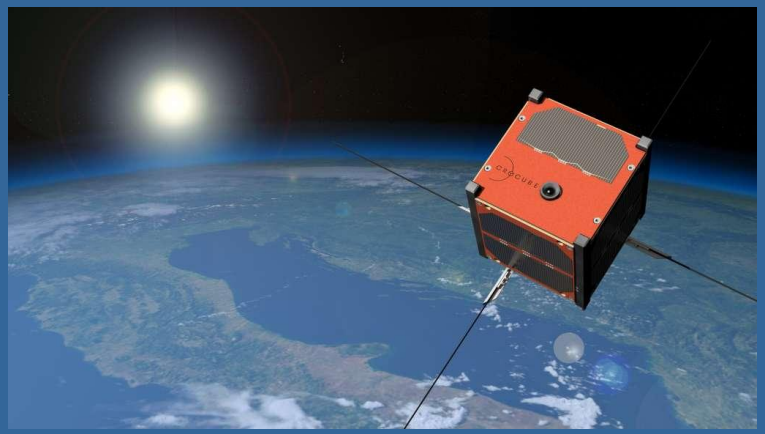
VELEUČILIŠTE U KARLOVCU
Karlovac University of Applied Sciences

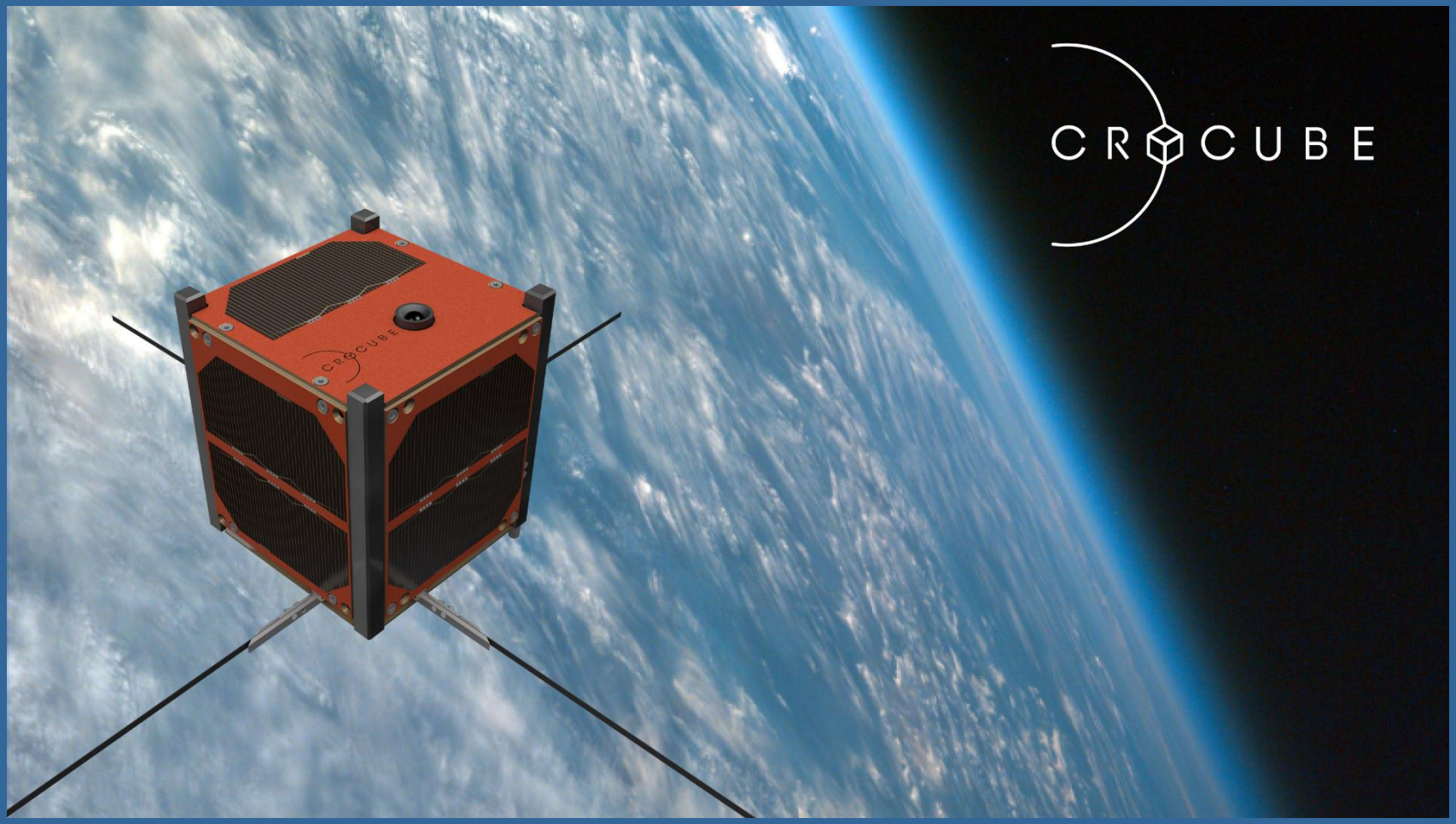
RADIO KLUB
„KARLOVAC“
9A1CVW

mr.sc. ŽELJKO ULIP, dipl.ing.

CroCube
1. HRVATSKI SATELIT

KARLOVAC
12.03.2025.



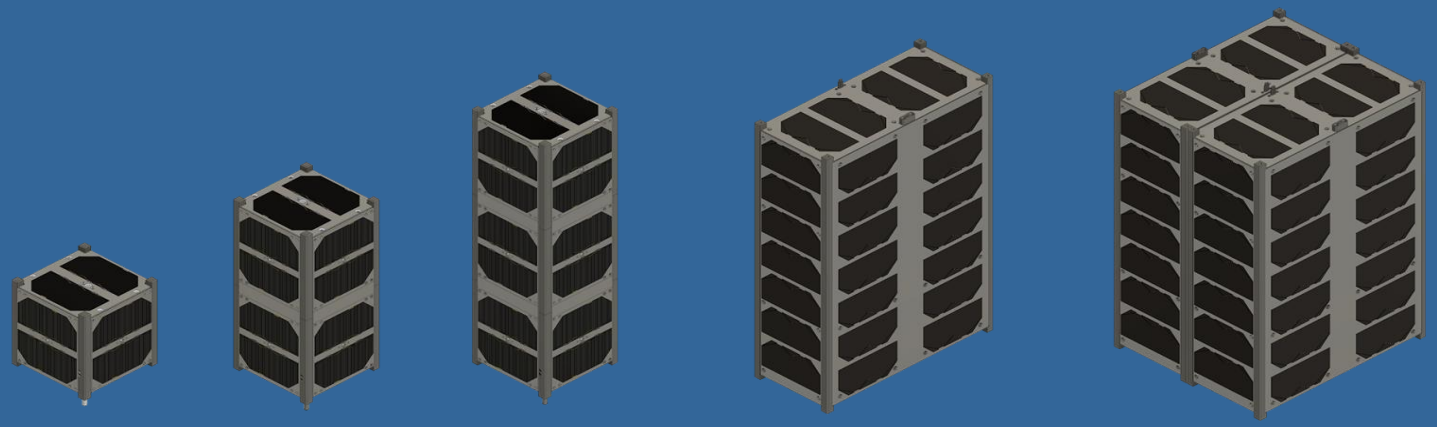

CRCUBE

POLAZNA IDEJA ZA CroCube SATELIT

- OBLIK: CUBE SAT 1 U (10x10x10 cm, 1 kg)
- VRSTA ORBITE: ~~POLARNA~~ EKVATORIJALNA
- PARAMETRI ORBITE: VISINA 510 km, NAGIB 45^0
- VRIJEME OPHODA: 95 min
- CILJNA SKUPINA: RADIOAMATERI, STUDENTI, UČENICI
- KOMUNIKACIJE: AMATERSKA SATELITSKA SLUŽBA
- VRSTE: TLM, RADIJSKI FAR, SSDV SLIKE, DIGIPITER
- KOORDINACIJA: HRS, HAKOM, IARU, ITU
- LANSIRANJE: SPACE X, RAKETA FALCON 9
- RADNI VIJEK: 2-3 GODINE

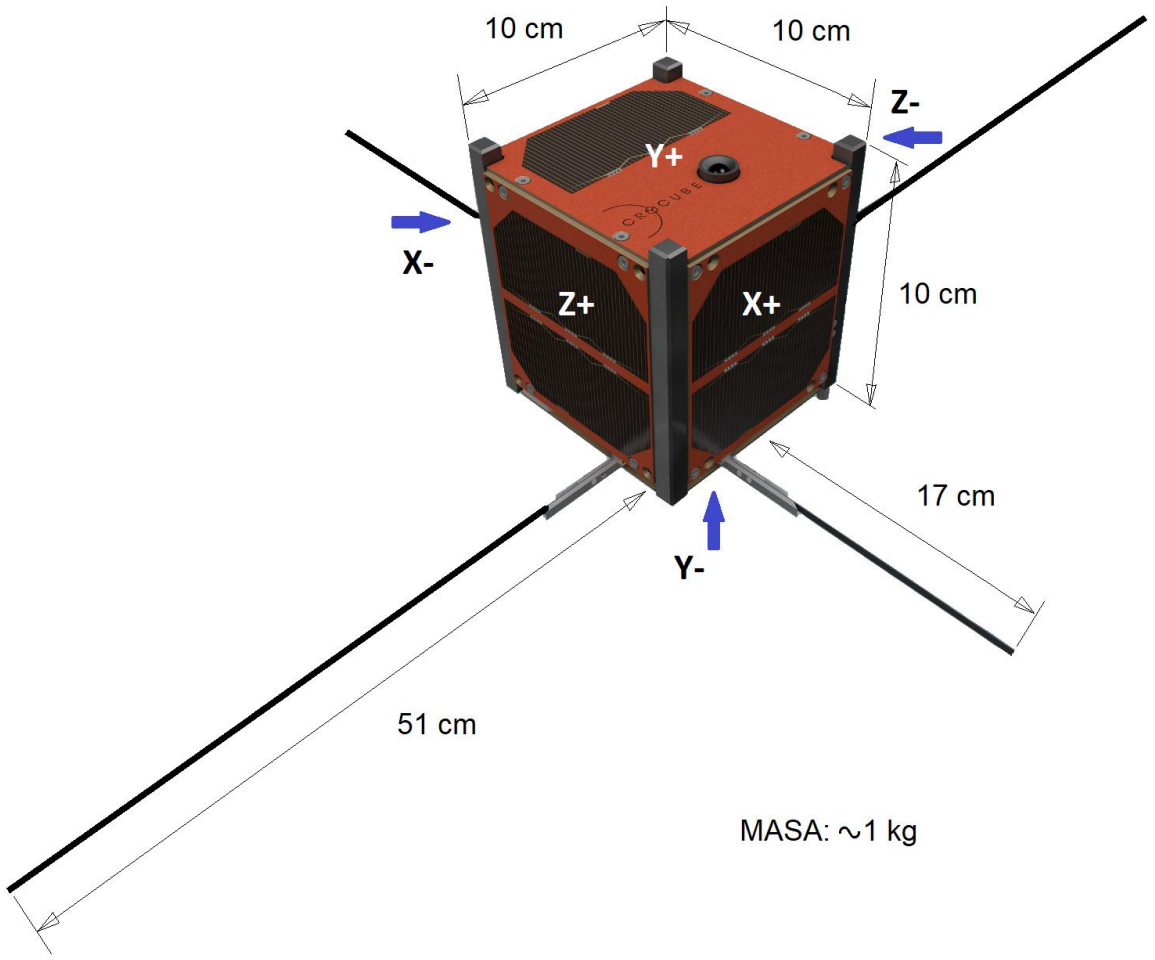
- **POVRATAK U ATMOSFERU I IZGARANJE: 5-7 GODINA**

OBLICI SATELITA CUBESAT TEHNOLOGIJE



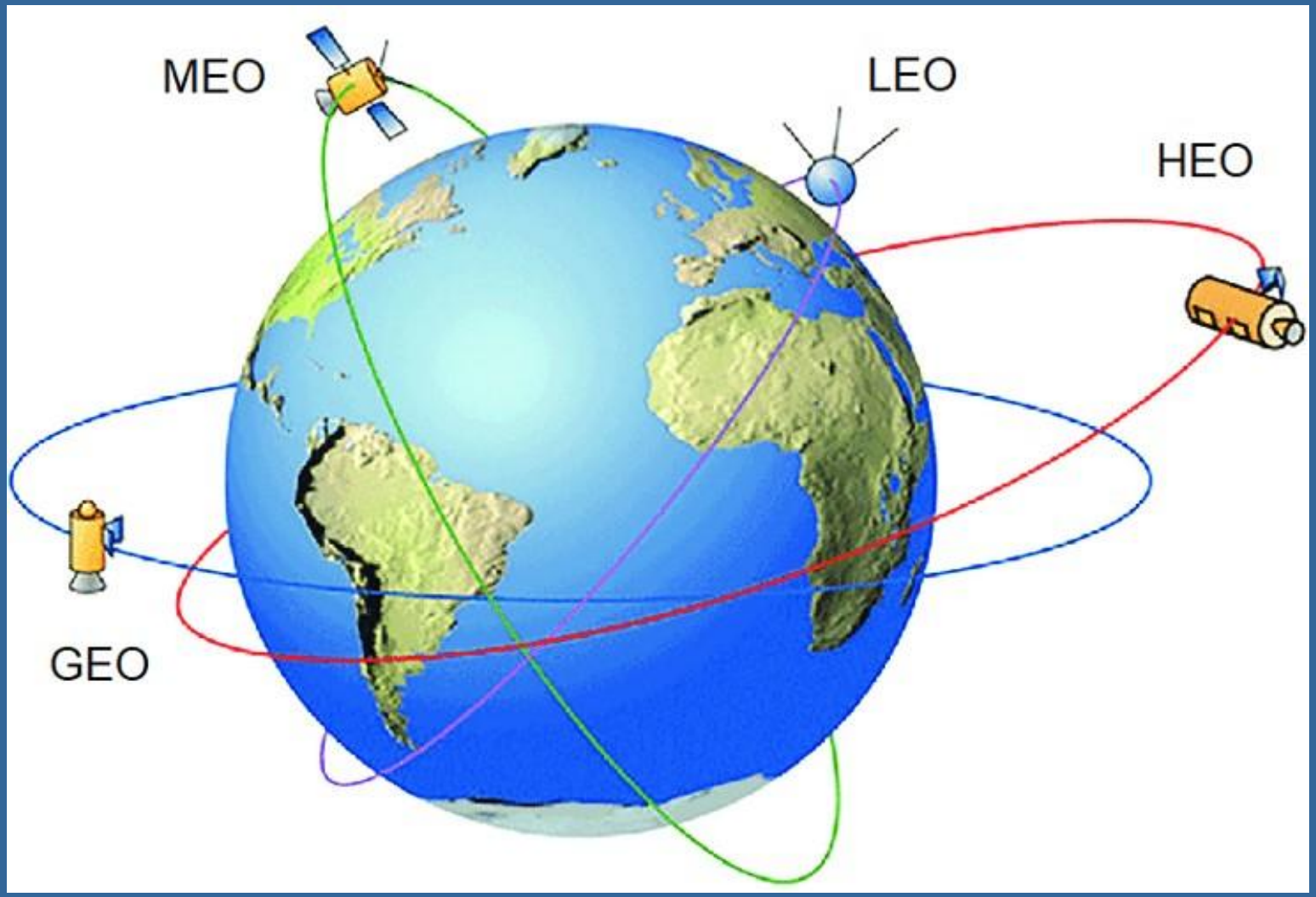
1U 2U 3U 6U 12U

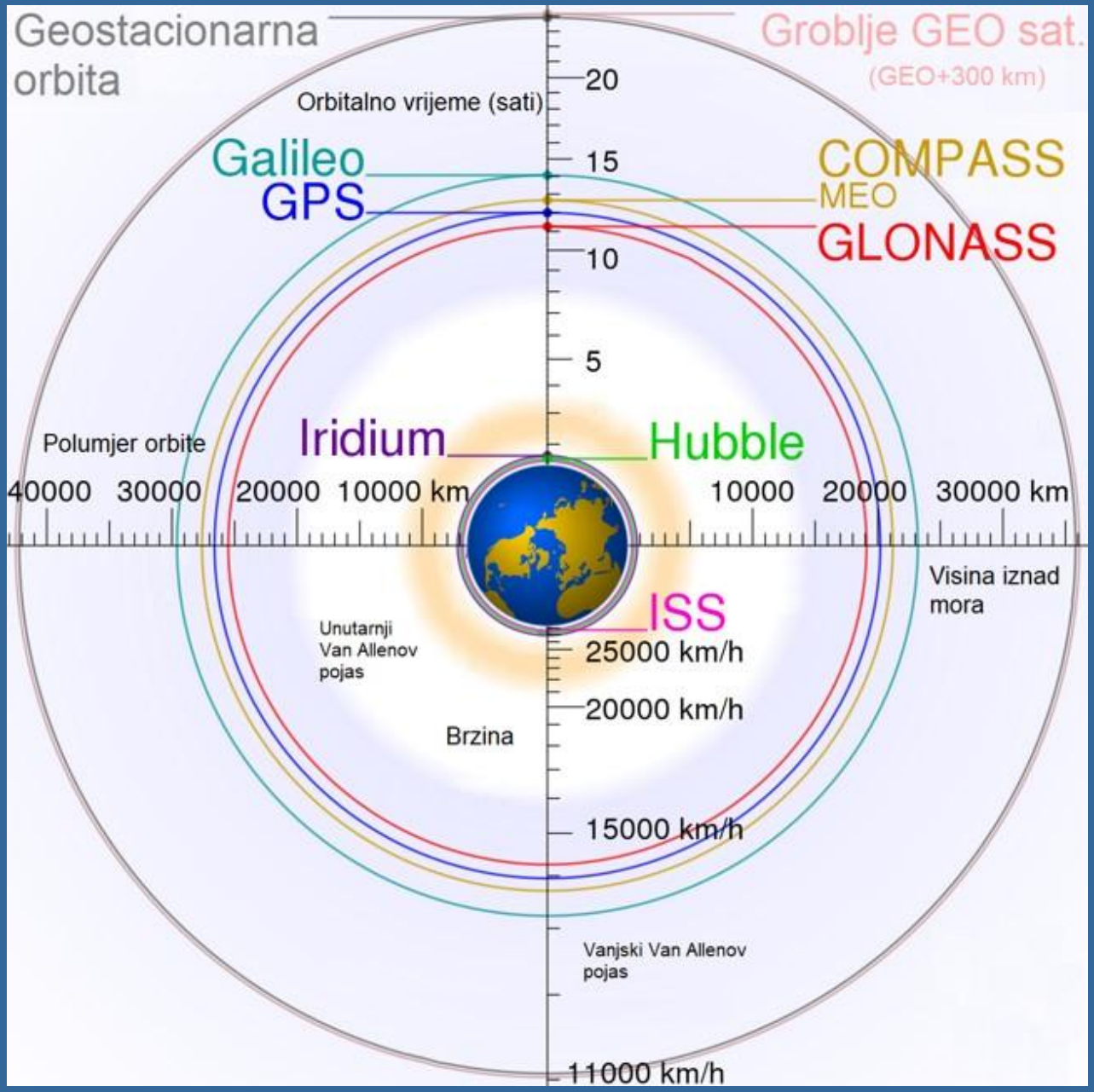
DIMENZIJE CroCube SATELITA



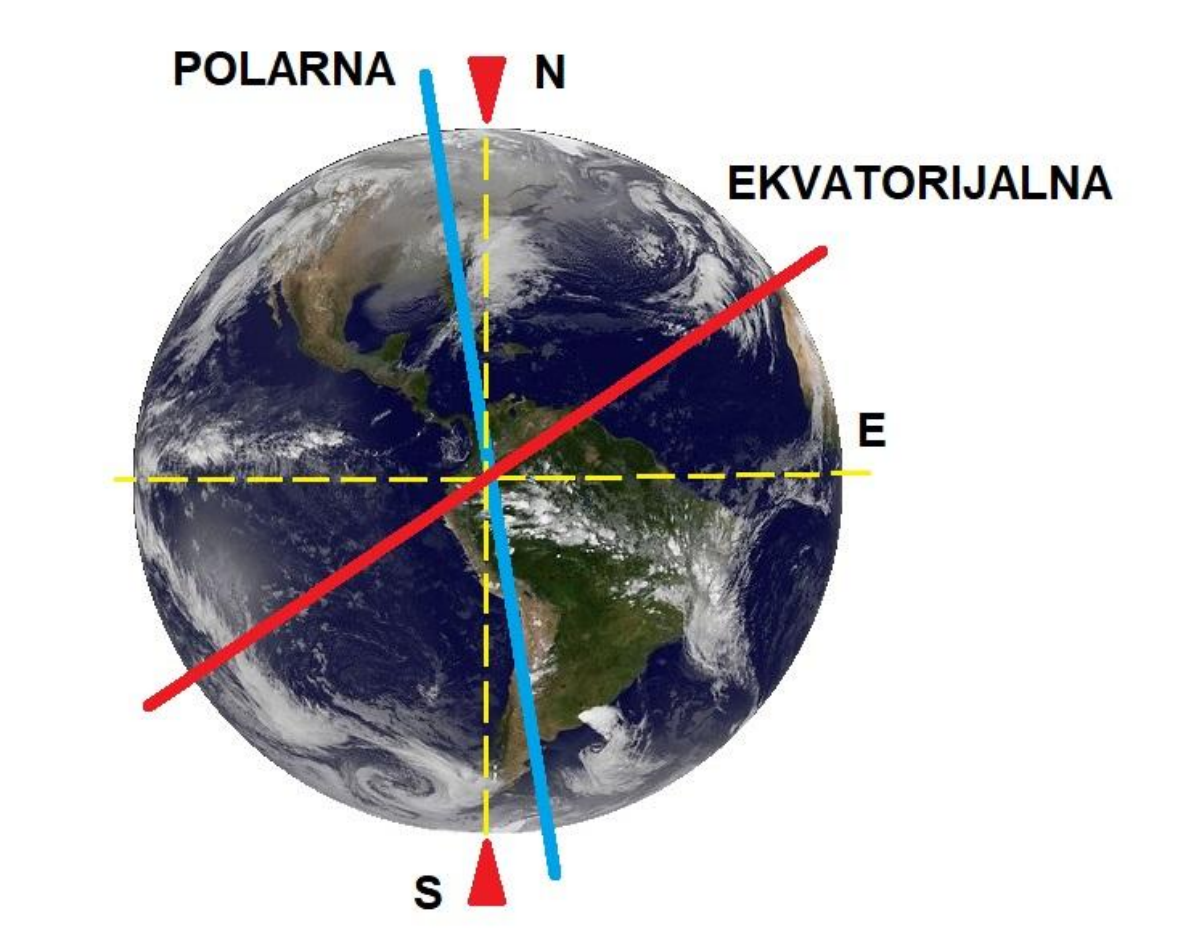
CILJNA SKUPINA: RADIOAMATERI, UČENICI, STUDENTI, IT SEKTOR

VRSTE SATELITSKIH ORBITA



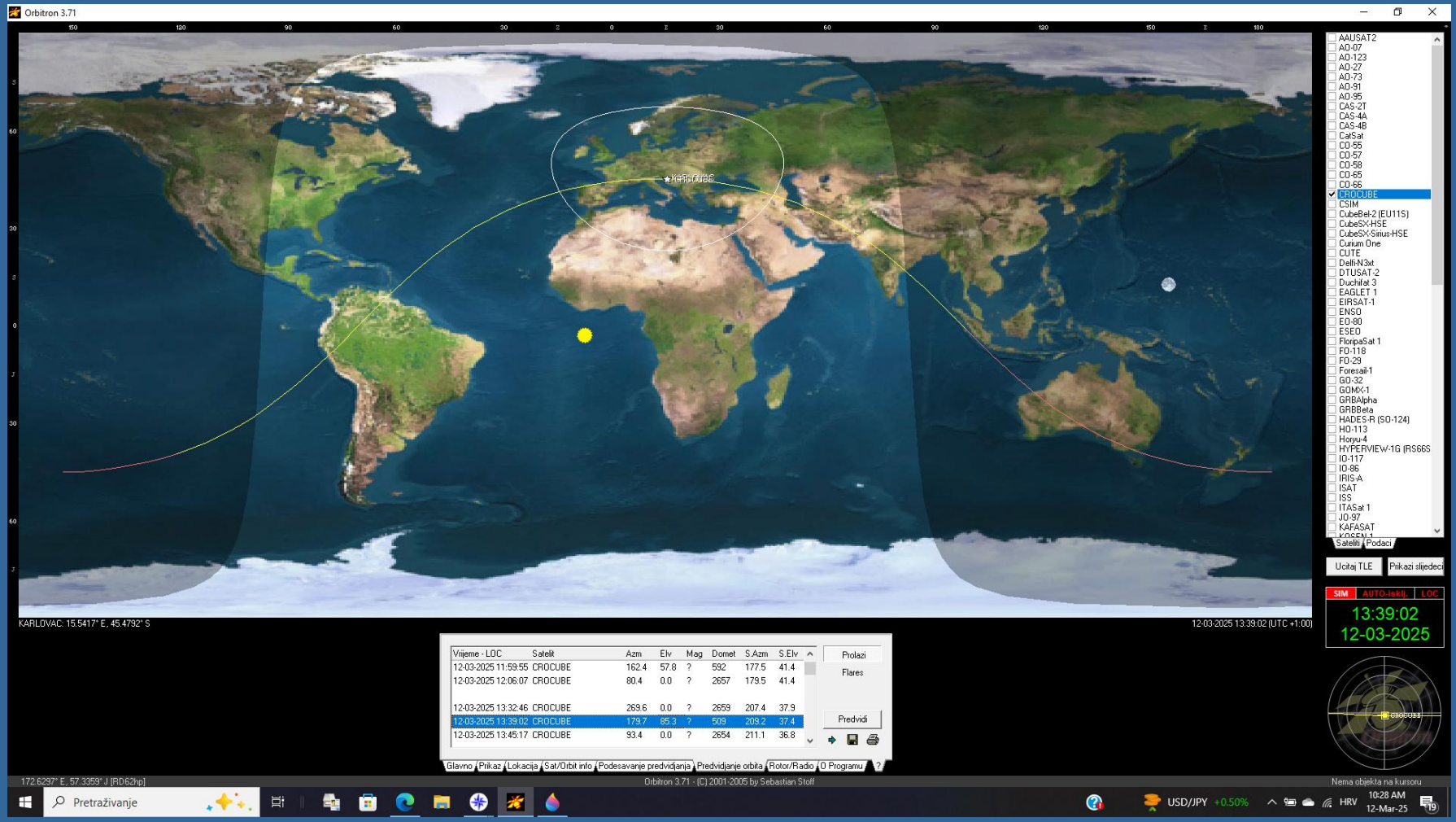

Geostacionarna orbita
Groblje GEO sat.
(GEO+300 km)
Orbitalno vrijeme (sati)
20
15
10
5
Galileo
GPS
COMPASS
MEO
GLONASS
Iridium
Hubble
Polumjer orbite
40000 30000 20000 10000 km
10000 20000 30000 km
Visina iznad mora
ISS
Unutarnji Van Allenov pojas
25000 km/h
20000 km/h
Brzina
15000 km/h
Vanjski Van Allenov pojas
11000 km/h

EKVATORIJALNA I POLARNA ORBITA



CroCube U EKVATORIJALNOJ ORBITI

SIMULACIJA PROLAZA



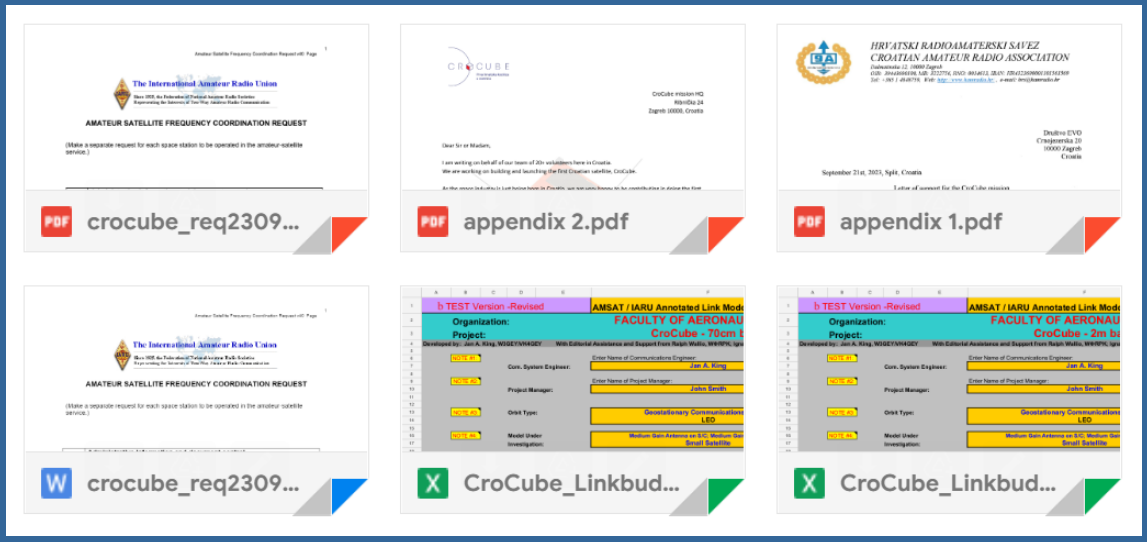
MEĐUNARODNA KOORDINACIJA (HRS, HAKOM, IARU, ITU)

HRVATSKI RADIOAMATERSKI SAVEZ

HAKOM HRVATSKA REGULATORNA AGENCIJA ZA MREŽNE DJELATNOSTI

ITU

IARU



The International Amateur Radio Union

Since 1925, the Federation of National Amateur Radio Societies
Representing the Interests of Two-Way Amateur Radio Communication

IARU Amateur Satellite Frequency Coordination

Back to List of Sats whose Frequencies have been coordinated

CroCube	Updated: 30 Nov 2023		Responsible Operator	Zeliko Ulip 9A2EY
Supporting Organisation	Društvo EVO (Society for Out-of-Frame Education)			
Contact Person				

Headline Details: CroCube is a 1U CubeSat mission to support the Croatian, but also worldwide amateur radio community with many HAM services and activities. The satellite is scheduled to launch aboard Falcon 9 launcher on the Transporter 10 mission in February 2024. The planned orbit will be SSO/510km. The mission's goal is also to facilitate the technological development of Croatia, create an advanced society focused on prosperity and innovation, and increase participation in the global space sector. Also, drive Croatia into the space era, increase interest in astronomy and space projects, and develop STEM and tech entrepreneurship, create a platform for founding a space center in Croatia, increase investments and employment in robotics, technology and ICT and finally reduce unemployment and prevent brain drain. The CroCube satellite is designed for HAM radio activities. Main purpose is to provide services for radio amateurs in Croatia and worldwide, and also for students of technical universities to get hands-on experience with satellite communication and get radioamateur licences. One of the project goals is to popularize HAM activities across the common population, students and children in Croatia. CroCube will provide these HAM services: - AX.25 telemetry - CW beacon - Digipeater - Anniversary/special occasions AX.25 & CW messages for community engagement - Experimental SSDV transmissions - SATNOGS integration, decoder, dashboard Proposing a UHF downlink using 9k6 G3RUH GFSK with AX25 telemetry. Planning an Exolaunch deployment from SpaceX Transporter 10 mission in Q2024 into a 510 km SSO. More info at https://drustvo-evo.hr/ **A downlink on 436.775 MHz has been coordinated**

Application Date:	25 Oct 2023	Freq coordination completed on	30 Nov 2023

The IARU Amateur Satellite Frequency Coordination Status pages are hosted by AMSAT-UK as a service to the world wide Amateur Satellite Community

The International Amateur Radio Union

Since 1925, the Federation of National Amateur Radio Societies
Representing the Interests of Two-Way Amateur Radio Communication

Hans P. Blondeel Timmerman, PB2T
Satellite Advisor
Nieuwe weg 21, 4031 MN Ingen, Netherlands
Email: satcoord@iaru.org

Date: 30 November 2023

To Željko Ulip 9A2EY

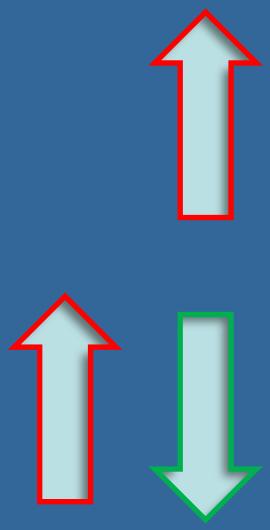
Dear Željko,

In response to your coordination request I confirm the IARU frequency coordination for **CroCube**.
Downlink frequency:
436.775 MHz with emission designator 20K0F1DAN, EIRP 30 dBm.
Uplink frequency
145.975 MHz with emission designator 20K0F1DAN.
Planned launch date: Q1 2024.
Licensing administration: Croatia.
Telecommand station: 9A1ADE
Planned Height and Orbit: 510 km SSO, 97.7 degree inclination, period 94 minutes.
IARU has coordinated frequencies in bands allocated to the amateur satellite service. All frequencies in the amateur satellite service are shared frequencies.
Please inform me about the actual launch date as soon as that information becomes available.

