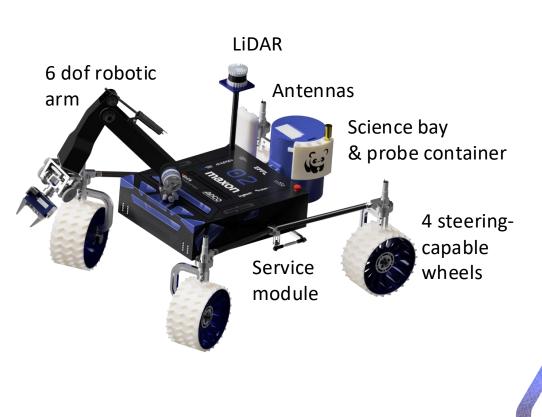


System Breakdown Structure





Selected Solutions





Approach to ERC Tasks



ERC 2022 – Presentation Task

Arion Zimmermann

Navigation Task

Task

Ability to localize itself

Navigate rough terrains

Avoid obstacles

Approach

LiDAR mapping
& odometry

Carbon fiber structure

Rocker suspension with differential bar

Steering mechanism

Polyurethane coating

In-wheel drive motor

Issues

Structural rigidity

Software integration

Solutions

Improve differential joints

Development branches & iterative unit tests



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Science Task

Task

Collect a sample

Take pictures of the terrain

Define and verify a science plan

Approach



Sampling mechanism



Rotating platform with Integrated sensors

6 dof arm

Issues

Cable management on rotating platform

Solutions

Use a slip ring

Avoiding experiments contamination

Use adaptive flexible structures to avoid inter-mechanisms gaps



Probing & Collection Task

Task

Place & Collect 4 probes Collect 3 surface samples

Approach

Science bay & probe container



4-samples science bay
4-probes container

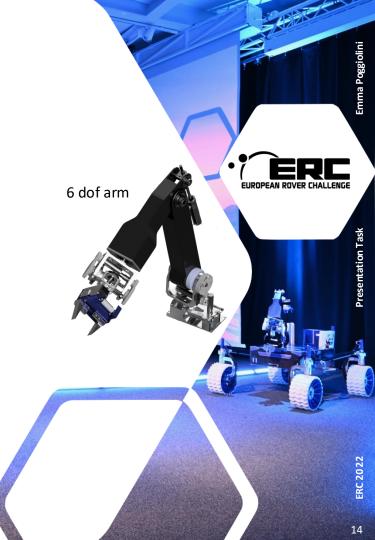
Sample collection & probing adaptive mechanism

Loss of sample material during arm delivery

Solutions

Issues

Flexible interface on the scoops



Maintenance Task

Task

Manipulate switches, buttons and objects on a control panel

Approach

Robotic

Carbon fiber structure

6 dof arm

Issues

Precise autonomous arm positioning

Overall structural rigidity

Arm overheating

Solutions

Computer vision to detect AR Tags

Piston to preload the chassis

Fans



Outreach & PR Activities



ERC 2022 – Presentation Task

Arion Zimmermann

Outreach & PR Activities

Events

Educational Workshops



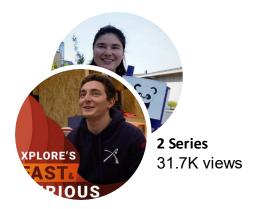
Public Events



Design Presentations



Social Media





Results



84K views **5.4K** likes



156K impressions **2.9K** likes

2.9K IIKes

2000 combined followers +100%



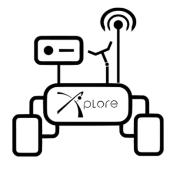
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Conclusion



Conclusion



A first attempt at autonomous control

A strong basis for future improvements

A high pedagogical impact

An increasing external impact



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EPFL maxon

















