MICROBIOLOGICAL ROCKET SONDE

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E-NNOVATE International Innovation Show

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Poland

PRESENTATION PLAN

7. Description and design assumptions
6. Launch vehicle
   - Sections
   - Drive
   - Flight simulations
5. Rocket probe
   - Sensors
   - Sample collection system
4. Flight course
3. Microbiological tests
2. Preparation of results
1. Bibliography

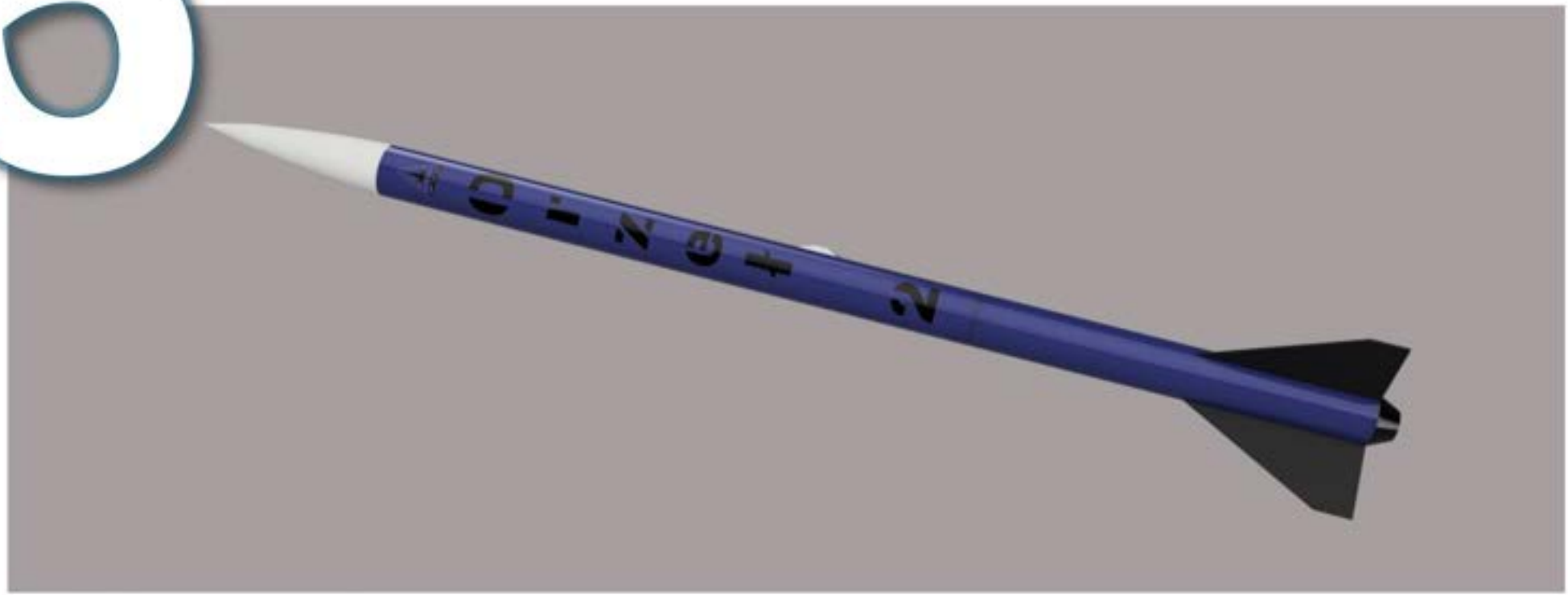
7 DESCRIPTION AND DESIGN ASSUMPTIONS

Operation of a measurement and research platform based on a carrier rocket and a rocket probe.

The scope of research includes:

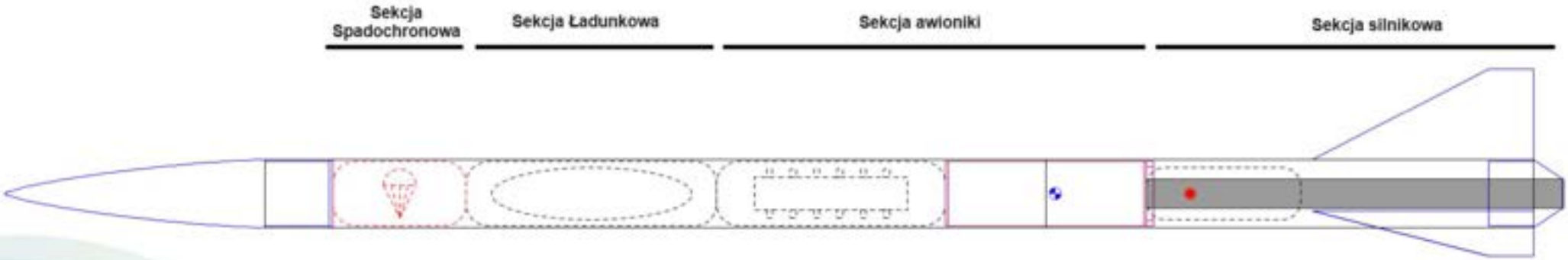
- **Measurements with on-board sensors of the gas concentration probe: hydrogen, carbon monoxide, CO2, VOC, flammable gases and the concentration of particulate matter PM10, PM2.5, as well as temperature, humidity and pressure**
- **Collecting samples of microorganisms suspended in the air**
- **Creating a map of atmospheric pollution on the website**
- **Testing the influence of the presence of gases on the occurrence of microorganisms**