Best wishes for a successful project.

HP Blondeel

Hans Blondeel Timmerman
IARU Satellite Advisor

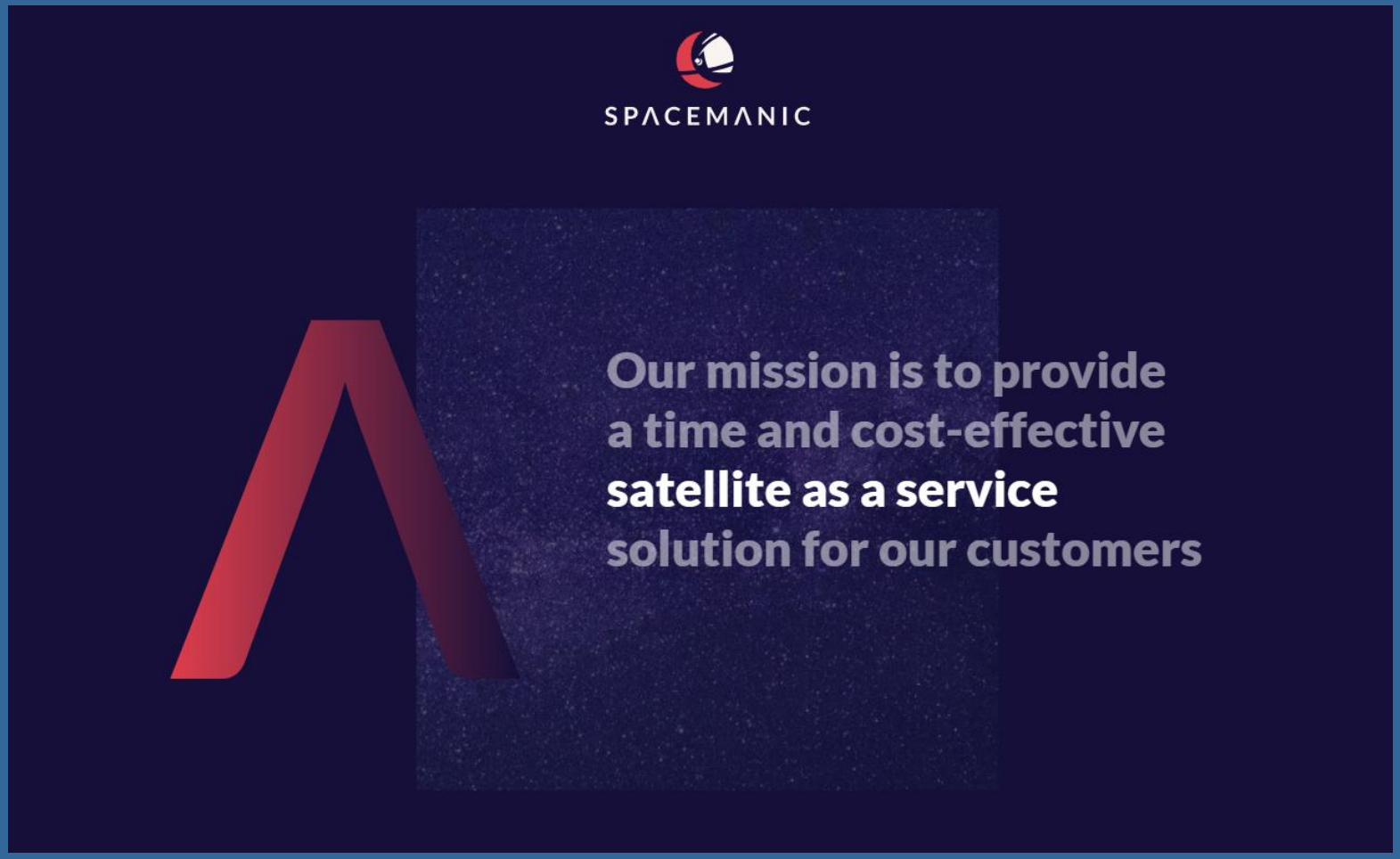


145,975 MHz

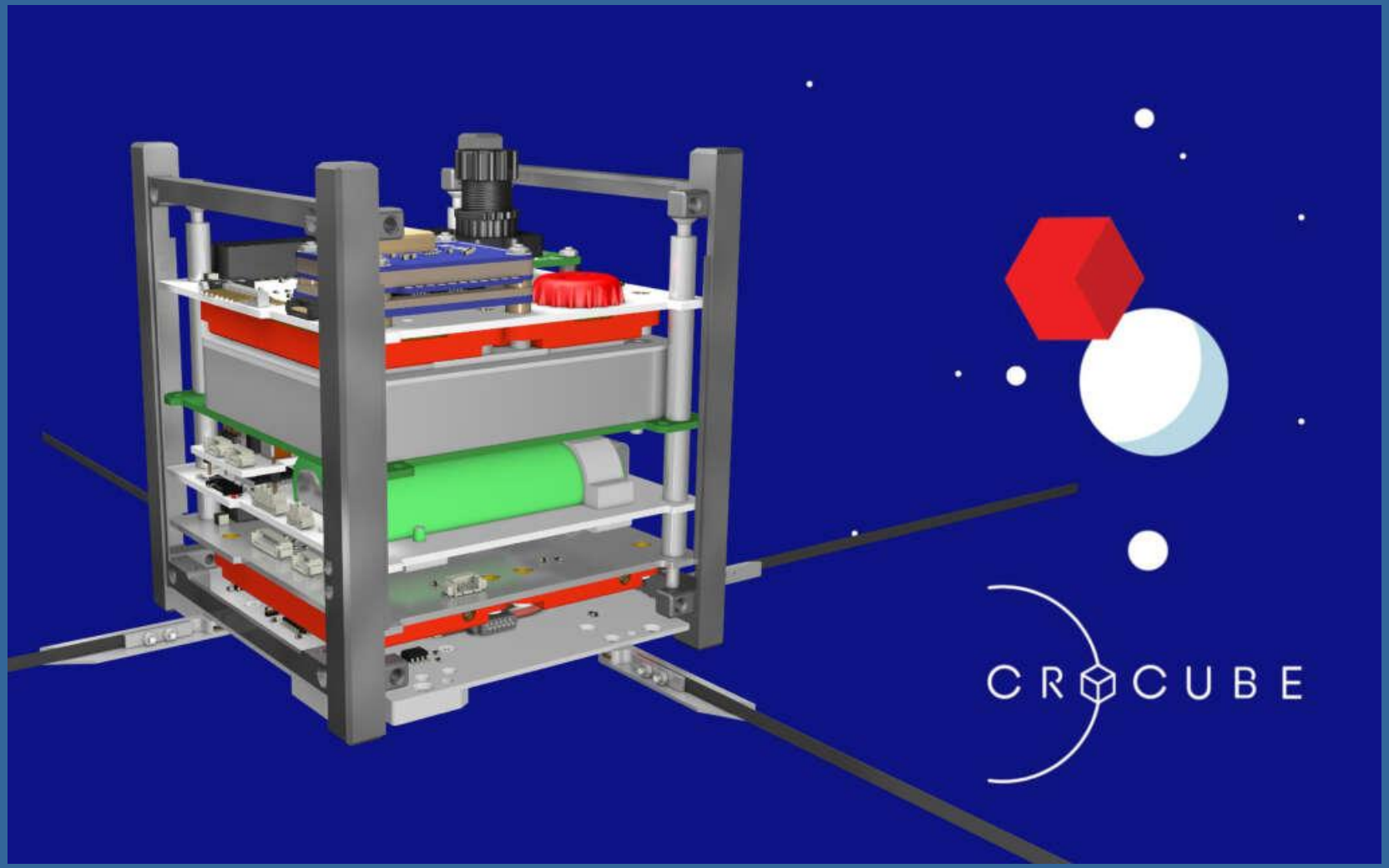
436,775 MHz

KAMPANJA PRIKUPLJANJA DONACIJA

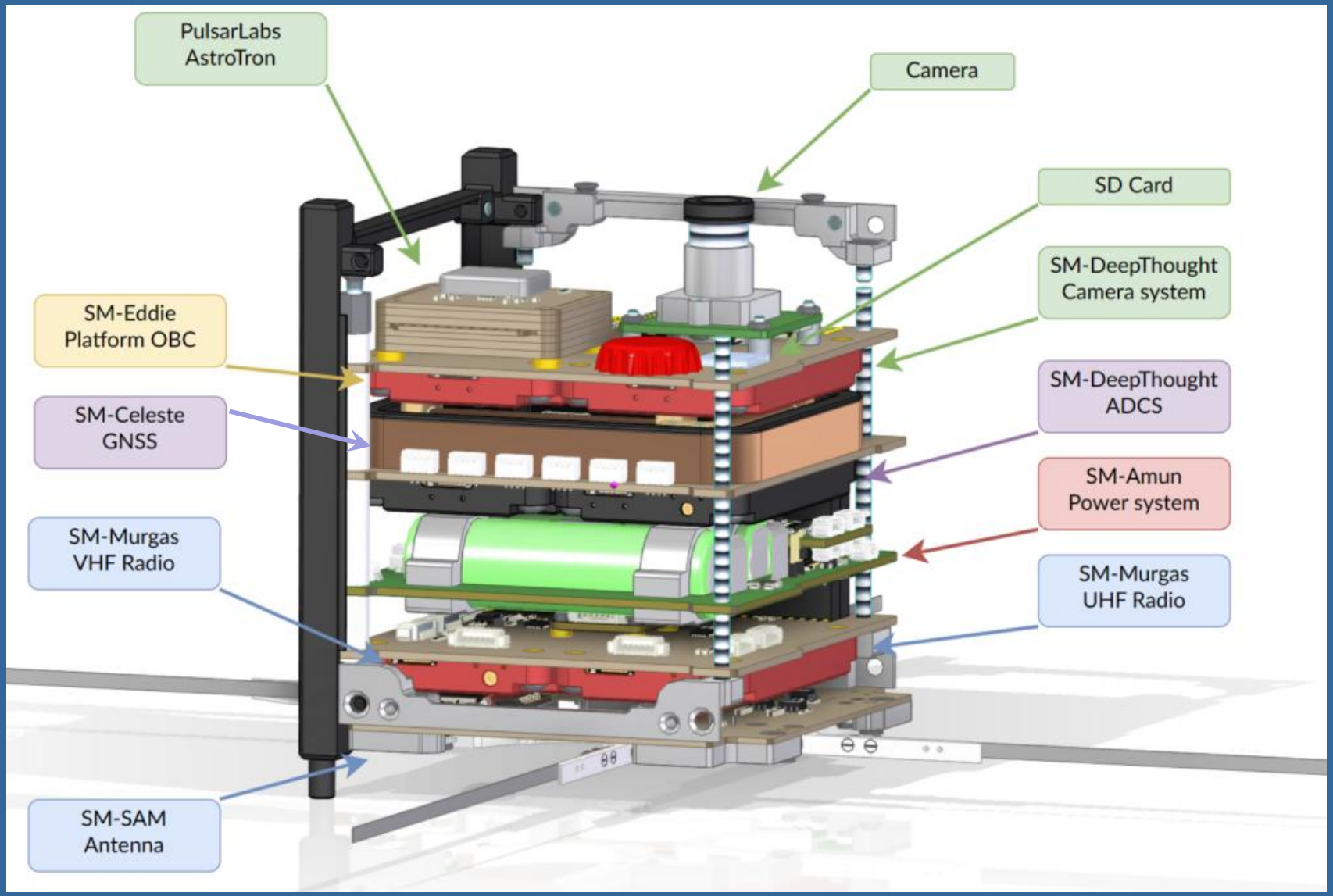
KLJUČNI PARTNER I SURADNIK SPACEMANIC, SLOVAČKA



ALAT U RUKE!

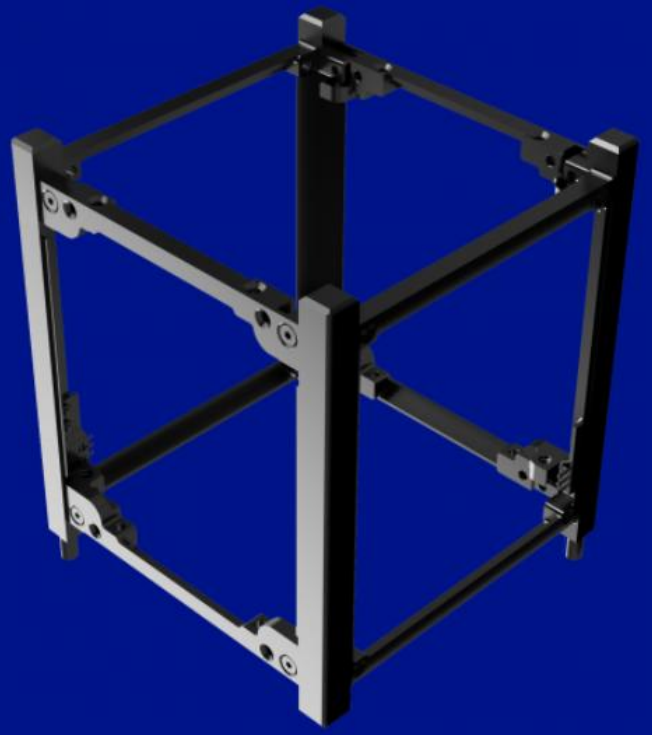


SASTAVNICE SATELITA



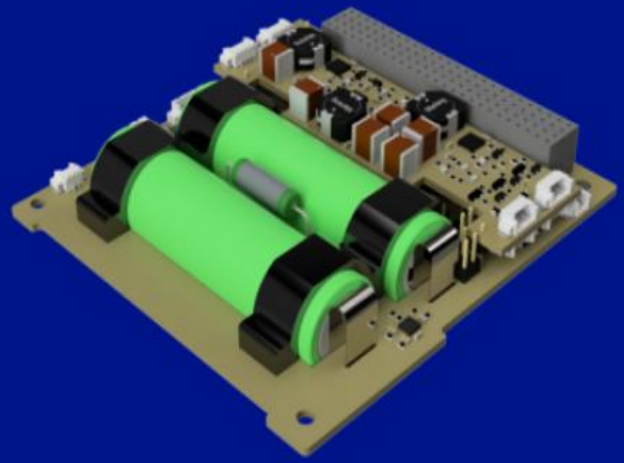
Struktura

Konstrukcija koja pruža potporu i stabilnost svim ostalim podsustavima satelita.
Struktura mora izdržati stres proizvodnje, sastavljanja, testiranja i transporta.
Napravljena je od aluminija a najčešće je mase manje od 0.5 kg.



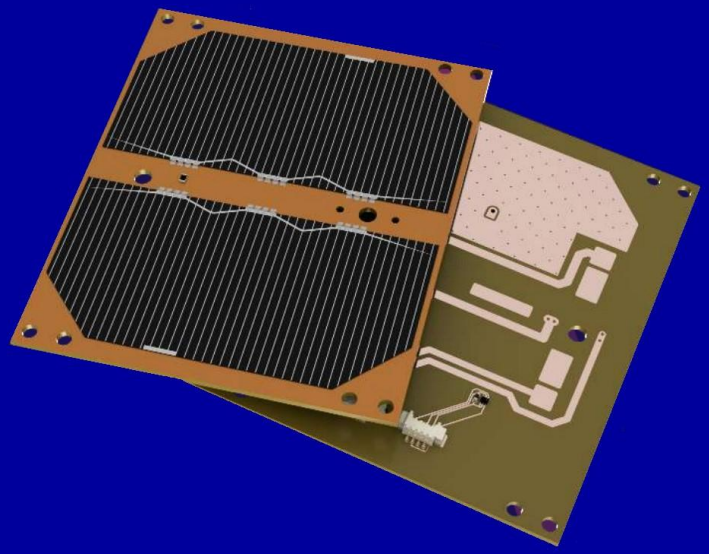
Napajanje

Sustav opskrbe energijom je glavni izvor napajanja za cijeli sustav, tzv. “srce” satelita.
Sastoji se od solarnih panela i baterija, a zadužen je za upravljanje proizvodnjom, pohranom i distribucijom energije.

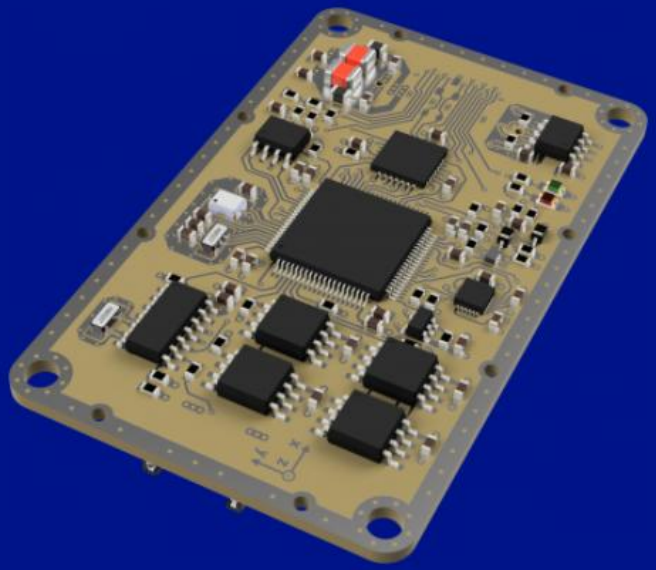


Solarni paneli

Nominalni napon: 4,82 V
Struja: 0,5 A
Iskoristivost: 30%

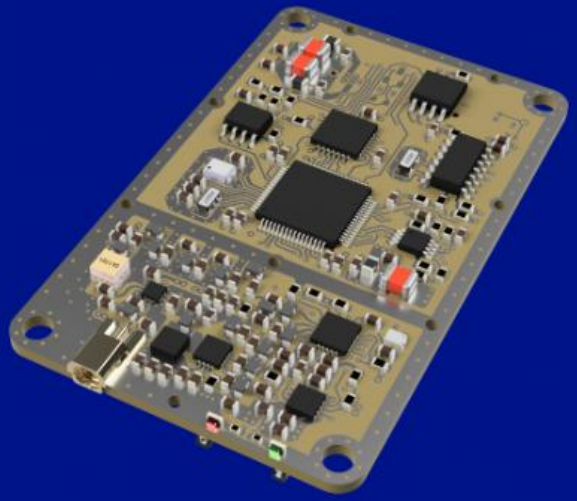


Računalo



Tzv. “mozak” satelita, povezuje sve podsustave, kontrolira ih i daje im upute za rad.

Sustav komunikacije



Jedan od najvažnijih podsustava satelita je radio. Njegov glavni zadatak je slanje i primanje radio signala sa zemaljske stanice putem UHF / VHF antena.

Nadalje tu je i deployable antenna – antena koja se razvije van iz satelita kad satelit dodje na odrediste u orbiti. Radio iskoristi antenu kako bi svoj signal pojačalo i doprlo do zemaljske stanice, gdje će podatci biti obrađeni preko software-a.

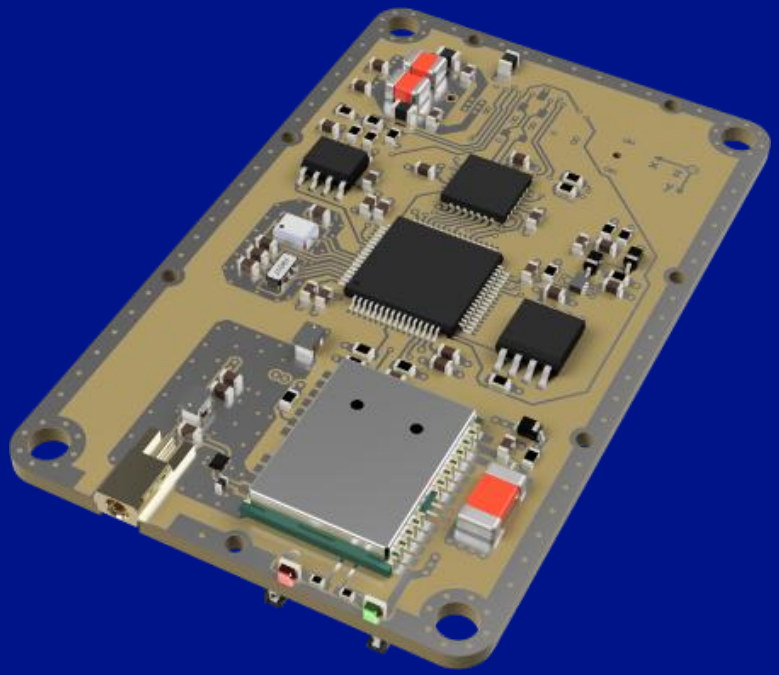
Sustav orijentacije i stabilizacije

Satelit će za orijentaciju koristi zavojnice tvrtke Serenum Space, koje ce mu pomoci kod zaokretanja i stabilizacije. Stabilizacija se vrši pomoću magnetometra i gyroskopa, koji ce omoguciti djelomicno manevriranje i kompenzirat rotaciju u tri osi takozvani “detumbling”

Kamera

Glavni teret satelita je UCAM-III tvrtke 4D systems, koja će fotografirati površinu Zemlje s 500 km visine.

Sustav za pozicioniranje (GNSS)



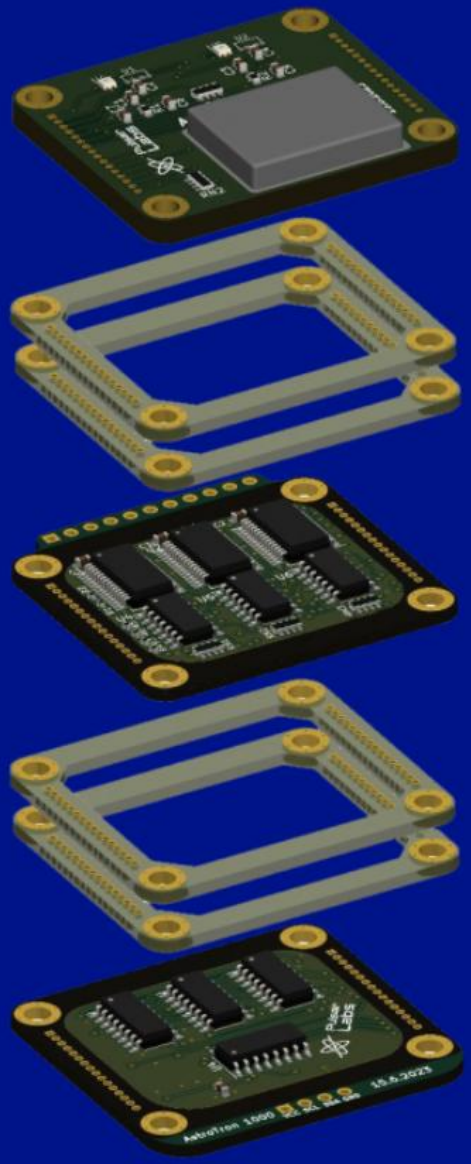
AstroTron 1000

Hrvatska tvrtka Pulsar Labs, osmislila je hrvatski modul – AstroTron

AstroTron je sustav s trostrukim mikrokontrolerima i trostrukim senzorima koji je osmišljen kako bi revolucionirao jeftinu elektroniku u svemiru. Sa redundancijom i autonomnim radom.

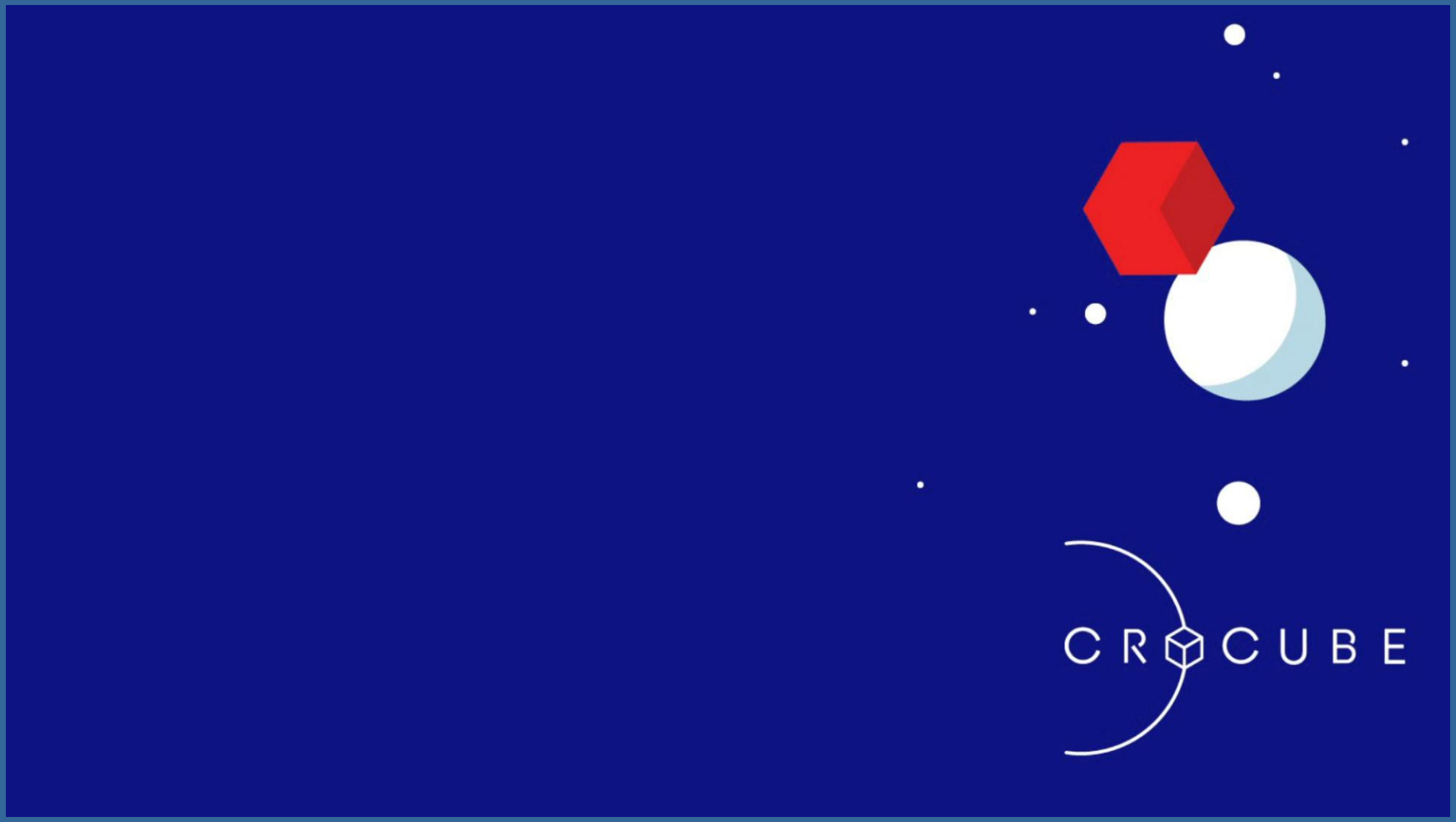
Tri mikrokontrolera djeluju kao jedinstvena cjelina, provode sustavne testove i bilježe greške. Šest svjetlosnih senzora, uključujući dva skrivena senzora za mjerenje šuma.Koristeći CSP protokol preko I2C, AstroTron je eksperiment u kojem se istovremeno ispituje izdržljivost mikrokontrolera, performanse svjetlosnih senzora i I2C matrica prebacivanja s arbitražnim krugom.

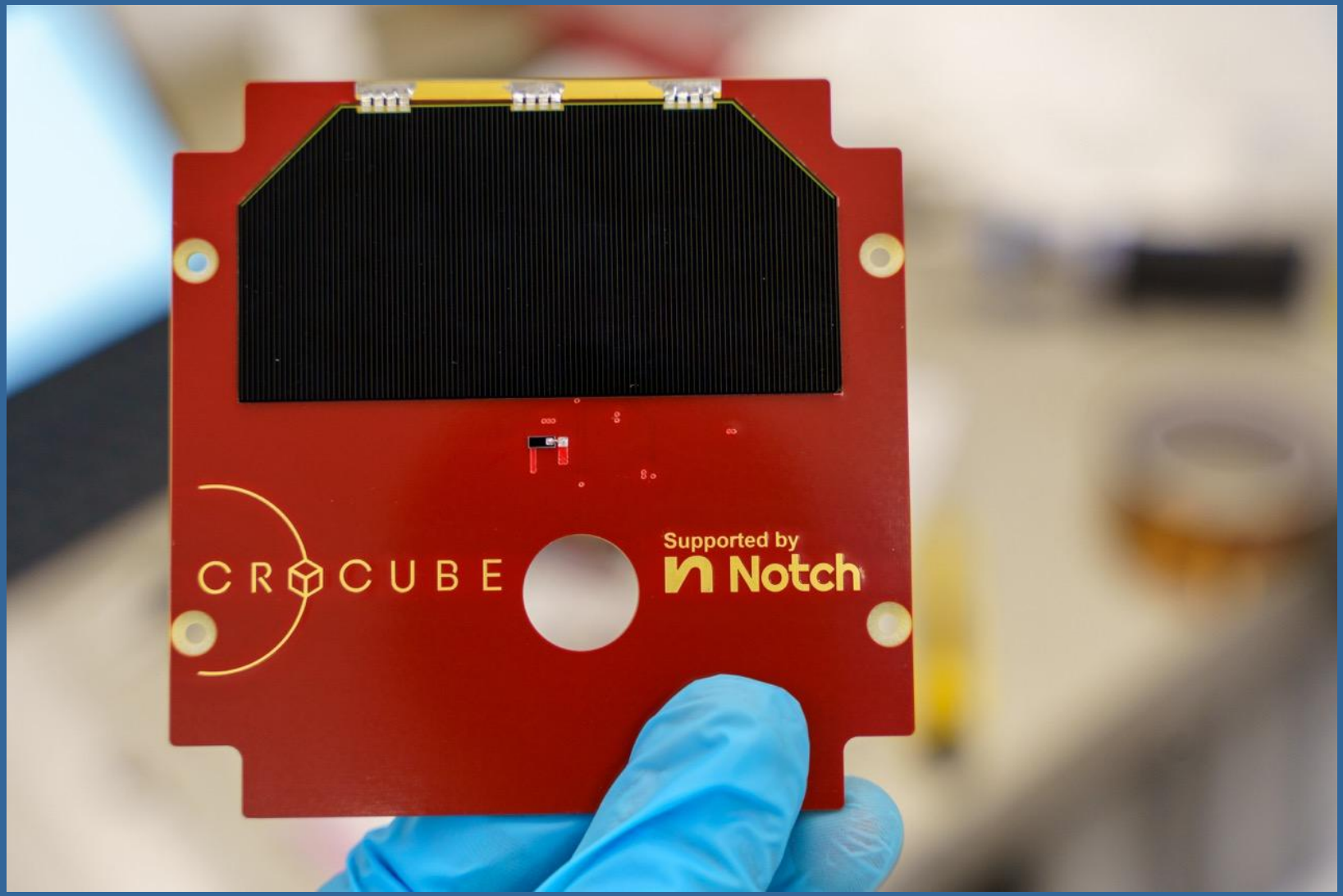
AstroTron ima za cilj postati pouzdana, ekonomična i jednostavna za korištenje platforma za Cubesatove koja podržava različite eksperimente. Njegove tri ploče nude senzore, mikrokontrolere s arbitražom i I2C povezivanje s inteligentnim mogućnostima zaobilaženja kvarova.

