

ACTIVITIES AT IMID

Aneta Zatočilová, Ing. Ph.D.

Institute of Machine and Industrial Design
Faculty of Mechanical Engineering
Brno University of Technology

Brno, 24.4.2024



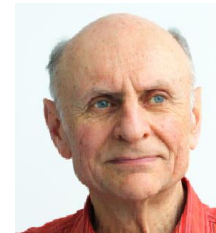
INSTITUTE OF MACHINE
AND INDUSTRIAL DESIGN

INTRODUCTION

- My activities and plans till 2020
- Activities 2021-2023
- Activities after 2023
- Total eclipse expedition 2024

RIAT 2020

Josef Nevrlý Jan Brandejs David Paloušek



SLM Technology

David Paloušek Daniel Koutný Radek Vrána



Jan Suchý

Malý Martin

Ondřej Vaverka

Ondřej Červinek



Vít Šreibr

Optical measurement

Tomáš Koutecký Aneta Zatočilová



Jakub Hurník



External - Pavel Loučka (Doc. Štarha ÚM)

3D Robotic printing

David Škaroupka



Martin Krčma



Arnošt Vespalec



Petr Krejčířík

RIAT 2023

Josef Nevrlý



Jan Brandejs David Paloušek



SLM Technology

David Paloušek Daniel Koutný Radek Vrána



Jan Suchý



Malý Martin



Ondřej Vaverka



Ondřej Červinek



Vít Šreibr



Jan Jaroš



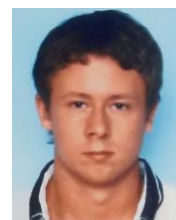
Jakub Slavíček



Filip Grygar

Optical measurement

Tomáš Koutecký



Jakub Hurník



Aneta Zatočilová



Ext. - Pavel Loučka
(Doc. Štarha ÚM)



Jakub Franke

3D Robotic printing

David Škaroupka



Martin Krčma



Arnošt Vespalec



Petr Krejčířik



Eva Fridrichová



Petr Křivohlavý



Dan Vícha

DEVELOPMENT OF OPTICAL SYSTEM FOR ŽŤAS

- 2010 – 2015 dissertation thesis
- 2018 – 2019 Zéta
- 2020 – ~~2023~~ Trend

AIM:

- automation of measurement of forgings during production -> saving production time and manpower
- first step for automation of forging process



DEVELOPMENT OF OPTICAL SYSTEM FOR ŽĎAS

HW

Choice of camera, lenses, other HW

Camera protection

Camera cooling?

Installation in industrial hall?

SW control

Image transfer to main pc

Shooting sync

Camera housing cooling control

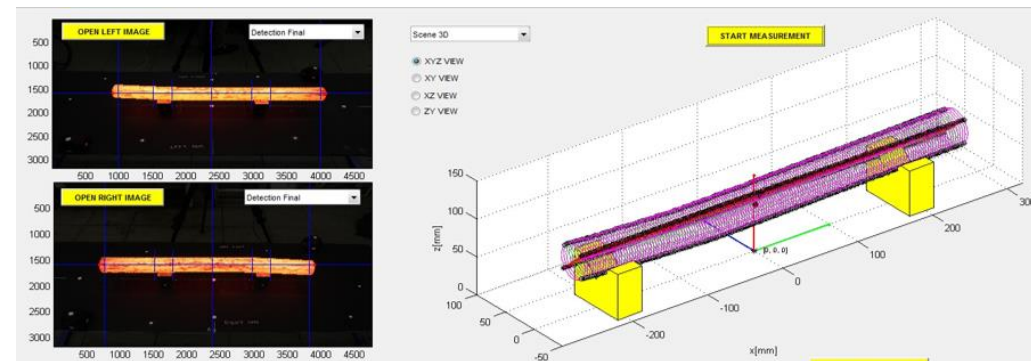
SW measurement

Calibration

Edges

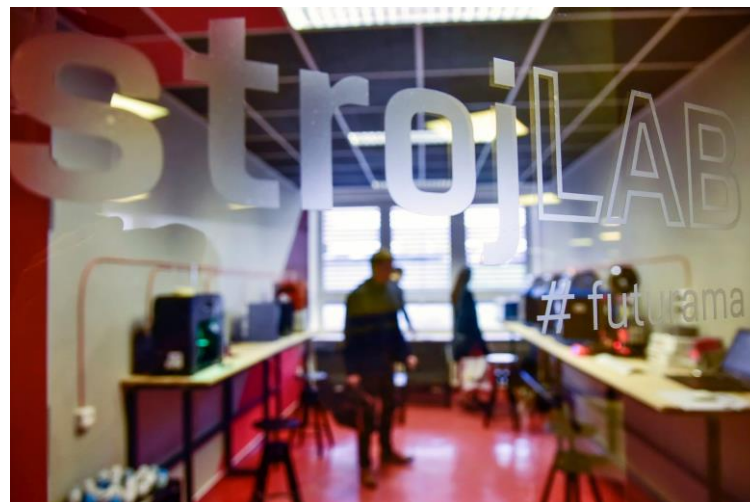
3D model

Results



INTERREG - FABLAB NET

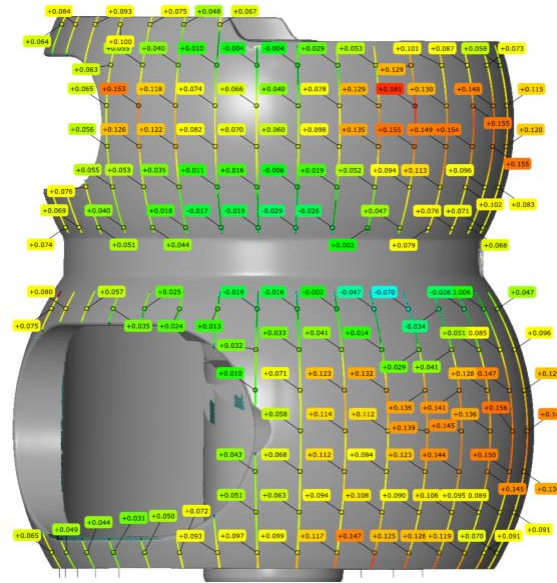
- Festival Prototyp
- Autodesk academia design
- FabFest
- Roll out strategy report



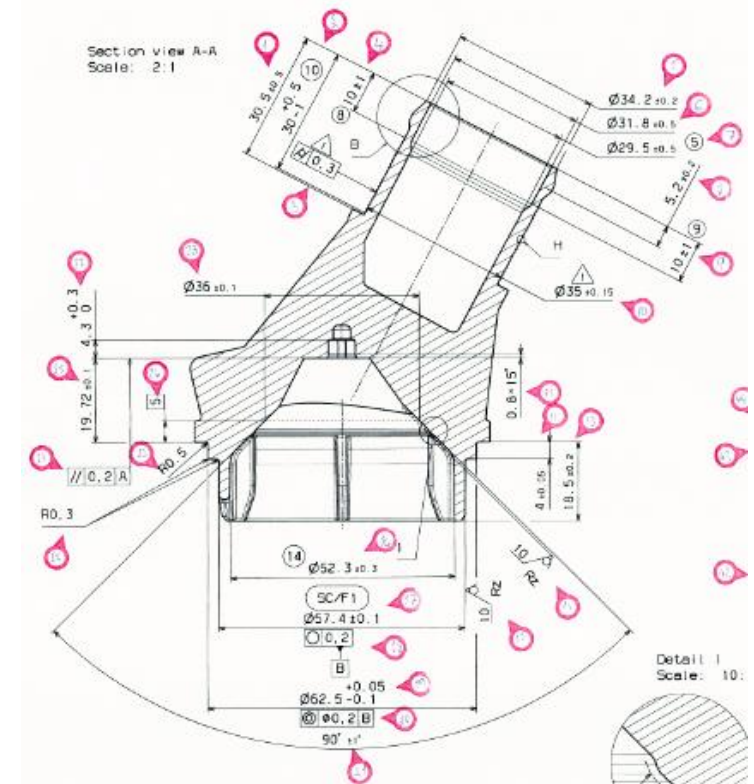
CONTRACTUAL RESEARCH

ITW PRONOVIA

- GD&T
- Dimensional inspection
- Reverse engineering



| Element | Property | Nominal | Actual | Tol - | Tol + | Dev | Check | Out |
|----------------------------|----------|---------|---------|--------|--------|--------|-------------------------------------|--------|
| DIM 21.∠XZ | ∠XZ | +90.00° | +88.63° | -1.00° | +1.00° | -1.36° | <input type="checkbox"/> | -0.36° |
| DIM 28.∅ | ∅ | +36.00 | +35.96 | -0.10 | +0.10 | -0.04 | <input checked="" type="checkbox"/> | |
| DIM 68 - Plane X profile 1 | ⤿ | +0.00 | +0.03 | +0.00 | +0.30 | +0.03 | <input checked="" type="checkbox"/> | |
| DIM 68 - Plane X profile 2 | ⤿ | +0.00 | +0.15 | +0.00 | +0.30 | +0.15 | <input checked="" type="checkbox"/> | |
| DIM 68 - Plane Y profile 1 | ⤿ | +0.00 | +0.06 | +0.00 | +0.30 | +0.06 | <input checked="" type="checkbox"/> | |
| DIM 68 - Plane Y profile 2 | ⤿ | +0.00 | +0.05 | +0.00 | +0.30 | +0.05 | <input checked="" type="checkbox"/> | |

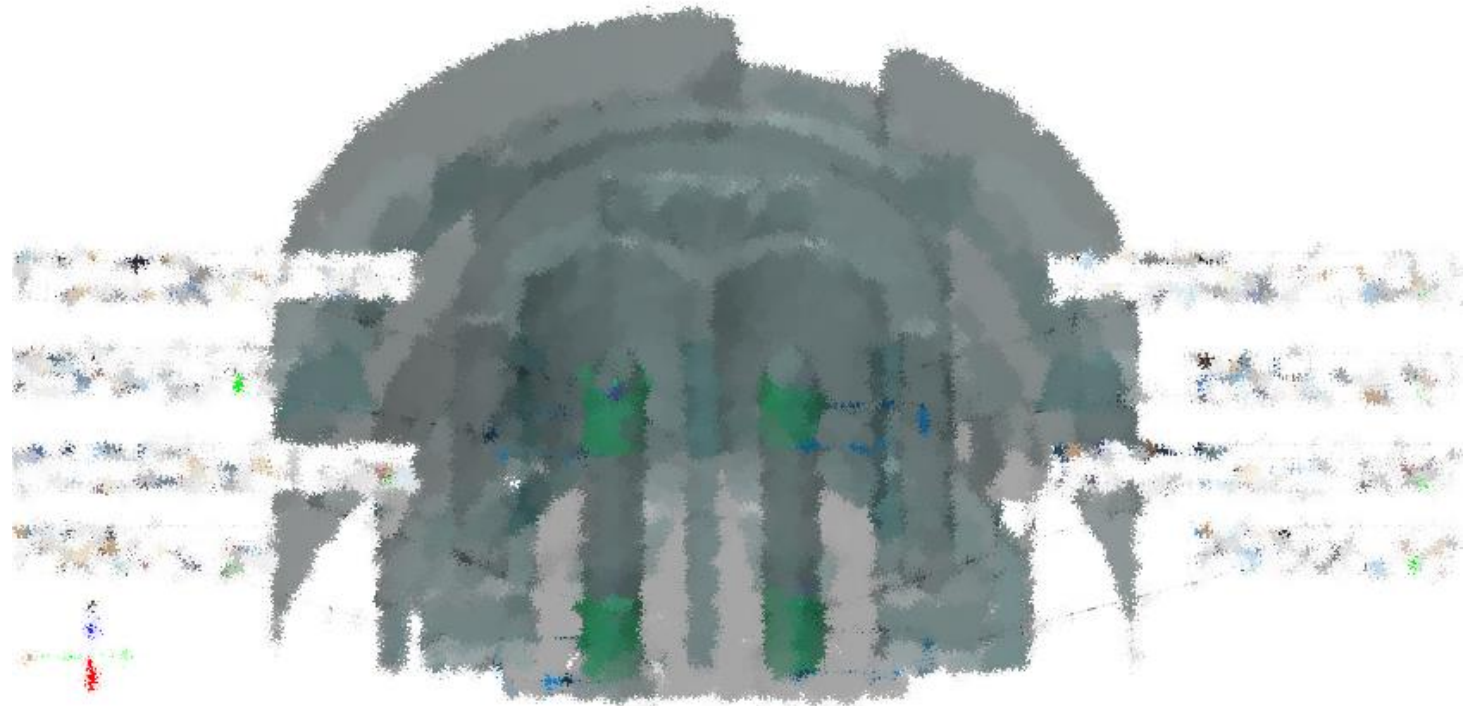
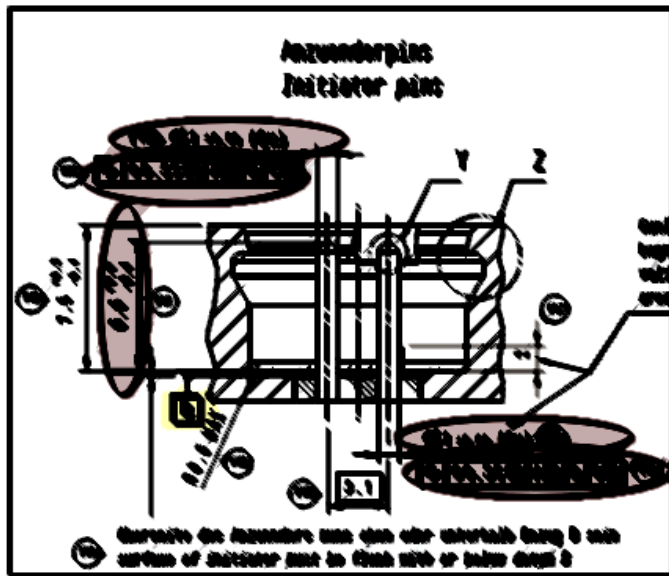