6 CARRIER ROCKET



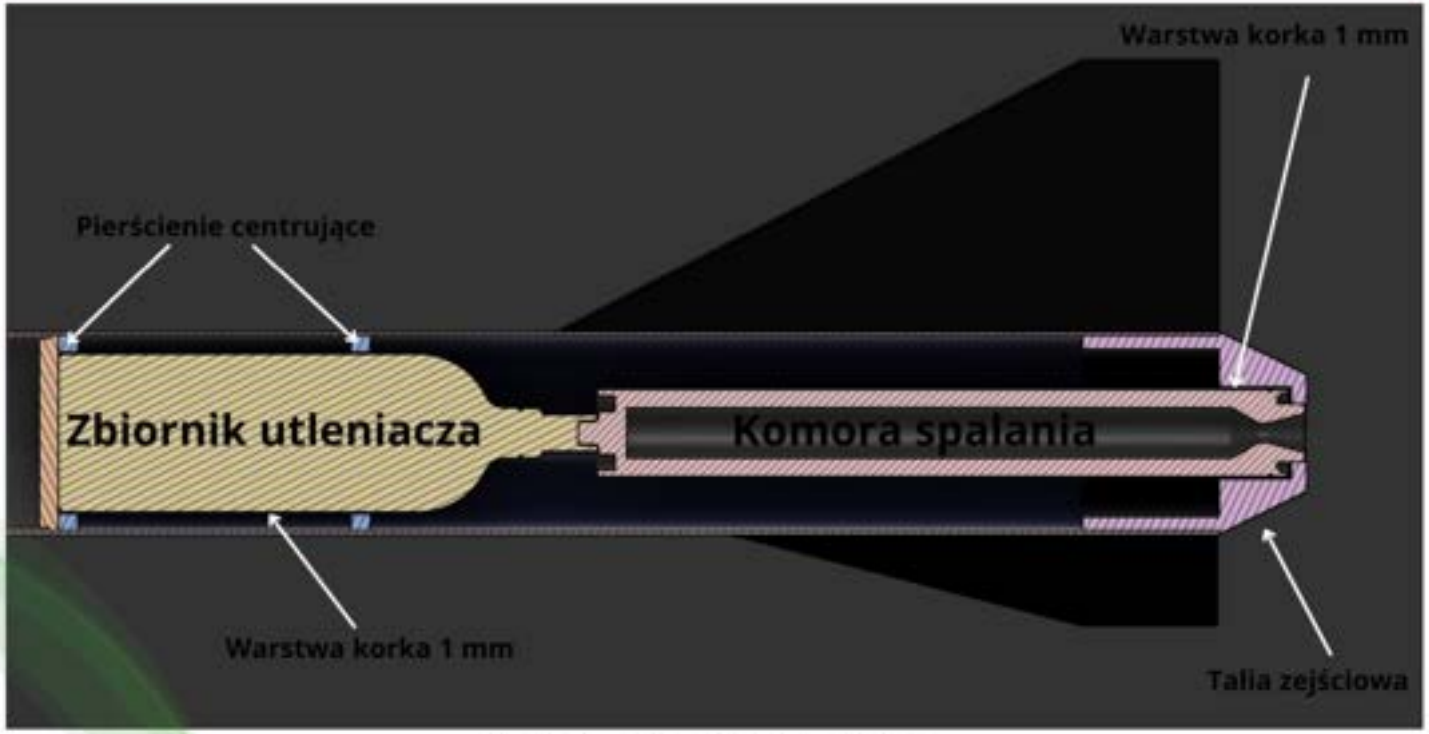
Rys. 1. Fotografia modelu rakiety.

INDIVIDUAL SECTIONS ROCKETS



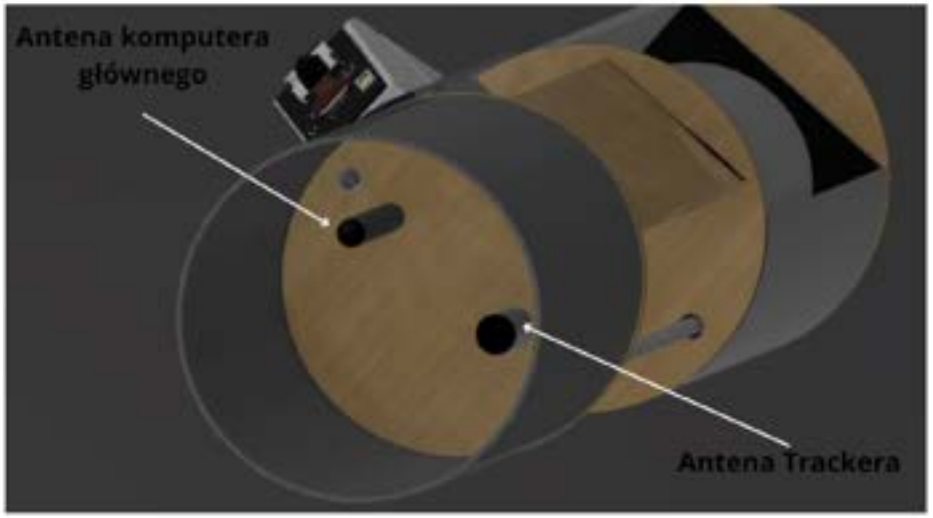
Rys. 2. Schemat ułożenia poszczególnych sekcji rakiety.