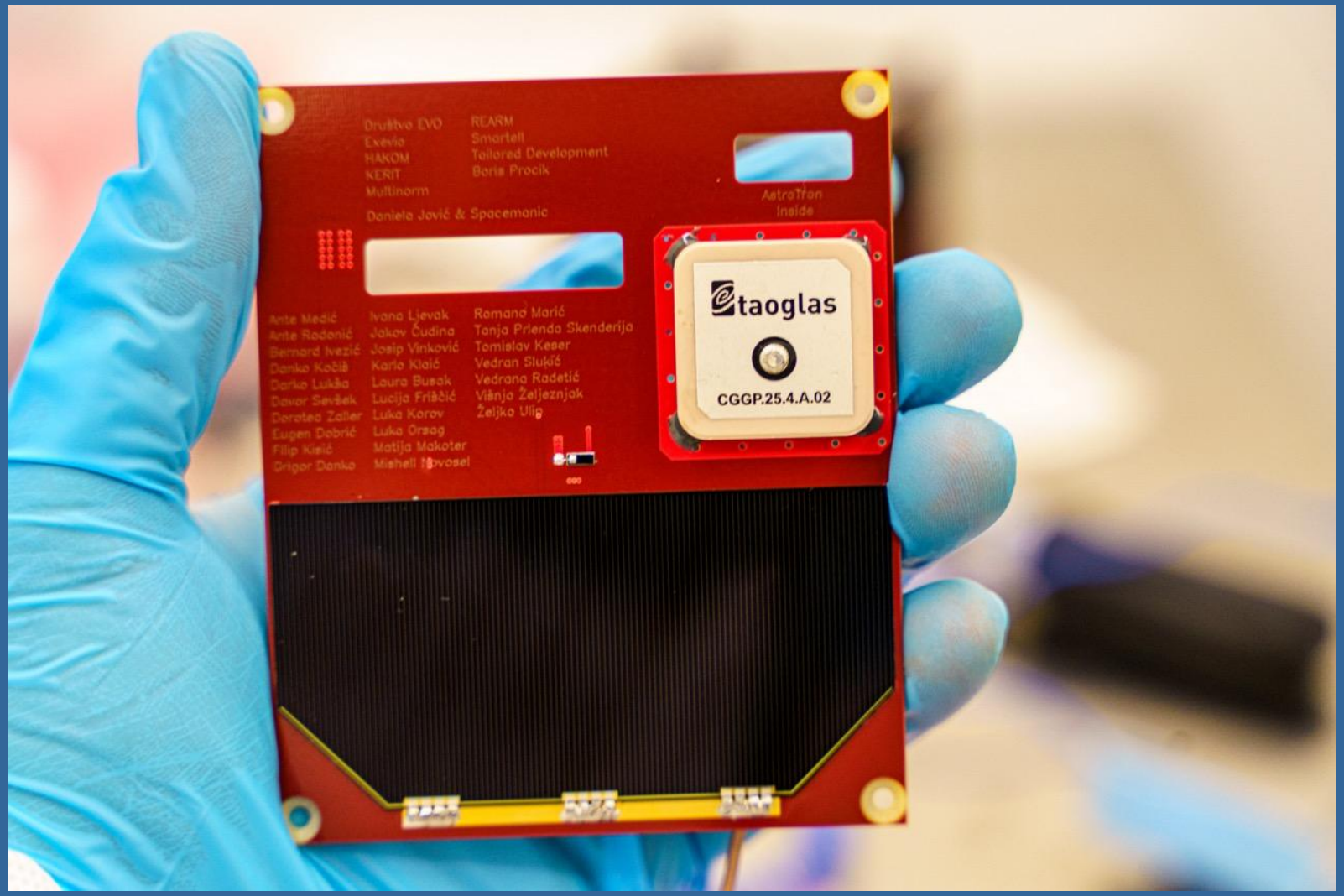


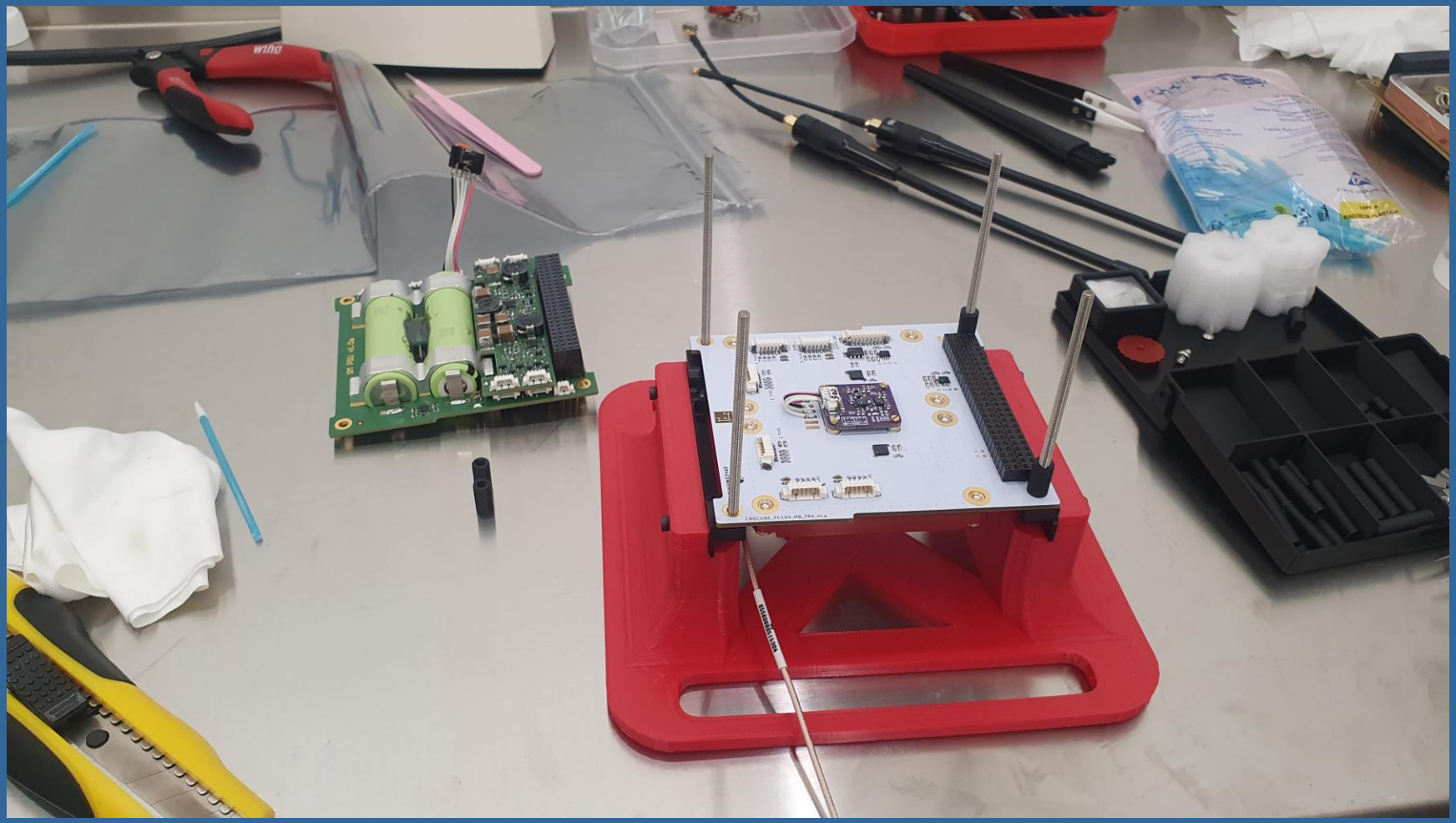
INSTITUT ZA FIZIKU, ČISTA SOBA

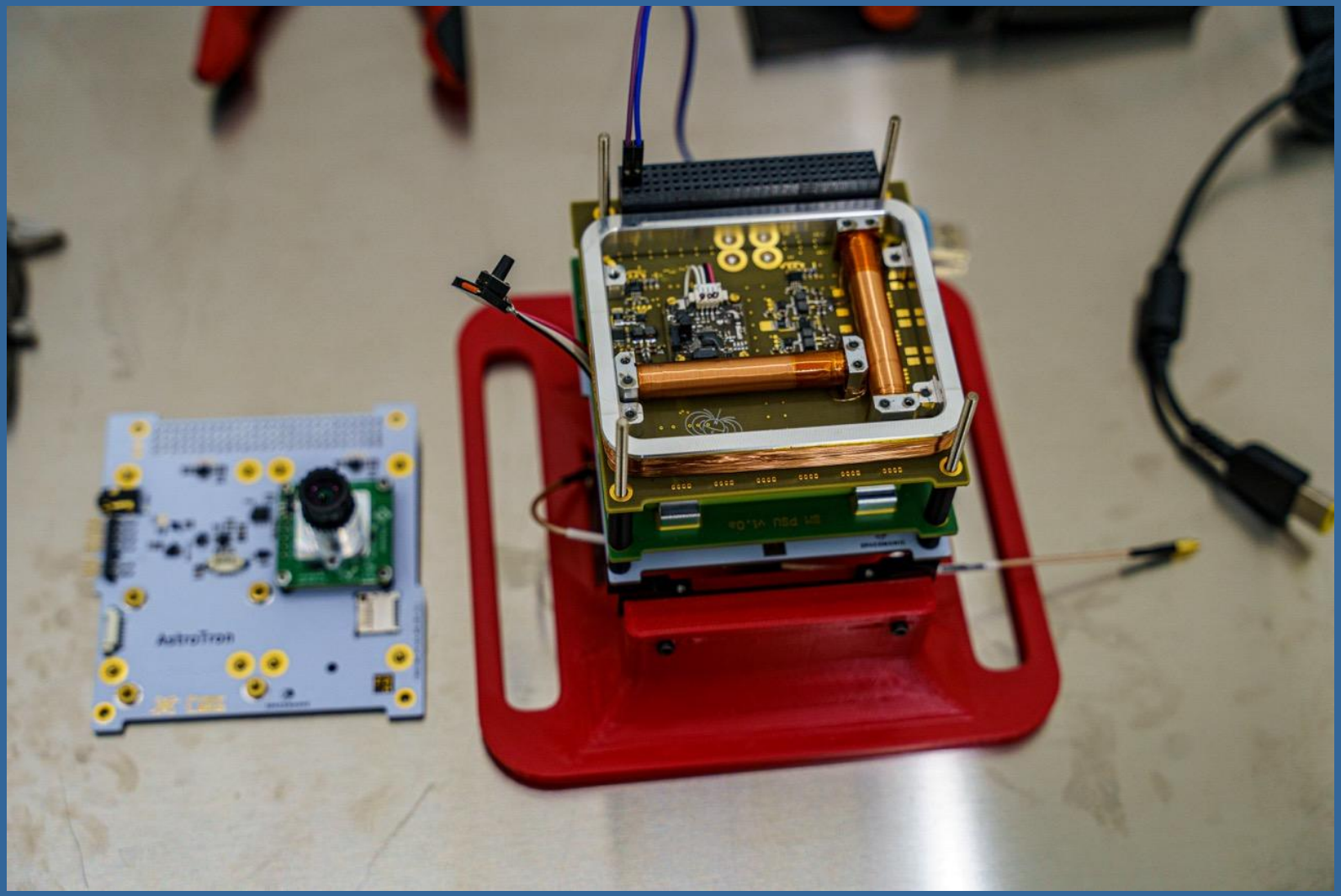
Institut za fiziku

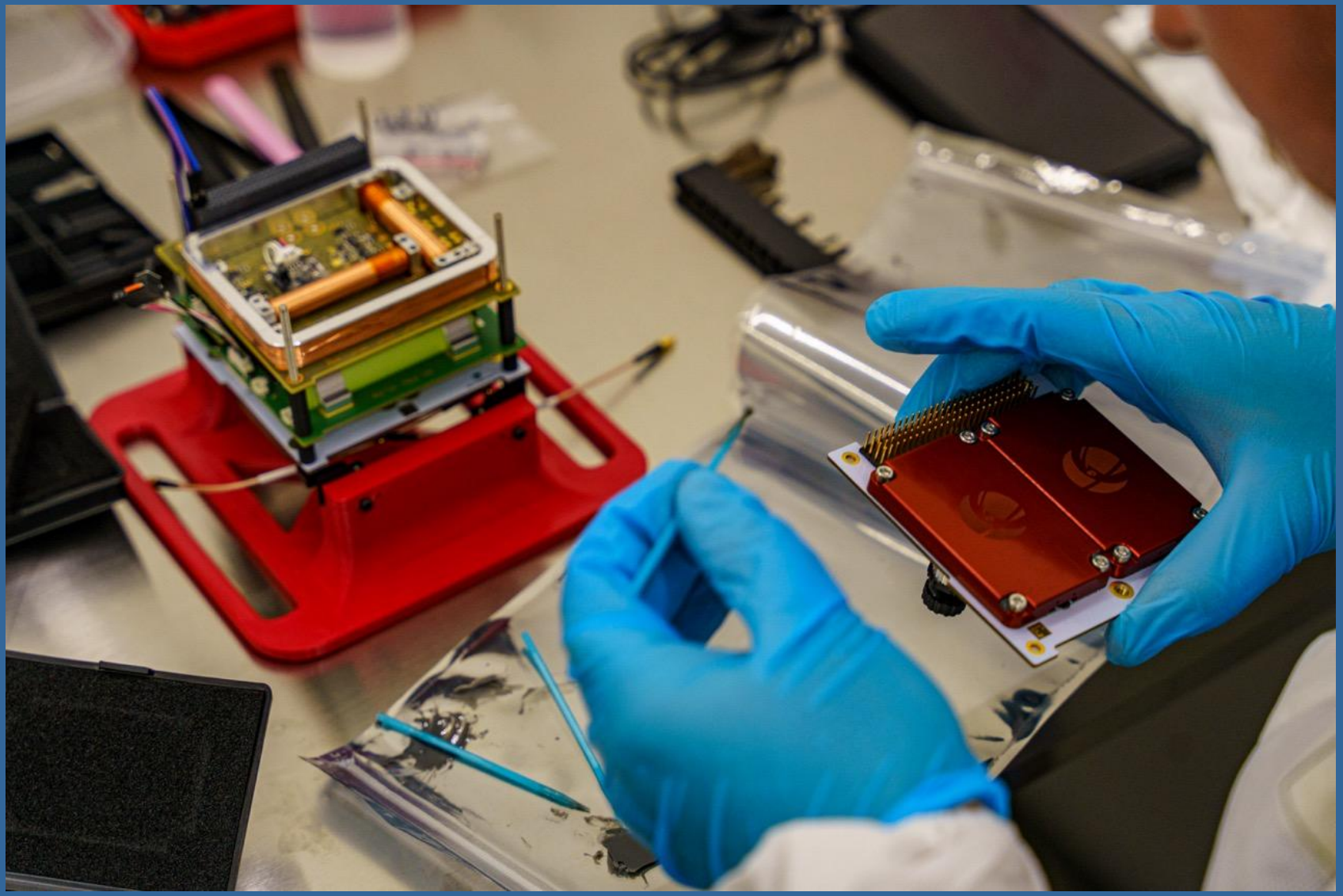

CRCUBE

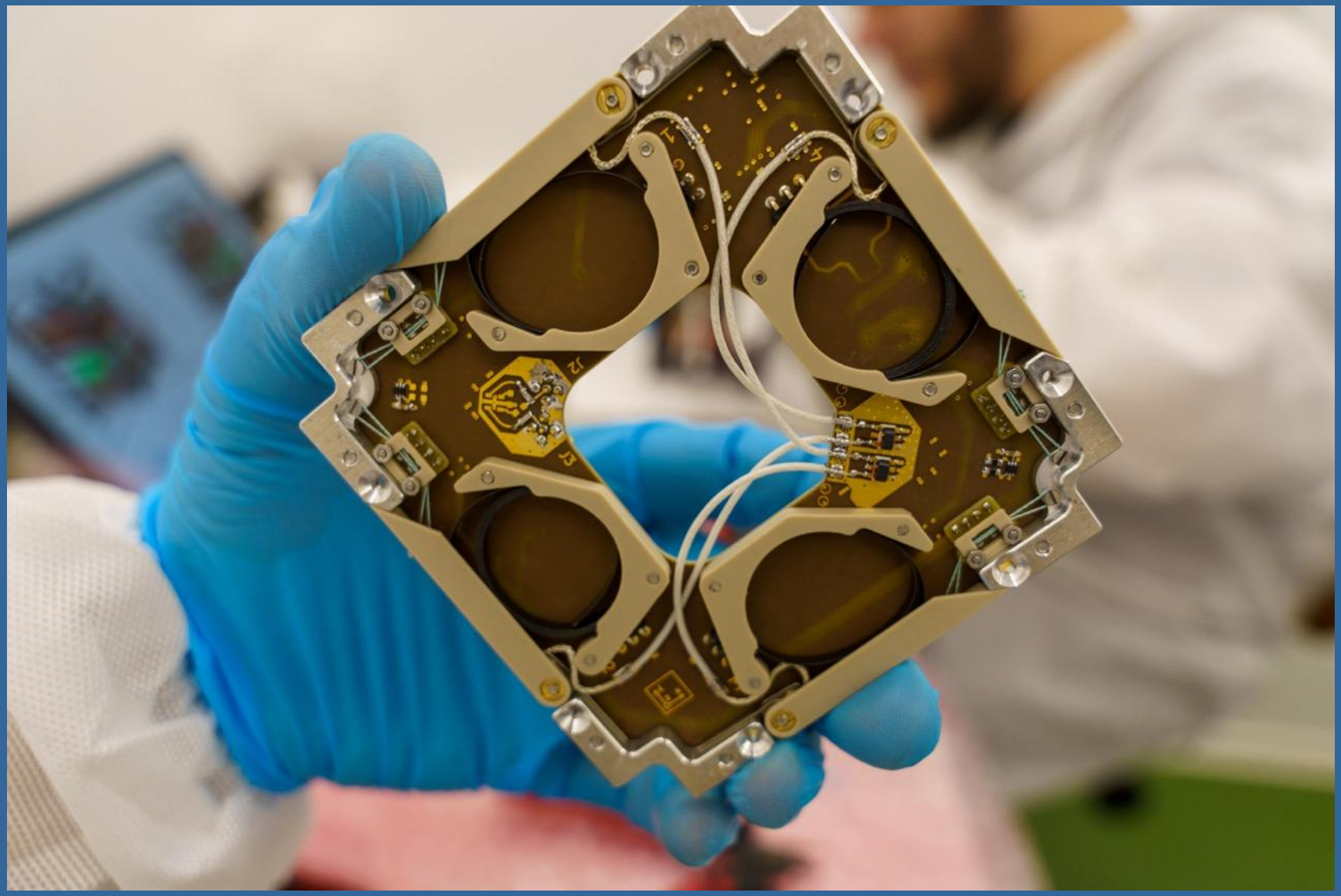

CR CUBE
Supported by
Notch

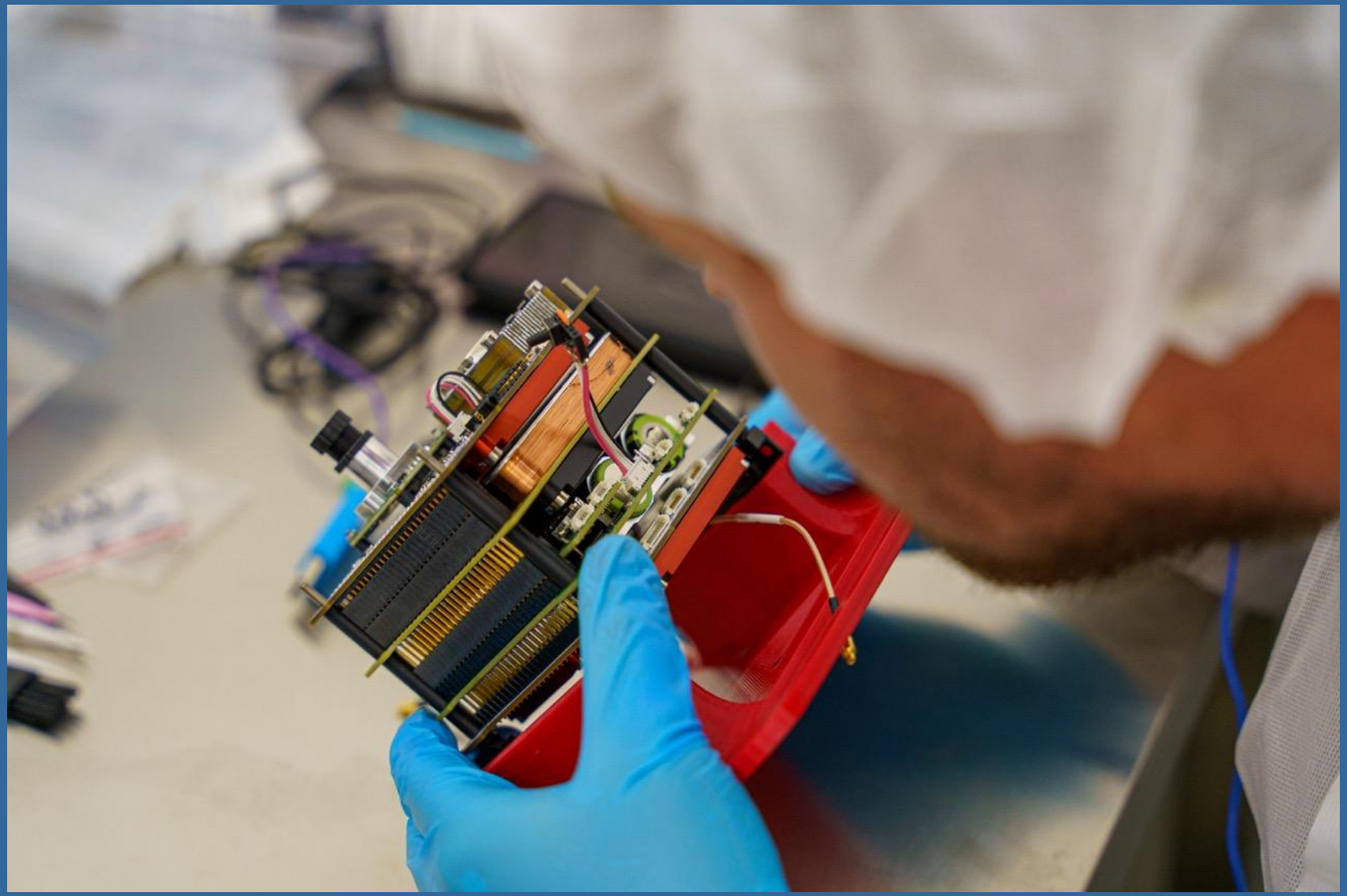

Društvo EVO
Exevio
HAKOM
KERIT
Multinorm
REARM
Smartell
Tailored Development
Boris Procik
Daniela Jović & Spacemanic
AstroTron
Inside
taoglas
CGGP.25.4.A.02
Ante Medić
Ante Radonić
Bernard Ivezić
Danko Kočiš
Darko Lukša
Davor Sevšek
Dorotea Zaller
Eugen Dobrić
Filip Kisić
Grigor Danko
Ivana Ljevak
Jakov Čudina
Josip Vinković
Karlo Klaić
Laura Busak
Lucija Friščić
Luka Korov
Luka Orsag
Matija Makoter
Romano Marić
Tanja Prlenda Skenderija
Tomislav Keser
Vedran Slukić
Vedrana Radetić
Višnja Željeznjak
Željka Ulig