CONTRACTUAL RESEARCH



CEITEC – laboratory of tomography

TRW Automotive GmbH

- GD&T
- Dimensional inspection



FUTURE PLANS IN 2019

- October 2019 Teaching internship on INSA de Lyon (2 weeks)
- TAČR Trend – Žďas a.s. 2020 – ~~2023~~ 
- ~~TAČR Zéta – Mico s.r.o. 2020 – 2022~~ 
- ~~2021 Research internship (University of Bonn ?)~~
- Since August 2020 maternity leave







ROSA NOCTURNA - the best of Winter Voices III (camera...)
4:57
Rosa Nocturna



ROSA NOCTURNA - Vteřiny (ft. Ereis Rayann)
4:55
Rosa Nocturna



ROSA NOCTURNA - Světloňoš (Live Masters of rock 2023)
5:10
Rosa Nocturna



ROSA NOCTURNA - Touhy v mlze
5:27
Rosa Nocturna



ROSA NOCTURNA - Padám (home lockdown video)
3:26
Rosa Nocturna



ROSA NOCTURNA - Strach (Melodka 2021 live)
3:42
Rosa Nocturna



ROSA NOCTURNA - O lásce, o válce a o krvi (Official video)
8:05
Rosa Nocturna




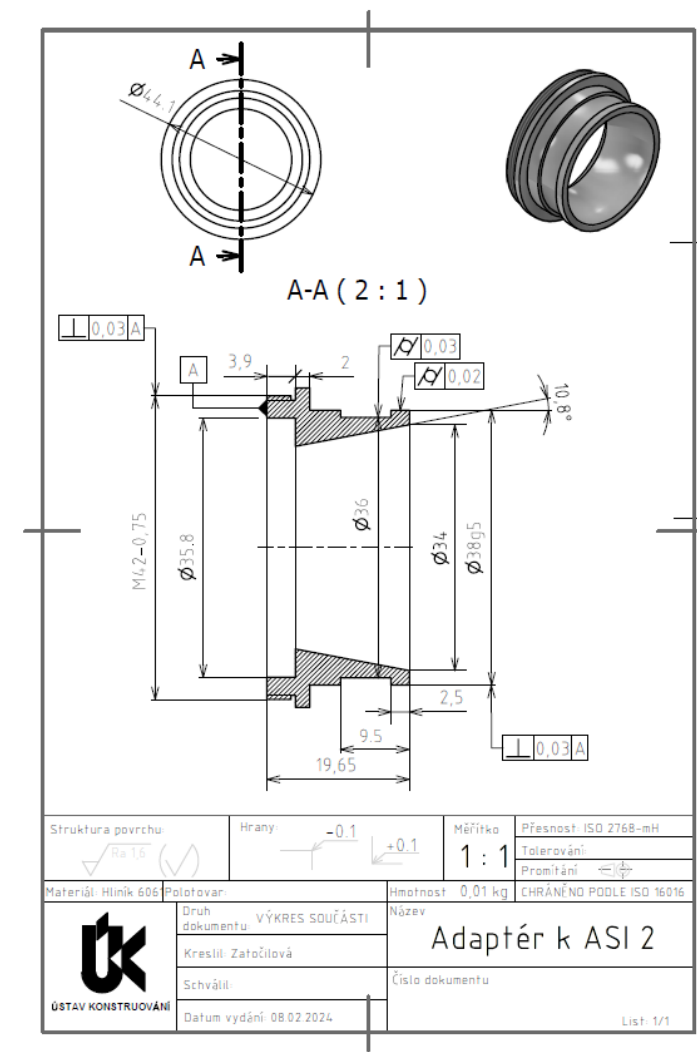
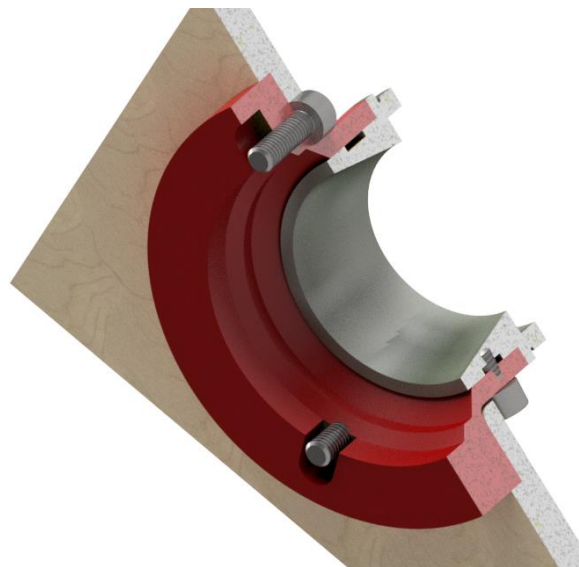
ROSA NOCTURNA - Dimitto Tibi (Melodka 2021 live)
3:52
Rosa Nocturna

MATERNITY LEAVE

- Wepuco Pahnke s.r.o, Amest s.r.o., CAMEA Technology, a. s.
- 3Dees systems cooperation – reverse engineering
- Teaching: 20 – summer: 1x 6KM, 1x RS1 + 2x 2K(P), 1x 6KM(P)
– winter: 4x 3CD, ZRI (P)+Koutecký, Hurník
2023 – summer: 2x 4KC

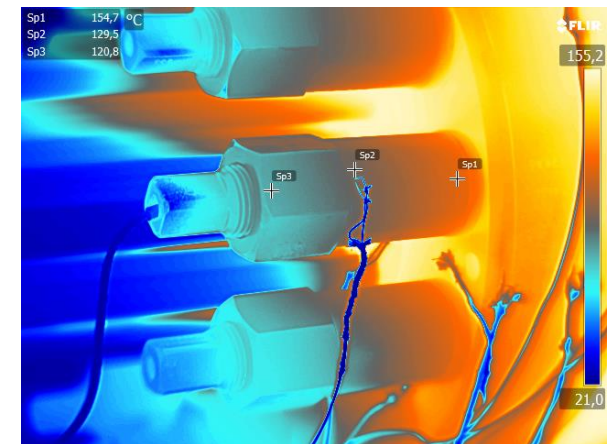
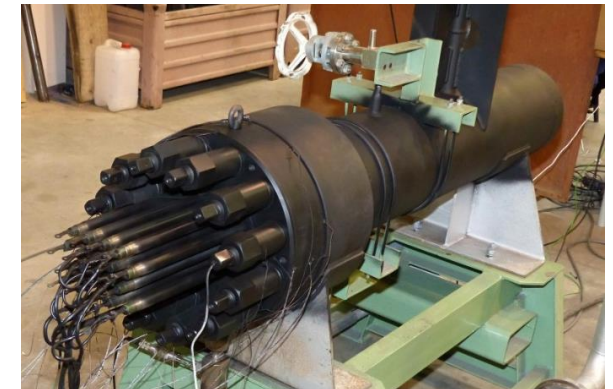
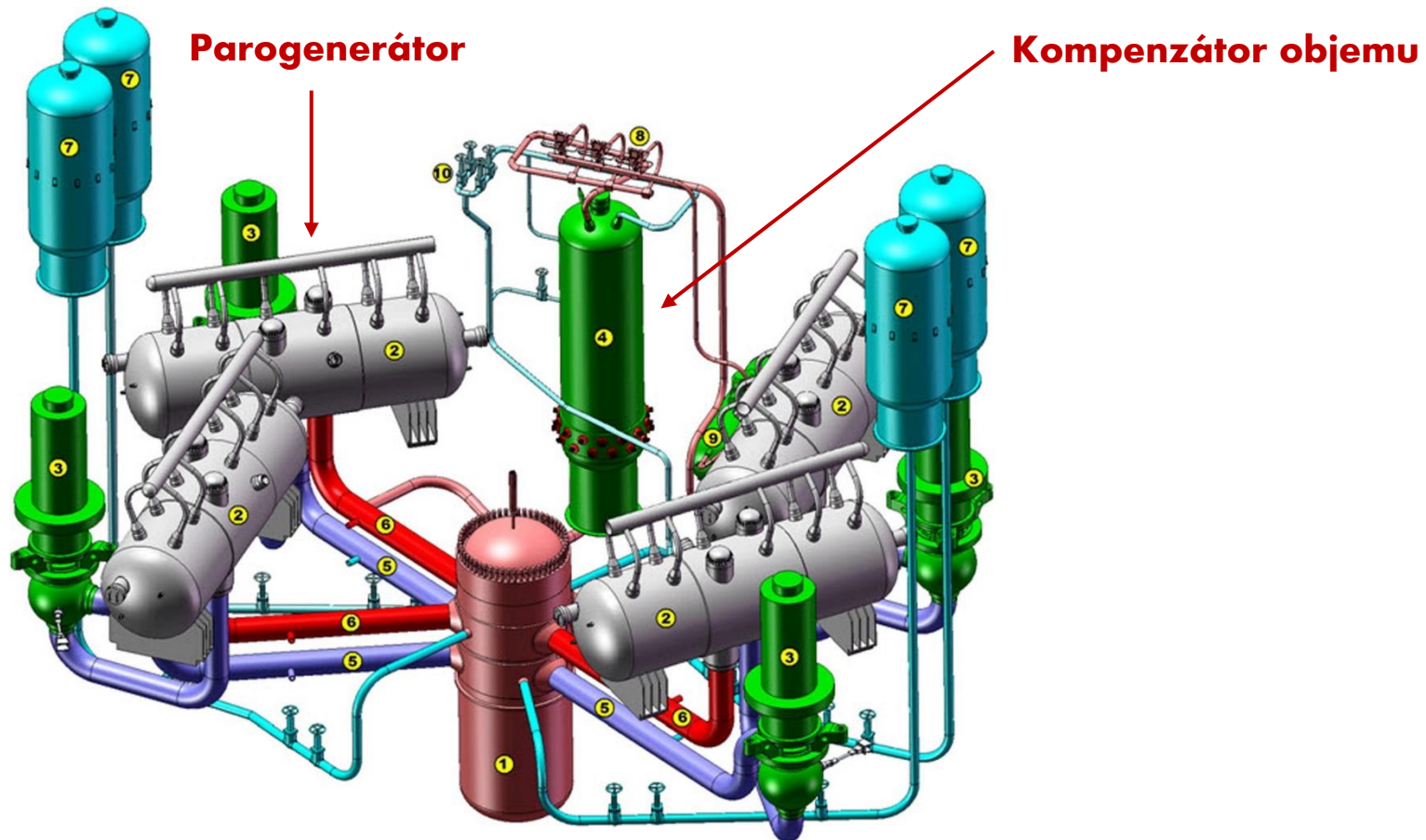
2024 – 2029 INTER-ACTION LUAUS24

Zkoumání fyzikálních procesů určujících koronální struktury a zdroje slunečního větru na základě pozorování záření těžkých iontů během úplných zatmění slunce 