ENGINE SECTION

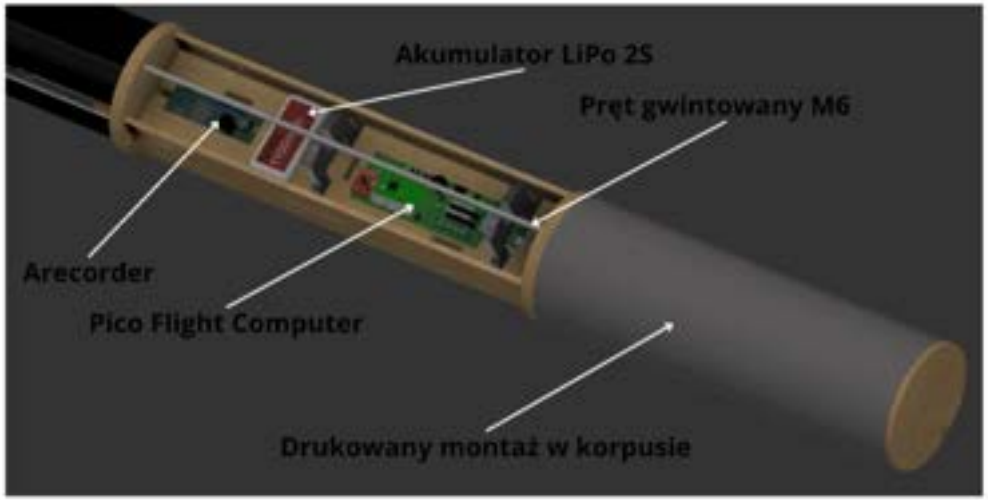


Rys. 3. Schemat sekcji spalinowej.

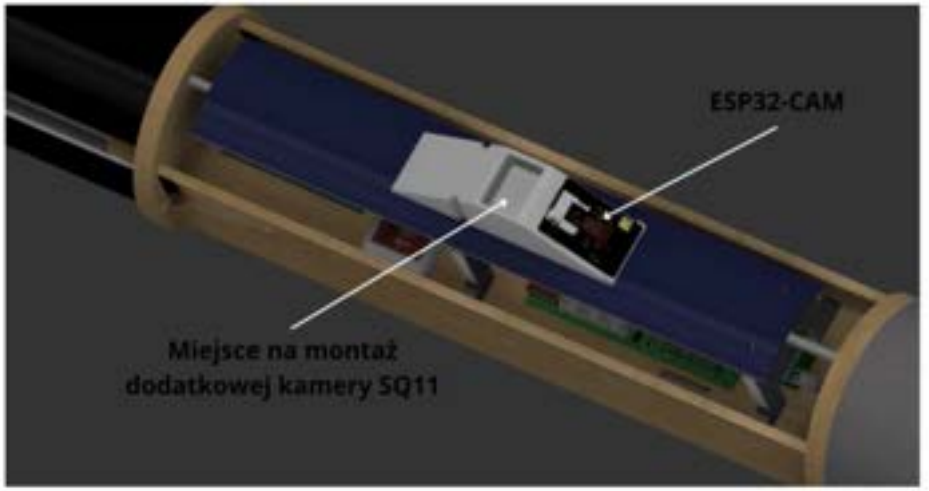
AVIONICS SECTION



Rys. 6. Schemat sekcji awioniki - moduł antenowy.

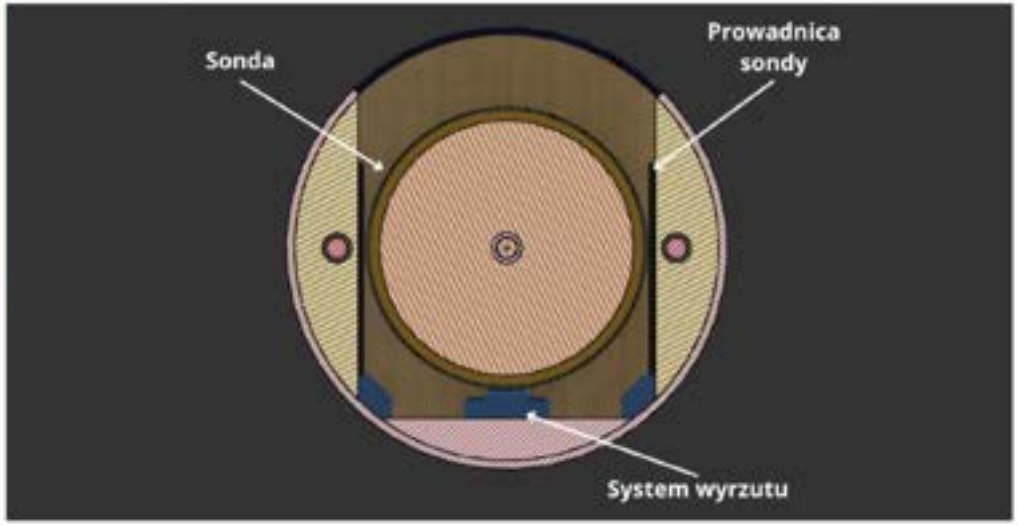


Rys. 4. Schemat sekcji awioniki wraz z podzespołami.