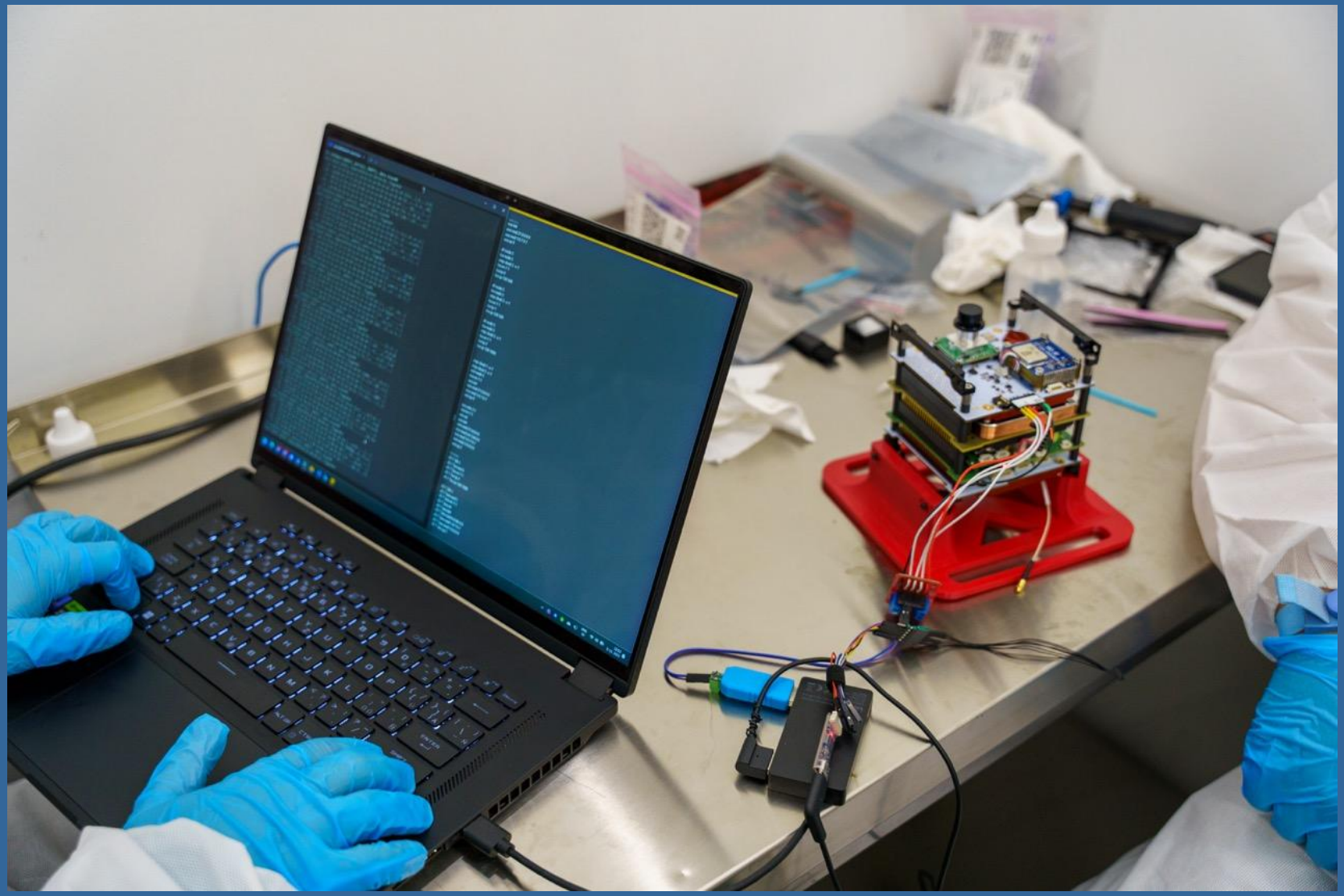


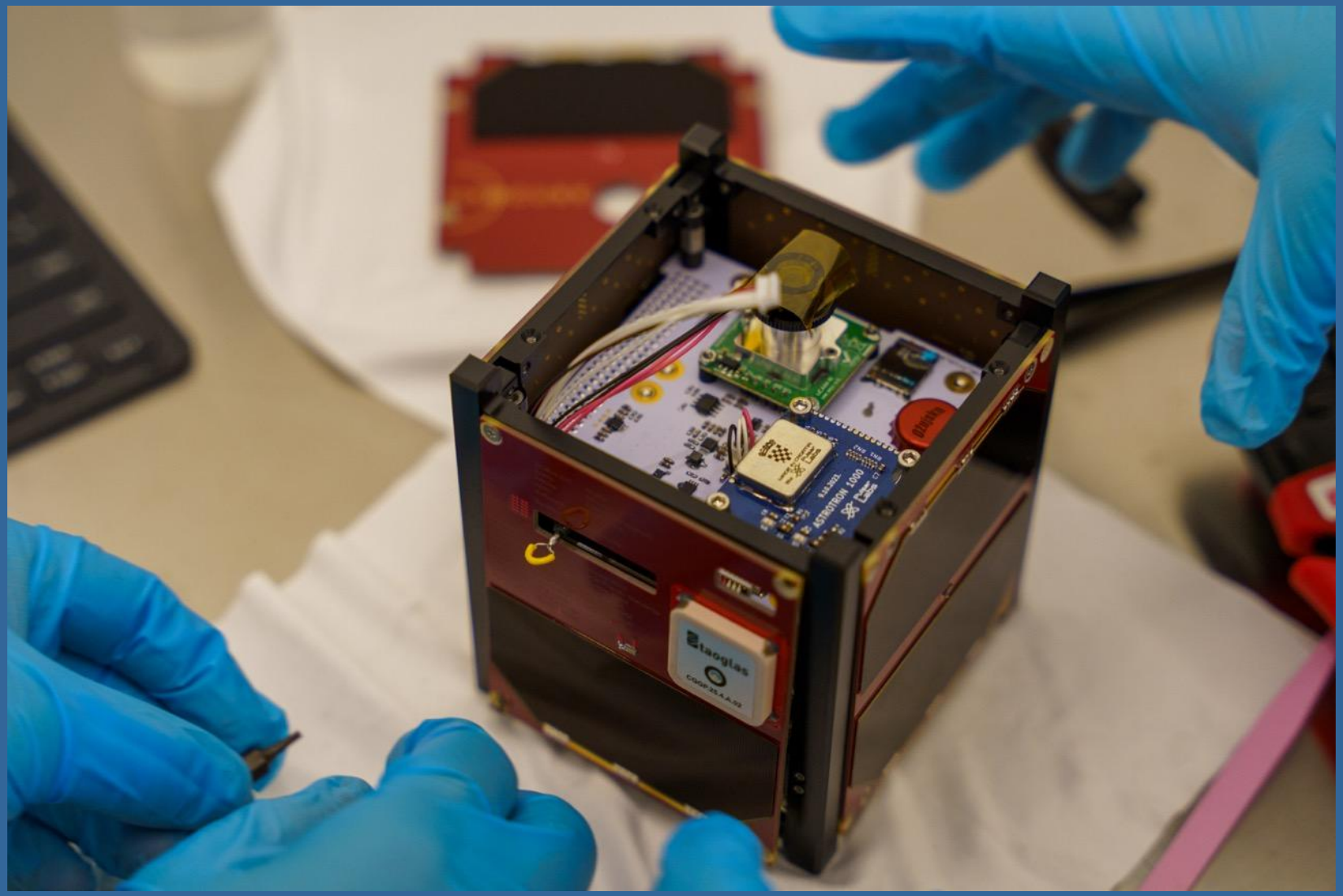

AstroTron

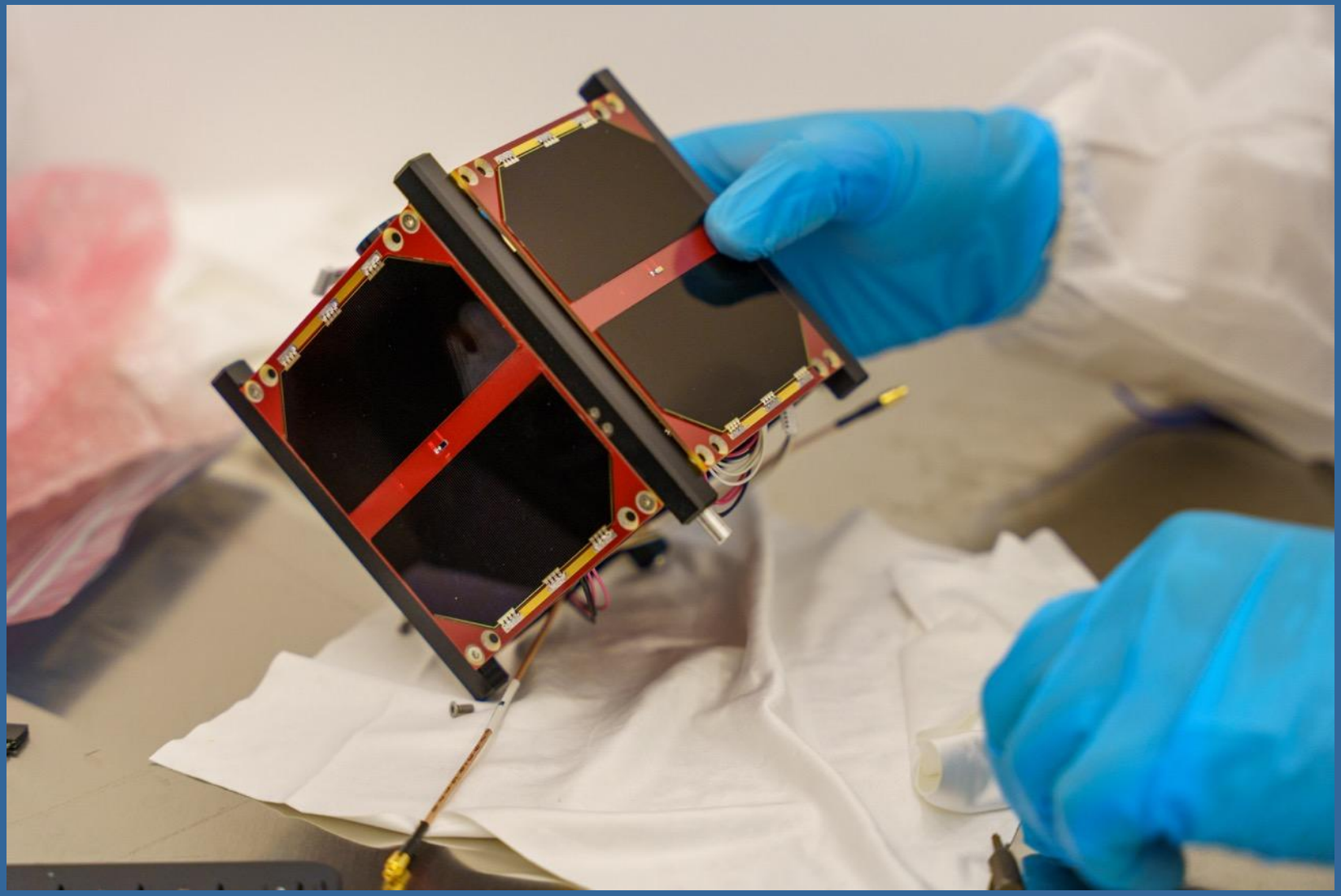


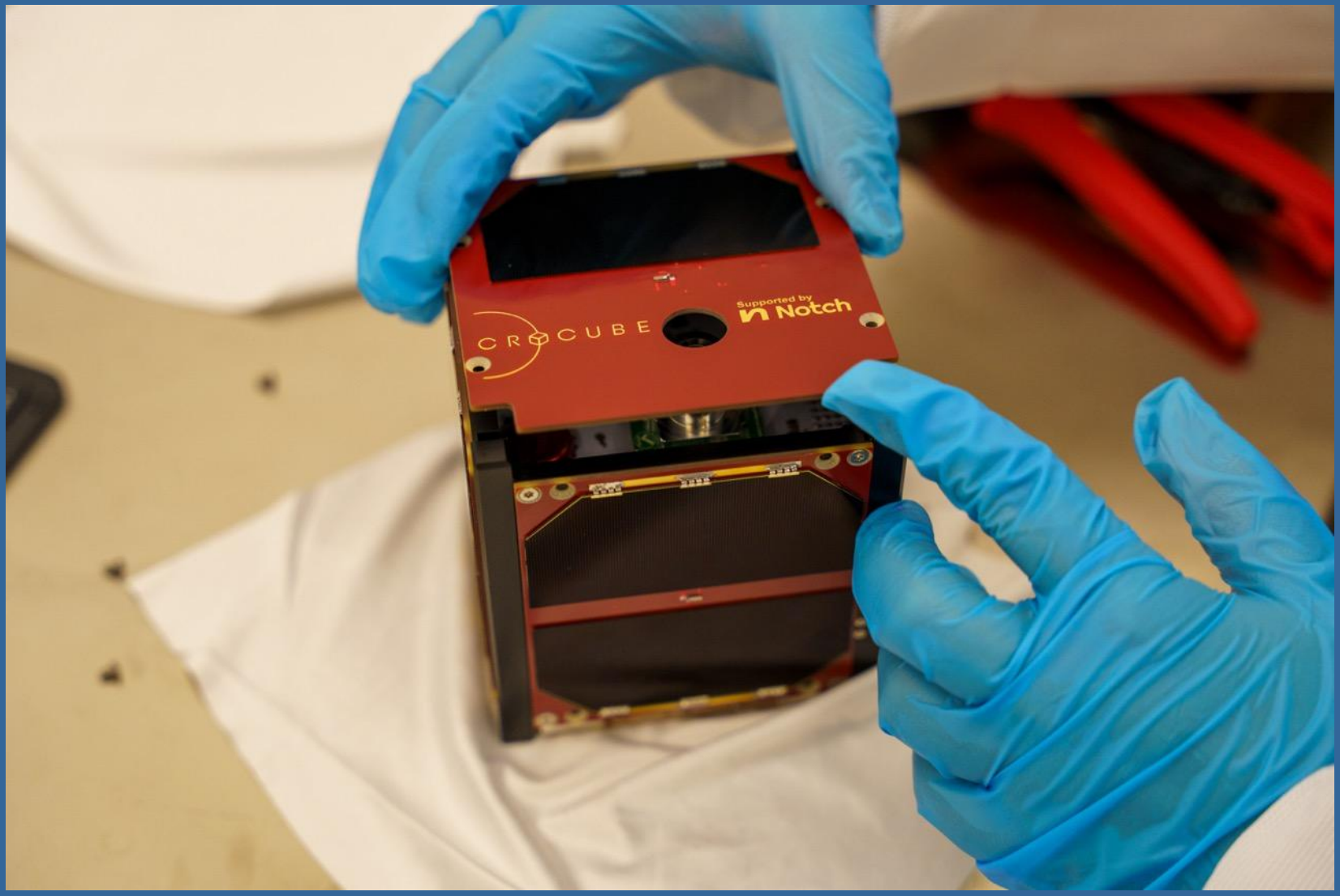






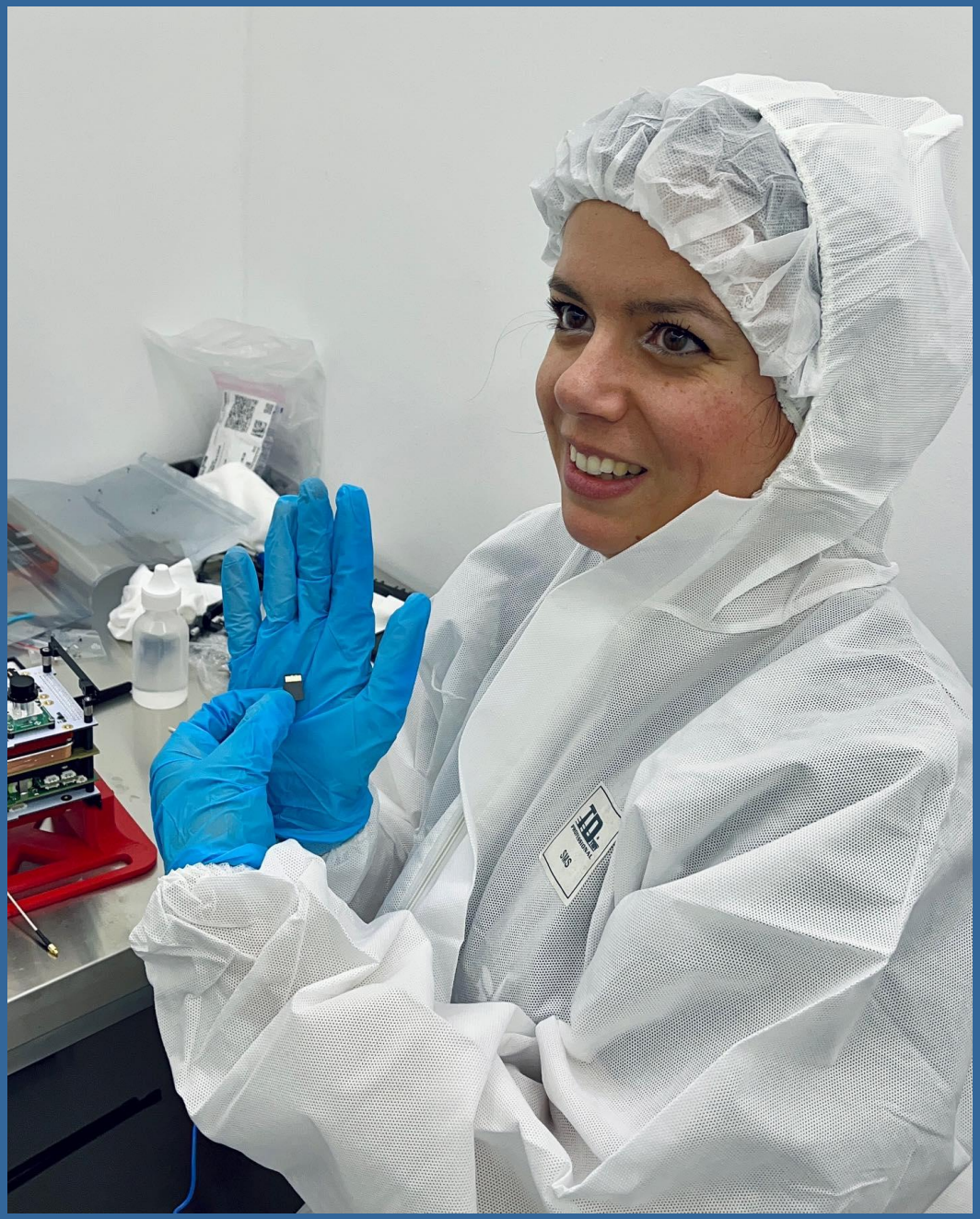

Taoglas

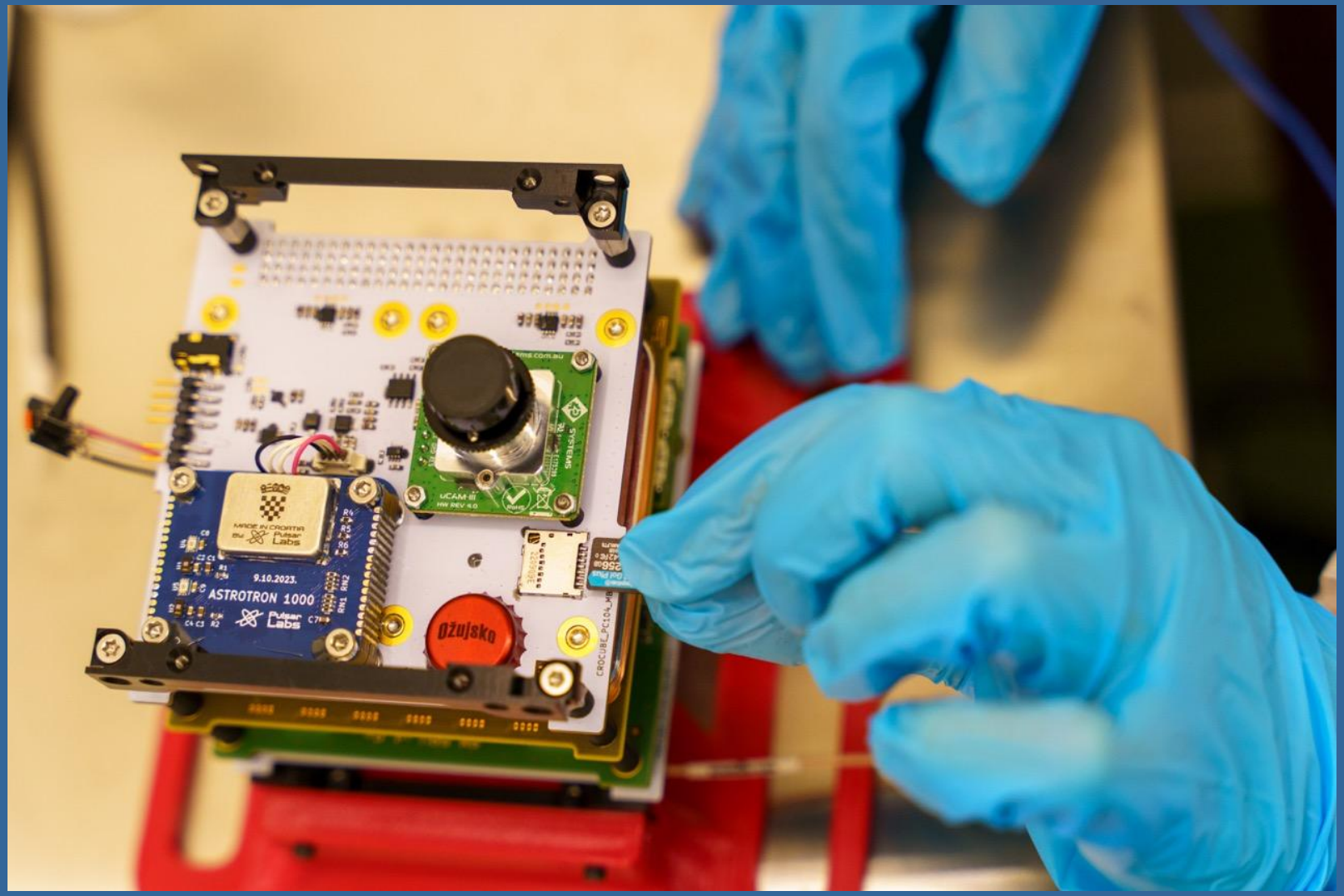



CR CUBE
Supported by
Notch


CR CUBE


SETINO
GRCUBE
Powered by
Nanoracks
Notch




ASTROTRON 1000
9.10.2023.
Pulsar Labs
Ožujsko

UMJETNIČKI RADOVI NA microSD KARTICI

UČENICI OSNOVNIH ŠKOLA

MLADEN SPEVAN

LARA KOMADINA

MUZIKA.HR VIJESTI RECENZIJE IZVJEŠTAJI KALENDAR

Singlovi

Prva hrvatska pjesma lansirana u svemir bit će “Svemir ima novi pozivni” grupe Chui

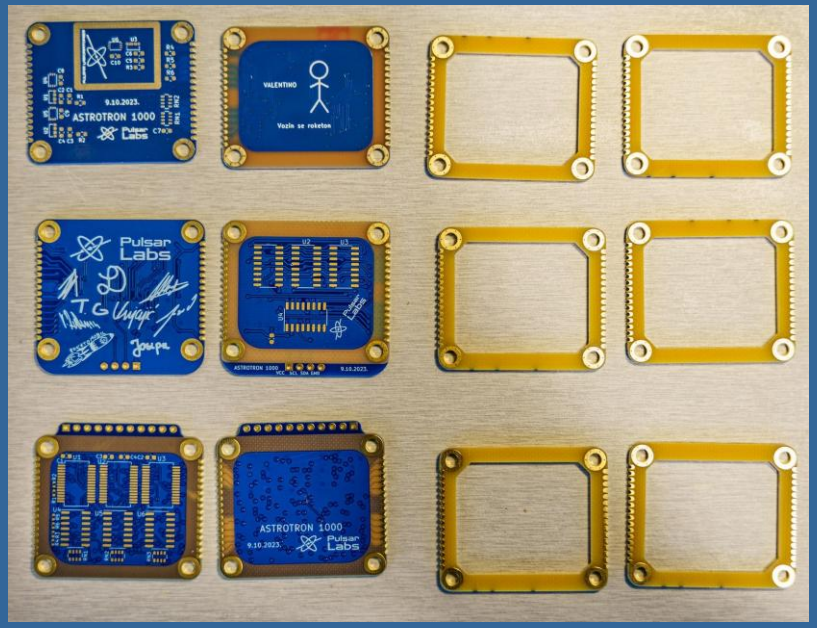
Lucija Očko - 28. velj 24.

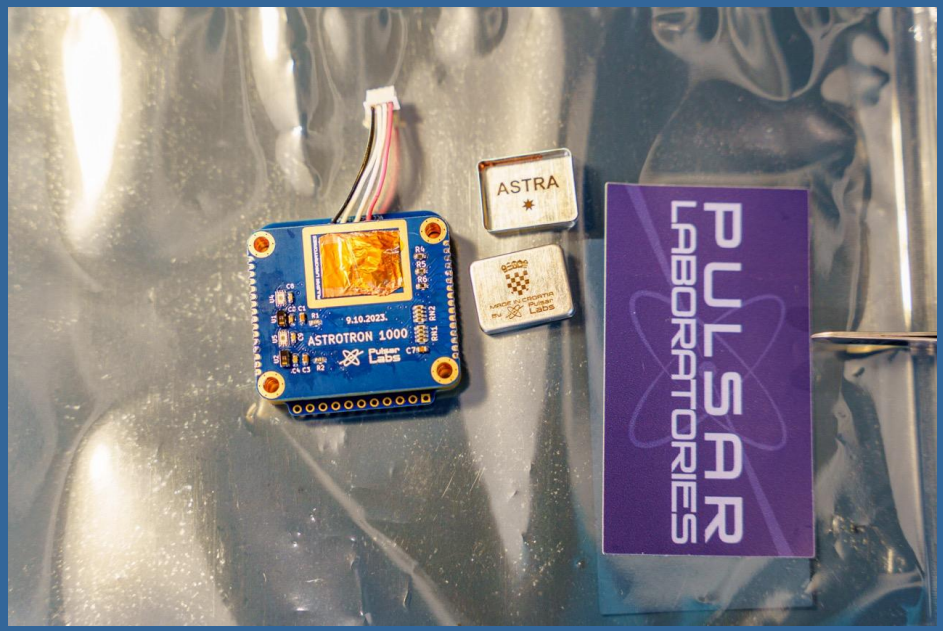
Eksperimentalni jazz bend Chui objavili su novi singl, “Svemir ima novi pozivni” koji je skladan kao himna prvog hrvatskog satelita koji će biti lansiran u svemir.

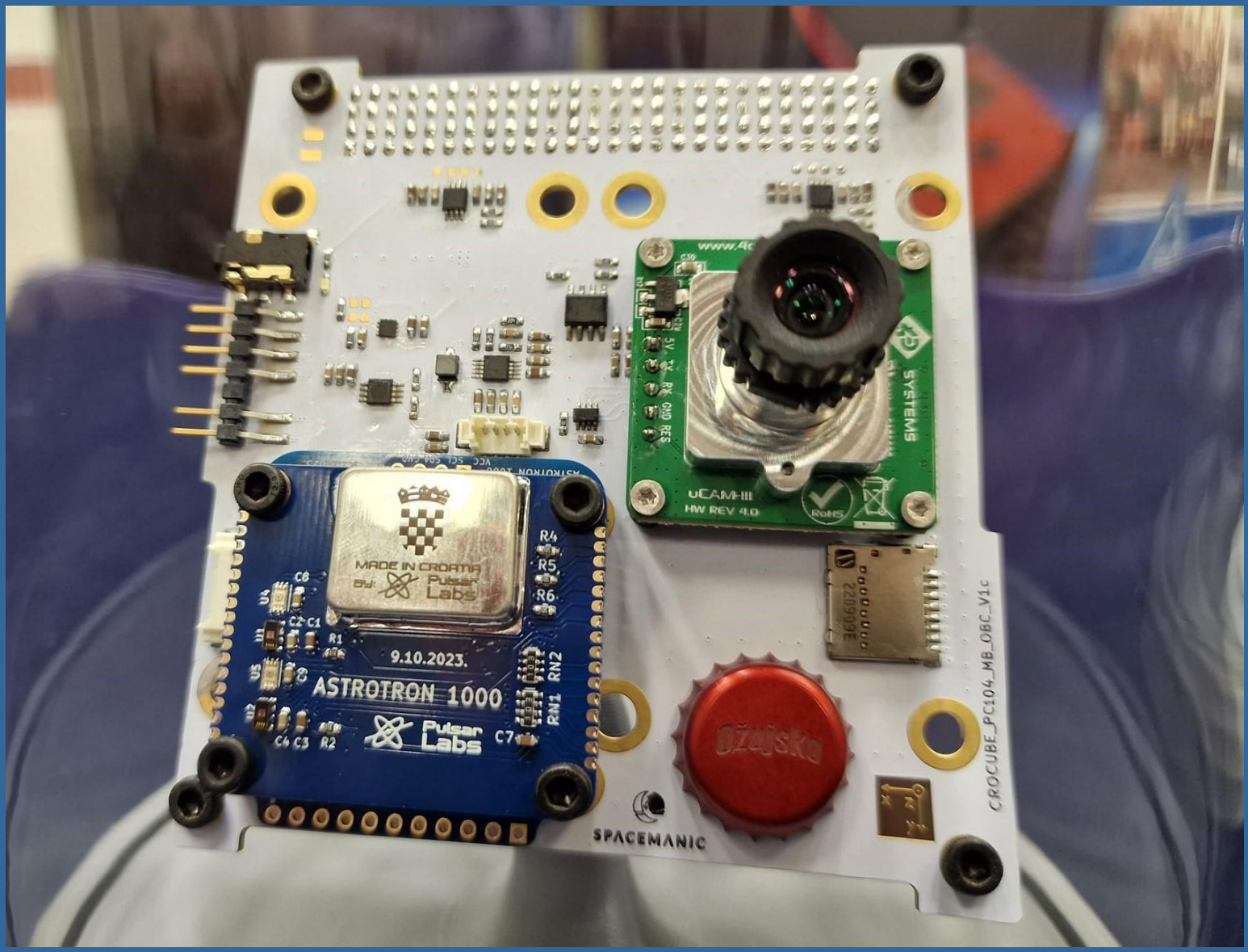
https://www.youtube.com/watch?v=pFn7m2j41kQ

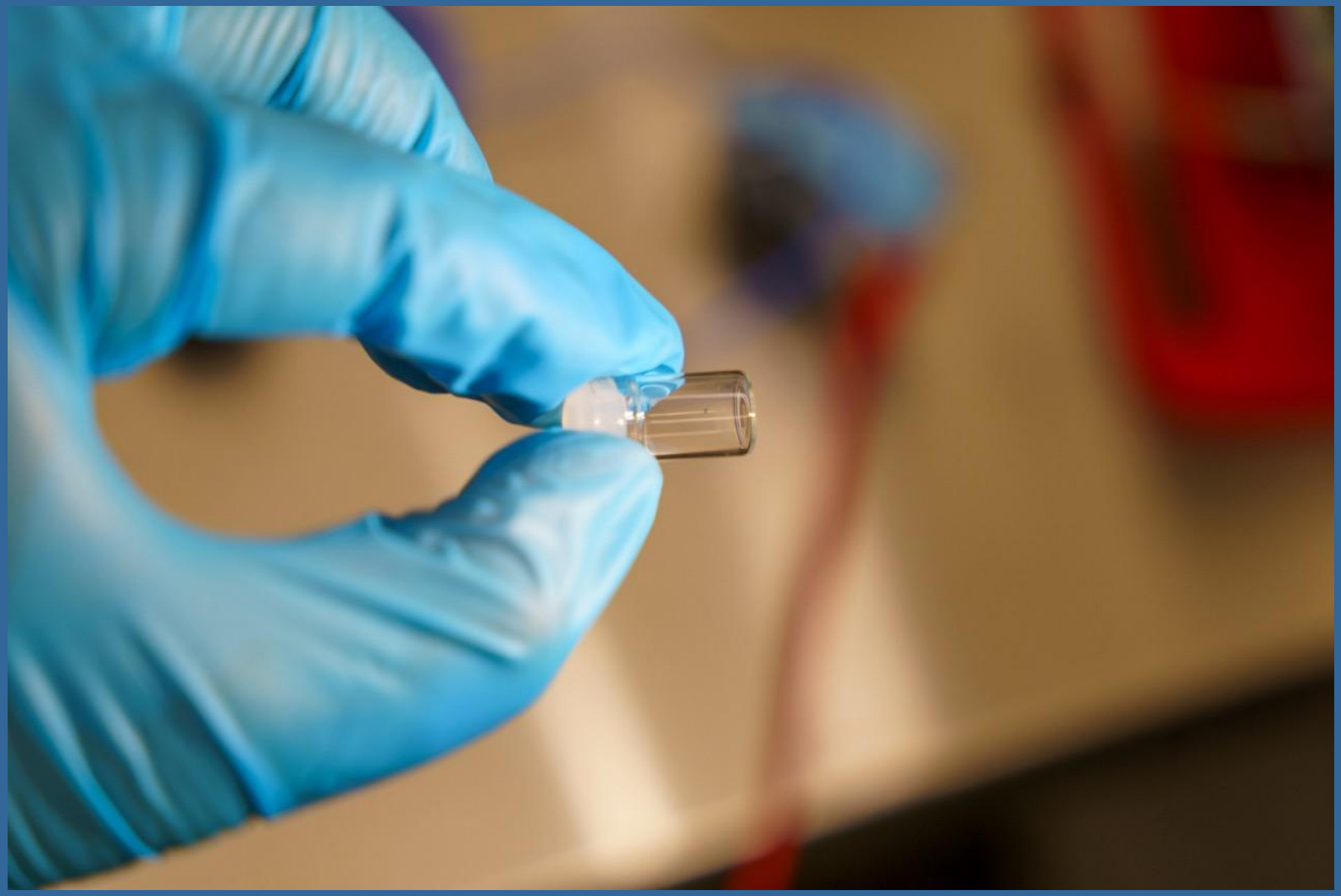
Pulsar Labs


Pulsar Labs
AstroTron 1000
CROCUBE

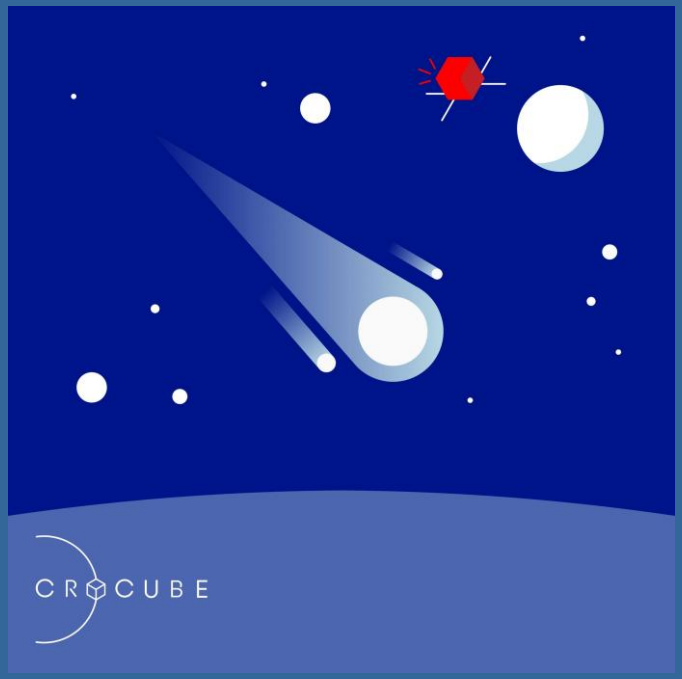

ASTROTRON 1000
9.10.2023.
Pulsar Labs
VALENTINO
Vozio se roketon

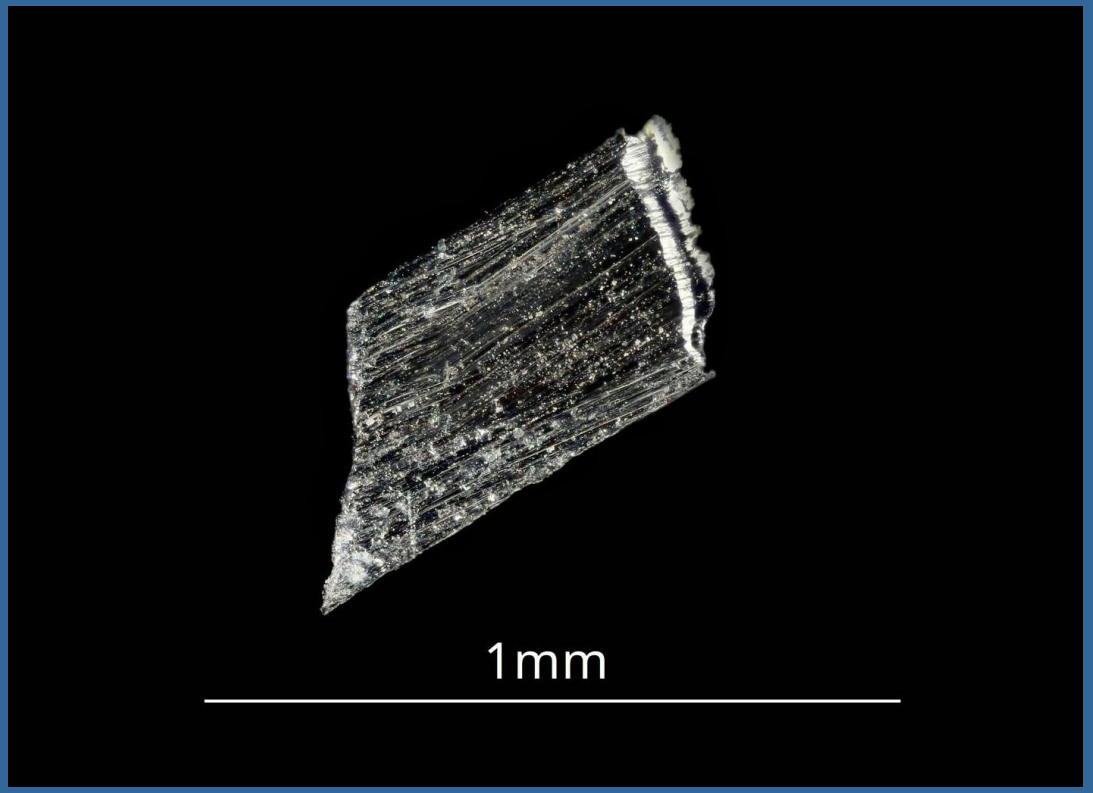

ASTRA
PULSAR LABORATORIES
ASTROTRON 1000
9.10.2023.
Pulsar Labs


MADE IN CROATIA
by: Pulsar Labs
9.10.2023.
ASTROTRON 1000
Pulsar Labs
uCAM-III
HW REV 4.0
SYSTEMS
SPACEMANIC
CROCUBE_PC104_MB_OBC_V1c