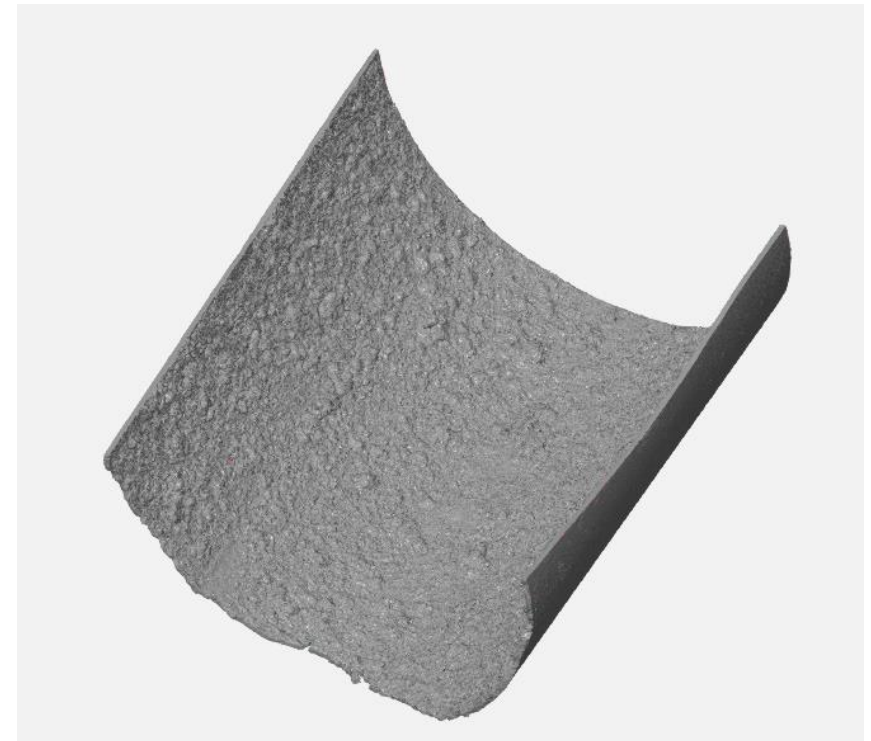
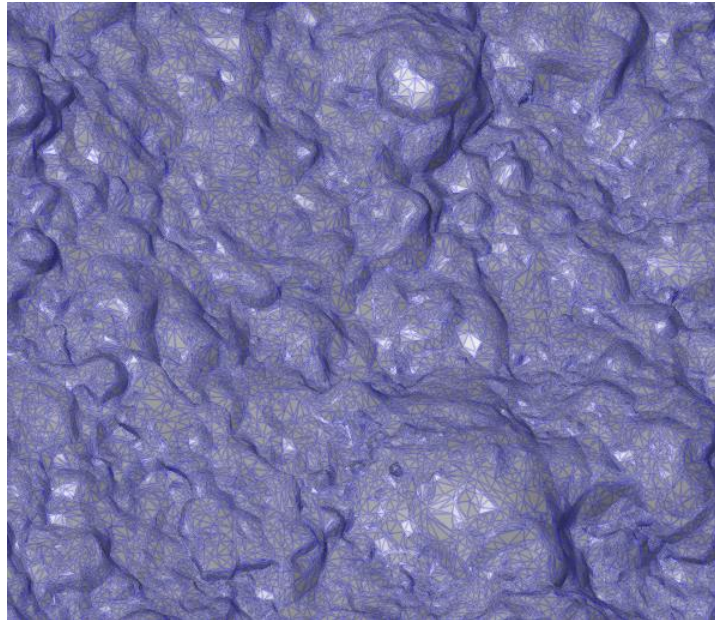
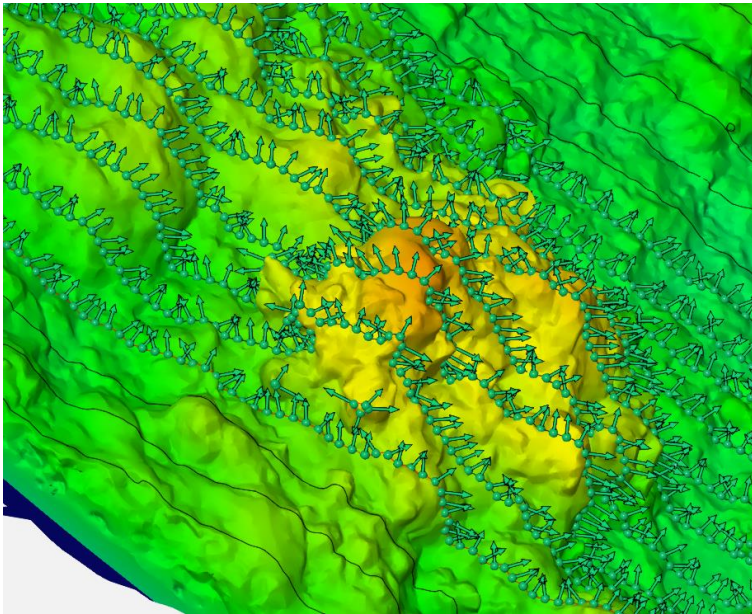
2024-2027 TAČR TREND TA1324S08000E

Vývoj flexibilních průmyslových parních turbín pro moderní energetiku TAČR TREND -
Technologičtí lídři - od února



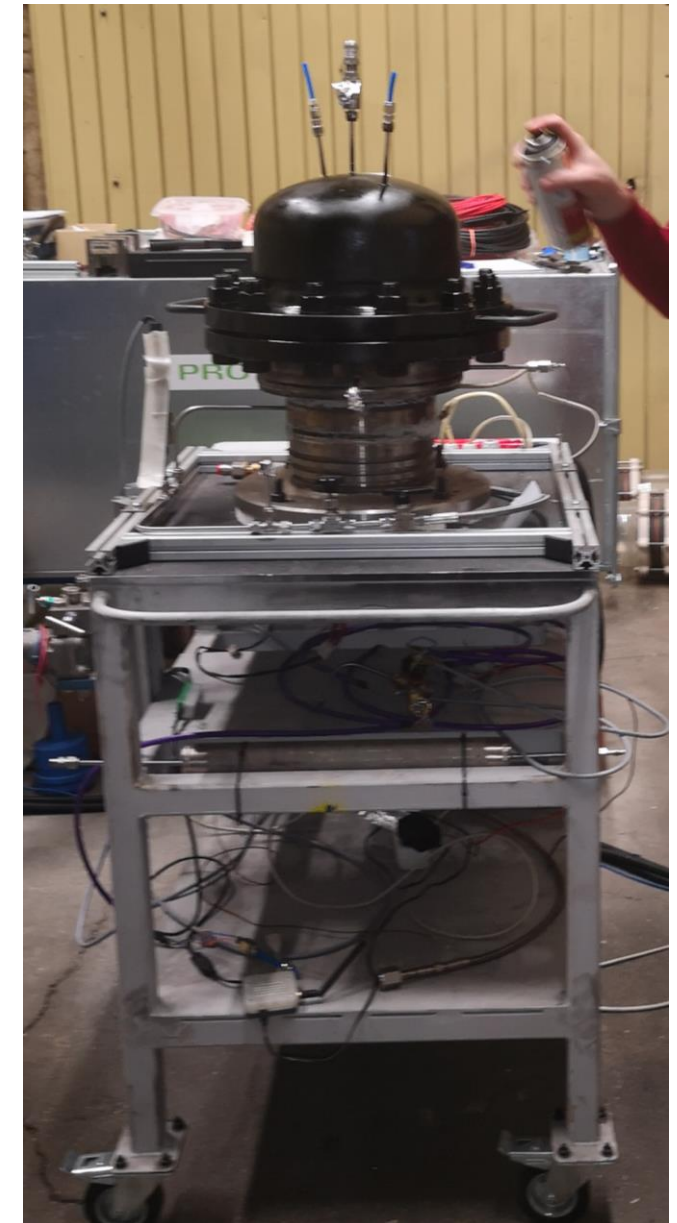
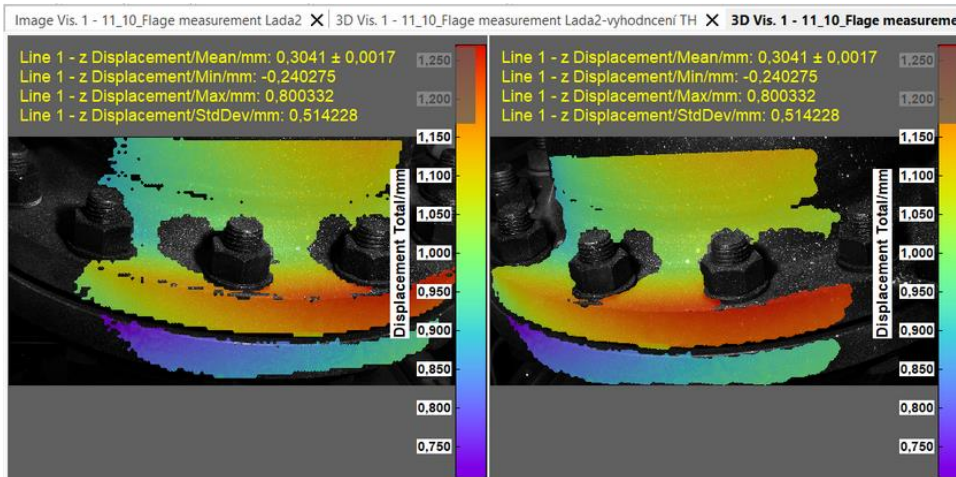
2024-2027 TAČR TREND TA1324S08000E

- Zpracování digitálních dat potrubí pro výpočty pomocí Comsol – problém s velikostí souboru – převod do STEP?, tloušťka vrstvy v pol. s.s. export bodů do excel atd.
- Model \varnothing 600 mm délka 100m