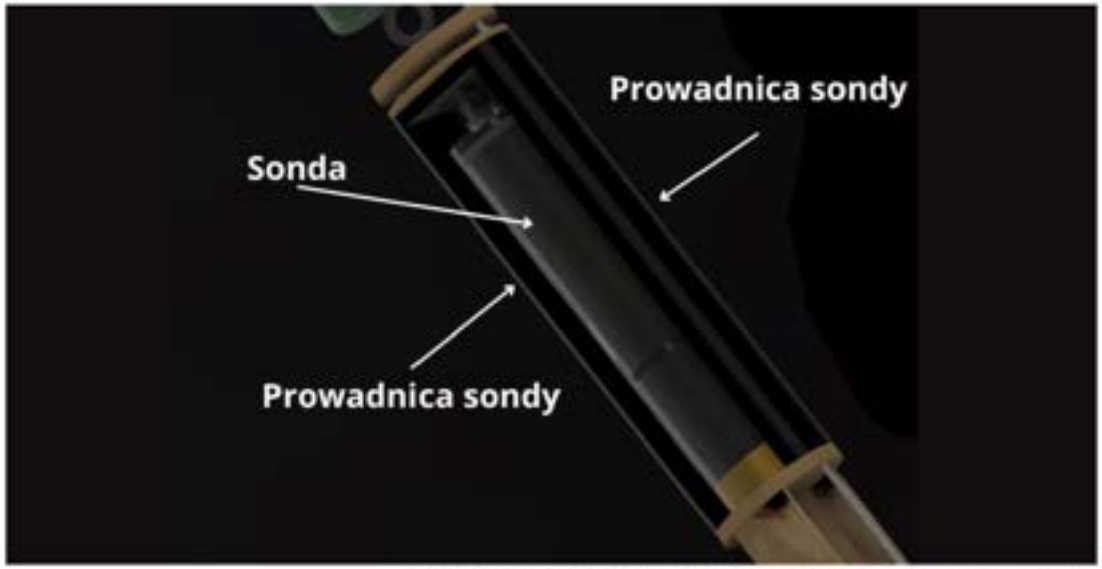


Rys. 5. Schemat sekcji awioniki – moduł z kamerą.

CARGO SECTION

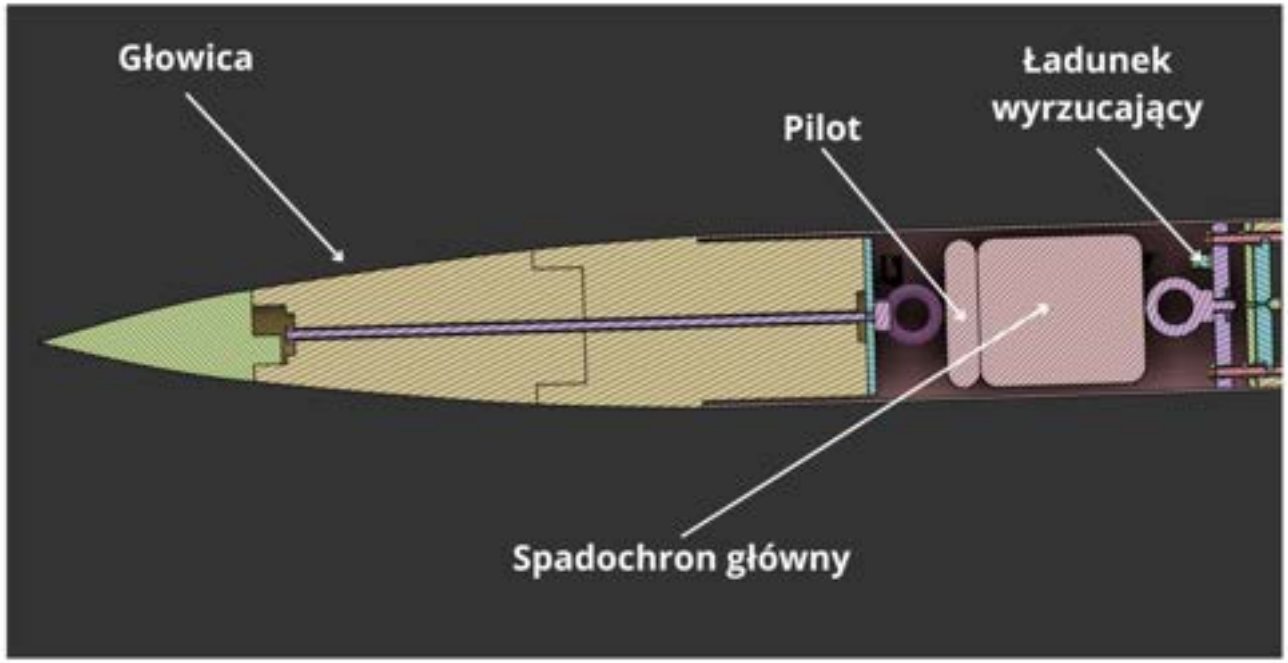


Rys. 7. Schemat sekcji ładunkowej – przekrój.