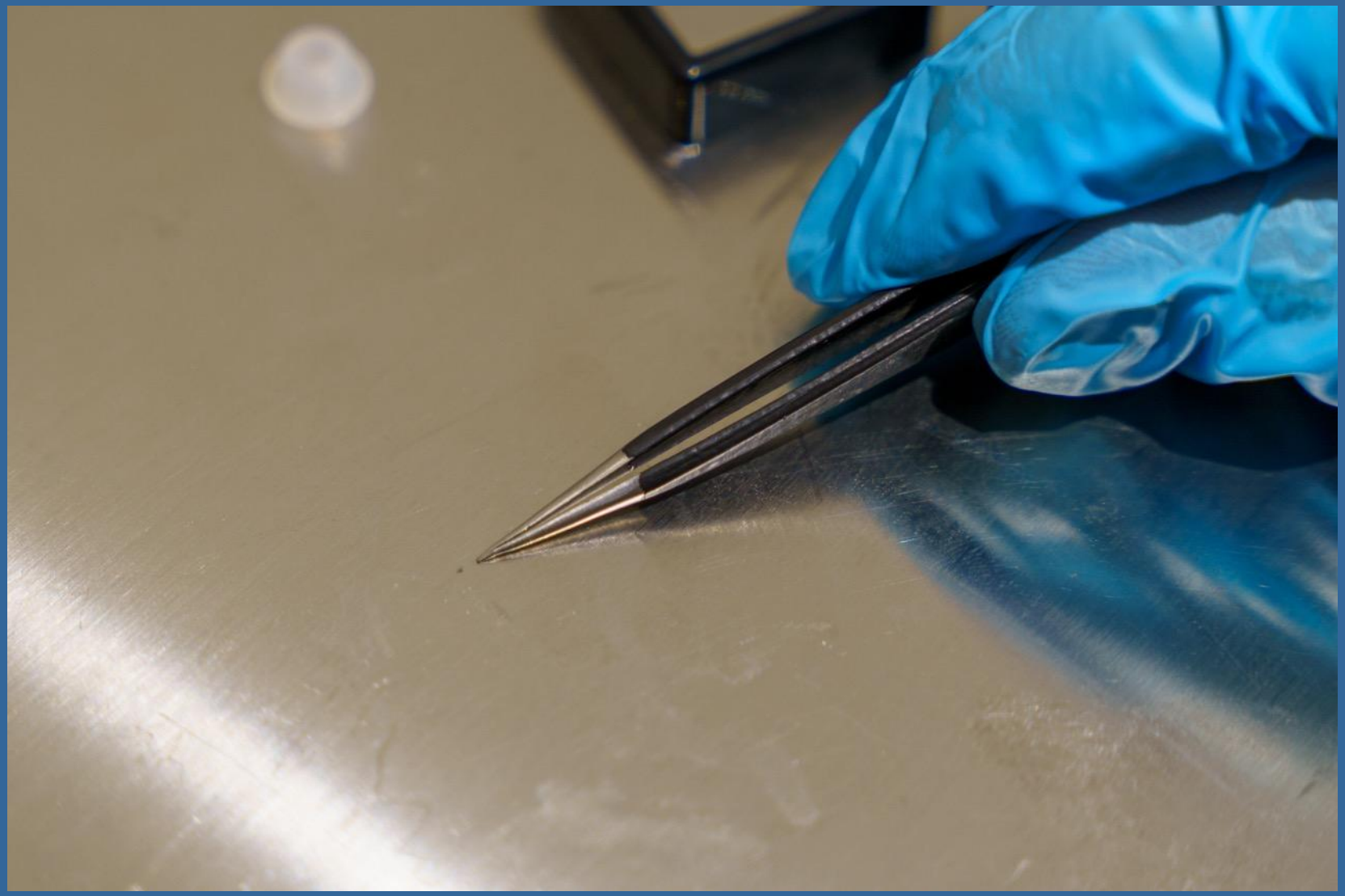
HRAŠĆINSKI METEORIT

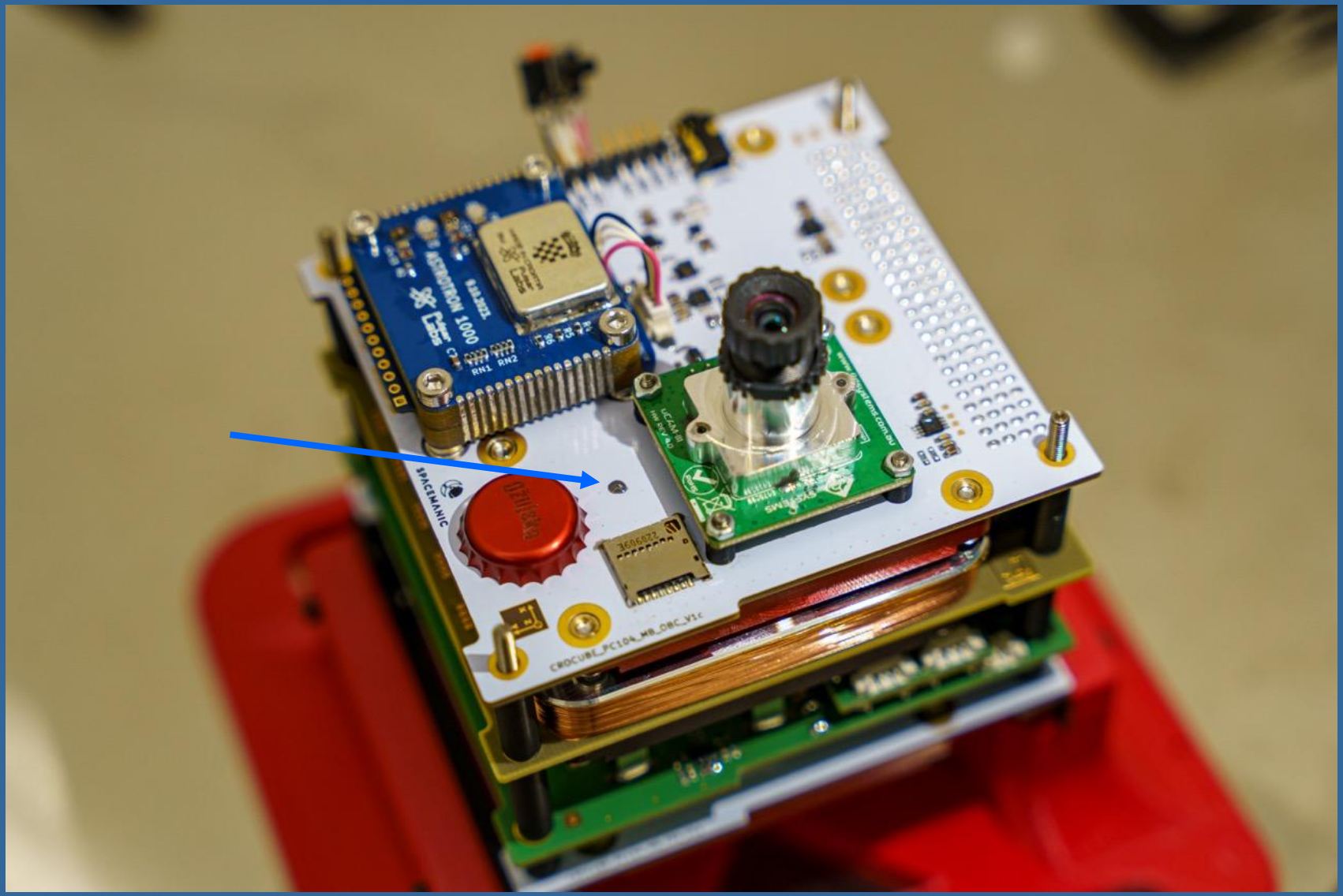




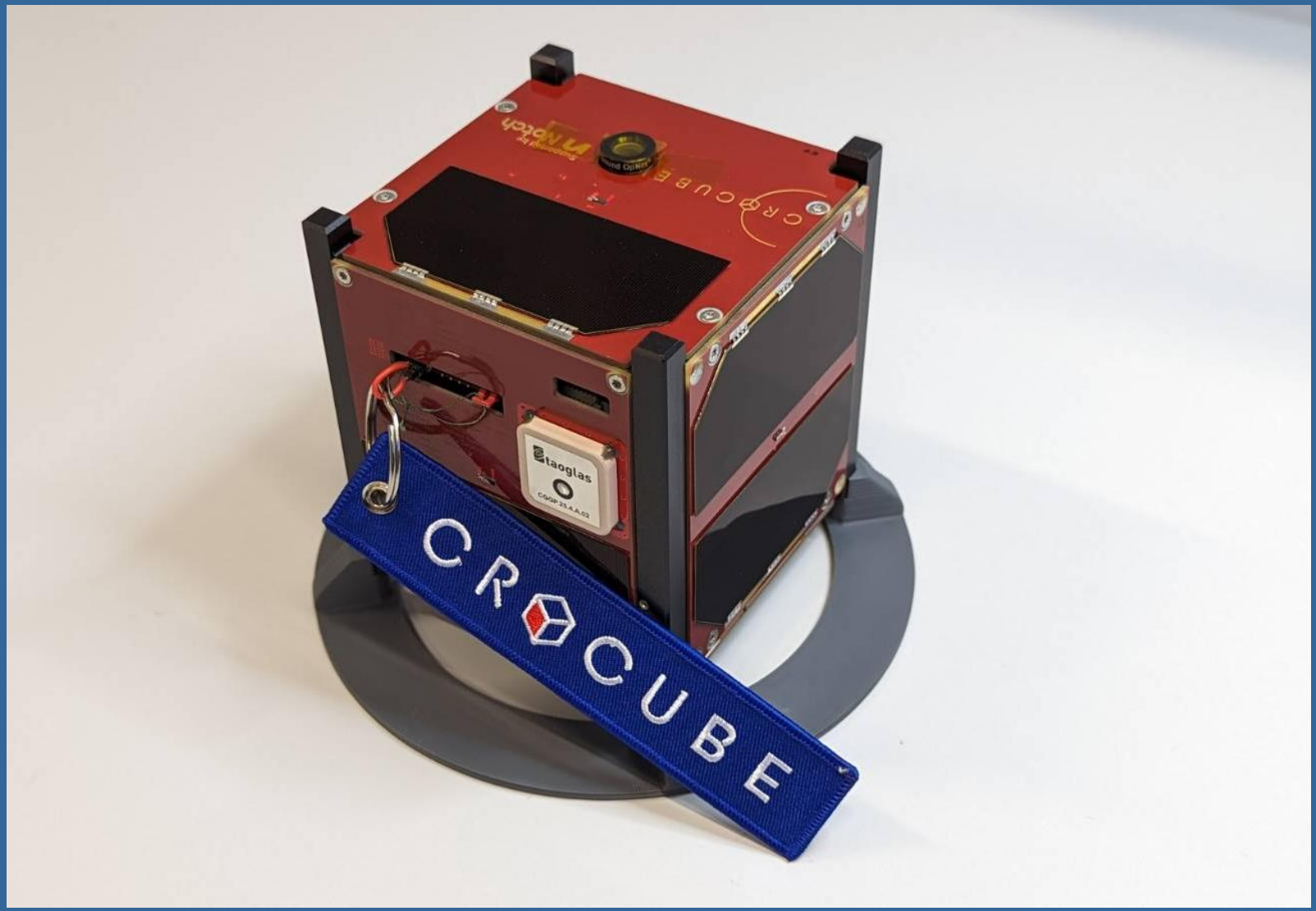
DAR PROFESORA DOMYANA SVILKOVICHA


HRASCHINA (IID)
Zagreb, Kroatien
gefallen 26. Mai 1751




AEROTRON 1000
RN1 RN2
SPACEMANIC

IDEM U SVEMIR !!!



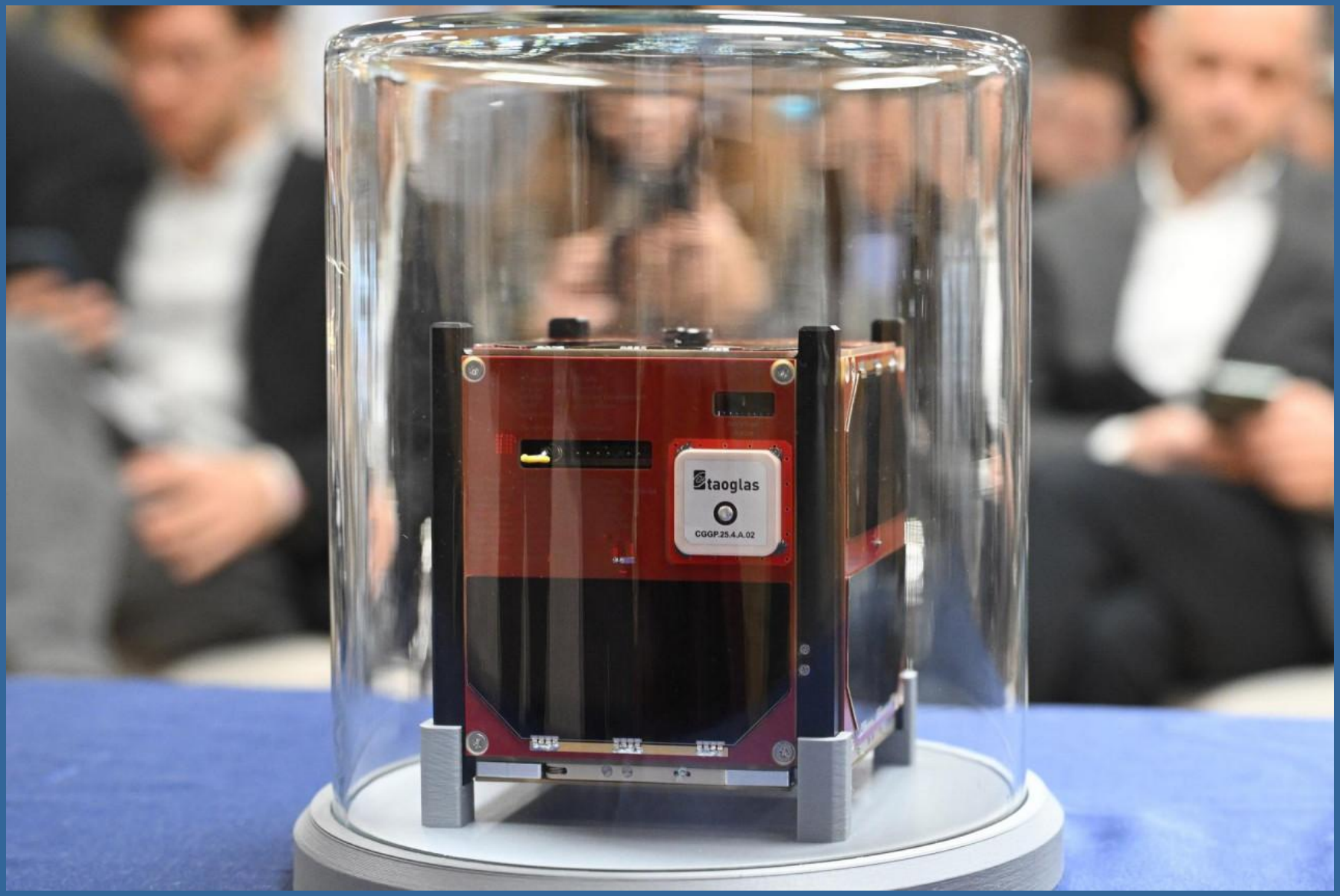
CroCube SATELIT KREĆE NA PUT

PREDSTAVLJANJE CroCube SATELITA ZICER, 10.11.2023.

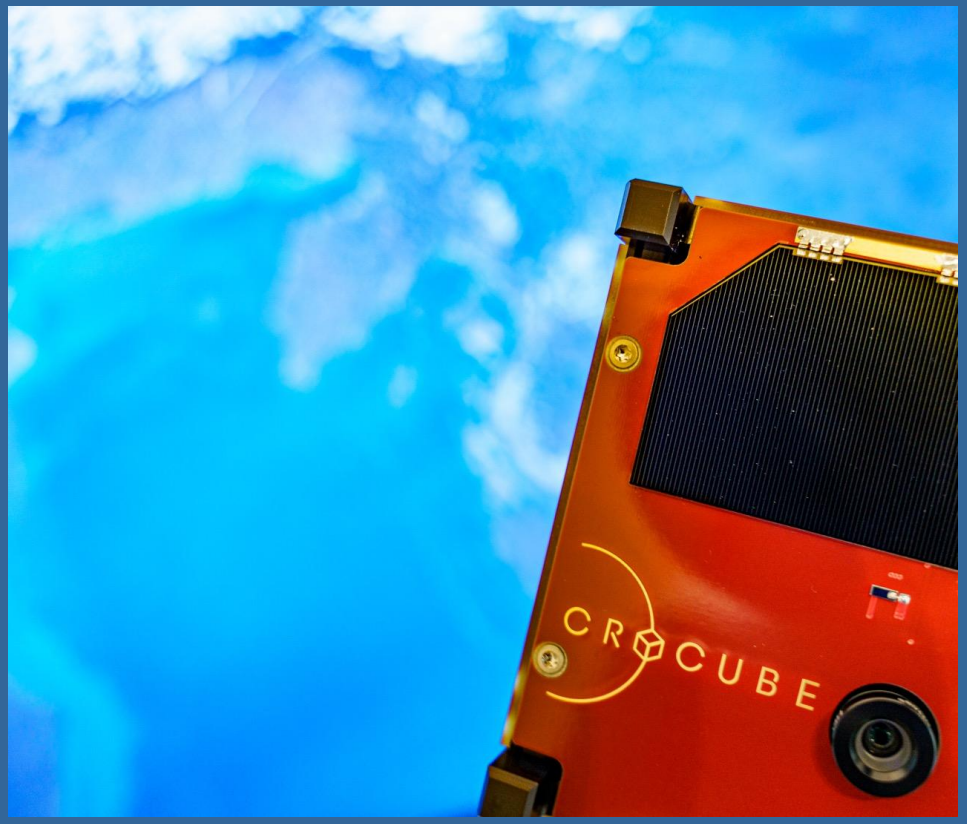

PREDSTAVLJANJE
CROCUBE


PREDSTAVLJANJE


PREDSTAVLJANJE

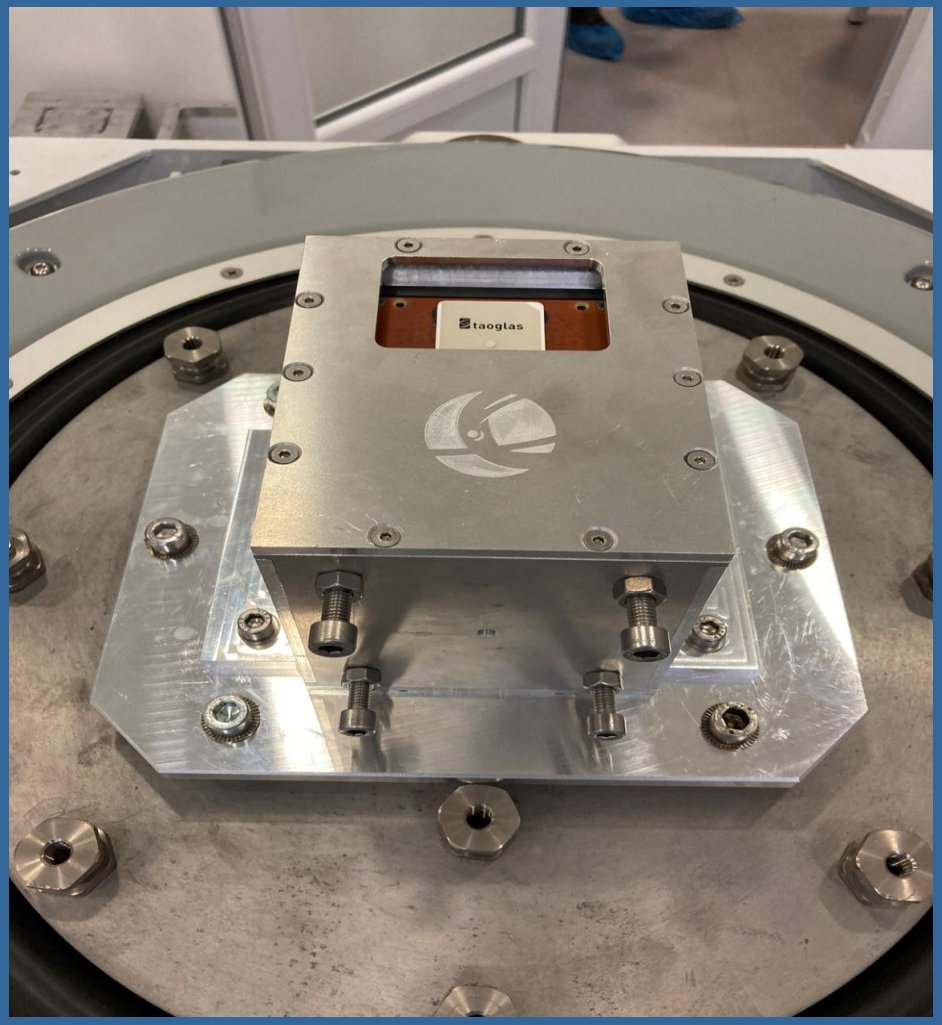

taoglas
CGGP.25.4.A.02

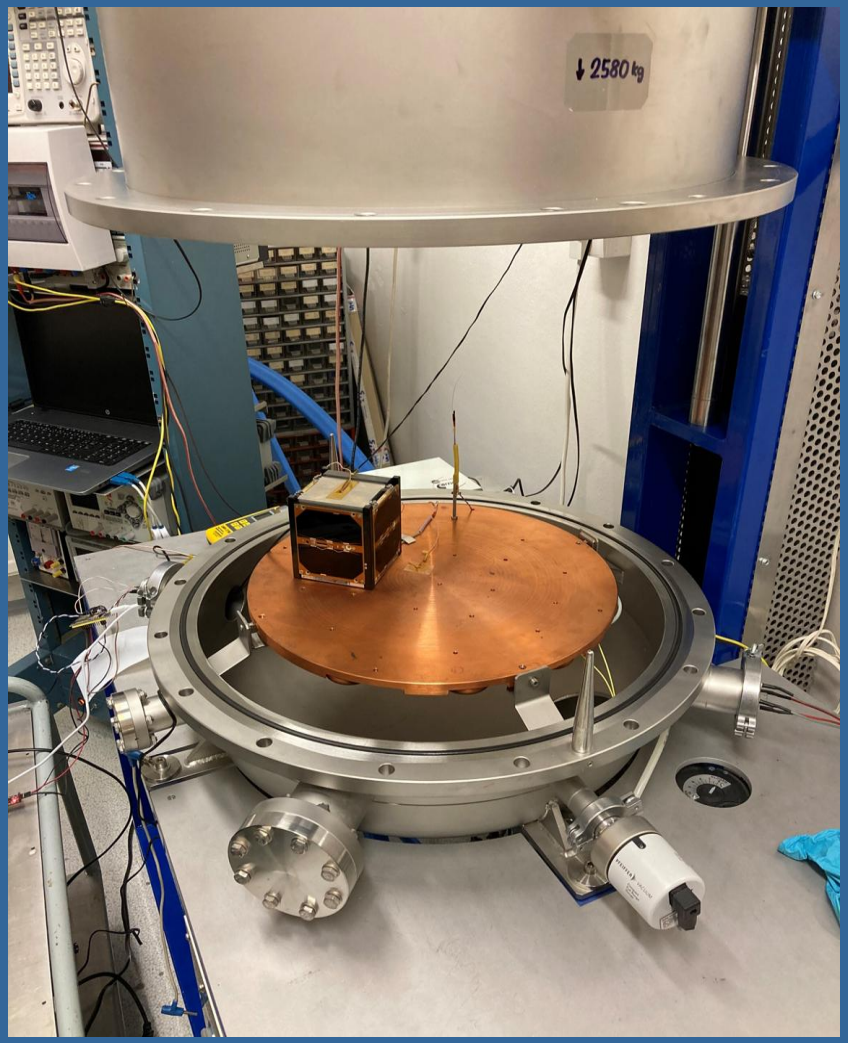
PA, PA, CroCube! SRETAN PUT!



PUT U STRATOSFERU 25.05.2024.
NUKLEUS AEROSPACE, MISIJA VENTUS-1

TESTIRANJE NA VIBRACIJE, VAKUUM, TEMPERATURU




2580 kg

TVRTKA INTEGRATOR

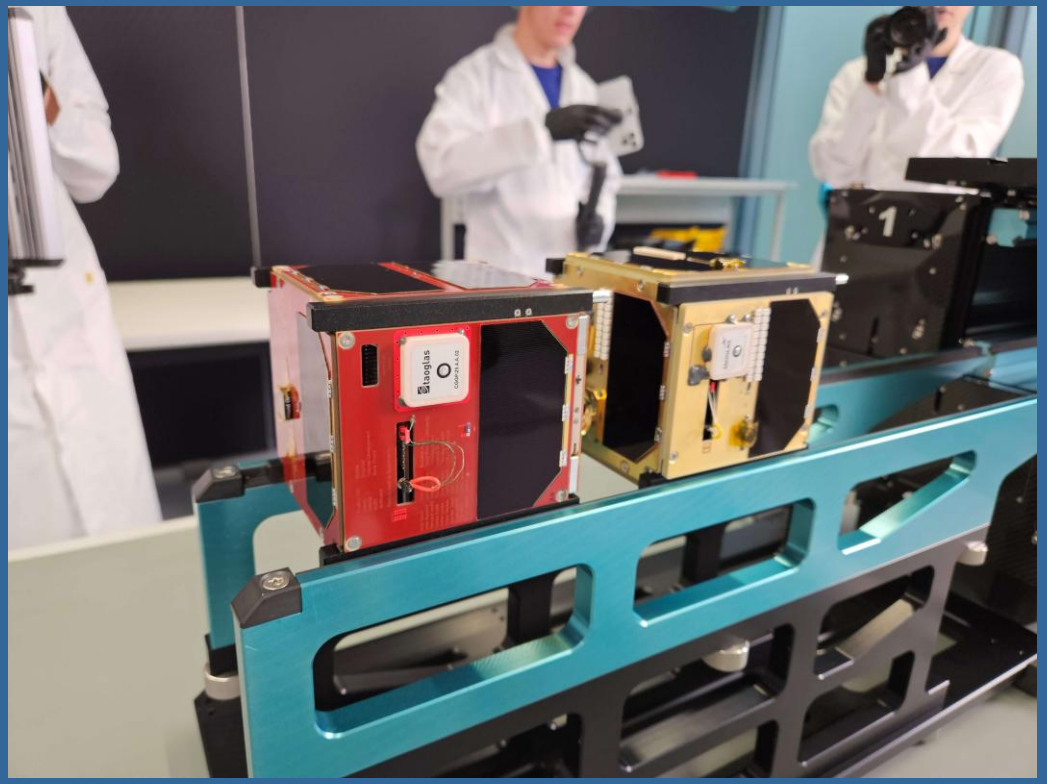
EXOLAUNCH


EXOLAUNCH
TRANSPORTER
EXO
LAUNCH


TRANSPORTER
EXOLAUNCH
TRANSPO


EXOLAUNCH


EXO
LAUNCH
SPACEMANIC
taoglas



EXO
LAUNCH
EXO
LAUNCH
EXO
LAUNCH
EXO
LAUNCH


EXO
LAUNCH
taoglas

IZ BERLINA U VANDENBERG

TIM TVRTKE EXOLAUNCH NA POSLU


EXOLAUNCH
EXOMISSION
IN PROGRESS
EXOLAUNCH.COM
EXOMISSION
IN PROGRESS
EXOLAUNCH.COM
EXO
LAUNCH


EXO LAUNCH
EXO LAUNCH
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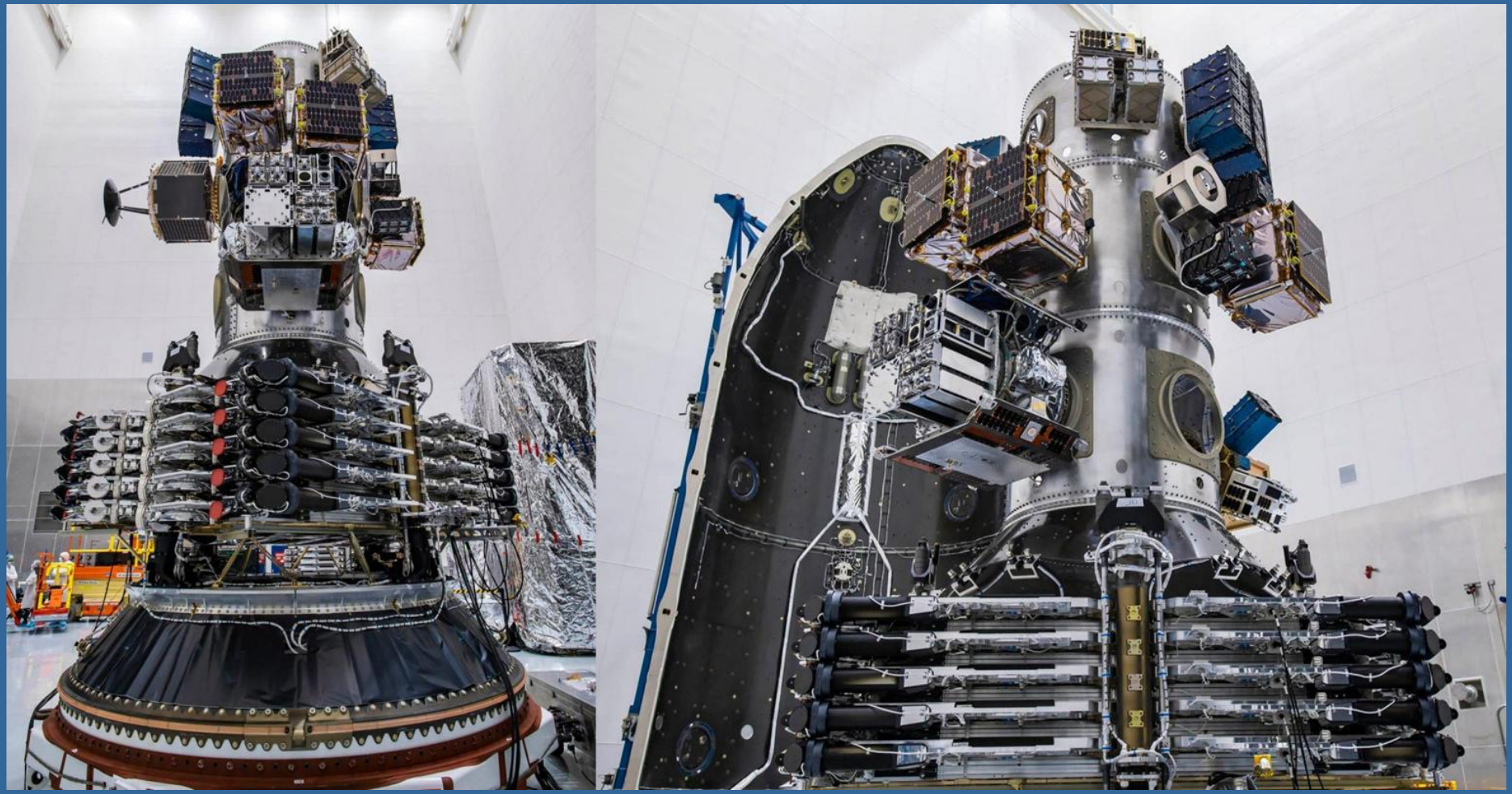
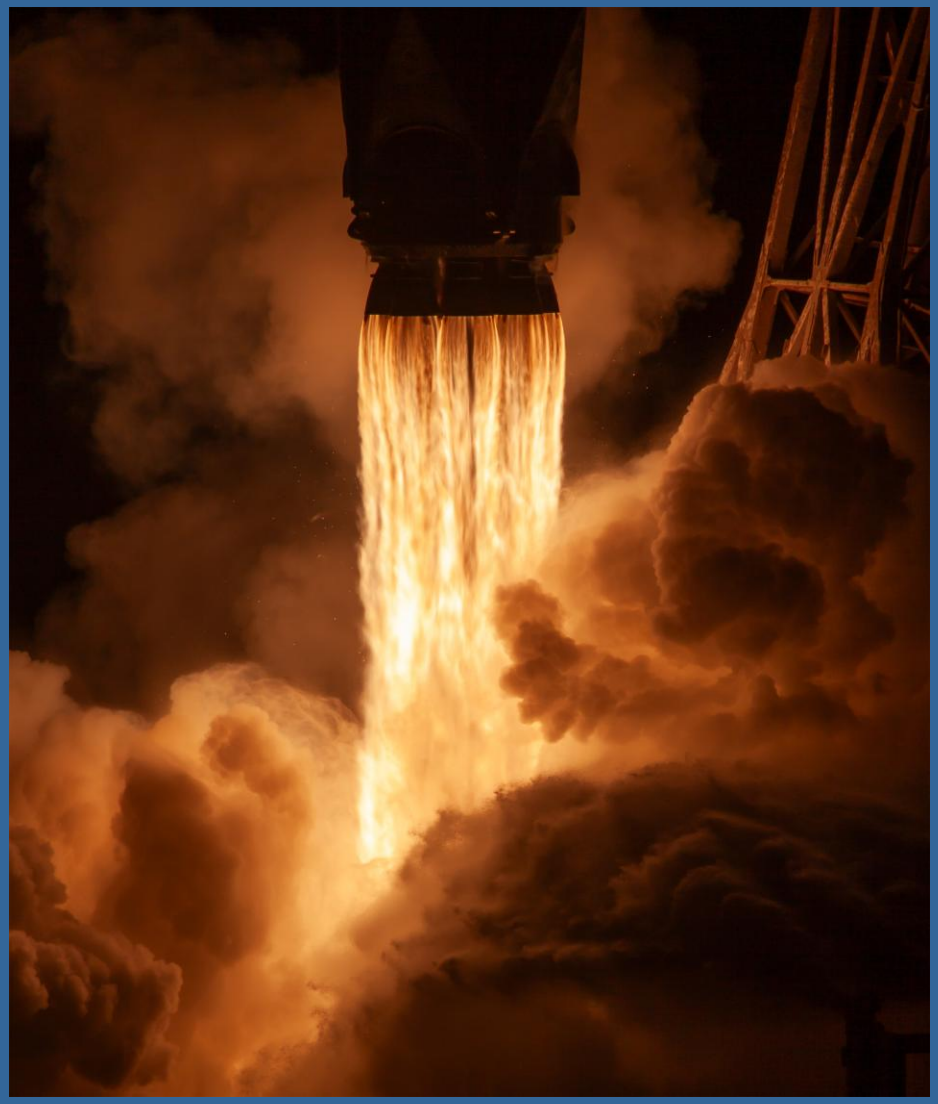


TEHNIČKI MUZEJ NIKOLA TESLA 21.12.2024.