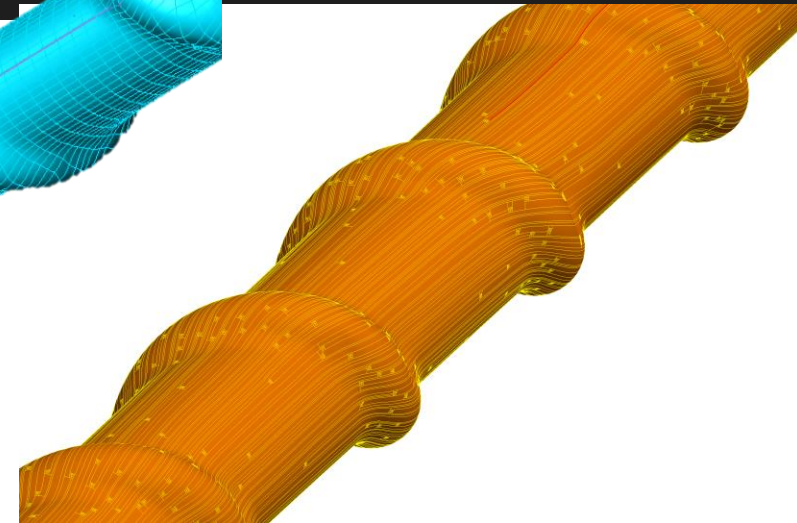
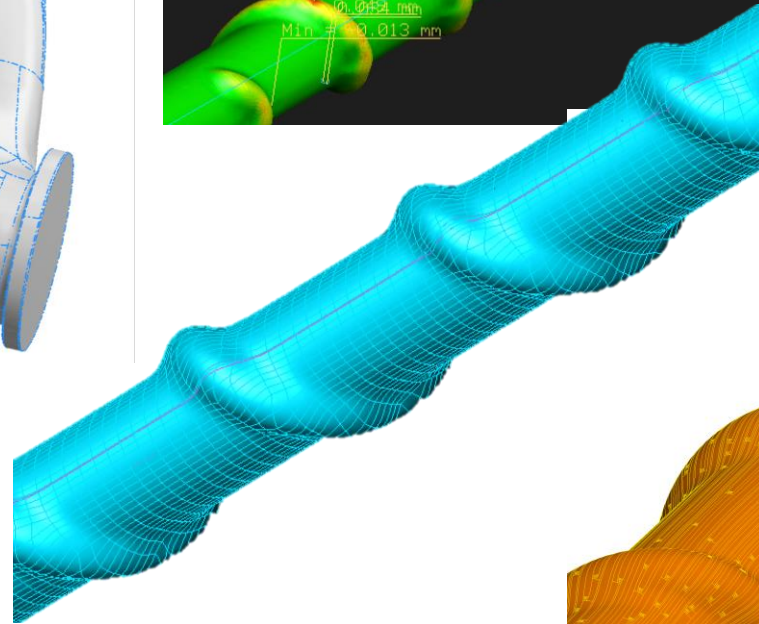
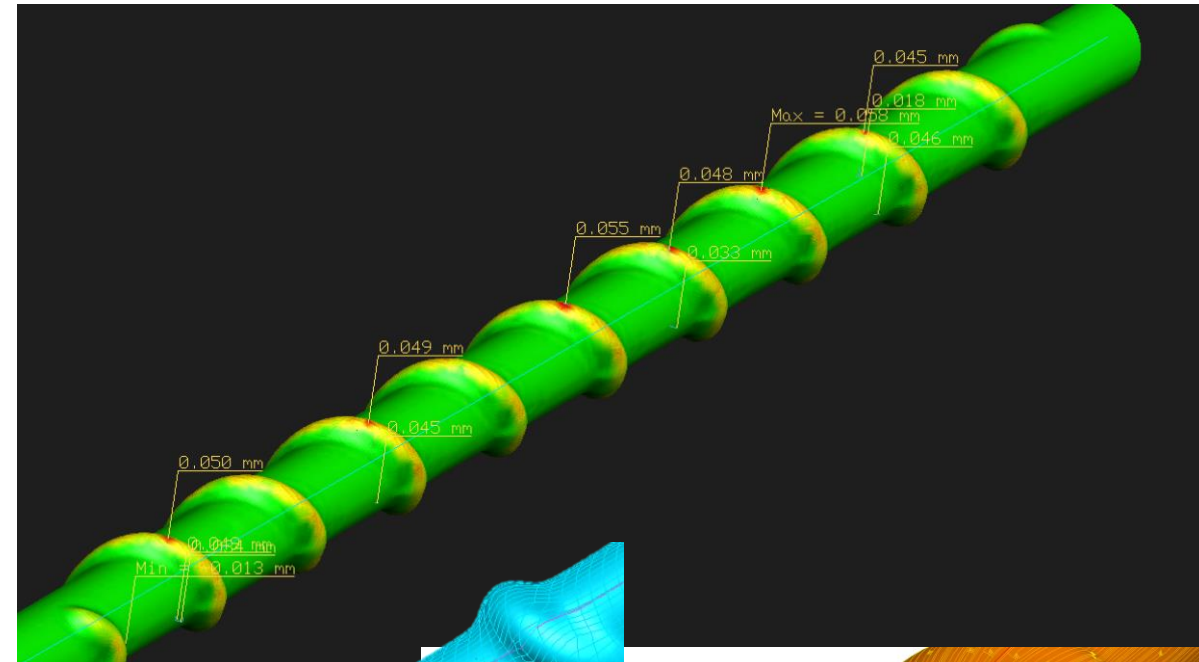
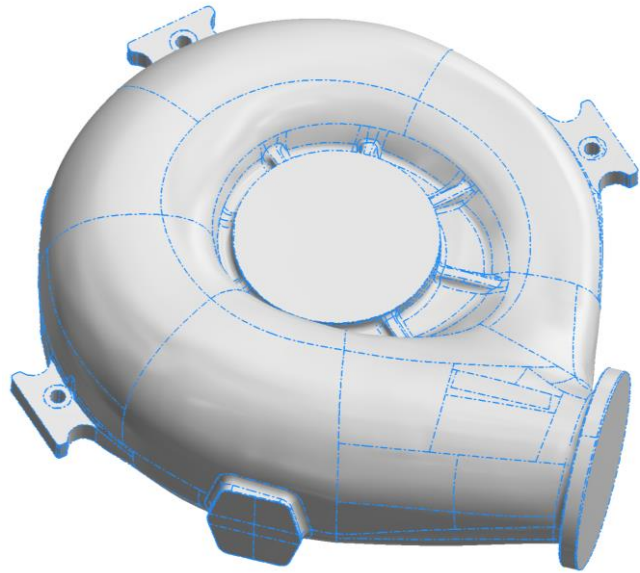
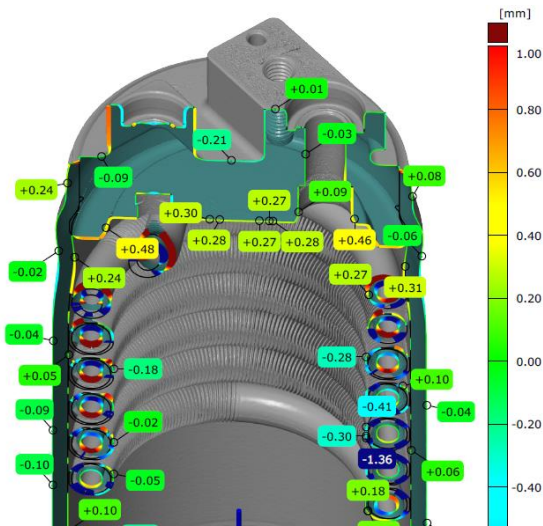


SPOUPRÁCE S Ú.E. ŠNAJDÁREK

- Kontrola dilatací příruby při použití různých těsnění
- Měření na stendech VUT (Šnajdárek), MICO s.r.o., při různých zátěžných podmínkách (teplota, tlak), monitorování úniku média
- Návaznost na publikaci:
A gasket design suitable for helium circuits of generation IV Gas-Cooled reactors Marek Staf [a](#),* , Ladislav Šnajdárek [b](#), Tomáš Hlinčík [a](#)



HS - RŮZNÉ



TEACHING ACTIVITIES 2020 VS 2024

WINTER

- ZRI-A – 3D optická digitalizace a inspekce strojních dílů (+Kotecký, Hurník)
- 3CD – CAD (Inventor)
- ZRS – Řízení projektu (+ Koutný)
- ~~■ (ZKP – Týmový projekt)~~
- ~~■ RS1 – 3D digitální technologie a CAD (Mechanika těles) (+Koutecký)~~

SUMER

- ~~■ (ZIP – Konstrukční projekt)~~
- ~~■ 6KM – Solidworks a 3D tisk~~
- 4KC – Konstruování strojů a CAD

VISIONS AND PLANS

- Development of cooperation with ÚM and ÚE
- Recycling of INTER-ACTION LUAUS24
- Active search for new partners (HS, research)
- Interreg DiST (2024 – 2027)
- Searching for new reaserch area...

15.