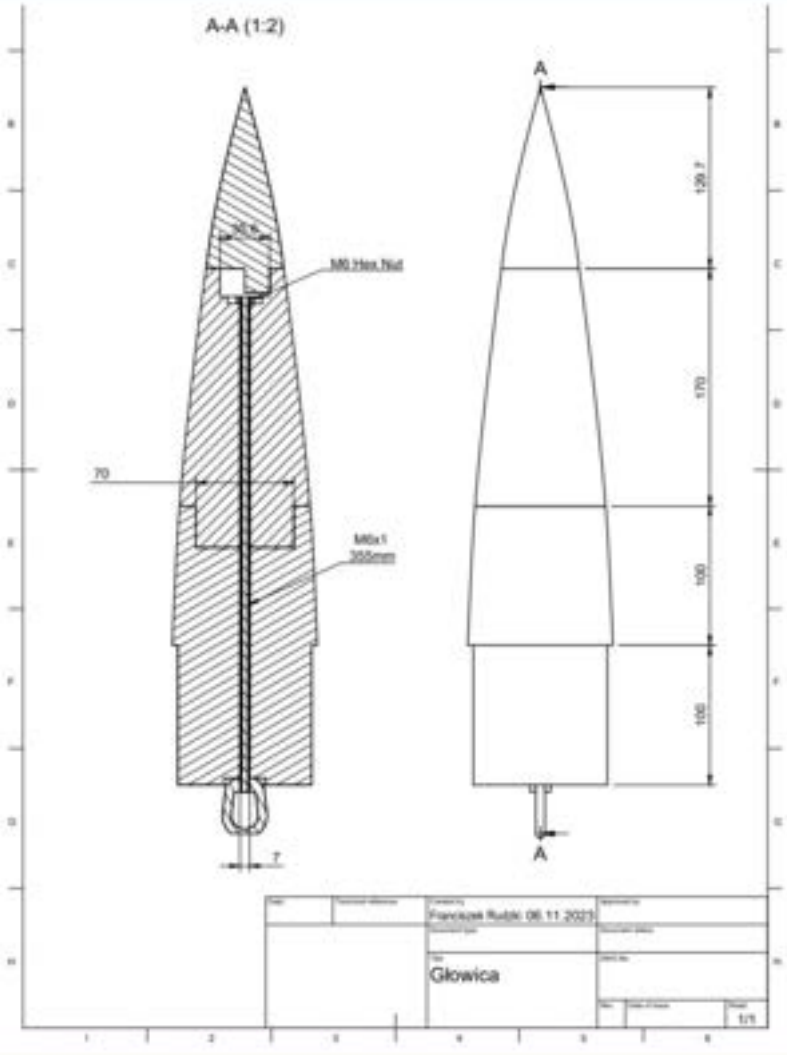


Rys. 8. Schemat sekcji ładunkowej – widok z boku.

