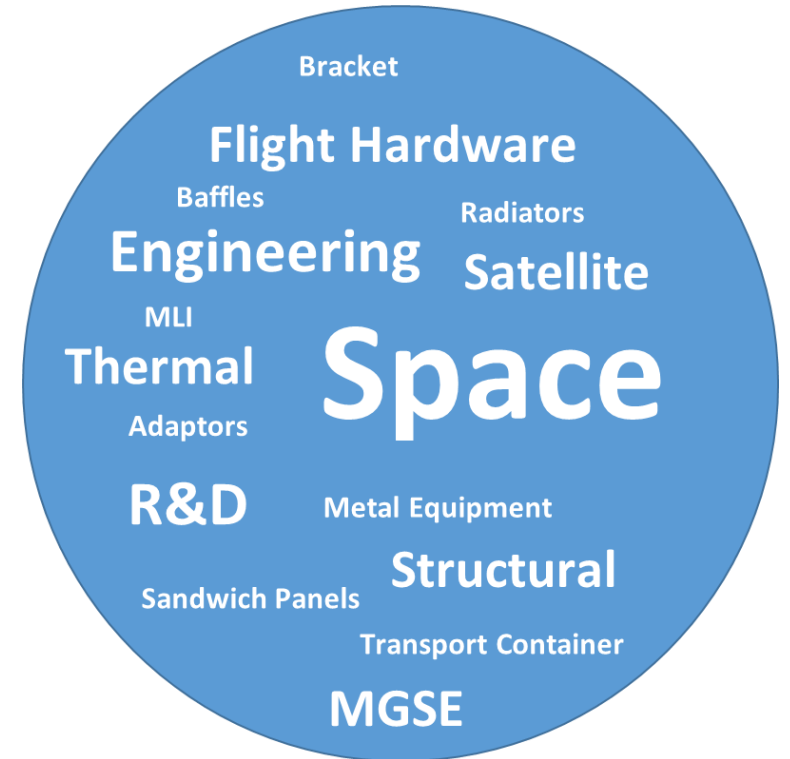


# ADM Test Facility Development Clean Space Days 2024



László SZEGEDI



## PROJECT OVERVIEW

- ADM aims to design, develop and build an in-house GNC test facility located at its premises, Miskolc, Hungary
- The test facility is ESA-recognized and would serve the needs of future ESA and industrial space projects
- Purpose of the test facility is to perform simulation of the following scenarios:
  - Rendezvous (cooperative; non-cooperative)
  - Different environmental conditions
  - Detectability
  - Docking
  - Movement on different surfaces (rover)

**ADM test facility aims to *COMPLETE*, and not to compete the present facilities in Europe**

## PROJECT OVERVIEW

- **Main features:**
  - Feasibility study with 5 tasks
  - 5 deliverable documents
  - 12-month duration
  - Will run parallel with the current ADM-ESA development projects: PHM, M2N
  - Time interval: July 2024 – June 2025
- **Tasks:**
  - Gap analysis and State of the Art review
  - Assessment of the future international and hungarian test needs
  - Presenting the ADM premise and way of development
  - Preliminary Requirements definition
  - Cost assessment