**Shadow-
Expedition**

tracking

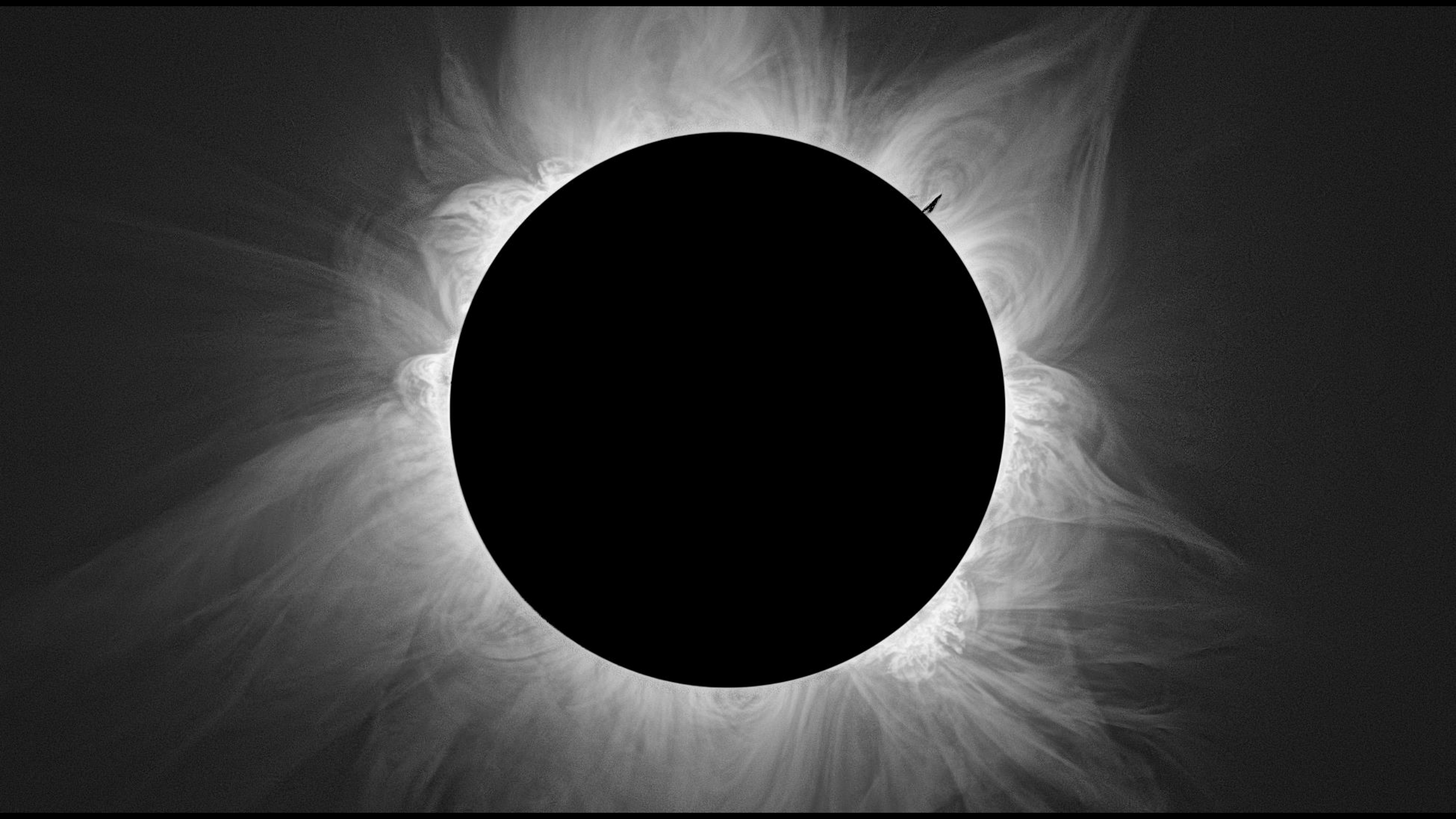


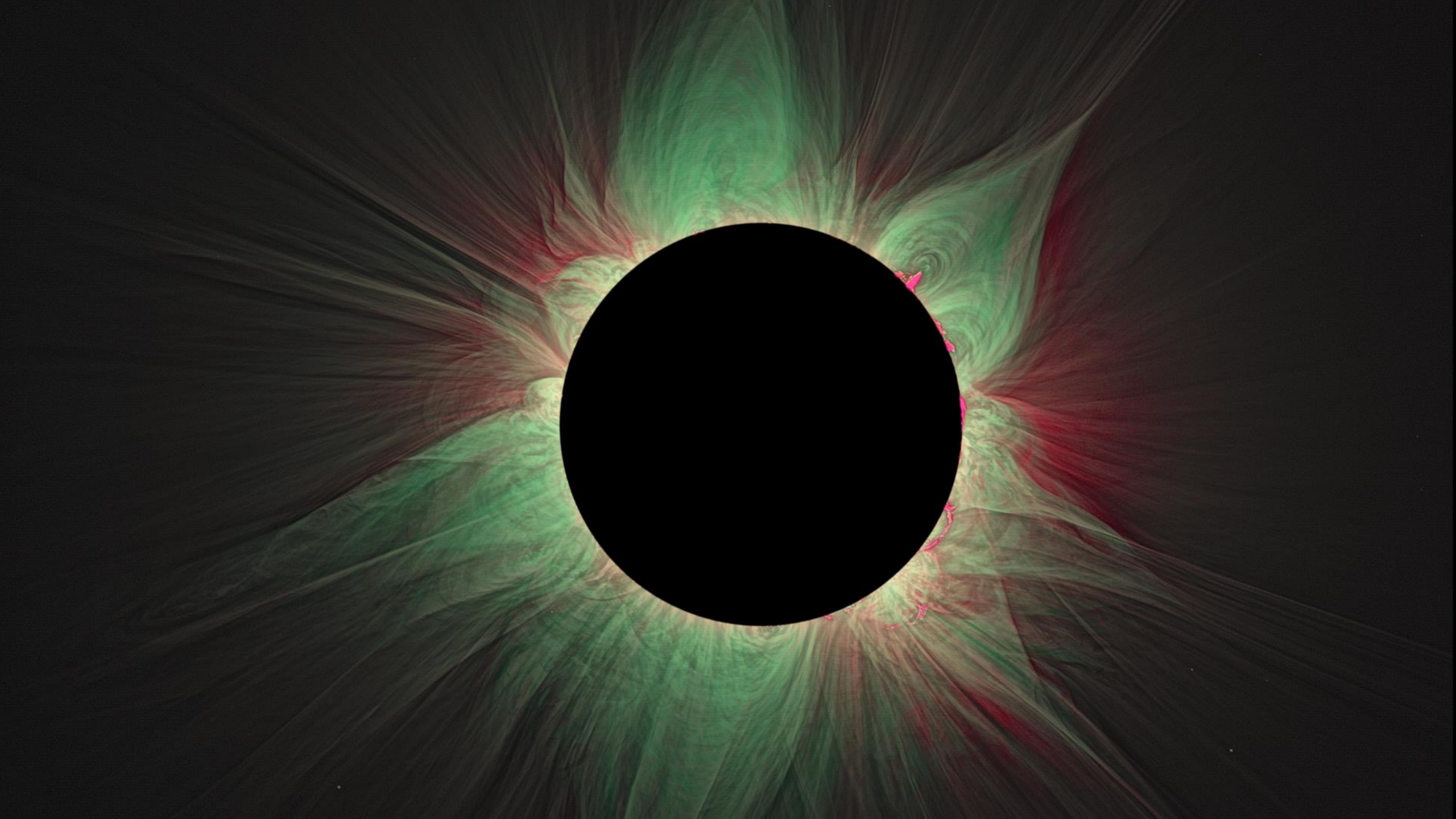
Mexico

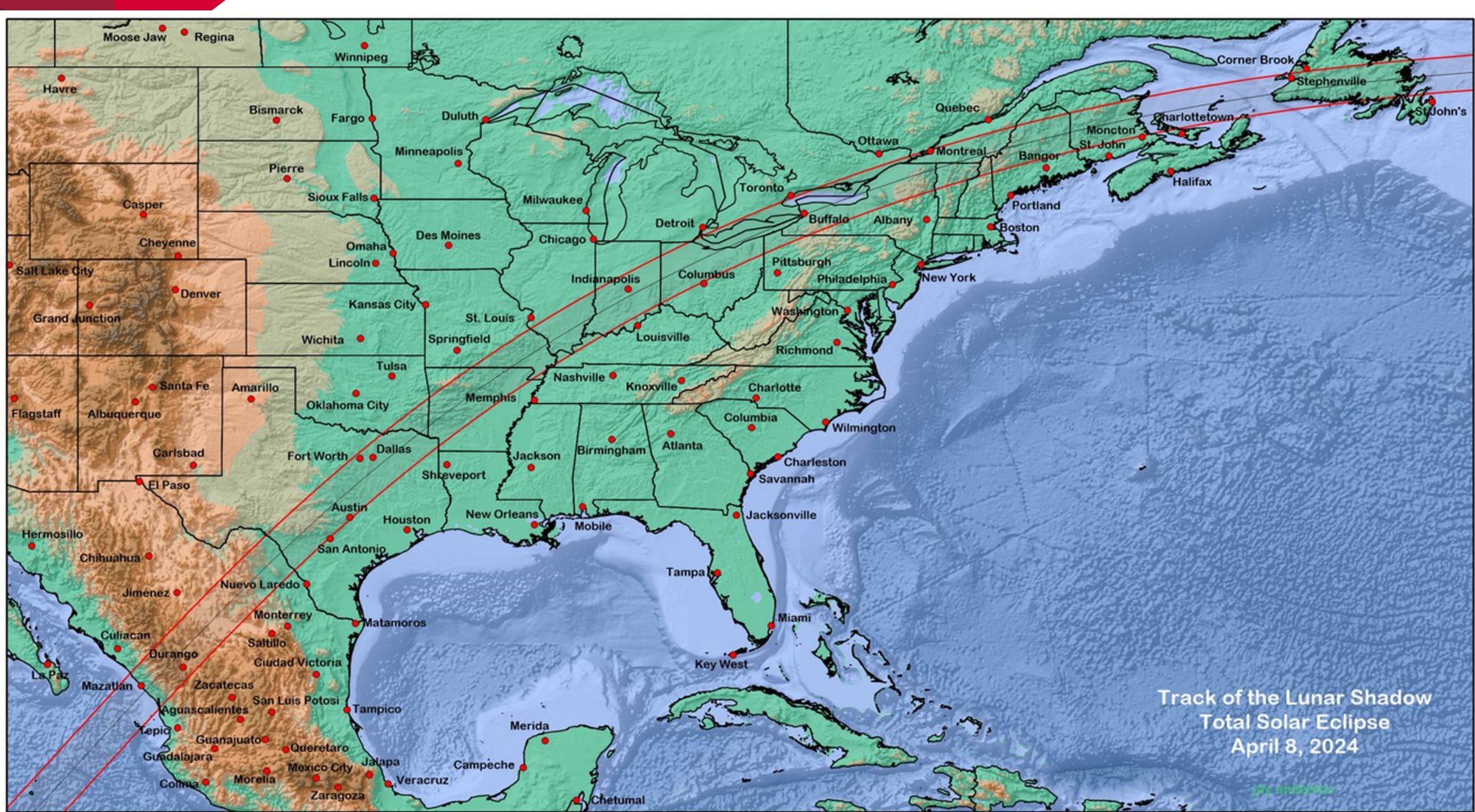
USA

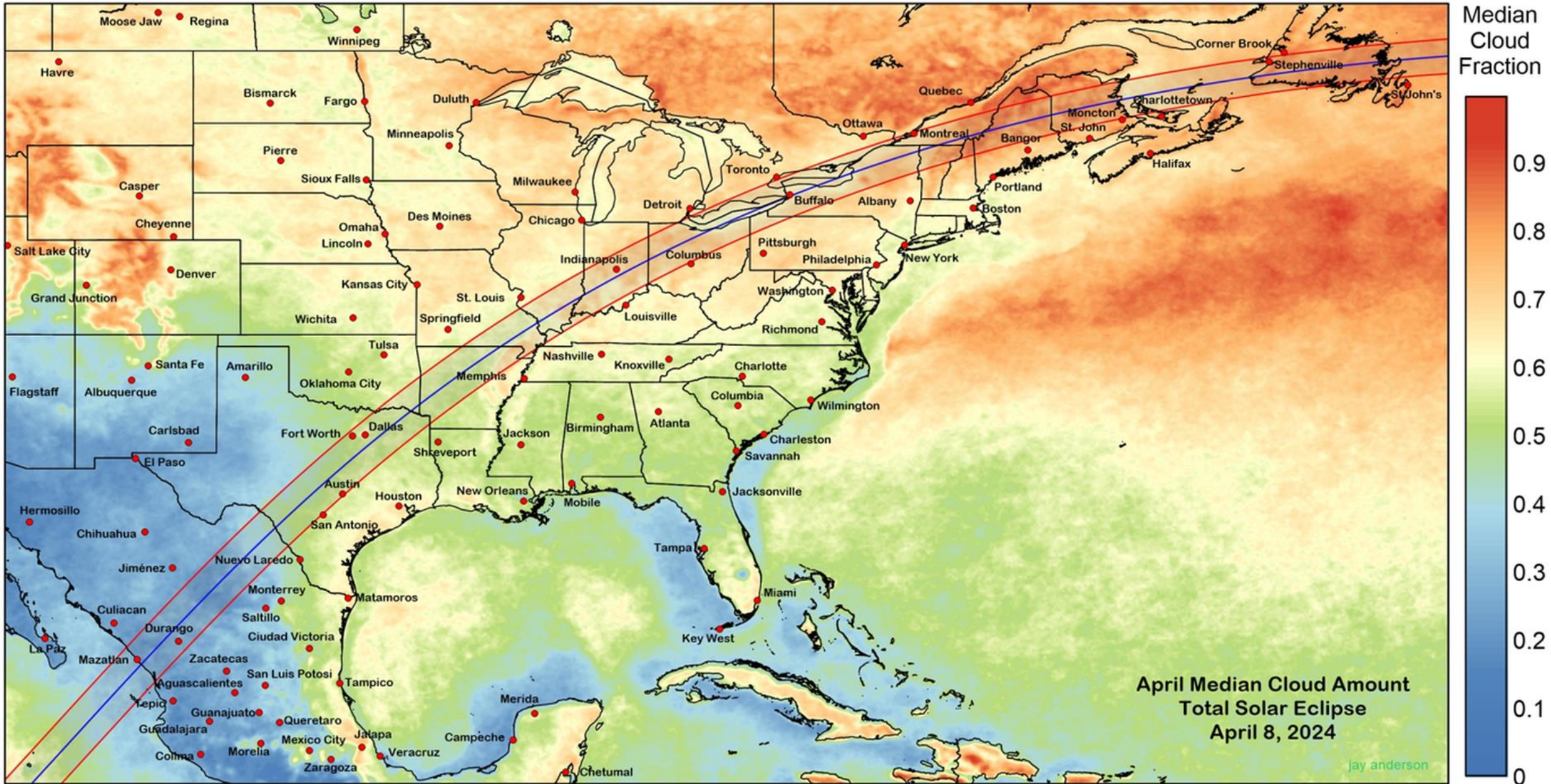
8. 4. 2024

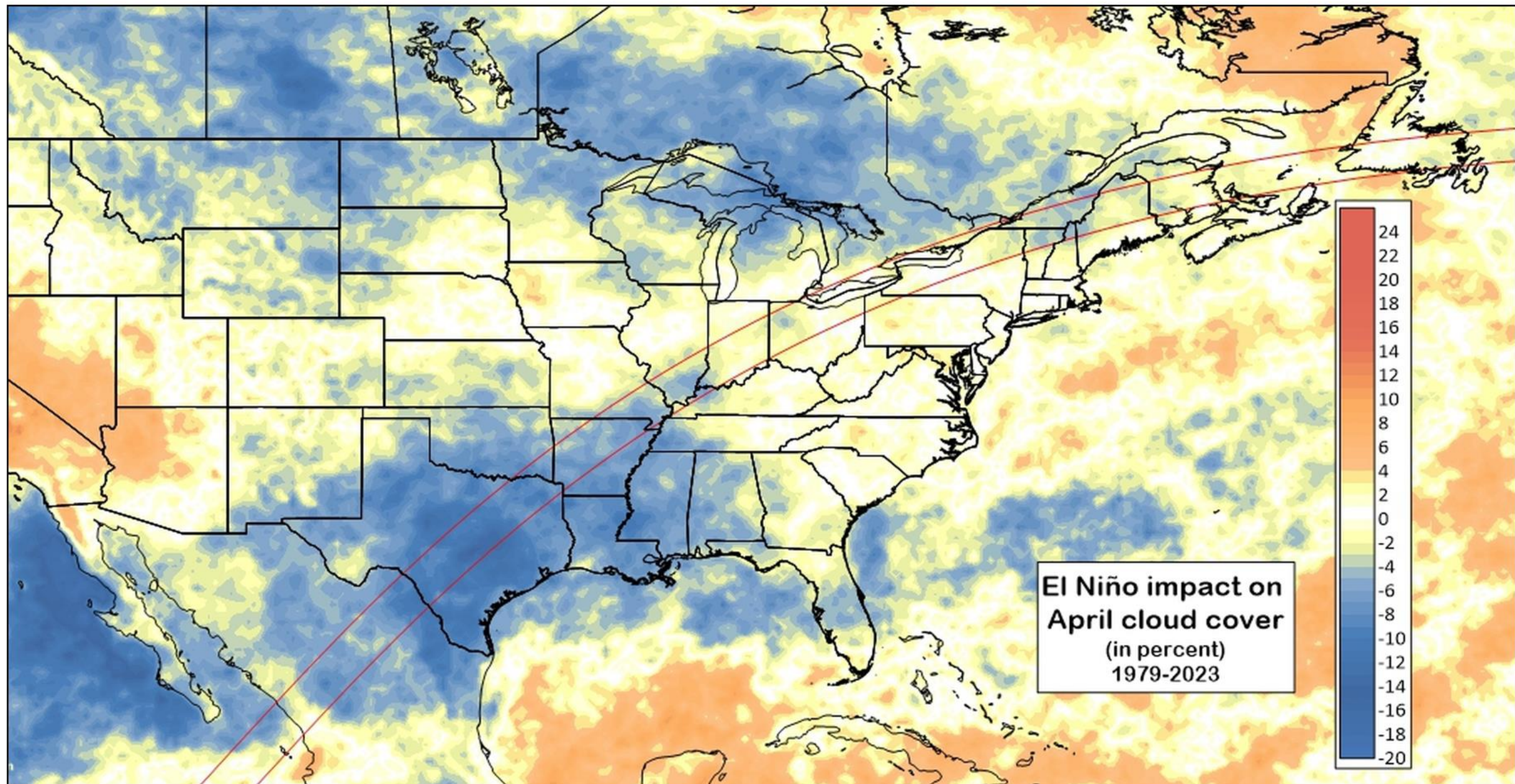
- 
0. 1999 Maďarsko
 1. 2005 Jižní Pacifik - loď
 2. 2006 Lybie, Turecko
 3. 2008 Mongolsko, Rusko
 4. 2009 Marshallovy ostrovy
 5. 2010 Francouzská Polynésie
 6. 2012 **Austrálie**
 7. 2013 **Keňa**
 8. 2015 Špicberky, **Faerské ostrovy**
 9. 2016 **Indonésie**
 10. 2017 USA
 11. 2019 Chile, Argentina
 12. 2020 **Chile**
 13. 2021 **Severní oceán - loď**
 14. 2023 Austrálie