PARACHUTE SECTION WITH HEAD



Rys. 9. Schemat sekcji spadochronowej i głowicy.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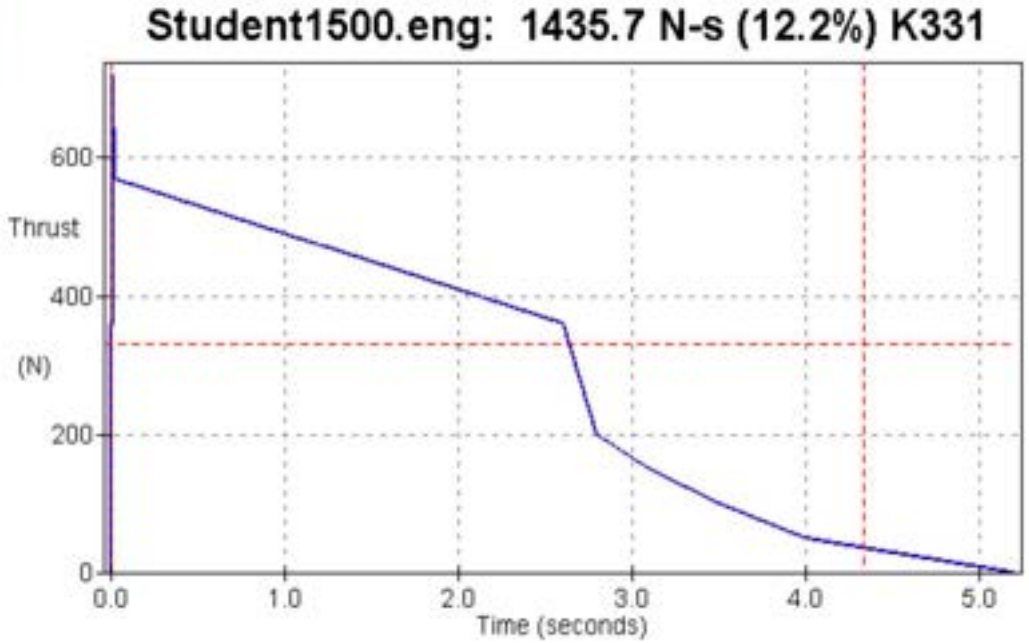
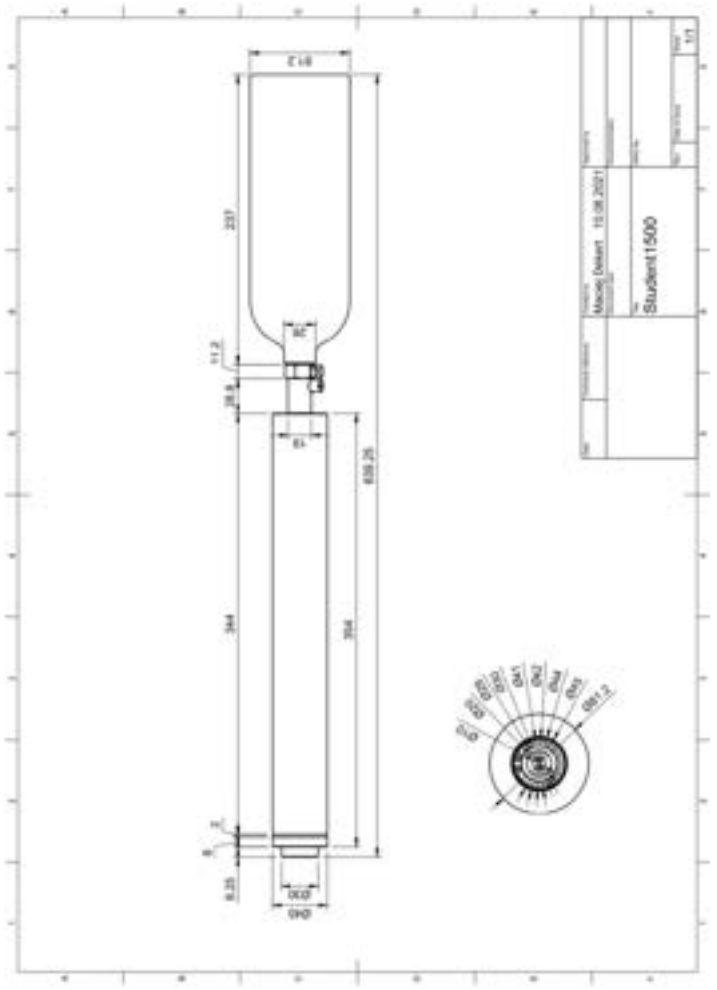
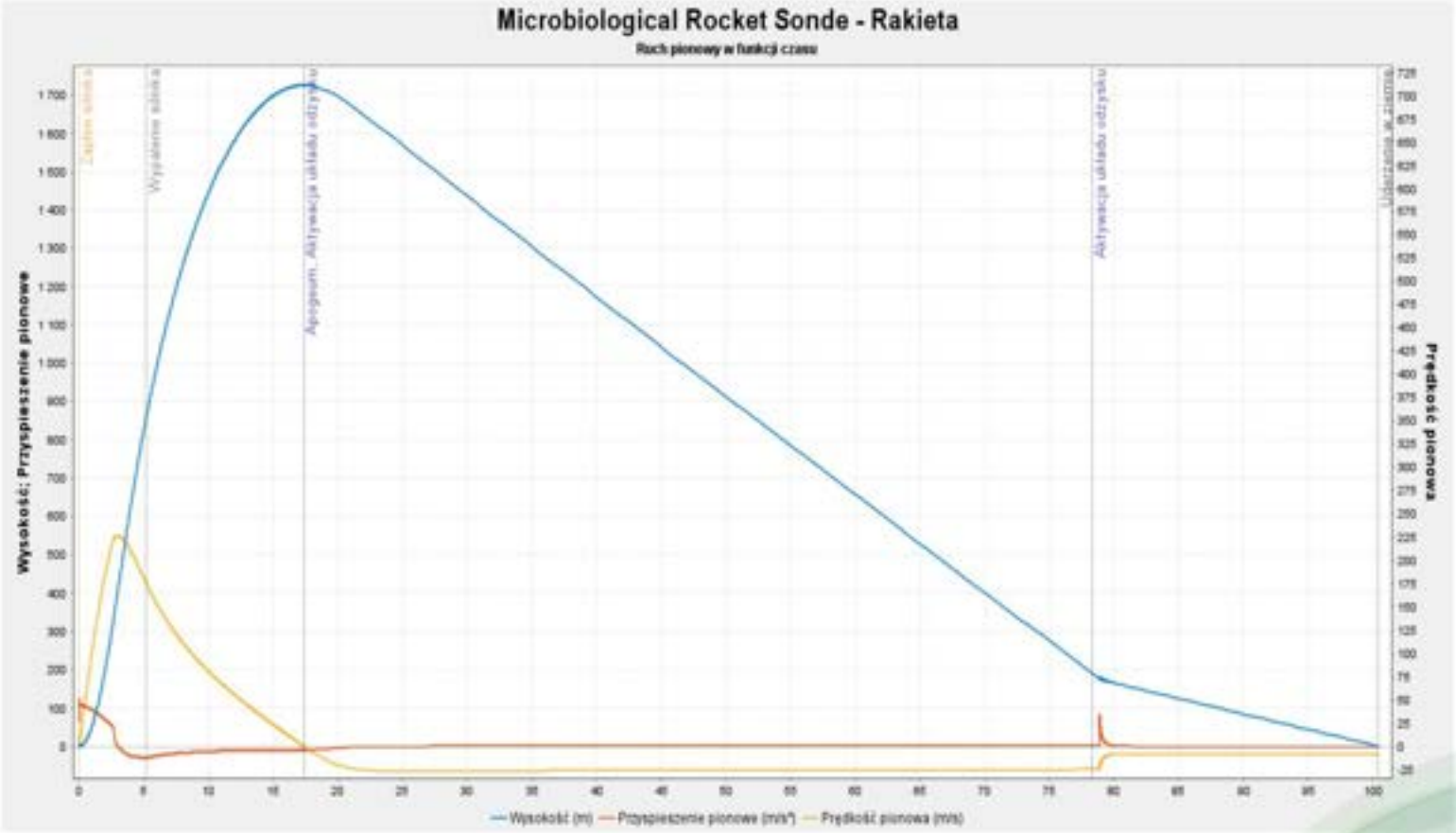
M8 Hex Nut
70
M8x1
305mm
7
A
A
139.7
170
100
100
Franciszek Rudzki 06.11.2021
Głowica
1/1