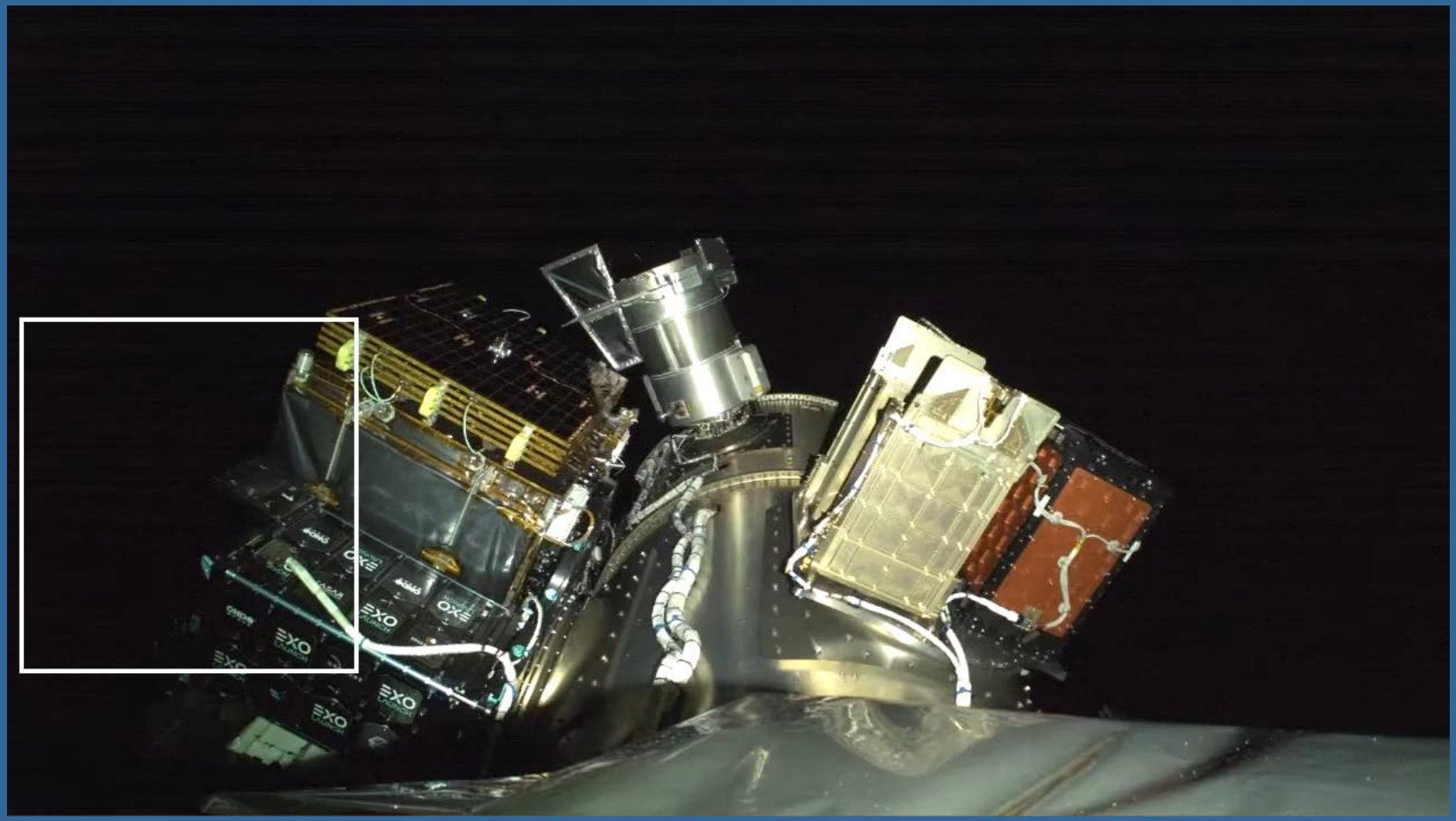
SpaceX, FALCON 9
BANDWAGON-2
VANDENBERG SFB, CALIFORNIA, USA
21.12.2024. 12.34 CET



REDOSLJED AKTIVNOSTI

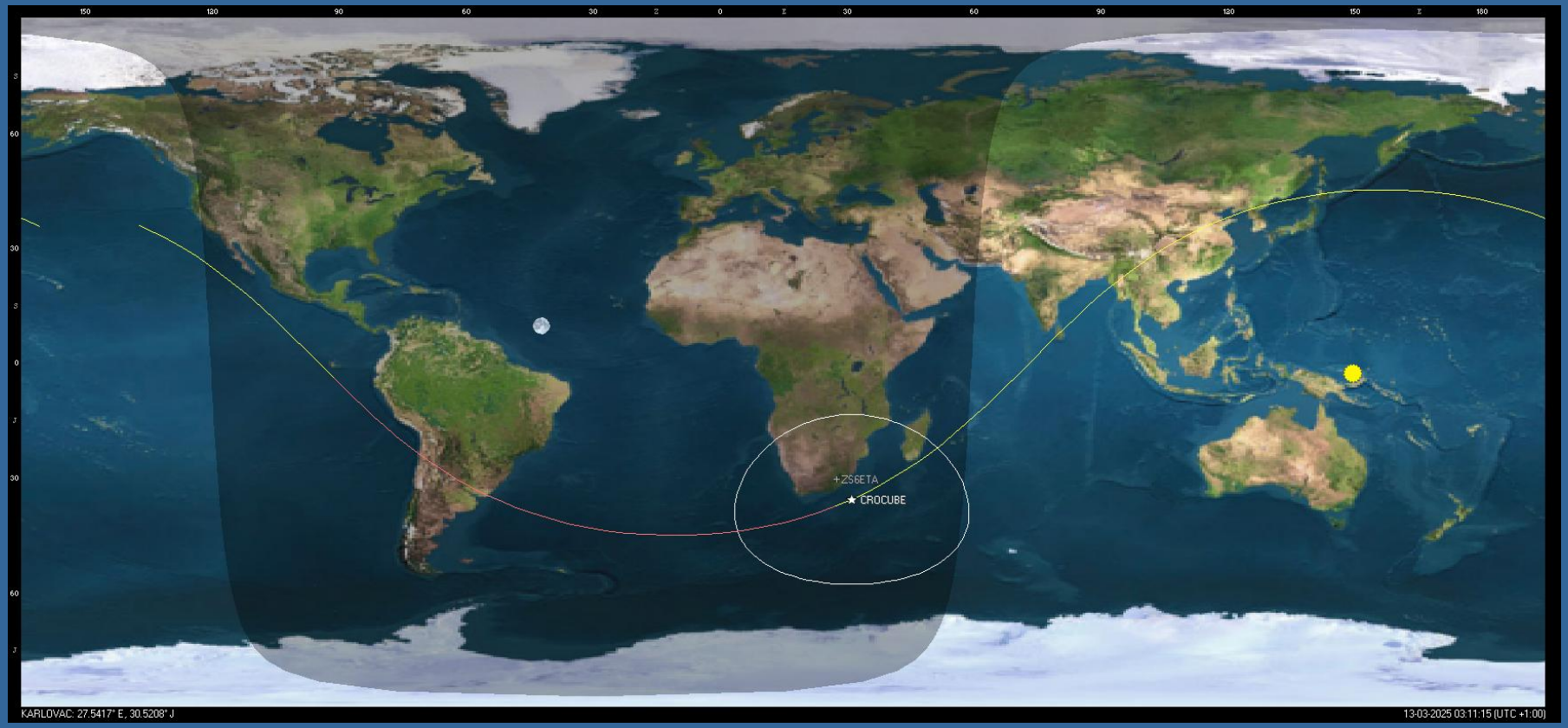
DOGAĐANJE	VRIJEME MISIJE (s)	VRIJEME MISIJE (h:m:s)	DATUM	VRIJEME
Lansiranje	0	0:00:00	21.12.2024.	12:34:24
Izbacivanje satelita	6066	1:41:06	21.12.2024.	14:15:30
Otvaranje 1. antene	7866	2:11:06	21.12.2024.	14:45:30
Otvaranje 2. antene	8046	2:14:06	21.12.2024.	14:48:30
Puna snaga odašiljača	8466	2:35:06	21.12.2024.	14:55:30
1. Prolaz iznad Hrvatske	27292	7:34:52	21.12.2024.	20:09:16
2. Prolaz iznad Hrvatske	33141	9:12:21	21.12.2024.	21:46:45
3. Prolaz iznad Hrvatske	39076	10:51:16	21.12.2024.	23:25:40
4. Prolaz iznad Hrvatske	45034	12:30:34	22.12.2024.	01:04:58
5. Prolaz iznad Hrvatske	51016	14:10:16	22.12.2024.	02:44:40

NA MJESTU IZBACIVANJA CroCube SATELITA



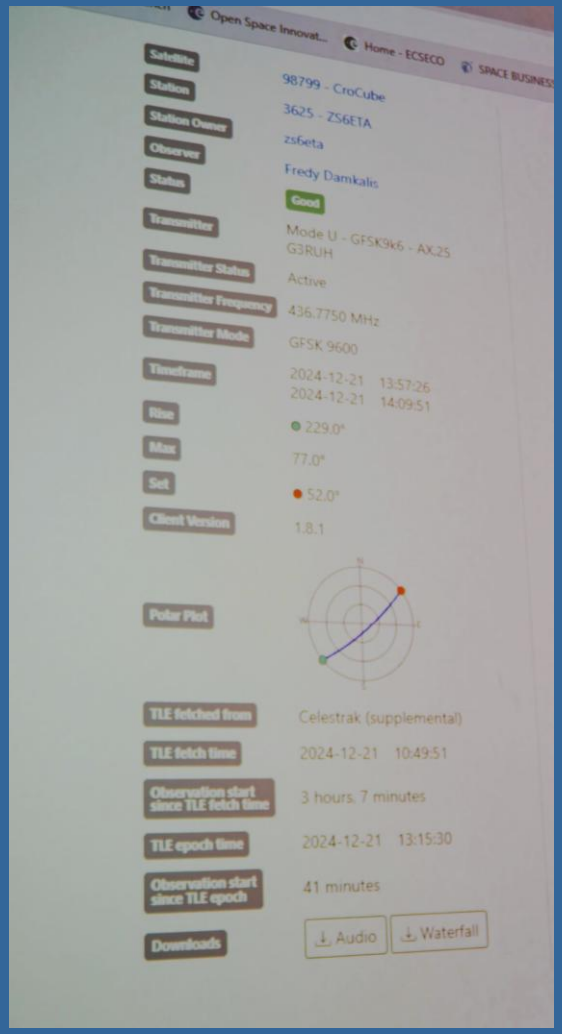

DOLAZAK NA 510 km
9A0CC
CRCUBE

PRVA MOGUĆNOST PRIJAMA SIGNALA

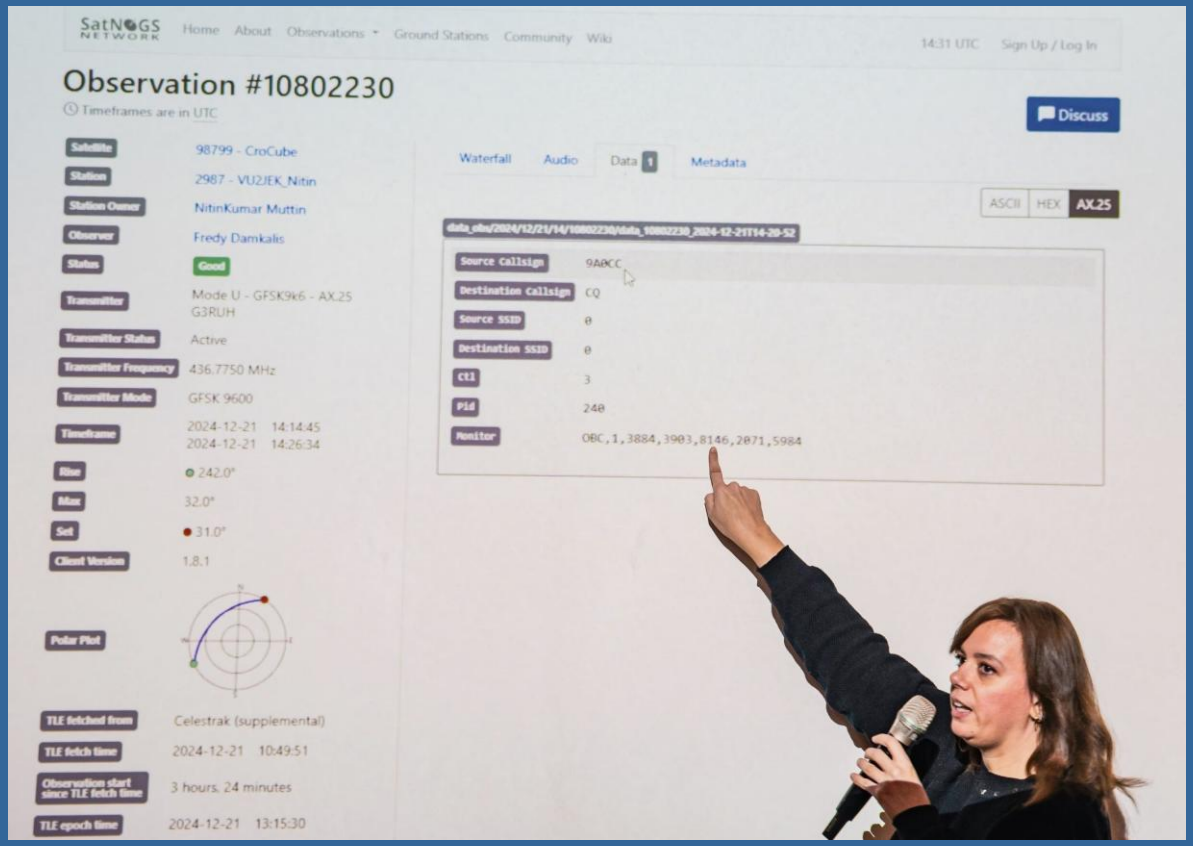


PRVI TLM PODACI PRIMLJENI U:

JAR



INDIJI



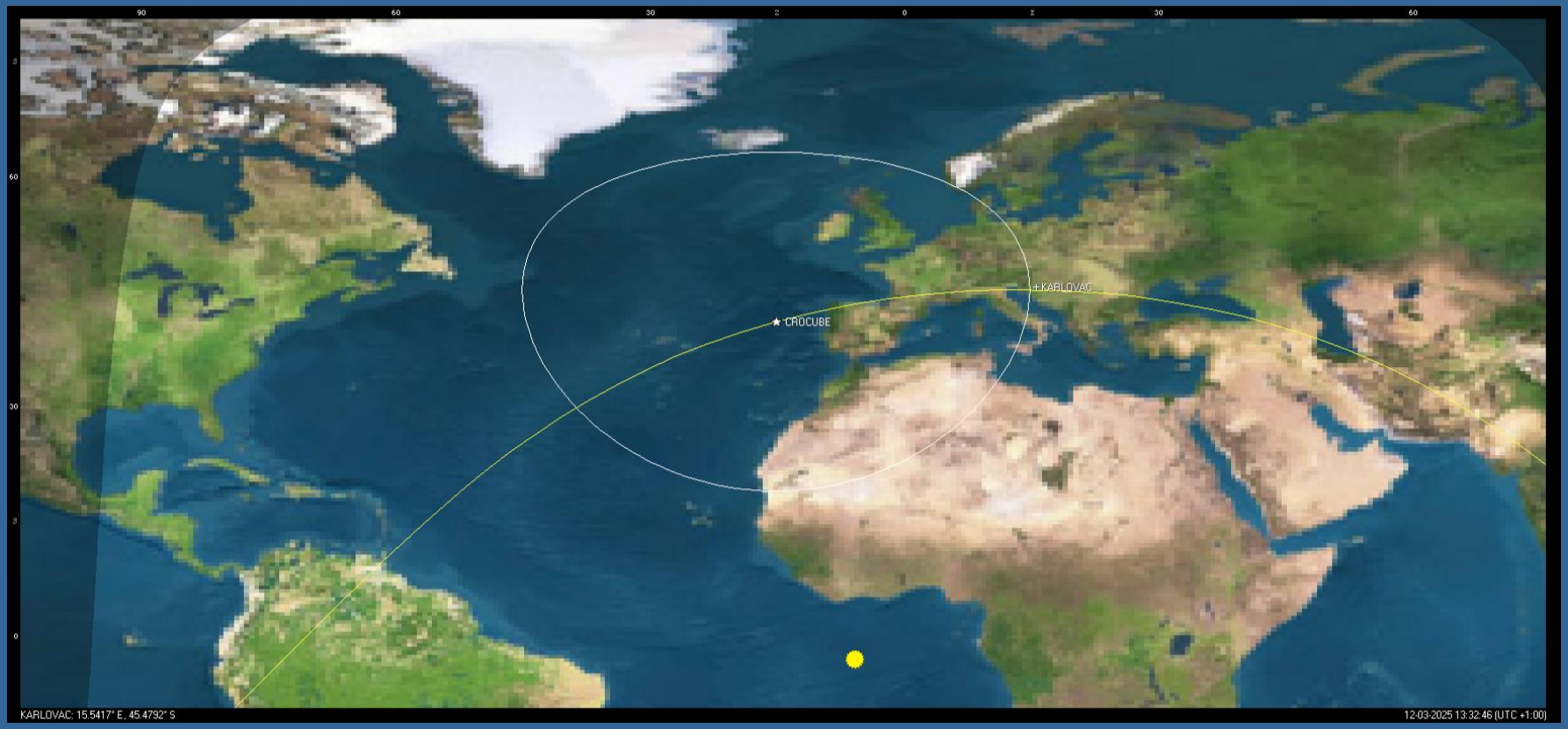
RADOSNA LICA ČLANOVA TIMA

TORTA I PJENUŠAC

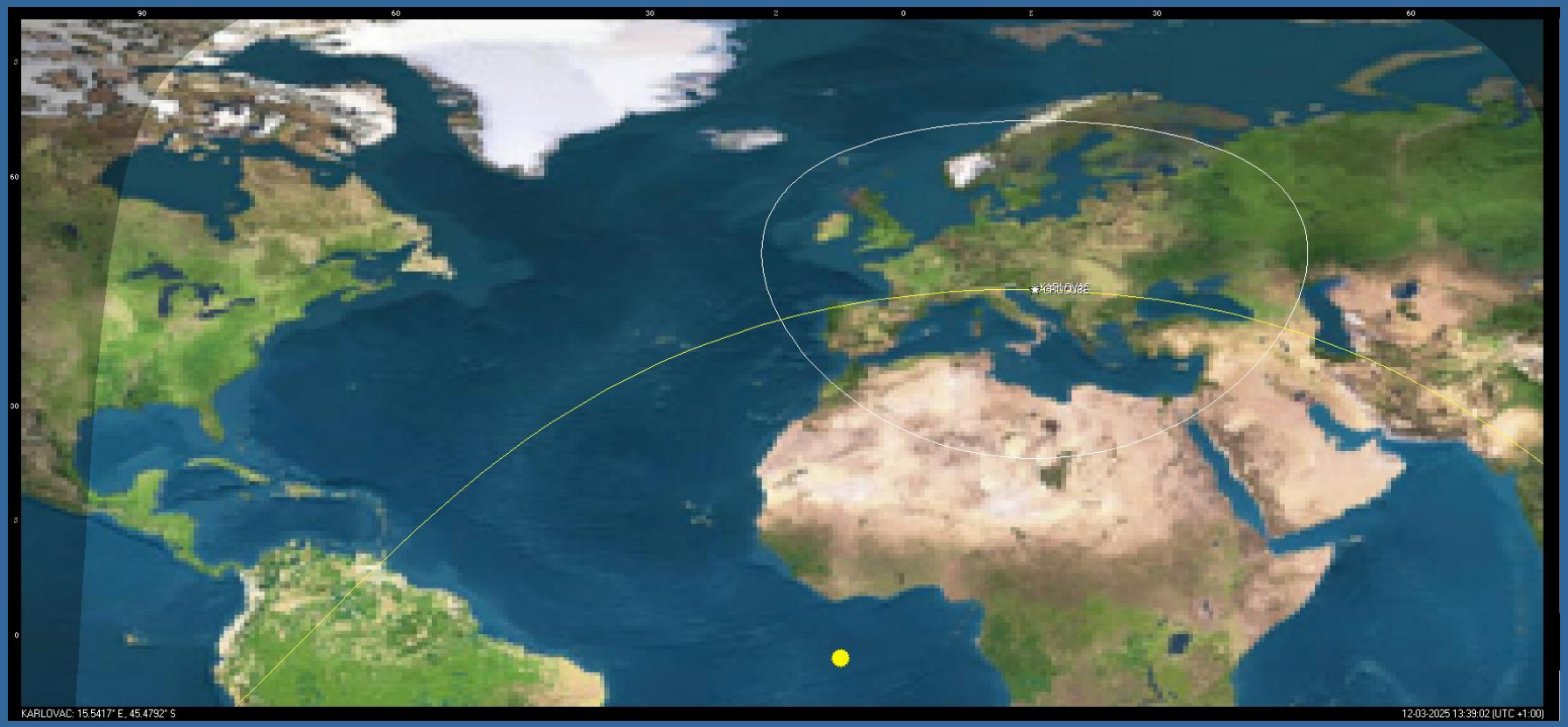
SVEČANOST POVODOM LANSIRANJA CroCube SATELITA ZICER, ZAGREB, 24.12.2024.

PUTANJA I ZONA POKRIVANJA SATELITA

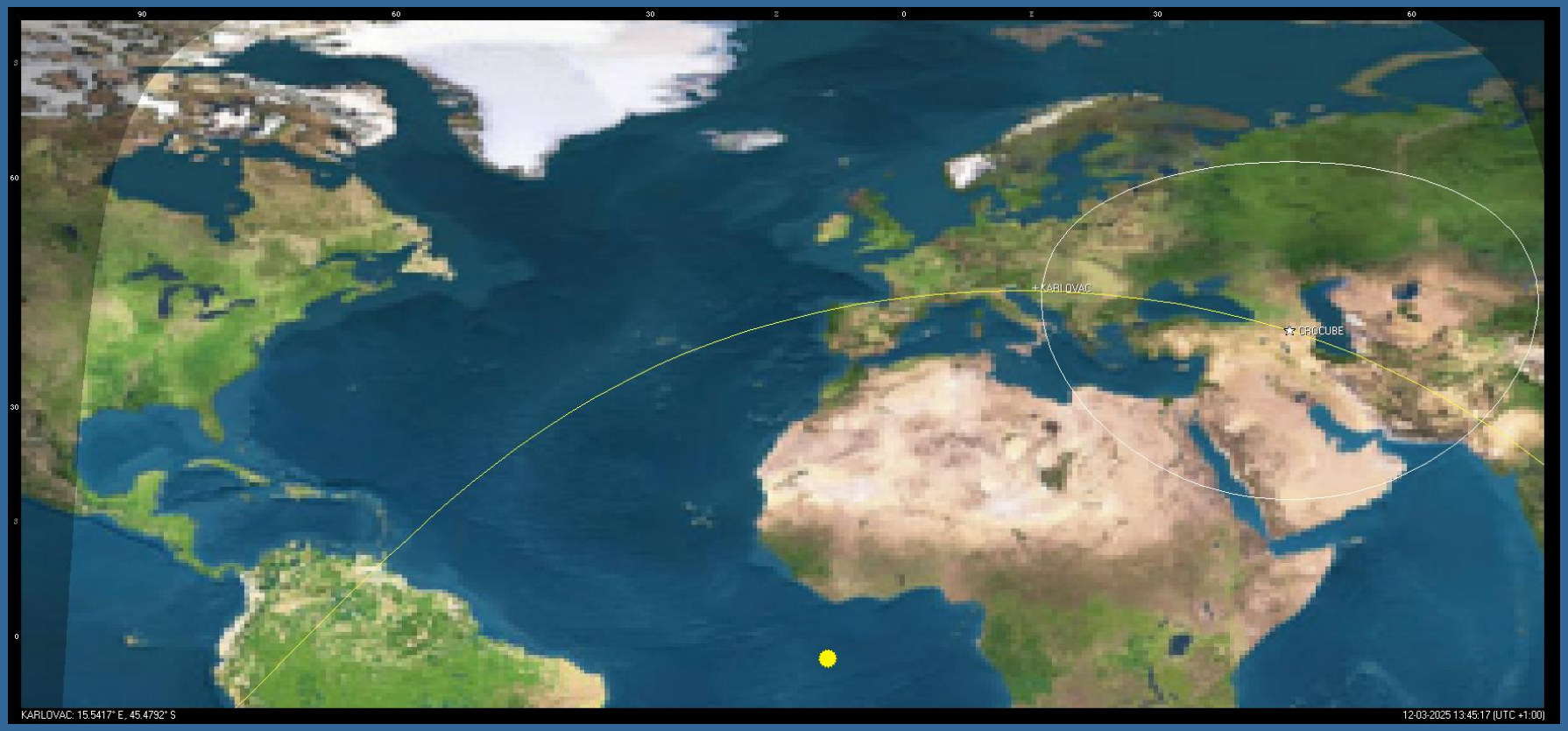
DOLAZAK,


SIM
AUTO-isklj.
LOC
13:32:46
12-03-2025
90
60
30
0
30
60
60
30
0
KARLOVAC
CROCUBE
KARLOVAC: 15.5417° E, 45.4792° S
12-03-2025 13:32:46 (UTC +1:00)

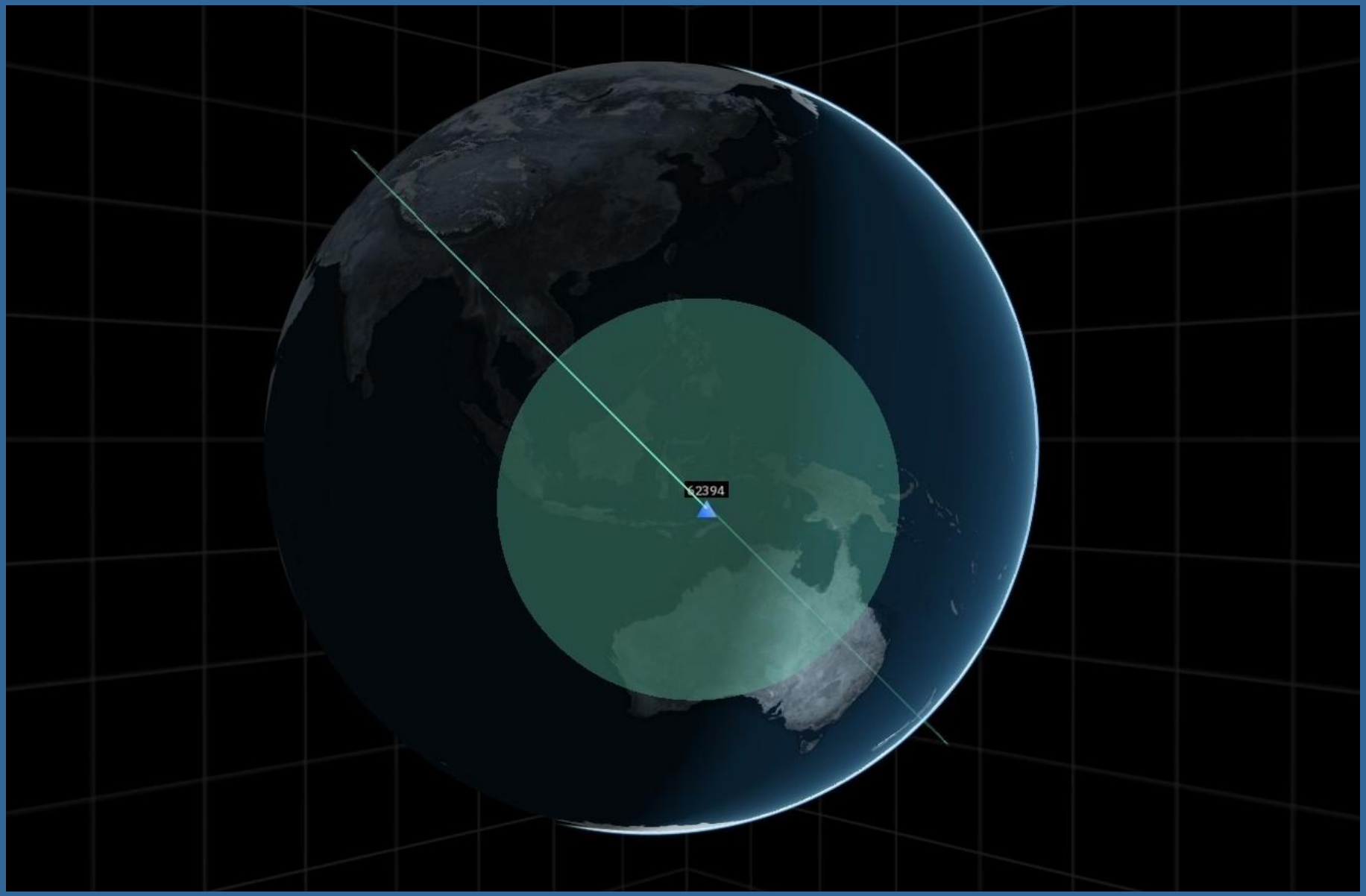
SKORO IZNAD NAS,



ODLAZAK.

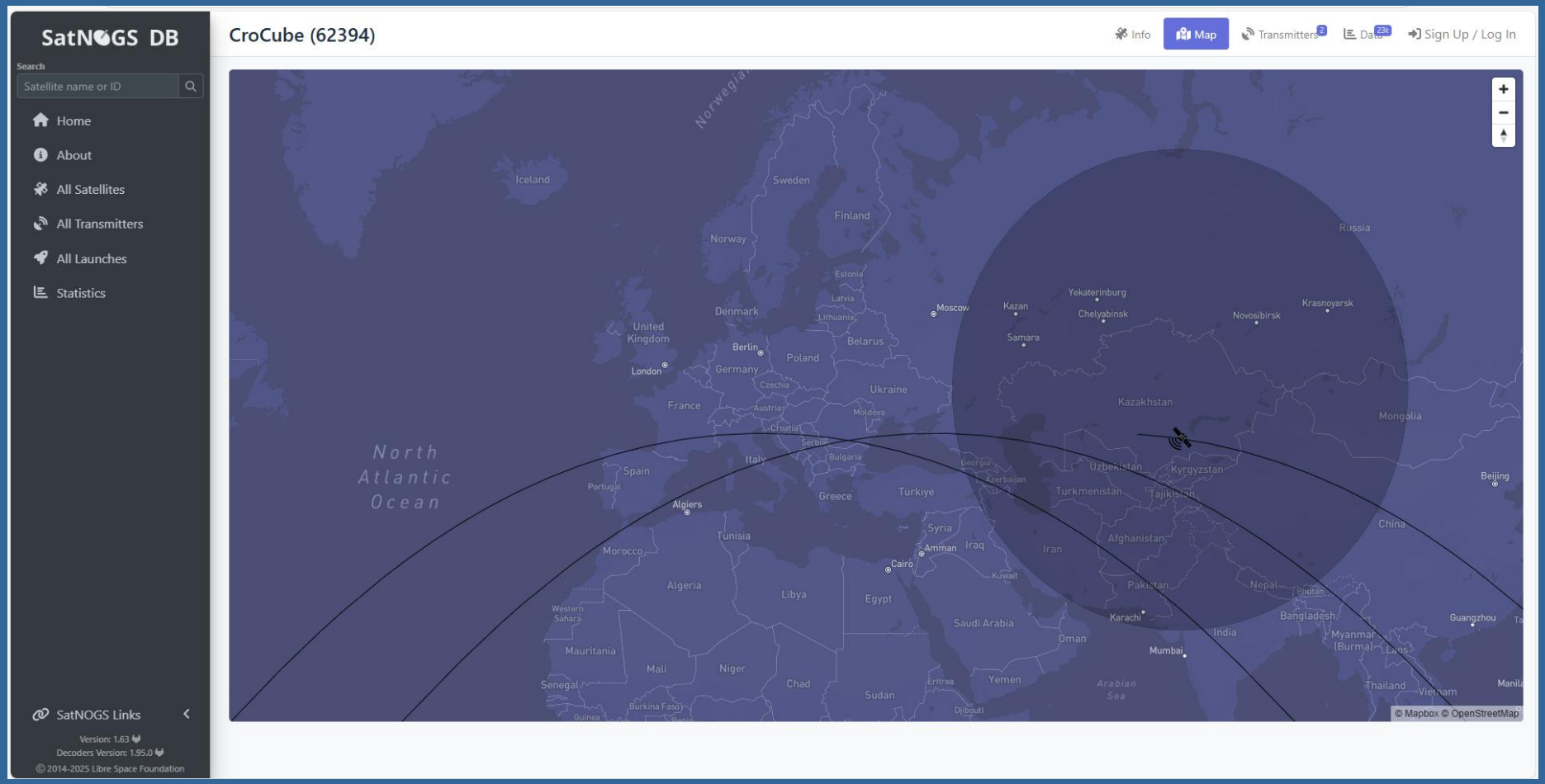

SIM
AUTO-isklj.
LOC
13:45:17
12-03-2025
KARLOVAC
CROCUBE
KARLOVAC: 15.5417° E, 45.4792° S
12-03-2025 13:45:17 (UTC +1:00)

IZNAD AUSTRALIJE I INDONEZIJE



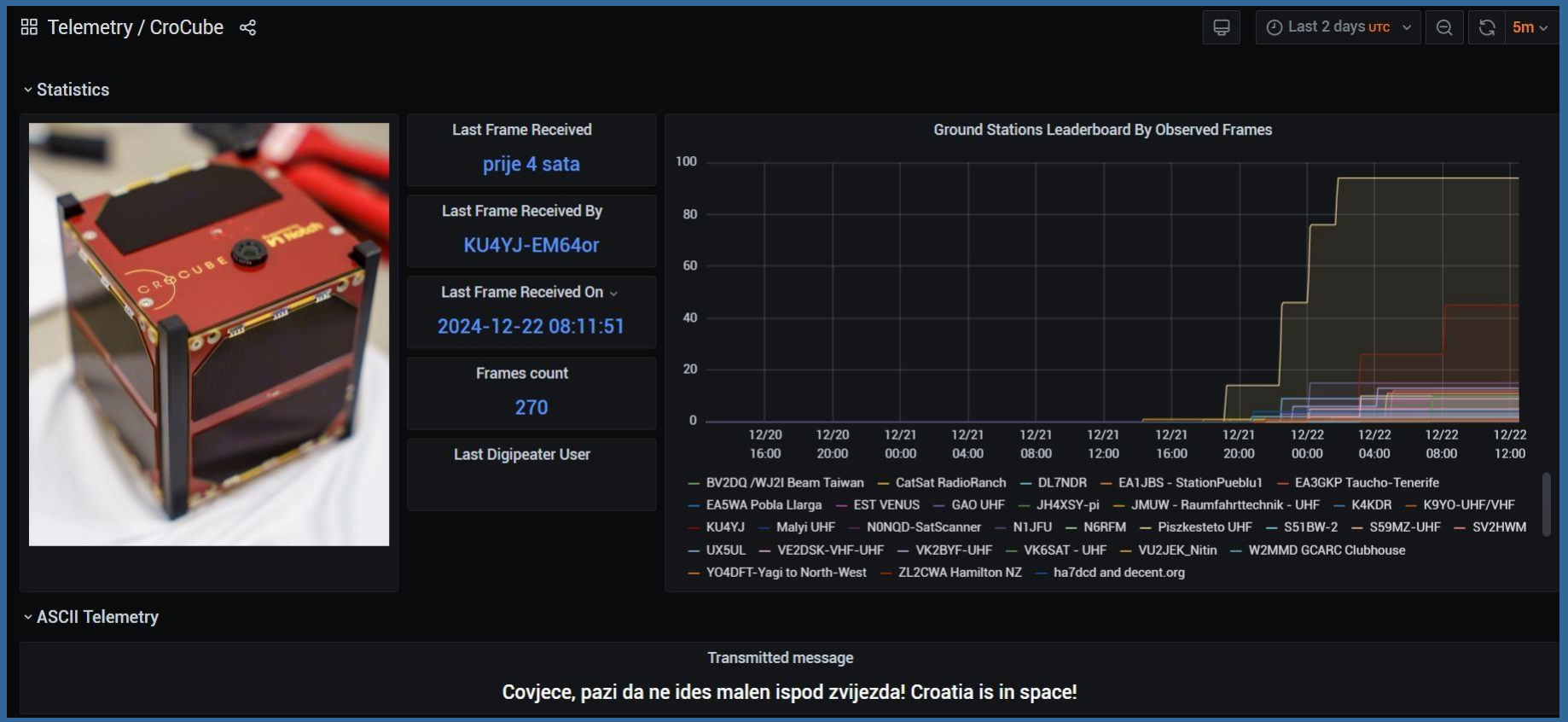
PRIKAZ POLOŽAJA NA SatNOGS PLATFORMI

12.03.2025. 10:22:57 CET



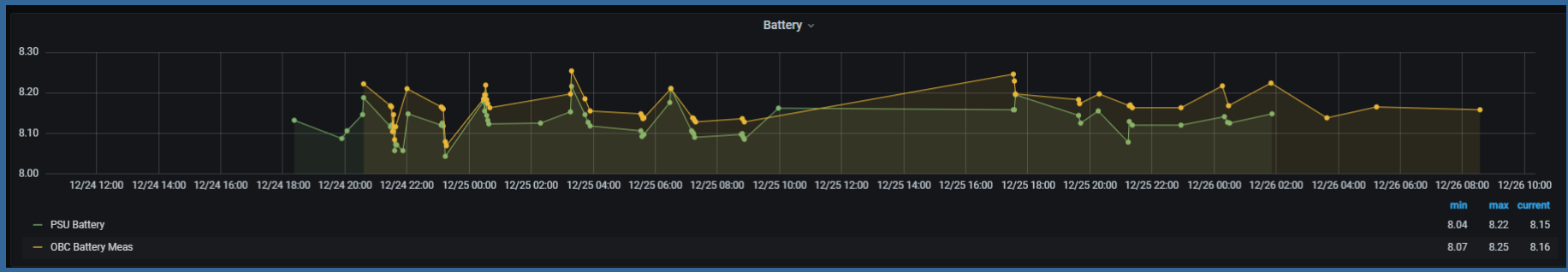
Covjece, pazi da ne ides malen ispod zvijezda! Croatia is in space!