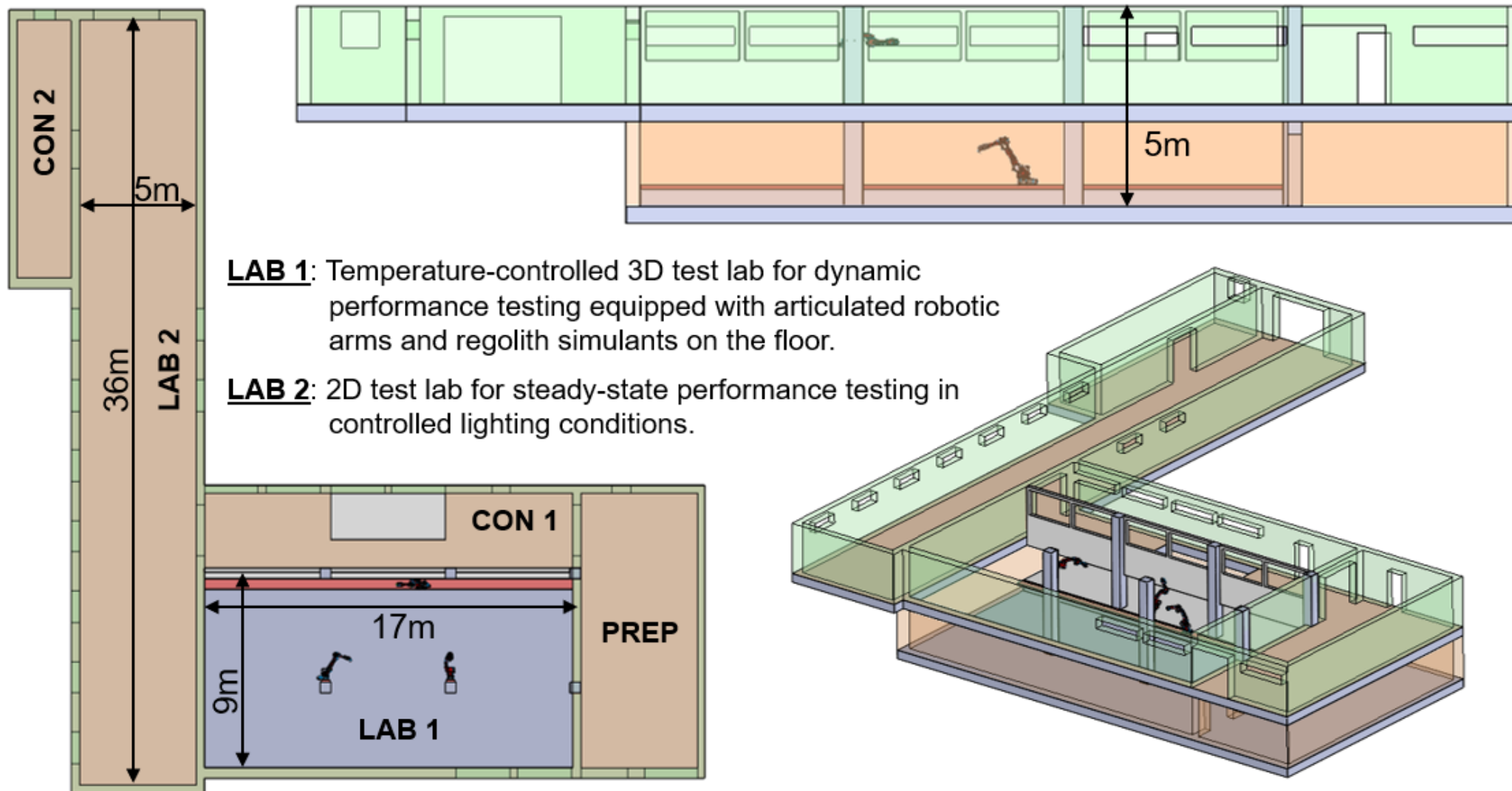
**TASKS**

- ***Gap analysis and State of the Art review (currently running)***
  - This task aims to provide a GNC gap analysis and mapping test facilities (in Europe and worldwide) related to GNC activities to get a comprehensive overview and to serve as an input to the implementation of the ADM test facility.
  - ADM will perform a GNC gap analysis through conducting interviews with GNC experts in order to properly identify gaps with respect to Admatis GNC capabilities and identification of needs. These will be input for preliminary requirements definition and for the Facility itself. ADM has identified a list of possible contacts to be interviewed and has submitted to ESA.
- **Assessment of the future international and Hungarian test needs**
  - To define the future Hungarian and international test needs related to GNC activities.
- **Presenting the ADM premise and way of development**
  - To present the ADM premise subject to development

**TASKS**

- ***Preliminary Requirements definition***
  - This is considered the **core** of the Activity. This task aims define the design requirements applicable to the test facility. ADM intention is to have ***different thermal environments*** and ***far range testing capabilities*** in the facility. The Facility requirements are going to be strongly driven by these capabilities. This task will focus on what is needed to be implemented and to clearly show the needed modifications with respect to the actual facility.
- **Cost assessment**
  - This task aims define the cost of the ADM test facility at completion.