ROCKET PROPULSION

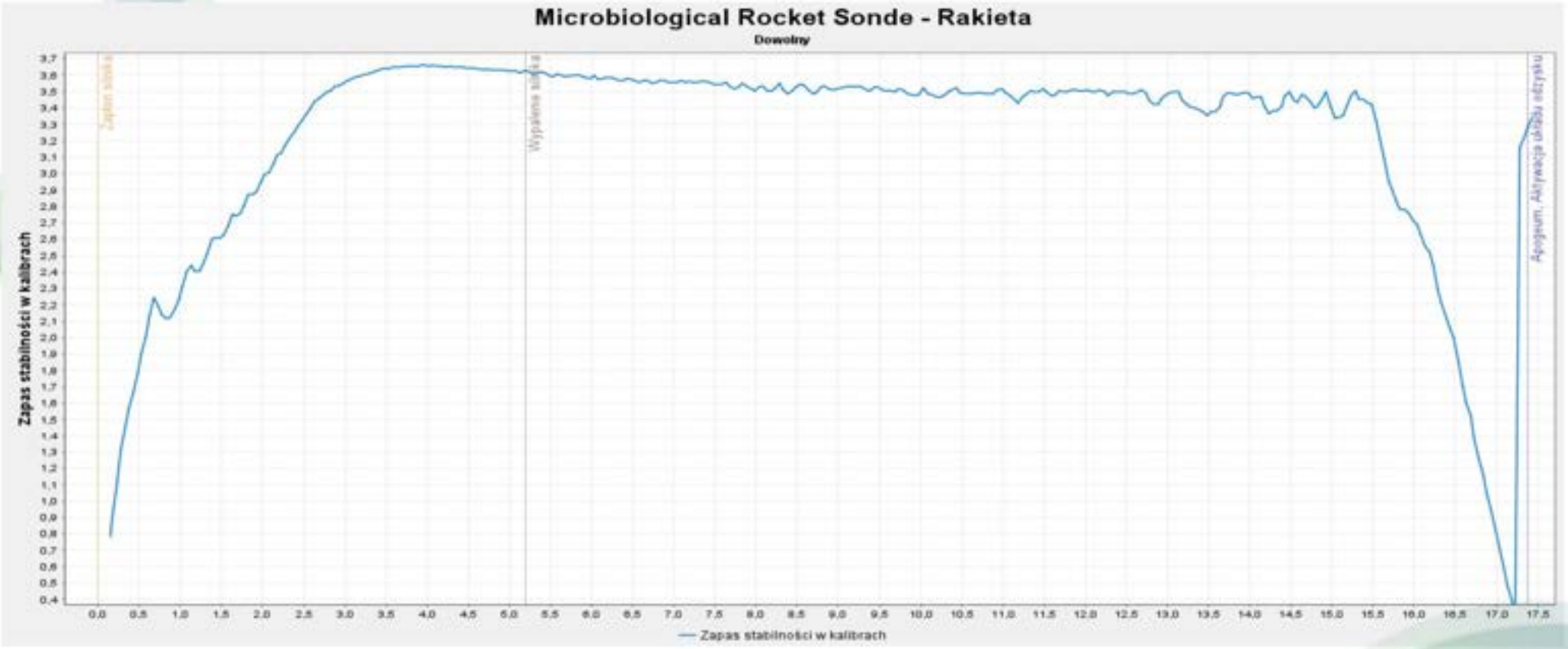


Rys. 10. Komora spalania.