„Čovječe, pazi da ne ideš malen ispod zvijezda”
stih iz pjesme „Opomena” Antuna Branka Šimića

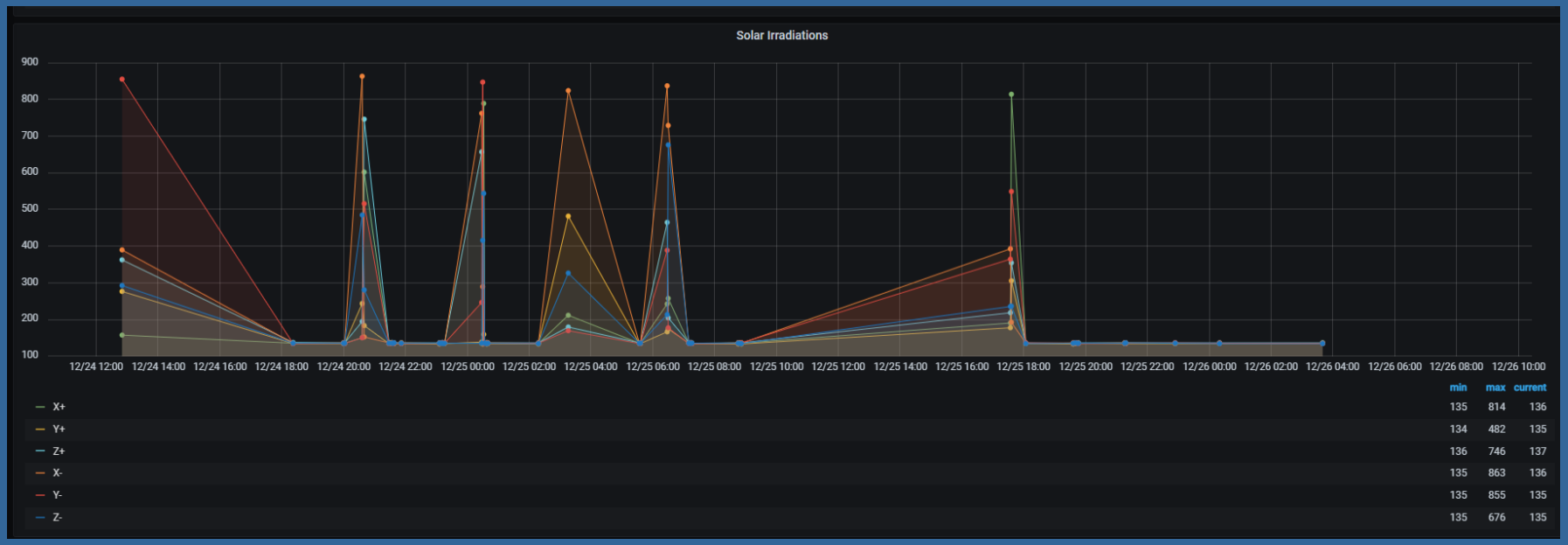


SatNOGS PLATFORMA ZA PRIHVAT PODATAKA

TELEMETRIJSKI PODACI SUSTAVA NAPAJANJA

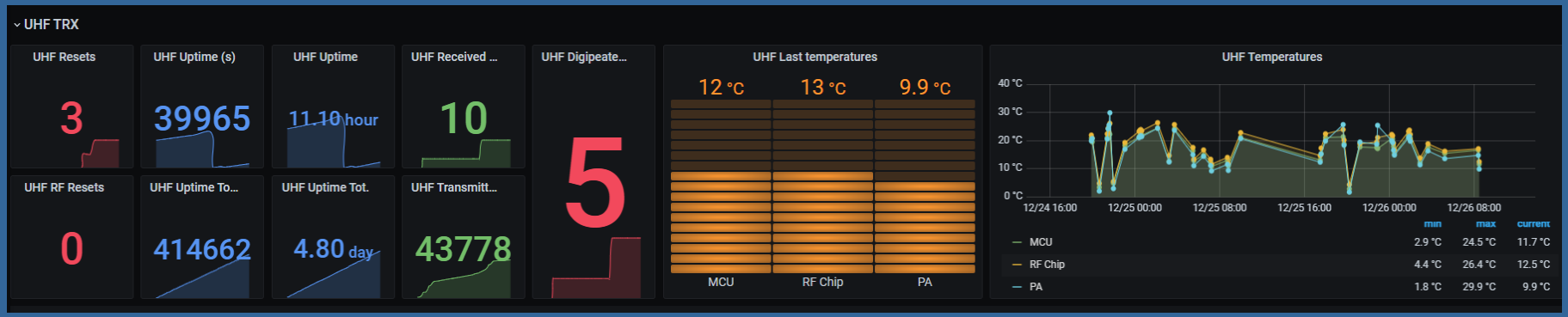


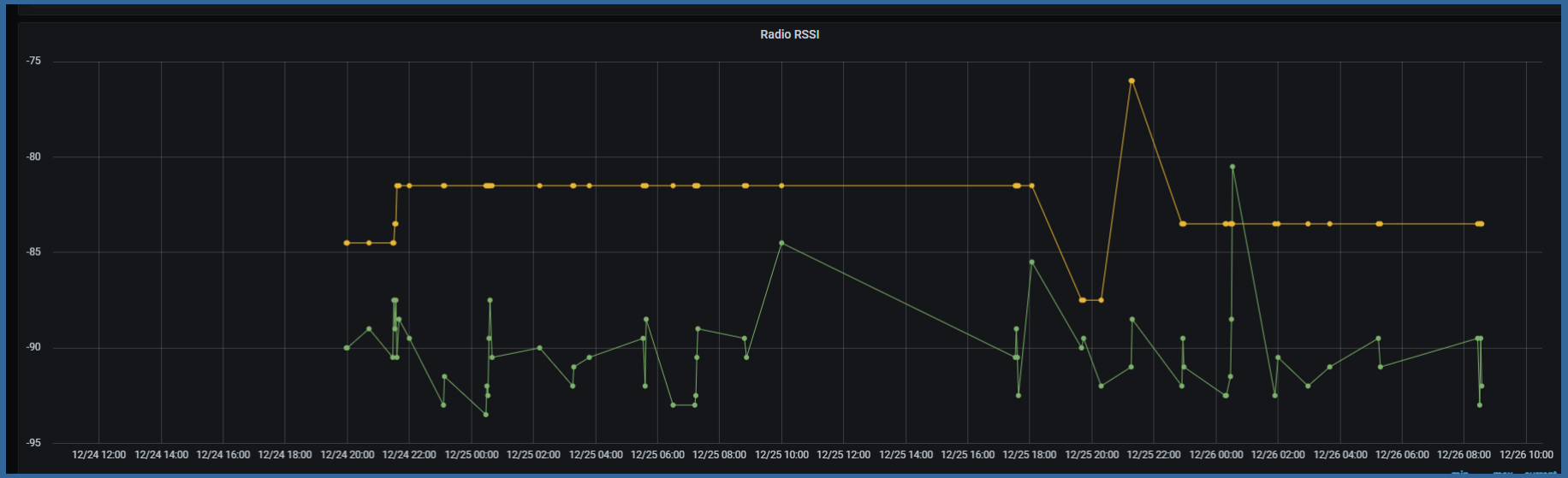
TELEMETRIJSKI PODACI O SUNČANIM PANELIMA



TELEMETRIJSKI PODACI RAČUNALA

TELEMETRIJSKI PODACI RADIJSKOG UREĐAJA





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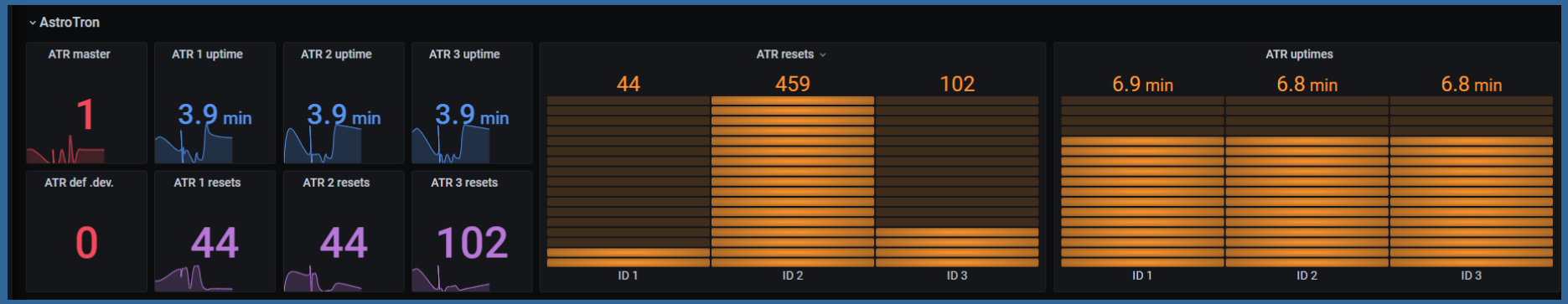
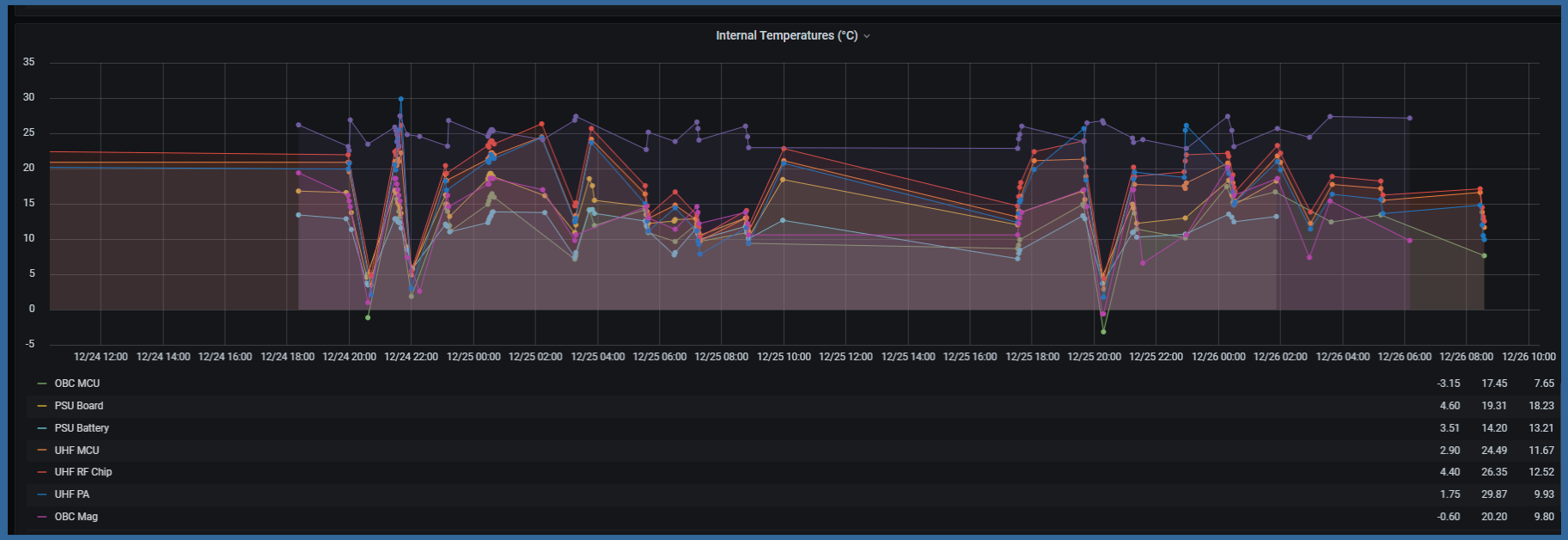
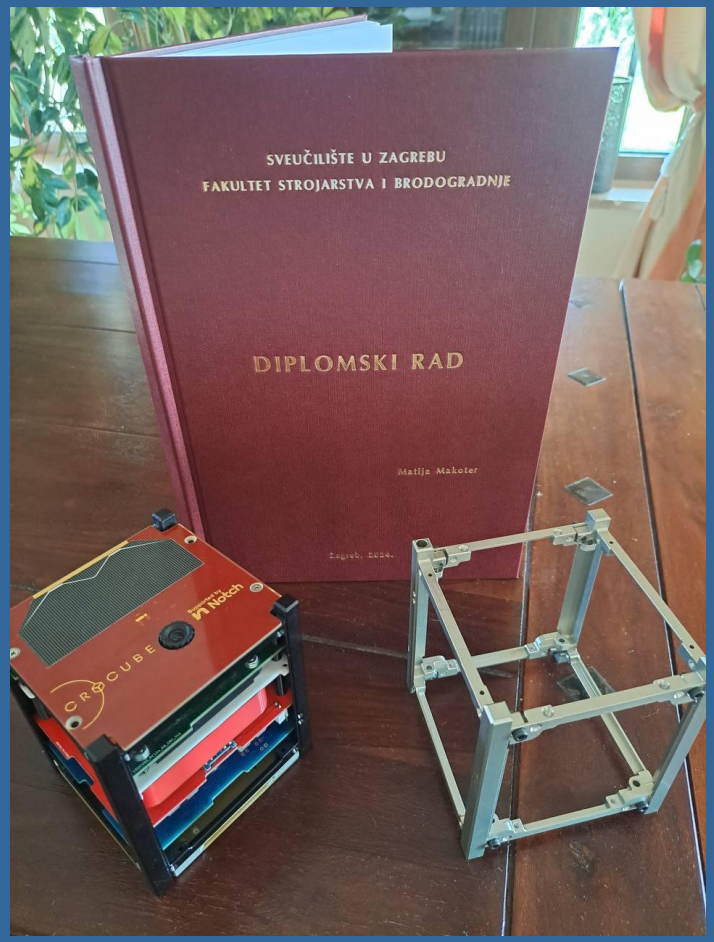


TELEMETRIJSKI PODACI O TEMPERATURAMA

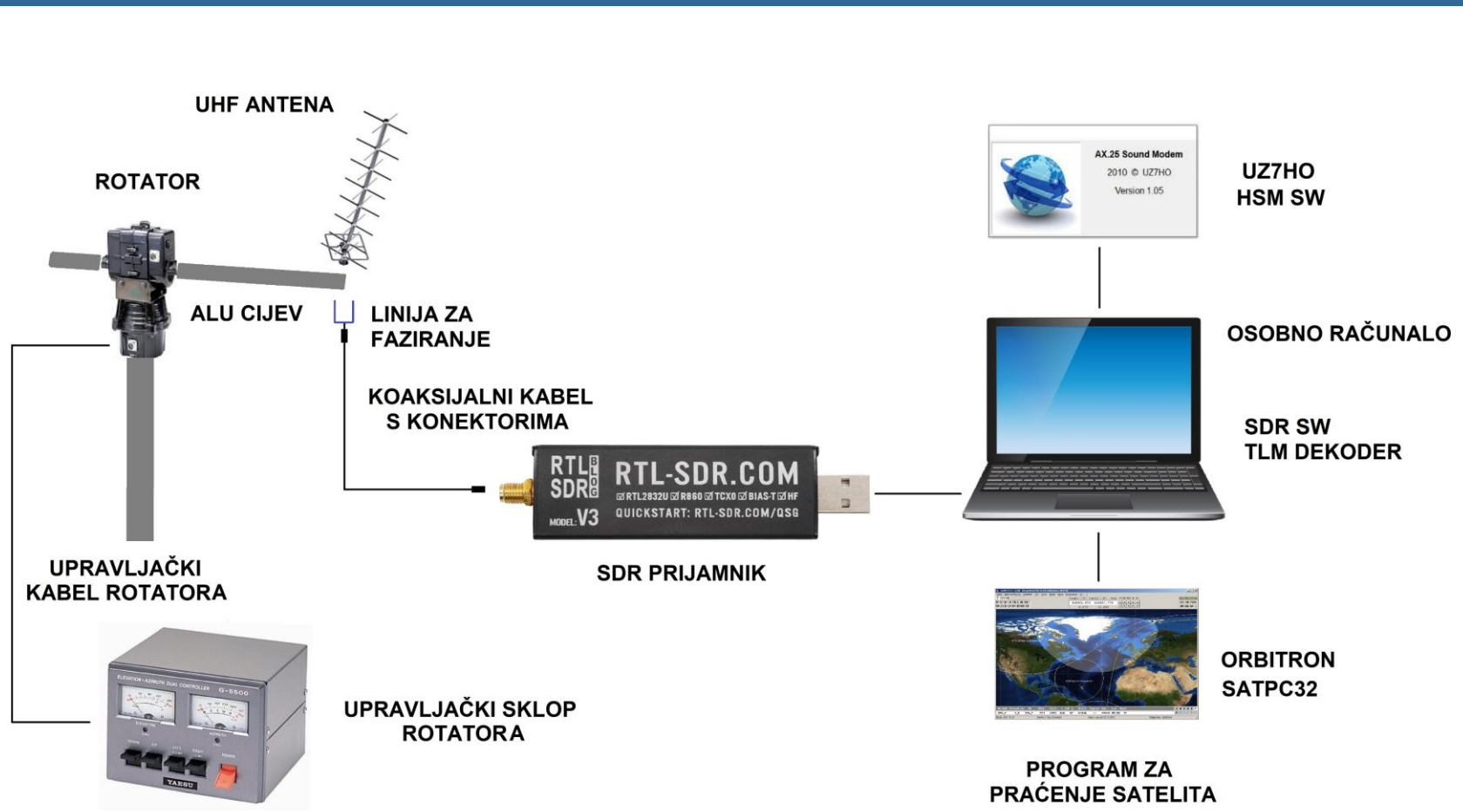


PRVI DIPLOMSKI RAD NA TEMU CroCube SATELITA

Matija Makoter: Aspekti oblikovanja i realizacije malog satelita, FSB, Zagreb 2024.



KAKO SLUŠATI CroCube SATELIT

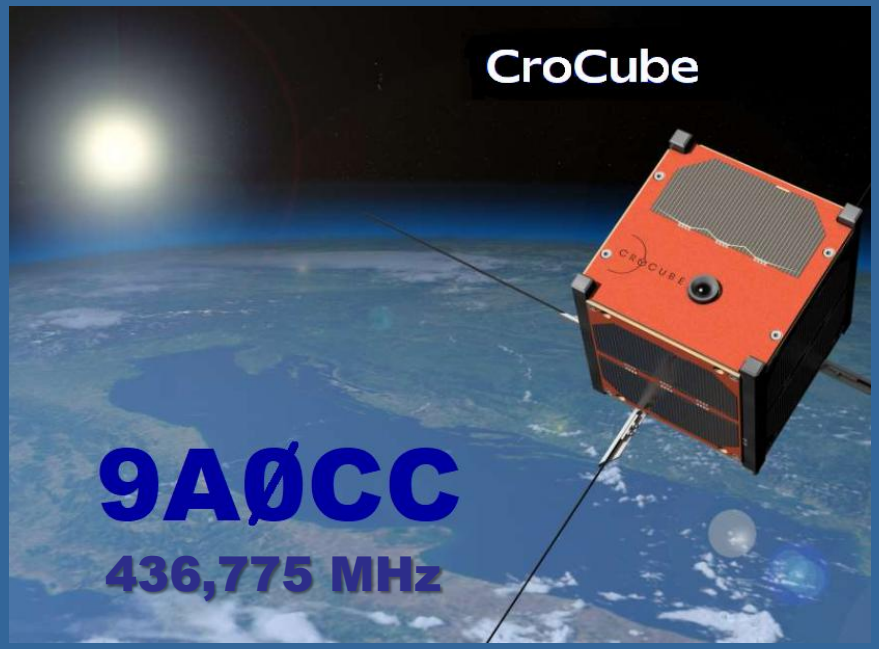


UHF ANTENA (DESNA)

UHF LNA

@ 9A2EY

TELEMETRIJSKI PODACI MORSEOVIM KODOM

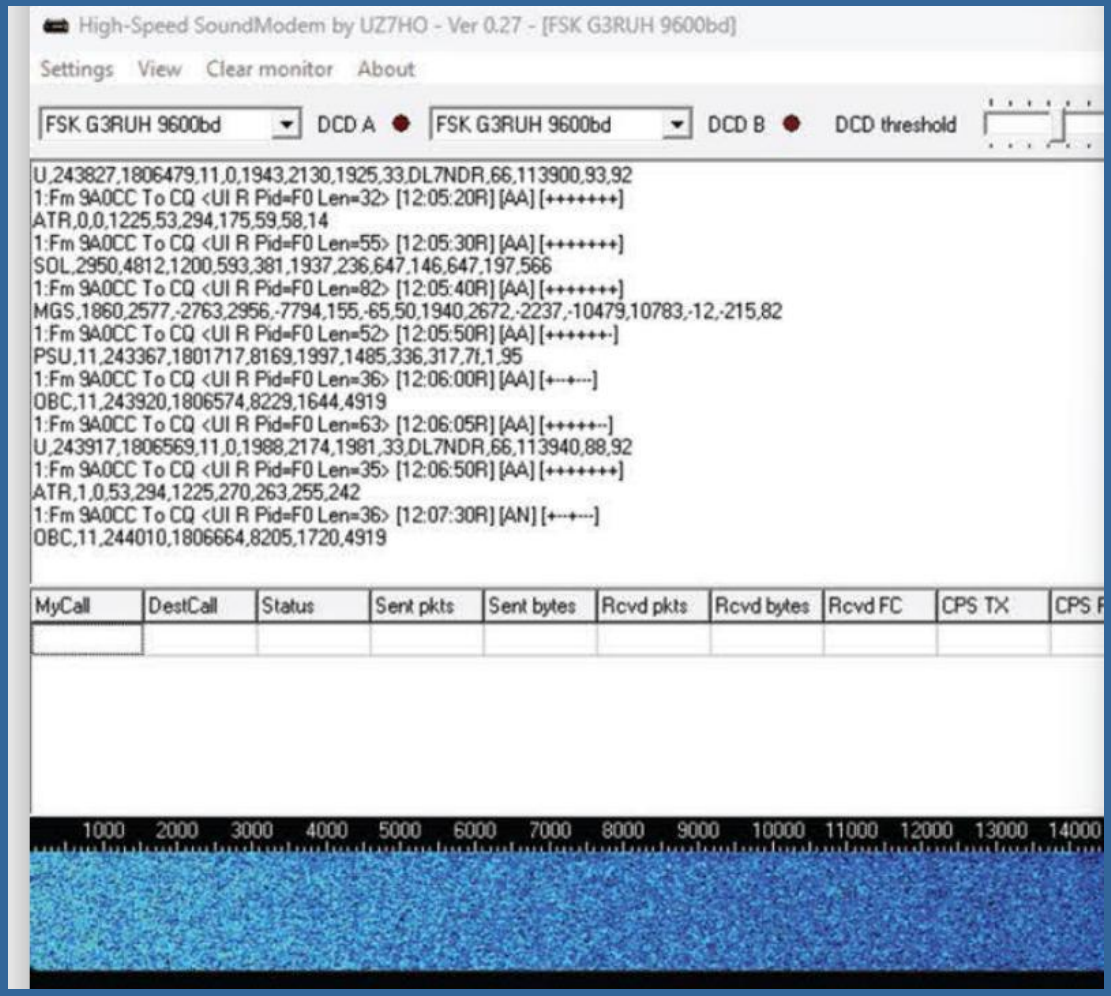


DE 9A0CC – U10409R5T18P17 AR

9A0CC - Pozivna oznaka CroCube satelita
U10409 - Vrijeme rada satelita u minutama (10409) što je 7 dana 13 sati i 42 minute
R5 - Broj resetiranja radijskog uređaja (5)
T18 - Temperatura mikrokontrolera radija (18^0 C)
P17 - Temperatura izlaznog stupnja radija (17^0 C)
AR - „Završavam odašiljanje“