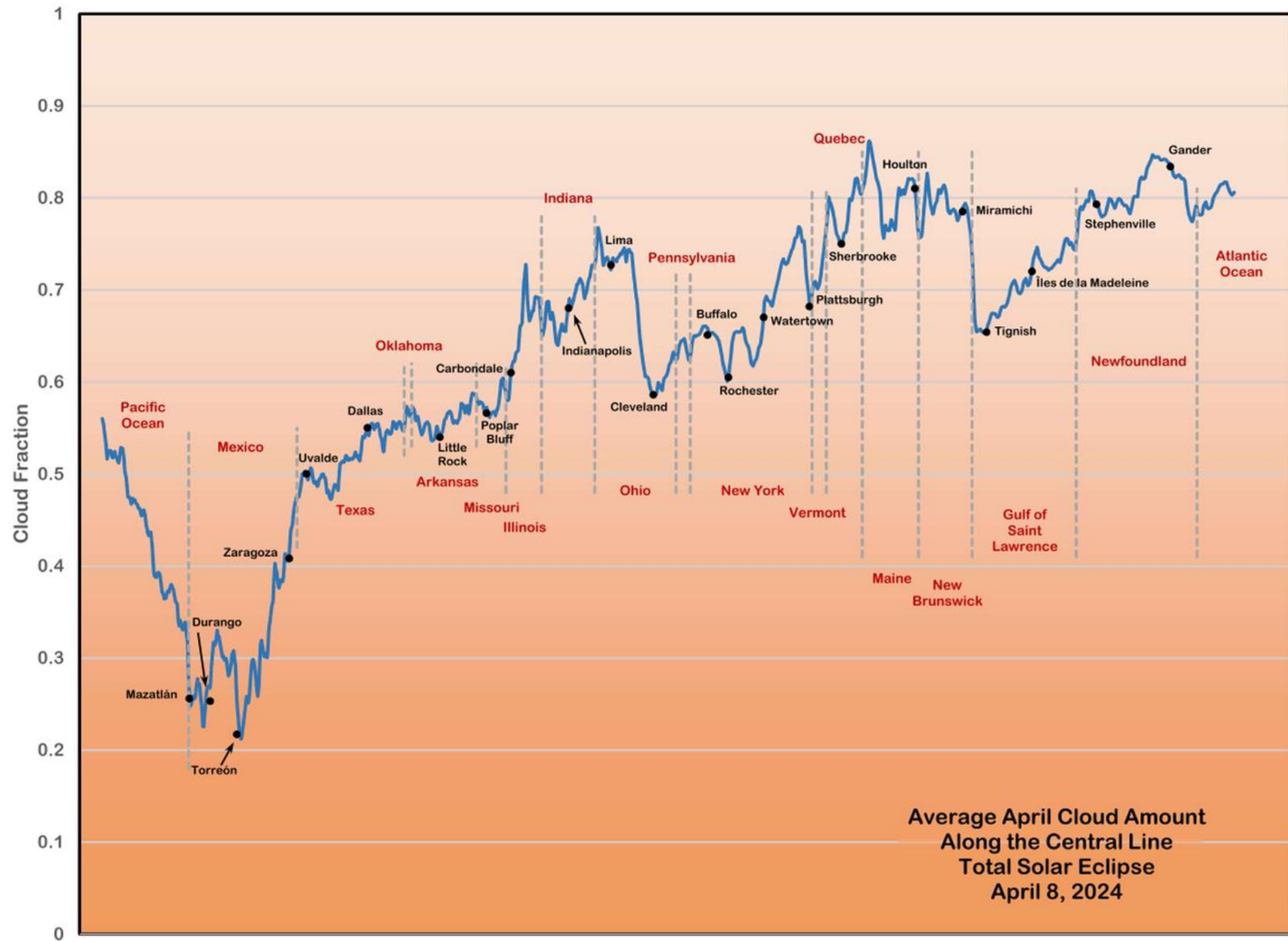




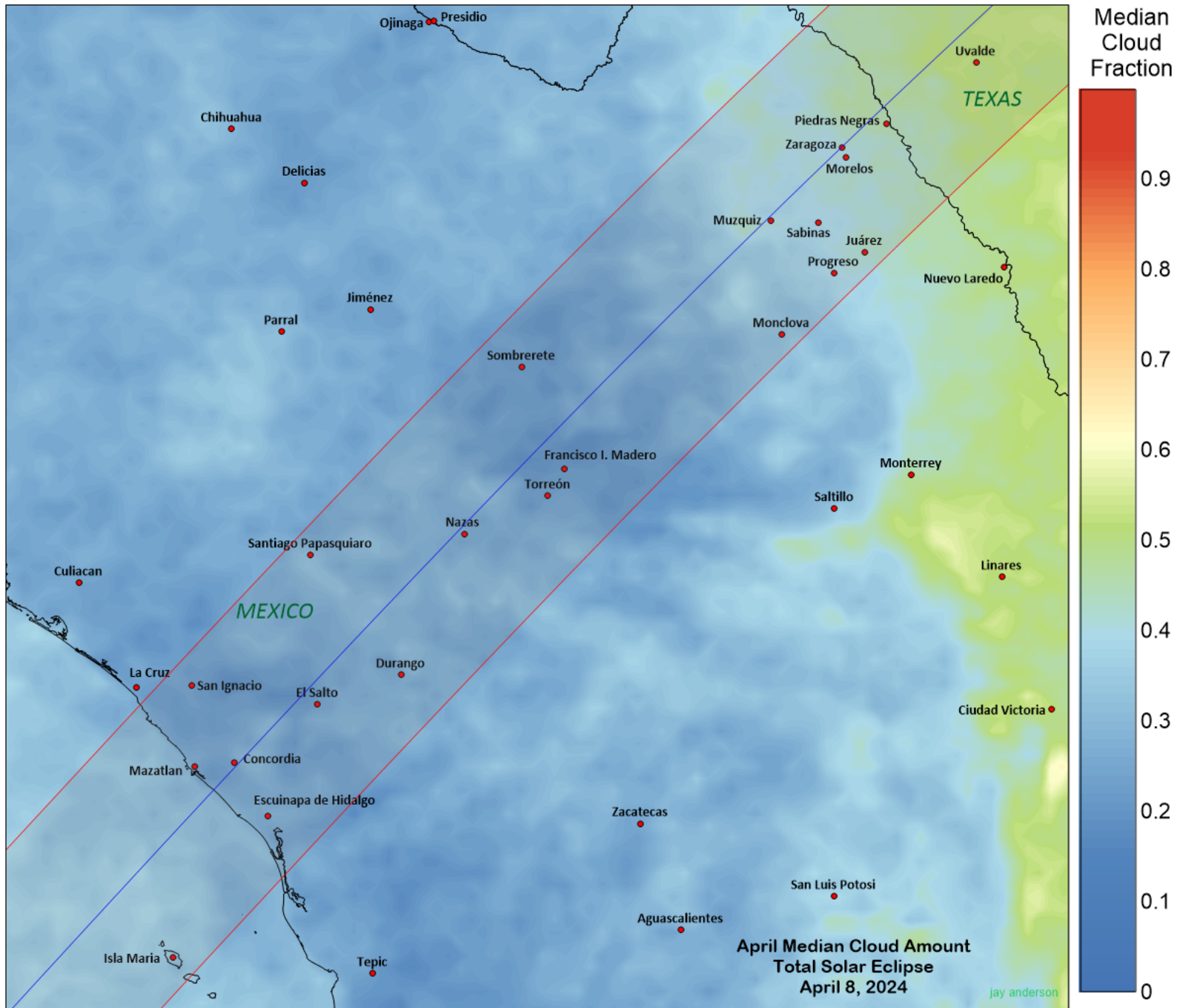


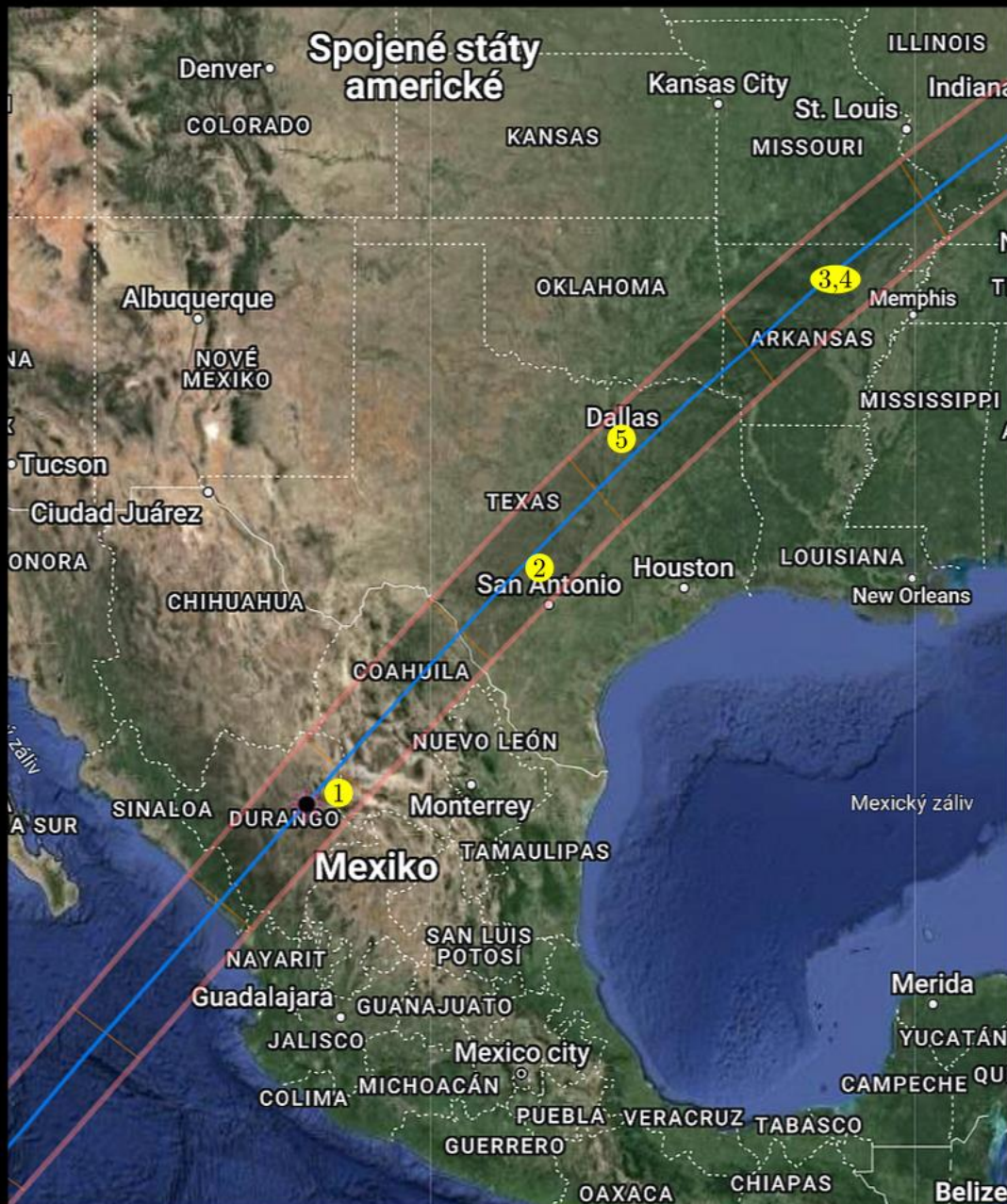






Average April Cloud Amount
 Along the Central Line
 Total Solar Eclipse
 April 8, 2024





5 pozorovacích míst:

- 3,4** Sims, Arkansas
 - jedno pevné místo
 - jedno mobilní místo

v 18:48 UT, délka zatmění 4 min 17 s
- 5** Dallas, Texas
 - kolegové z Hvězdárny v Úpici

v 18:40 UT, 3 min 50 s
- 2** Kerrville, Texas
 -

v 18:32 UT, 4 min 24 s
- 1** Torreón, Mexiko
 -


v 18:17 UT, 4 min 11 s

8. 4. 2024 bude v ČR letní čas UT +2

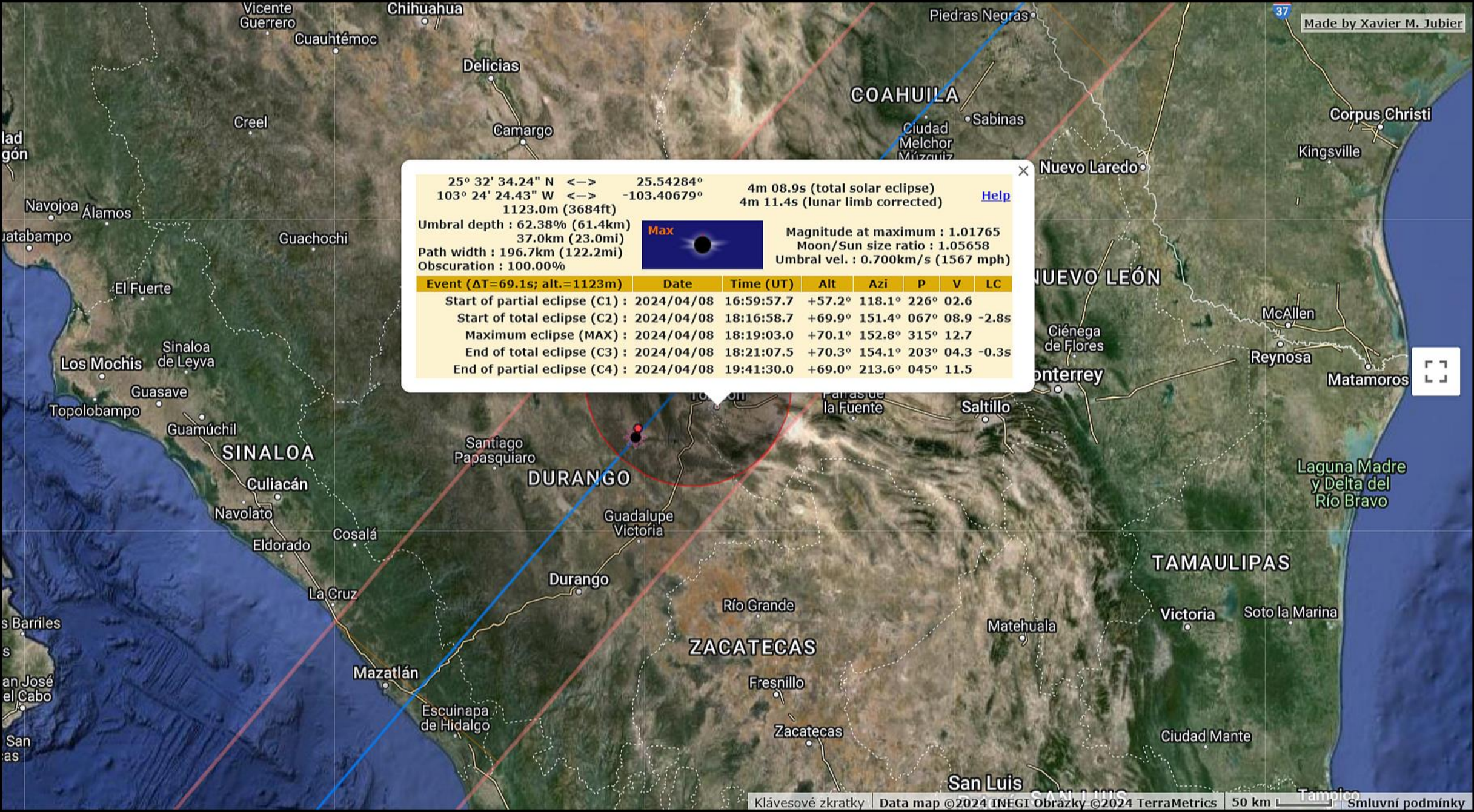
25° 32' 34.24" N <-> 25.54284°
 103° 24' 24.43" W <-> -103.40679°
 1123.0m (3684ft)

4m 08.9s (total solar eclipse)
 4m 11.4s (lunar limb corrected)

Umbral depth : 62.38% (61.4km)
 37.0km (23.0mi)
 Path width : 196.7km (122.2mi)
 Obscuration : 100.00%

Max 
 Magnitude at maximum : 1.01765
 Moon/Sun size ratio : 1.05658
 Umbral vel. : 0.700km/s (1567 mph)

| Event ($\Delta T=69.1s$; alt.=1123m) | Date | Time (UT) | Alt | Azi | P | V | LC |
|--|------------|------------|--------|--------|------|------|-------|
| Start of partial eclipse (C1) | 2024/04/08 | 16:59:57.7 | +57.2° | 118.1° | 226° | 02.6 | |
| Start of total eclipse (C2) | 2024/04/08 | 18:16:58.7 | +69.9° | 151.4° | 067° | 08.9 | -2.8s |
| Maximum eclipse (MAX) | 2024/04/08 | 18:19:03.0 | +70.1° | 152.8° | 315° | 12.7 | |
| End of total eclipse (C3) | 2024/04/08 | 18:21:07.5 | +70.3° | 154.1° | 203° | 04.3 | -0.3s |
| End of partial eclipse (C4) | 2024/04/08 | 19:41:30.0 | +69.0° | 213.6° | 045° | 11.5 | |





1.4



Bobcat

OBJEVTE BOBCAT.