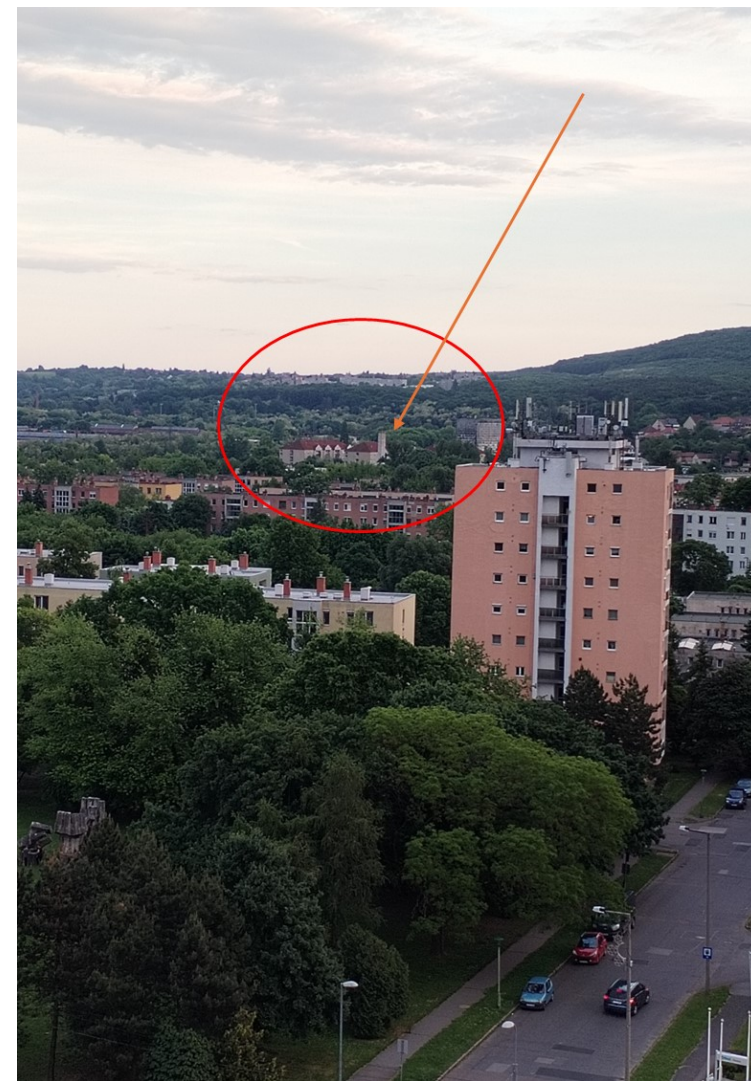
## ADM TEST FACILITY CONCEPT-3 LABS



**LAB 1:** Temperature-controlled 3D test lab for dynamic performance testing equipped with articulated robotic arms and regolith simulants on the floor.

**LAB 2:** 2D test lab for steady-state performance testing in controlled lighting conditions.

## ADM TEST FACILITY CONCEPT-3 LABS



### LAB 3:

- Open-air experimental platform for long range testing in non-controlled environment. Test facility chimney seen from cca. 1km, as a potential target for navigation marker testing in VIS / TIR.
- Target visibility is good, imaging is feasible using VIS/IR camera with proper magnification.
- Observatory terrace is ideal working place to deploy instrumentation.
- Ambient light pollution (city lights) will have severe effect on detectability (S/N ratio).

## Gap analysis and State of the Art review

- **ADM is performing a state-of-the-art review / market survey on GNC facilities, focusing on:**
  - What kind of GNC related test facilities are present in Europe and over the world. This market survey will include test facilities at ESA, at universities, national institutes, and in the private sector.
  - Presenting the purpose and the abilities of the facilities. This includes the technical description of the facility, description of the main test activities that are and can be implemented in the facility; detailing the facility dimensions, equipment and instrumentation used, movable masses, illumination conditions, heating-cooling capabilities, image detecting devices (sensors, cameras), image processing software used for the evaluation.
  - Availability and capacity of the test facility, meaning the number of tests is and could be performed in a year, and booking conditions.
  - Price level and commercial conditions, payment terms of the facility.
  - ADM will perform a survey on the GNC technologies and tests (available and being developed) inside the EU and also worldwide. This includes the presenting also the development team and the description of the development they perform.
- ADM aims to perform a GNC gap analysis through **conducting interviews with GNC experts** (maybe some of You who are sitting here 😊) of ESA, universities and industry.



## GENERAL & TECHNICAL QUESTIONS

- **The following question would be utilized for conducting the interviews:**
  - **General questions:**
    1. What is the main purpose of the facility? (rendezvous, docking, landing, etc.)
    2. What are the technical parameters and abilities of the facility? (dimensions, equipment, instrumentation, masses, illumination, software, etc.)
    3. What kind of tests are performed in the facility?
    4. What is the capability of the test facility (how many tests can be performed per year)?
    5. What is the availability of the facility; what is the booking time?
    6. What are the commercial conditions of the facility?
    7. What are the limitations of the facility?
    8. What kind of technology is used?
    9. What kind of technology development would be needed for the future?
    10. What are customer requests that do not fit with the facility?
    11. Can you identify future technologies, programs to be tested without available facility?
  - **Technical questions:**
    - Mechanical / robotic systems; Lighting conditions; Planet / moon / asteroid GNC test scenarios; Sensors / cameras; software

## THANK YOU FOR YOUR ATTENTION!