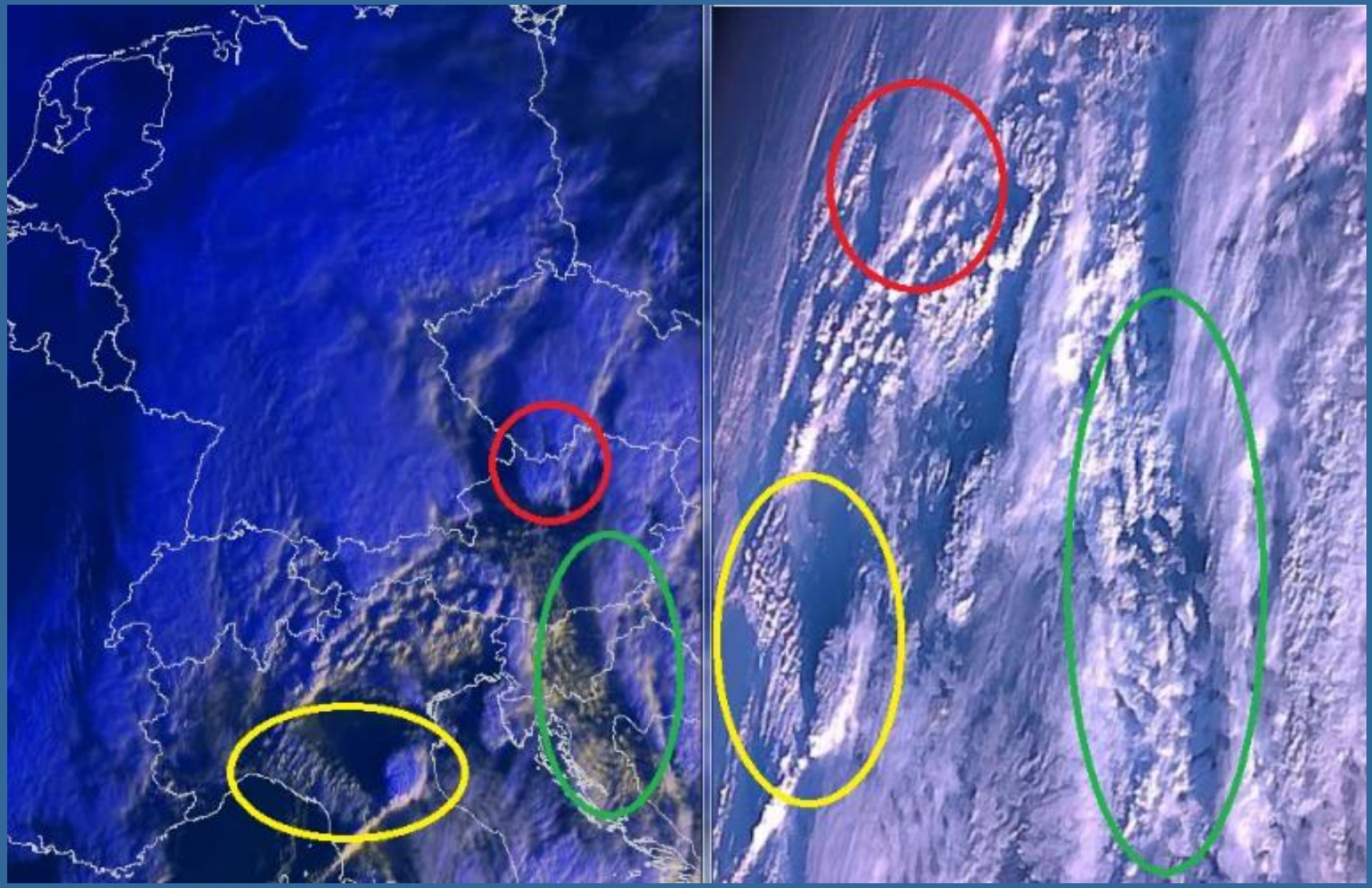
DIGITALNI PODACI I KONTROLNI TON

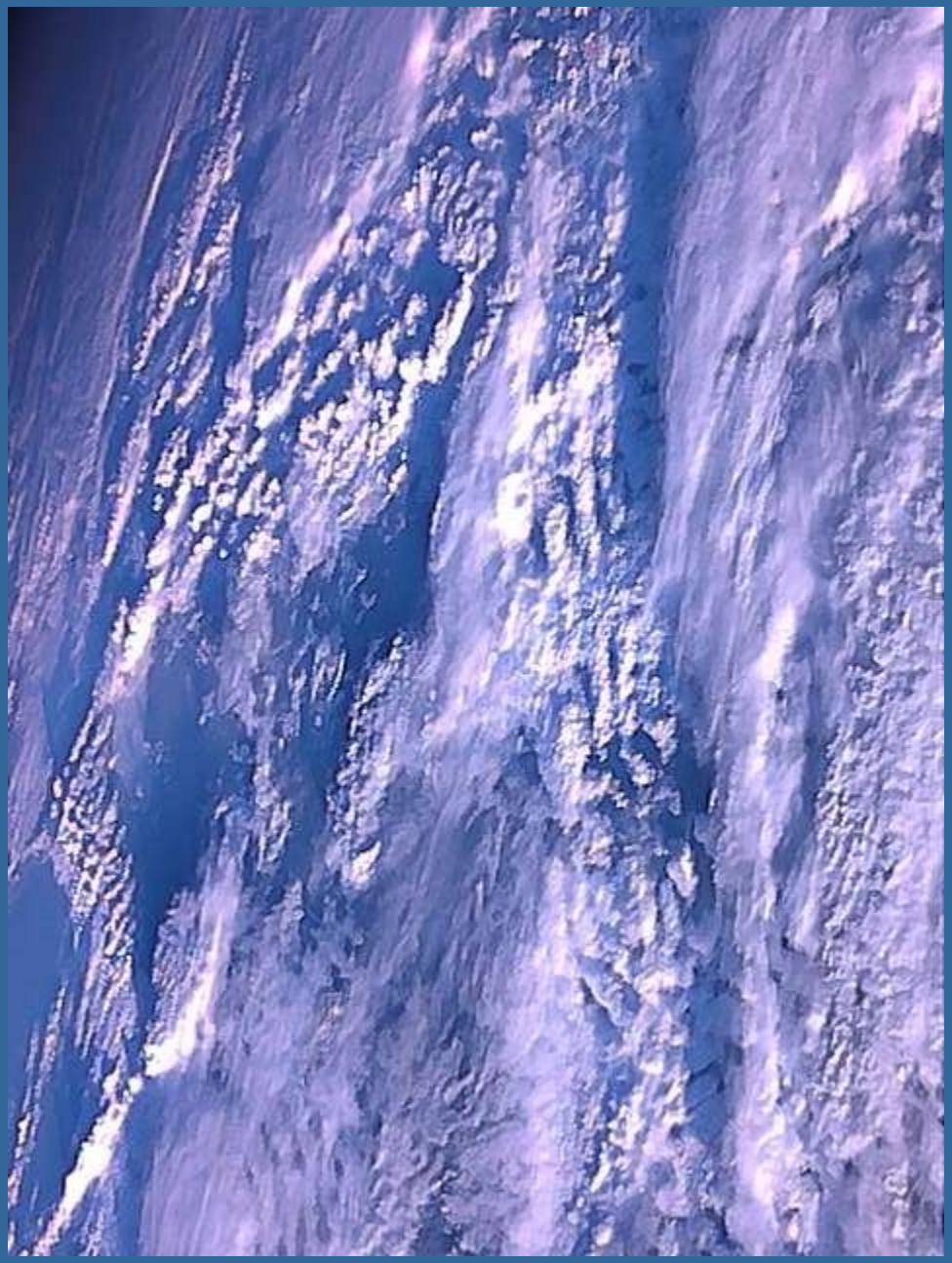
DEKODIRANI DIGITALNI PODACI

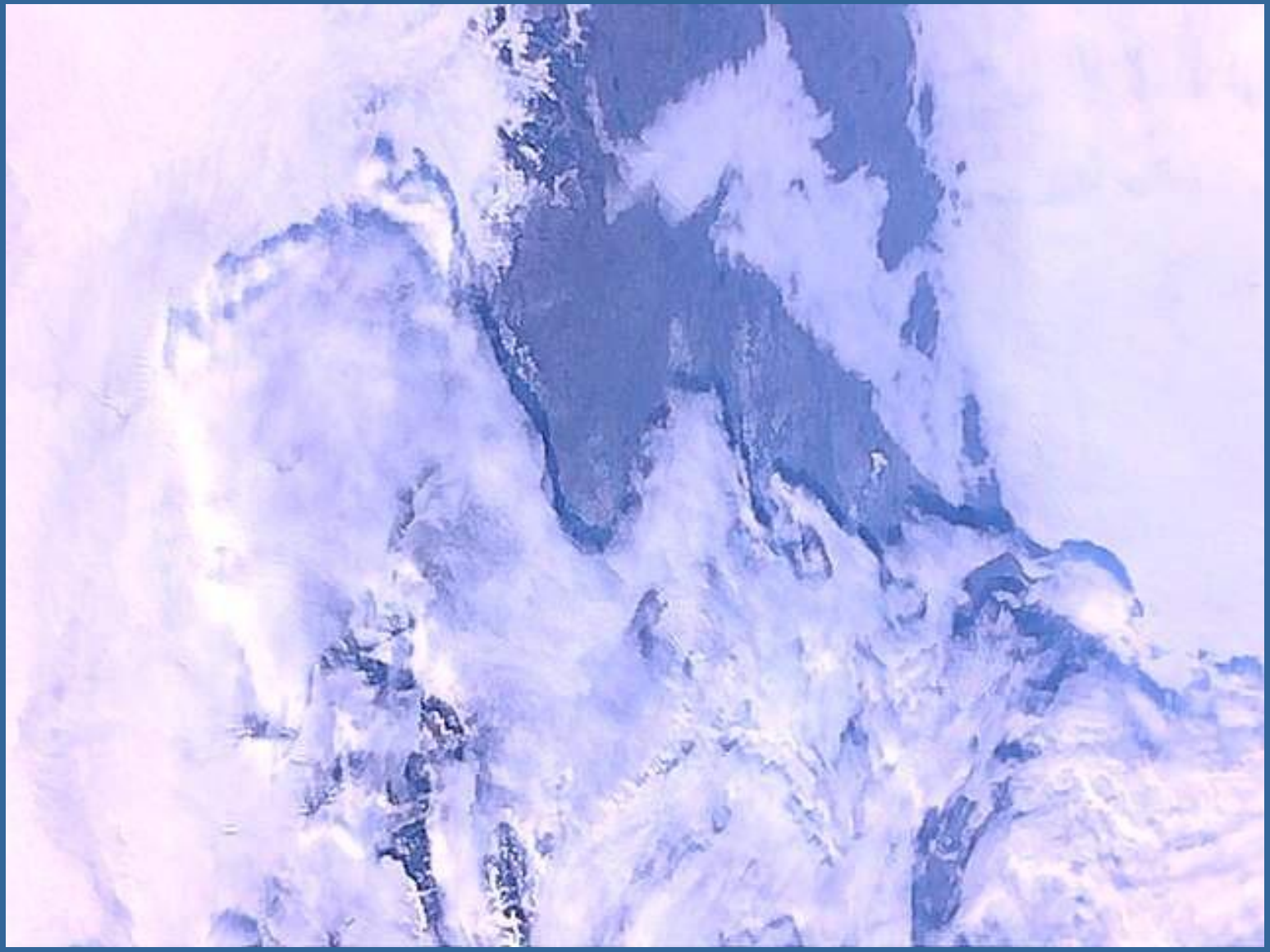


PODATKE PRIMIO LUCIJAN FRANIN, 9A1Z

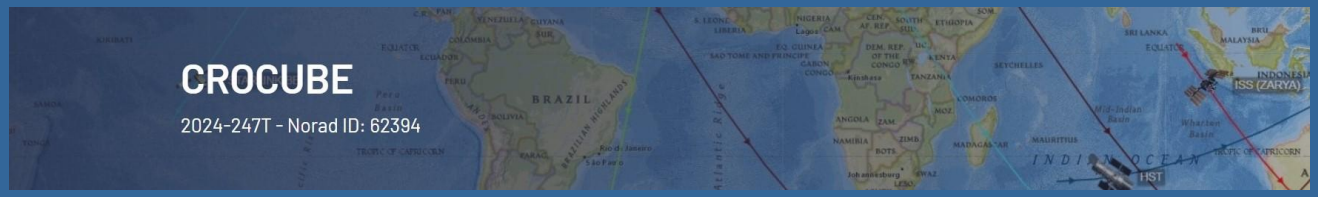
PRVE SLIKE 28.01.2025. U 8:16







NORAD BROJ: 62394



Satellite information CROCUBE - 2024-247T

Spacetrack Directory Name	CROCUBE
Alternative name	2024-247T
Follow CROCUBE	CROCUBE Tracker
Pass predictions CROCUBE	Pass predictions CROCUBE
Orbit launches	2024-12-21 (one month ago)
Days in orbit	58
Starting point	AFWTR (Vandenberg Air Force Base, USA)
Perigee	507 km
Apogee	512 km
Orbit slope (inclination)	44.99°
Laps per day	15
Height CROCUBE	511.54 km

Suggest changes

PRAĆENJE SATELITA NA N2YO PLATFORMI

N2YO.com

Like 28K

Tracking **30262** objects as of 17-Feb-2025
HD Live streaming from Space Station
2,135 objects crossing your sky now

ISS will cross your sky
in 5h 31m 54s

Find a satellite... Search
N2YO.com on Facebook Advanced

Home | Most tracked | Just launched | Satellites on orbit | Alerting tools | More stuff | Sign in

CROCUBE

Track CROCUBE now!
10-day predictions

NORAD ID: 62394
Int'l Code: 2024-247T
Perigee: 508.7 km
Apogee: 514.2 km
Inclination: 45.0 °
Period: 94.7 minutes
Semi major axis: 6882 km
RCS: Unknown
Launch date: December 21, 2024
Source: (HRV)
Launch site: AIR FORCE WESTERN TEST RANGE (AFWTR)

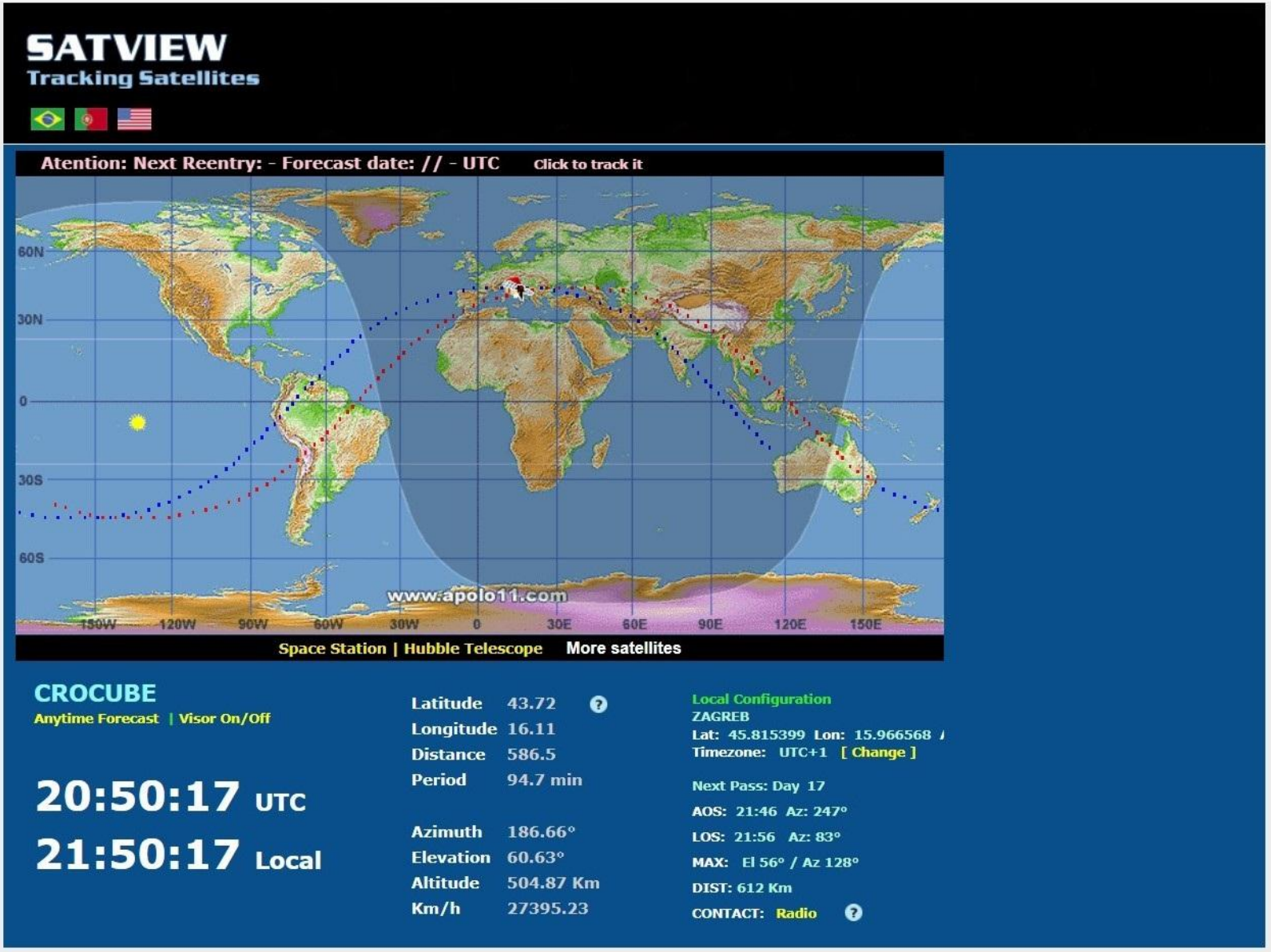
Your satellite tracking list
Add CROCUBE on your tracking list
Your tracking list is empty

Powered by N2YO.com
Local Time: GMT+1

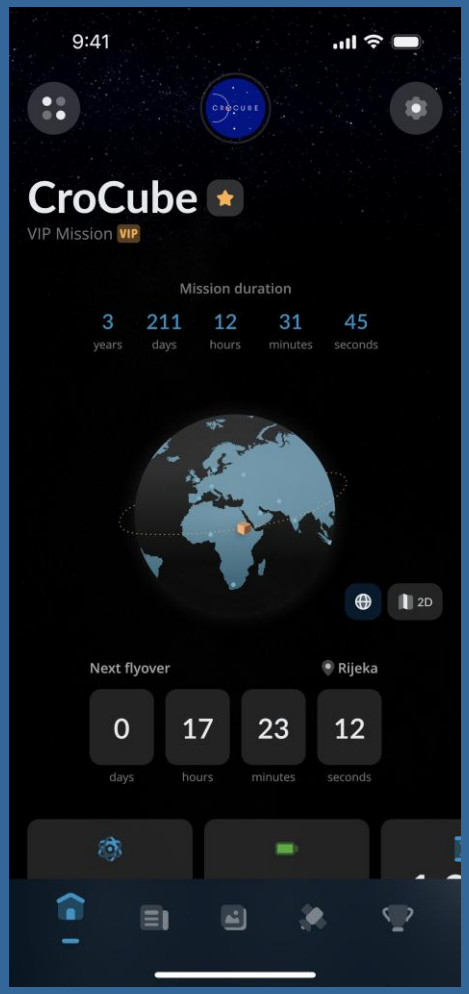
NEXT PASS OF CROCUBE OVER YOUR CURRENT LOCATION

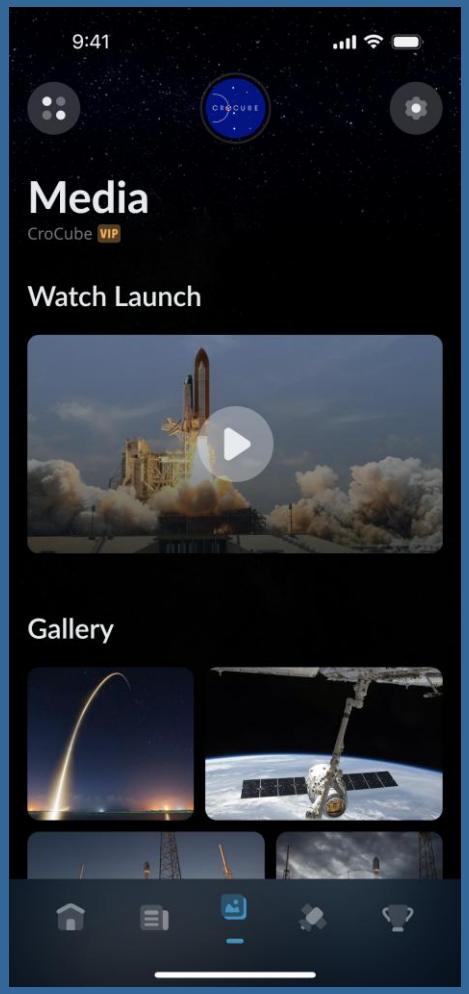
START AZIMUTH		MAX ELEVATION		END AZIMUTH		TOTAL DURATION
Feb 17 21:53	90° E	21:53	20°	21:56	82° E	03m 25s

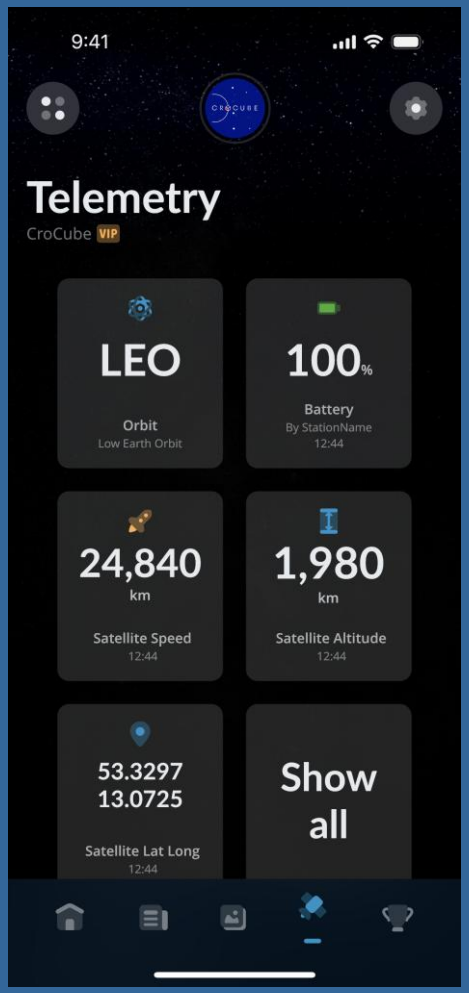
PRAĆENJE SATELITA NA SATVIEW



GOOGLE PLAY CroCube
Exevio Ltd







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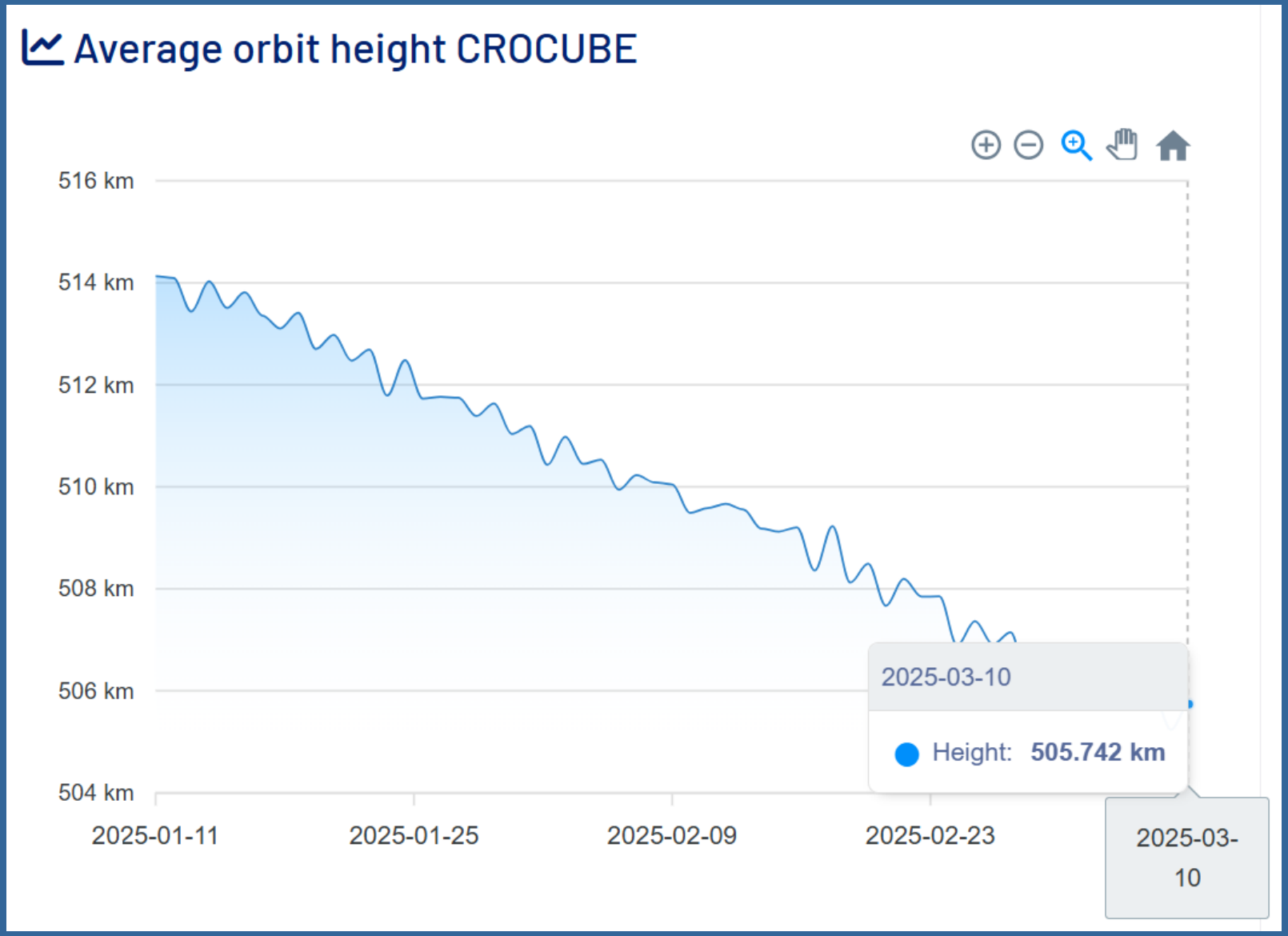

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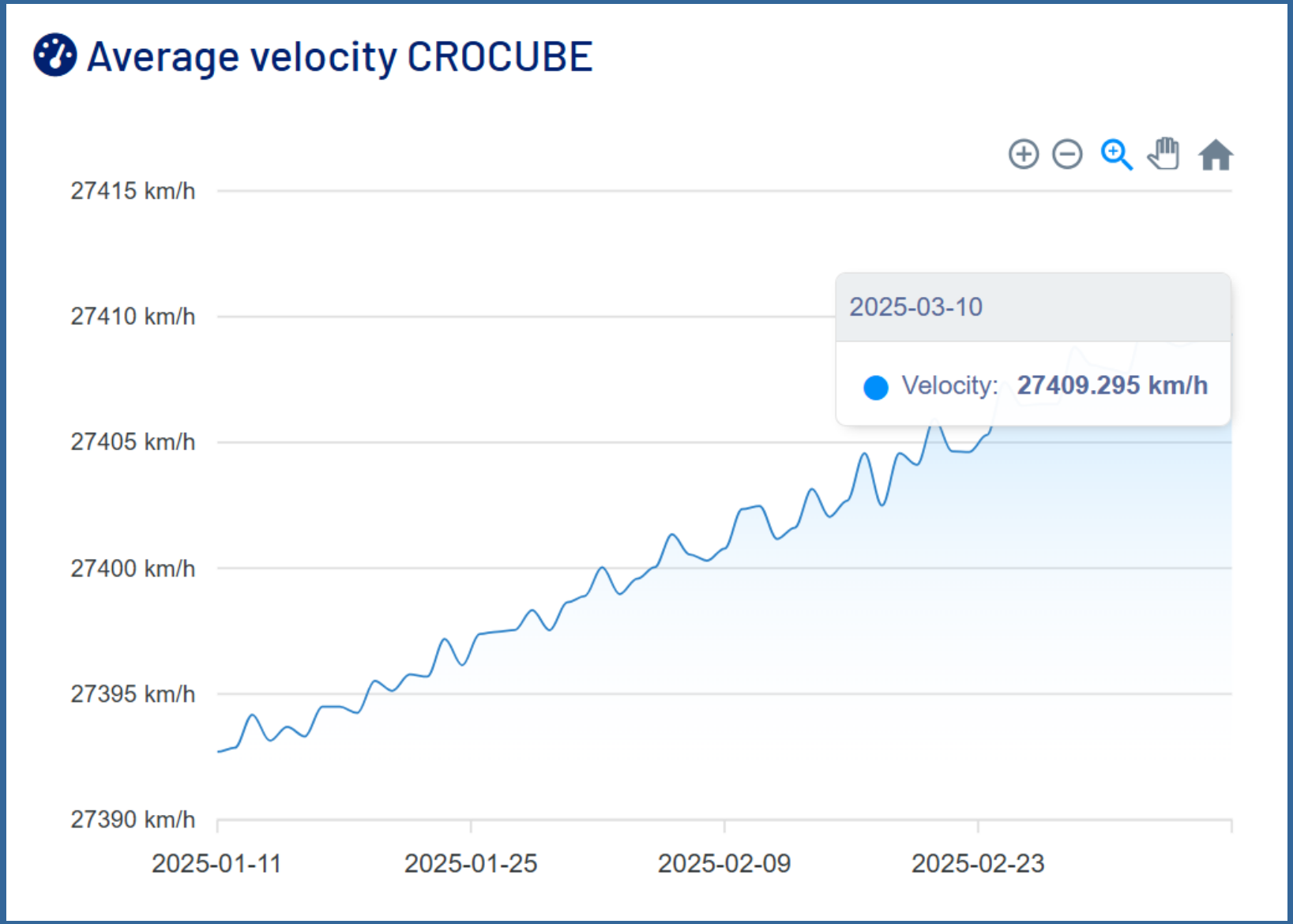

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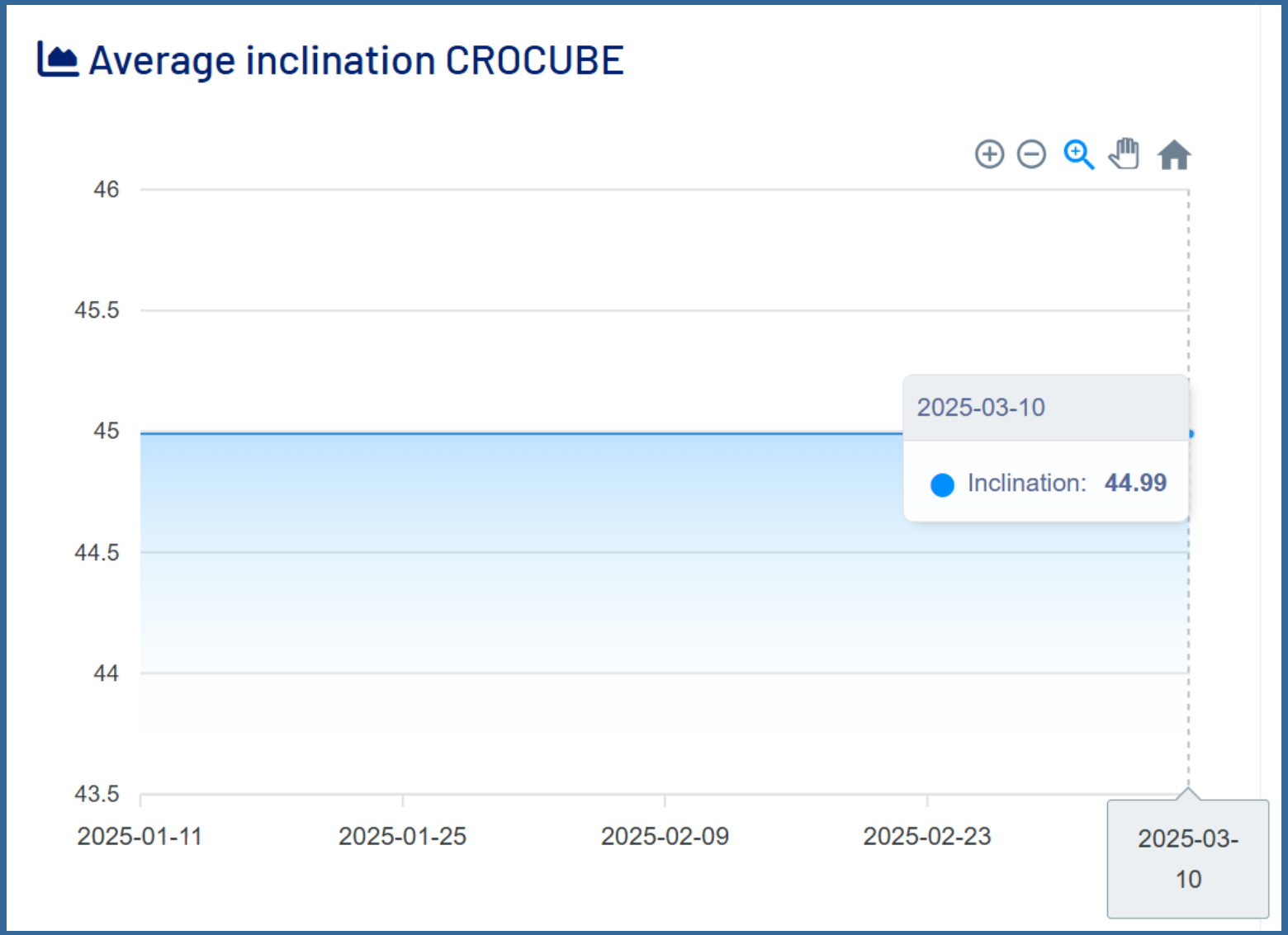

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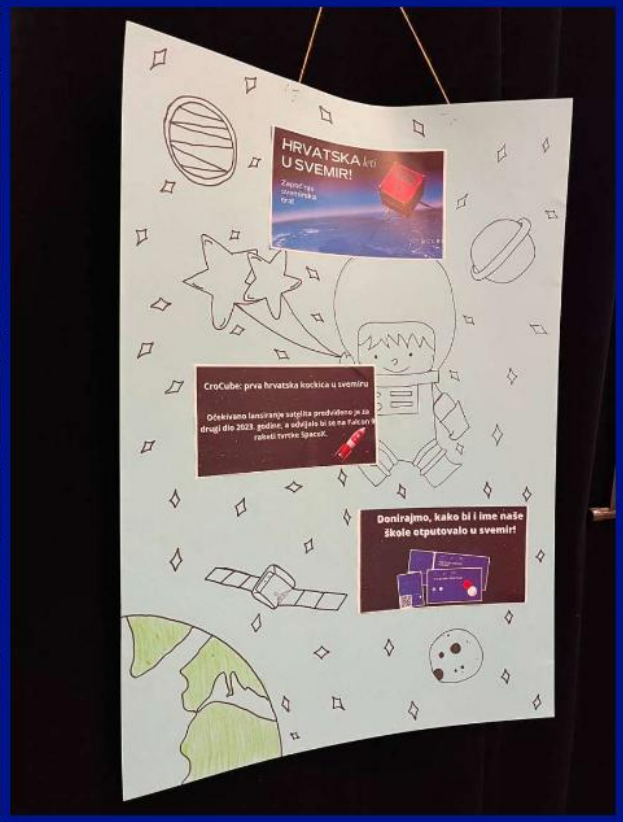
Prvi hrvatski satelit u orbiti.


HRVATSKA kreće U SVEMIR!
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Donirajmo, kako bi i ime naše škole otputovalo u svemir!


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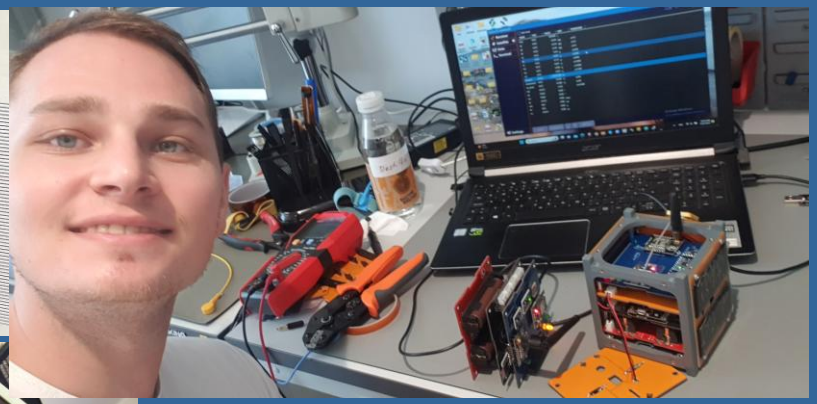


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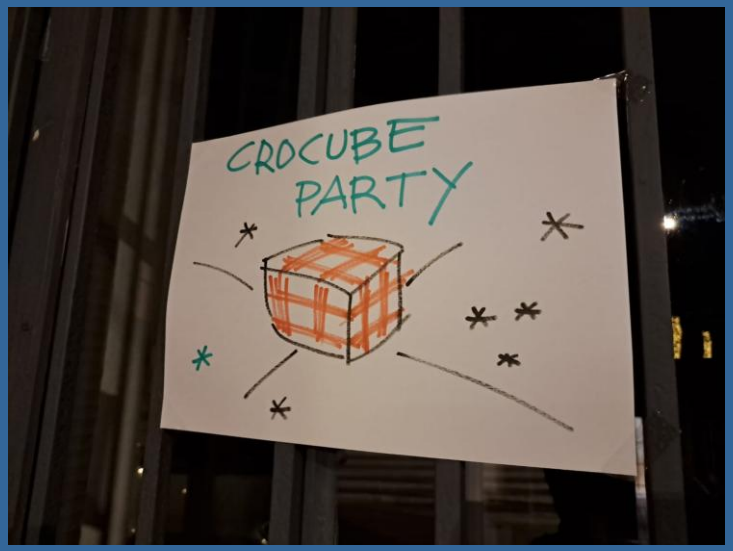

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