BOB

1.4



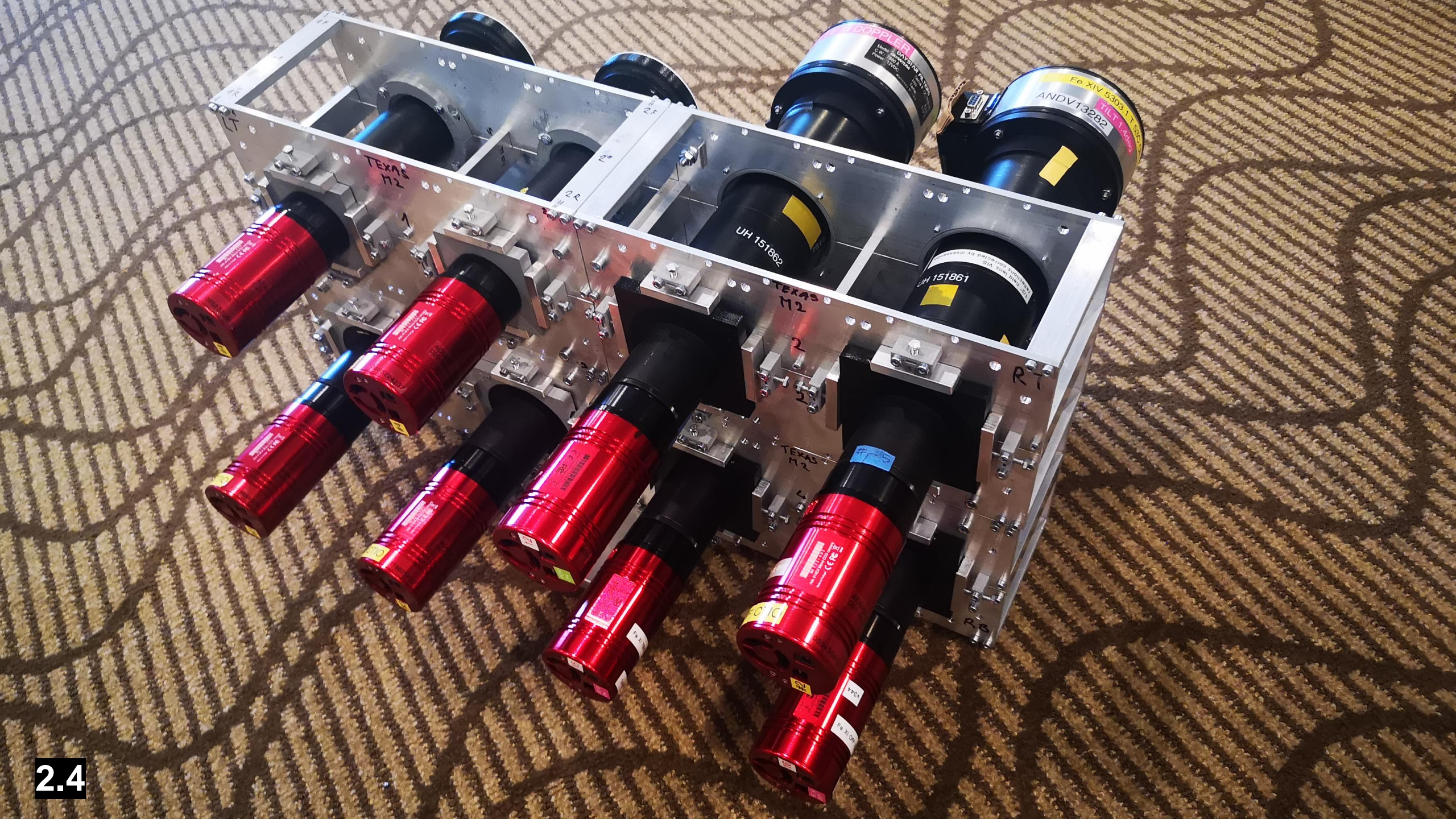
1.4







2.4















3.4















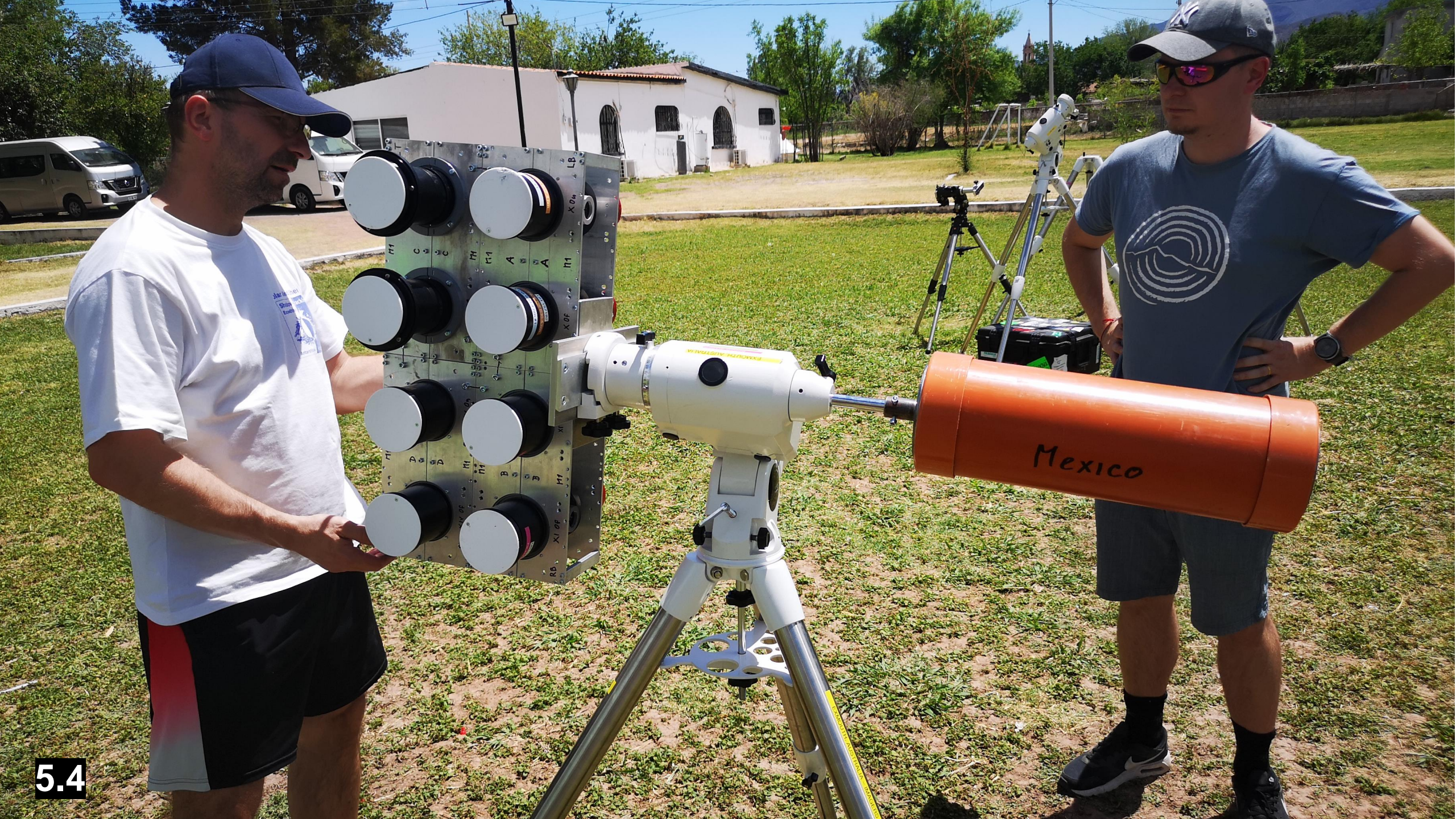






5.4





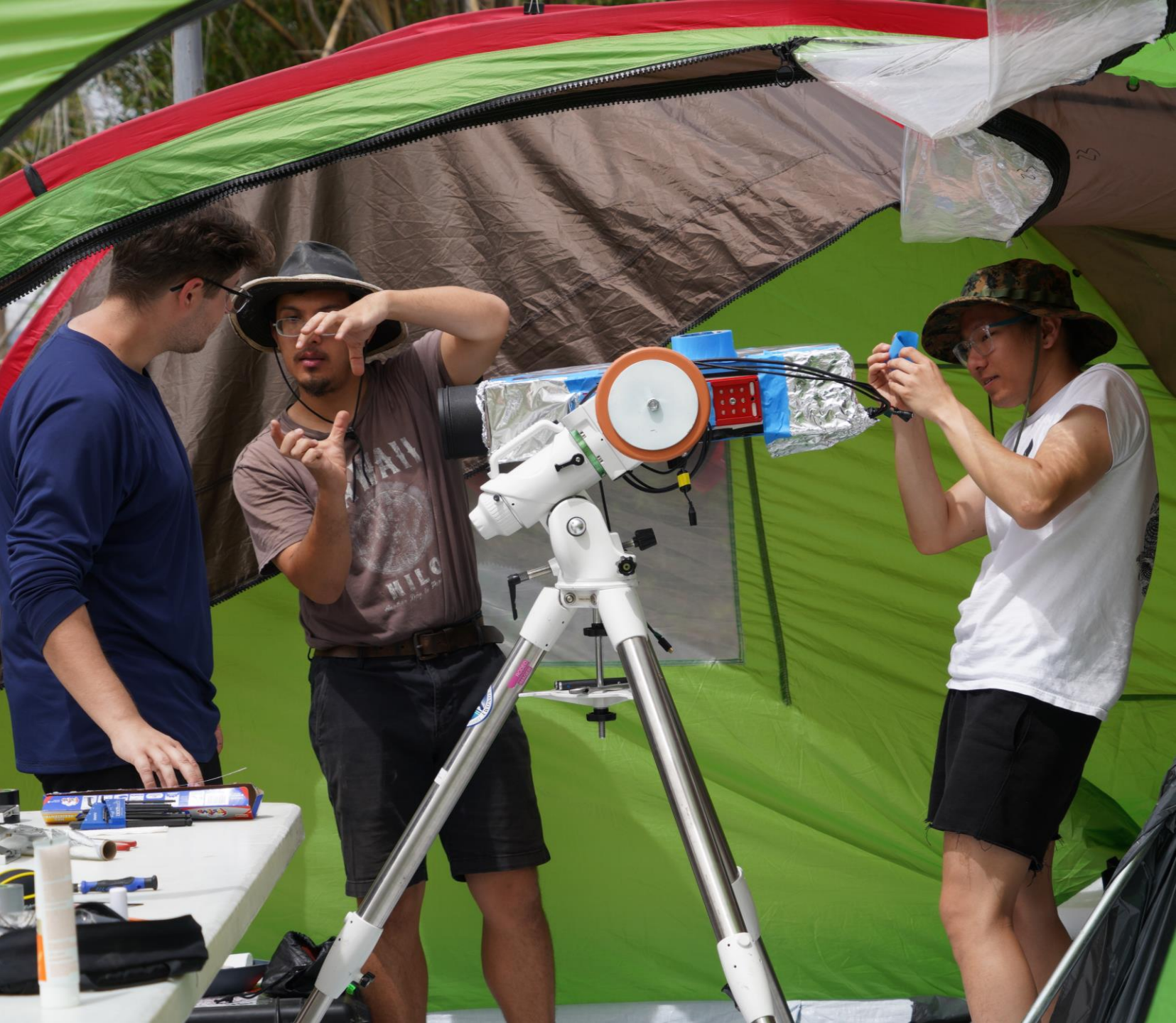
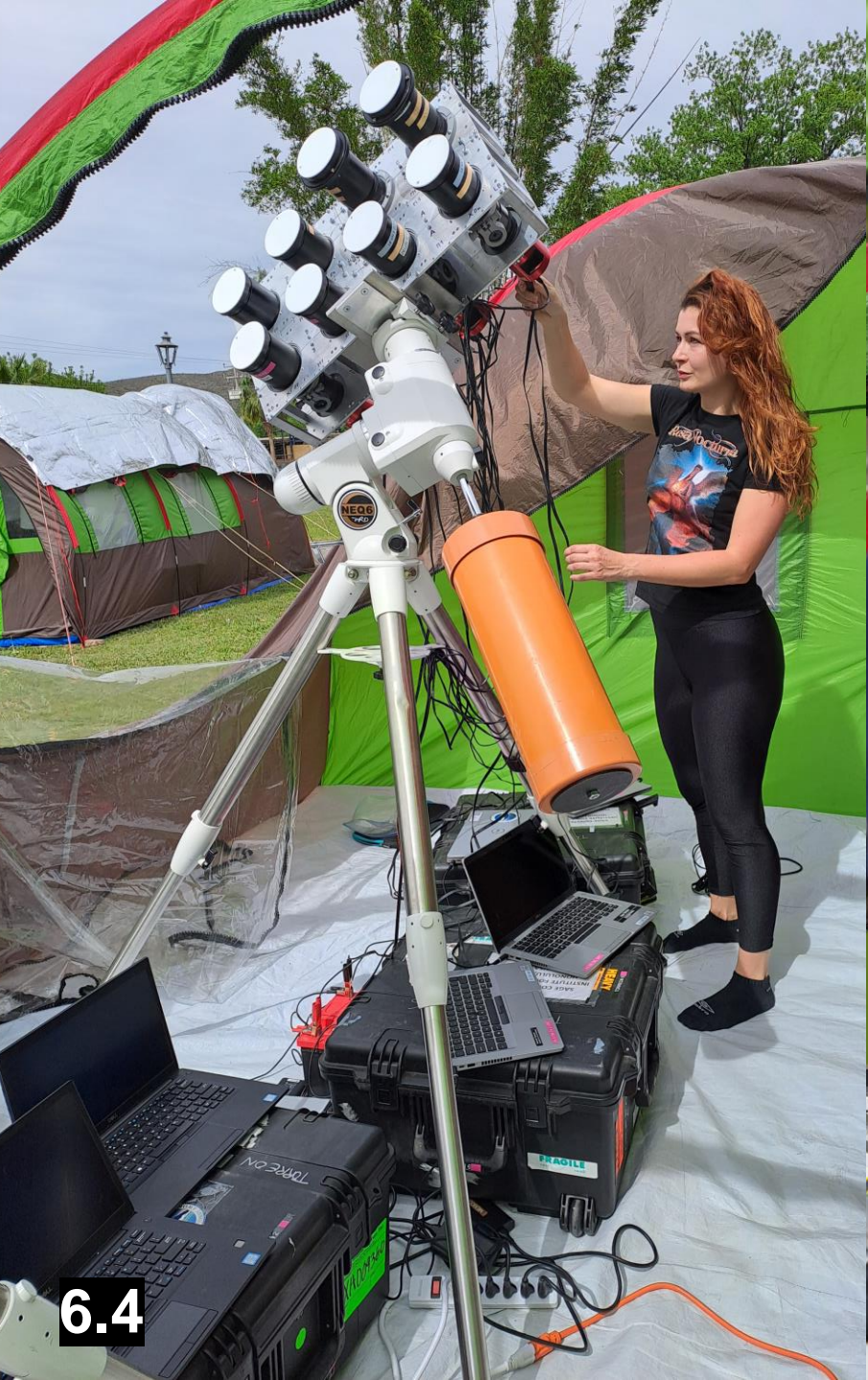


5.4





5.4





6.4



6.4





7.4





7.4













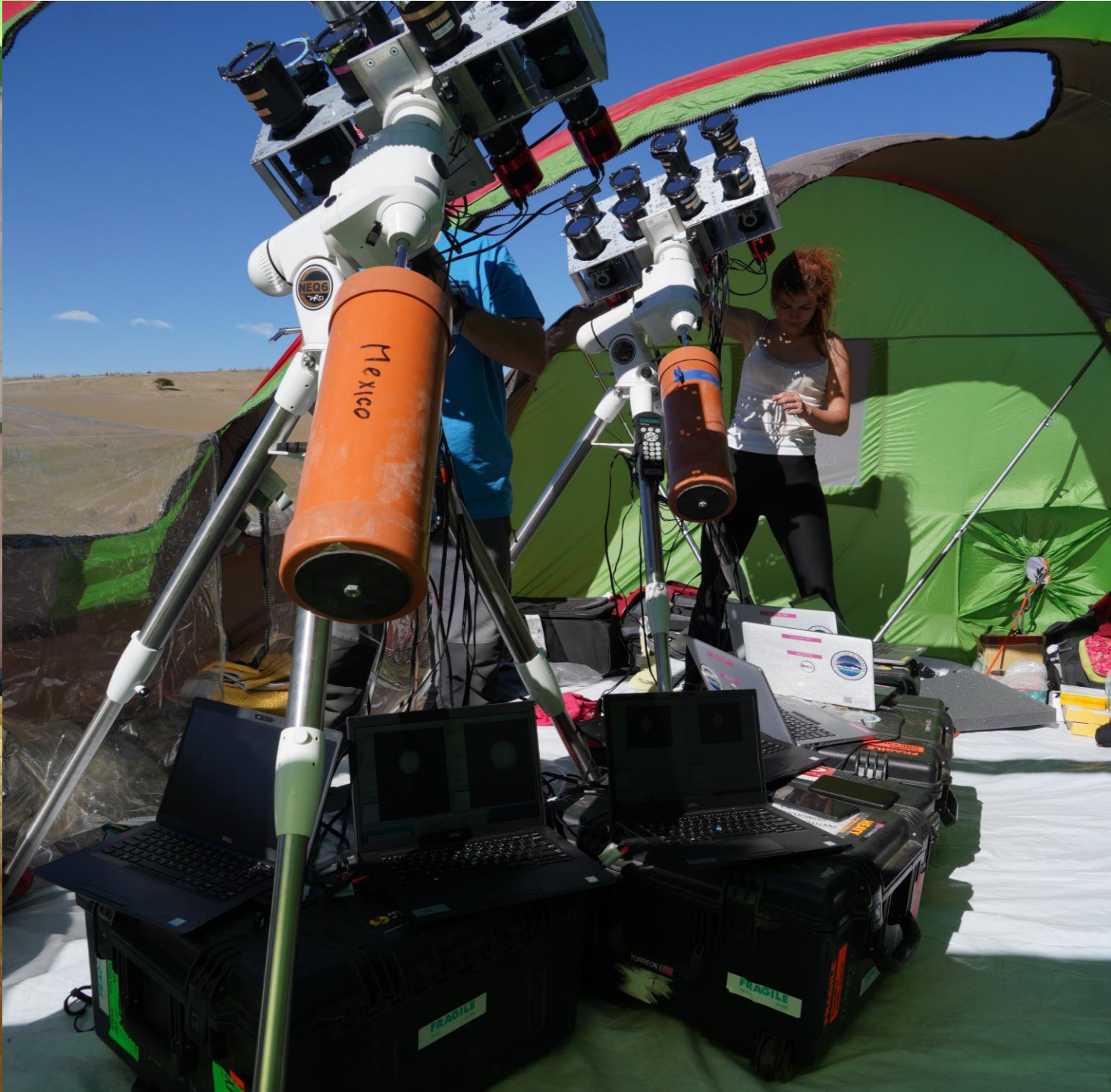




8.4



8.4







8.4





















10.4



10.4





10.4



10.4



11.4







ORION AND CREW HABITAT
ORION TO NASA'S NEW SPACECRAFT FOR ASTRONAUTS

0 MONTHS 0 WEEKS 2 DAYS

Space Center Houston

WE ARE GOING
BACK TO THE

MARS

FOOD LAB

STATION

TRAM TOUR
NASA
JOHNSON SPACE CENTER



11.4

THANK YOU FOR YOUR ATTENTION

Aneta Zatočilová, Ing. Ph.D.

Zatocilova.a@fme.vutbr.cz



INSTITUTE OF MACHINE
AND INDUSTRIAL DESIGN

www.ustavkonstruovani.cz