Student1500



FLIGHT SIMULATIONS

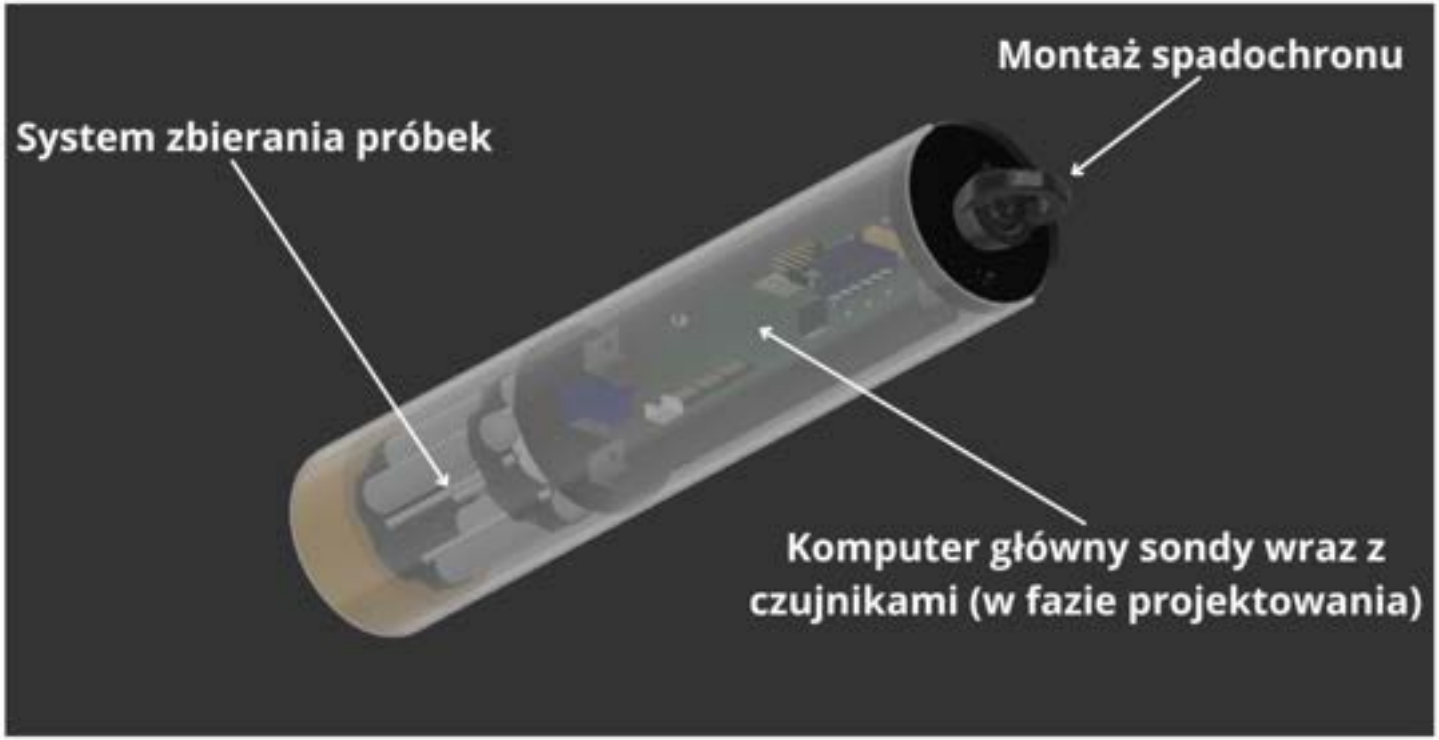


FLIGHT SIMULATIONS

The entire device consists of two main sections:

- **SENSORS SECTION** - contains sensors that make measurements on board the probe during free fall on a parachute.
- **MICROBIOS SAMPLE COLLECTION SYSTEM** - collects samples of microorganisms suspended in the air into sterile chambers thanks to the air flow during free fall.

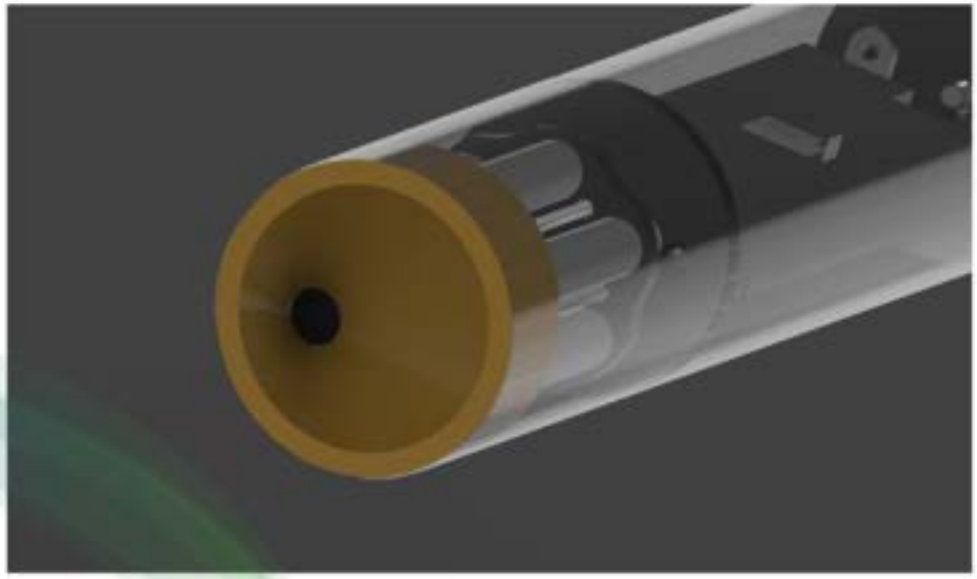
5 ROCKET SONDE



Rys. 11. Komora spalania.

SENSORS
SECTION

SAMPLE COLLECTION SYSTEM



Rys. 12. System zbierania probówek.

Rys. 13. Spadochron utrzymujący sondę przy spadku swobodnym.

4 FLIGHT COURSE

THE ENTIRE FLIGHT SEQUENCE IS DISCUSSED IN THE POINTS:

- **T-10 MIN - ENGINE REFUELING**
- **T-5 MIN - SET THE ROCKET ON THE LAUNCHER**
- **T-2 MIN - ROCKET AND PROBE ARMING**
- **T-1 MIN - STARTING SEQUENCE**
- **T-0S - ENGINE IGNITION**
- **T+4,3 S - ENGINE FUEL BURN**
- **T+17,5 S - APOGEUM OF FLIGHT**
- **T+78 S - ROCKET MAIN PARACHUTE ACTIVATION**
- **T+100 S - ROCKET TOUCHDOWN**

3 MICROBIOLOGICAL TESTING

The material collected by the probe is applied to each dish filled with substrate.

- **For pans one and two - material collected by the probe at an altitude of 1,200 meters.**
- **For pans three and four - material collected by the probe at an altitude of 900 meters.**
- **For pans five and six - material collected by the probe at an altitude of 600 meters.**
- **For dishes seven and eight - material collected by the probe at an altitude of 300 meters.**
- **Incubation for 48 hours.**

2 PREPARATION OF RESULTS

In real time, a graphic image of the atmosphere map is created on the website based on updated results.

1 BIBLIOGRAPHY

1. Rendered photos and technical drawing were made in Autodesk Fusion 360.
2. Rocket flight simulation charts created in OpenRocket.
3. Rocket engine thrust graph created with ThrustCurveTool.
4. A photo of the combustion chamber of a rocket engine comes from https://forum.rakiety.org.pl/viewtopic.php?p=28246

Thank you for your attention!

START

https://youtu.be/Hns3pMOYtBk

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