A bit closer to the stars:
LINC-NIRVANA on its way to First Light

AstroTechTalk 28.04.2017

Thomas Bertram

Outline

1. Installation
2. Comissioning
3. Working at the LBT

Previously…

Aug. 2015

Oct. 2015

Installation Plan

I2	Receipt & Bench Installation dry run	Nov. 15
I3	GWS Alignment / Computing Environment	Jan. 16
I4	Bench & Cryostat Integration	Feb. 16
I5	Warm Optics SX Alignment	Mar. 16
I6	HWS Sensor SX Alignment & loop SX	Apr. 16
I7	Warm Optics DX Alignment	May 16
I8	HWS Sensor DX Alignment & loop DX	May 16
I9	Annular Mirror Alignment	Jun. 16
I10	Cryostat + Instrument Verification	Jun. 16
I11	Installation at Instrument Platform	Jul. 16

Installation Plan

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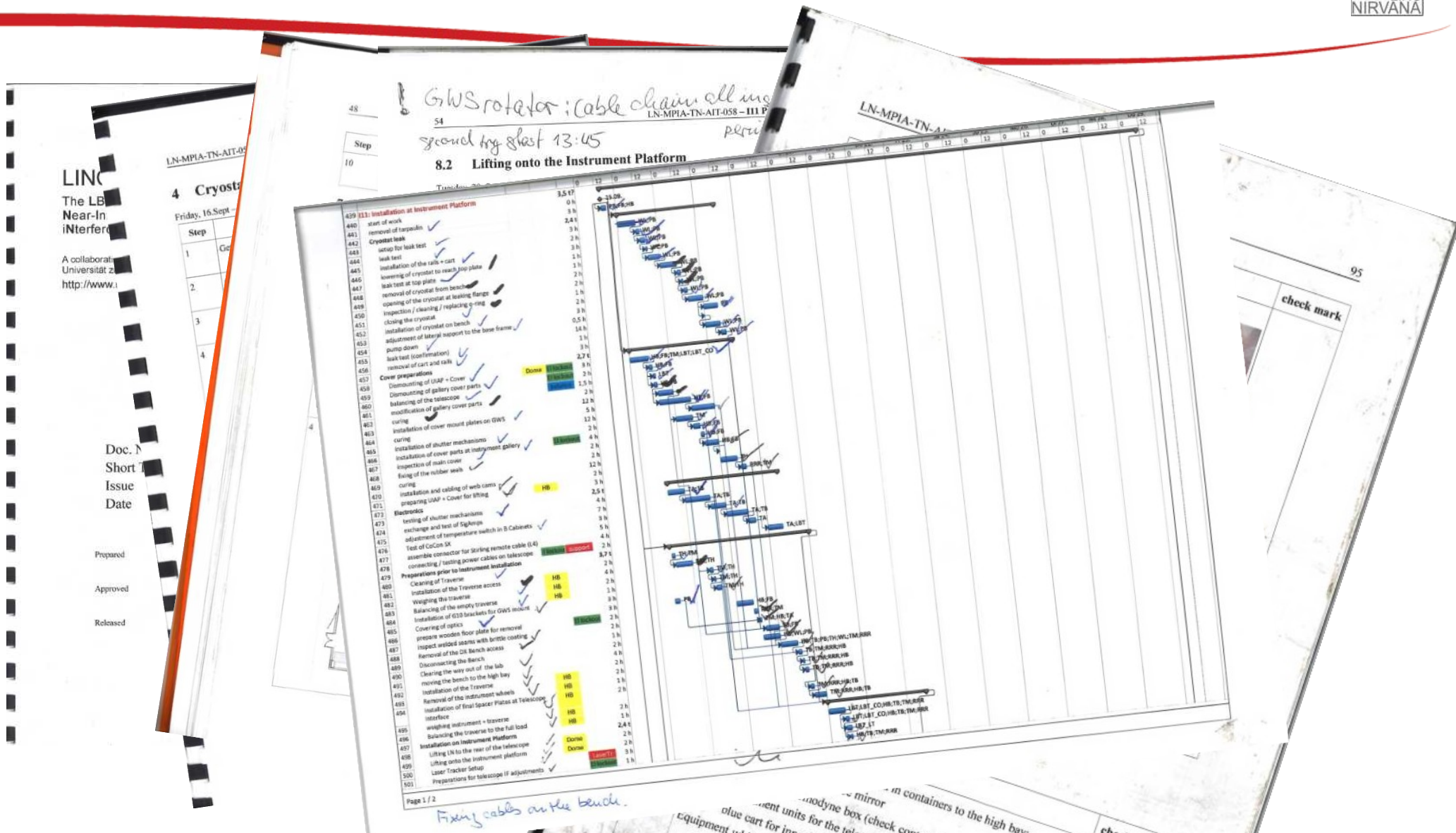
~~I7~~	~~Warm Optics DX Alignment~~	~~May 16~~
I8	HWS Sensor DX Alignment & loop DX	May 16
I9	Annular Mirror Alignment	May 16
I10	Cryostat + Instrument Verification	Jun. 16
I11	Installation at Instrument Platform	Sept. 16

Team planning

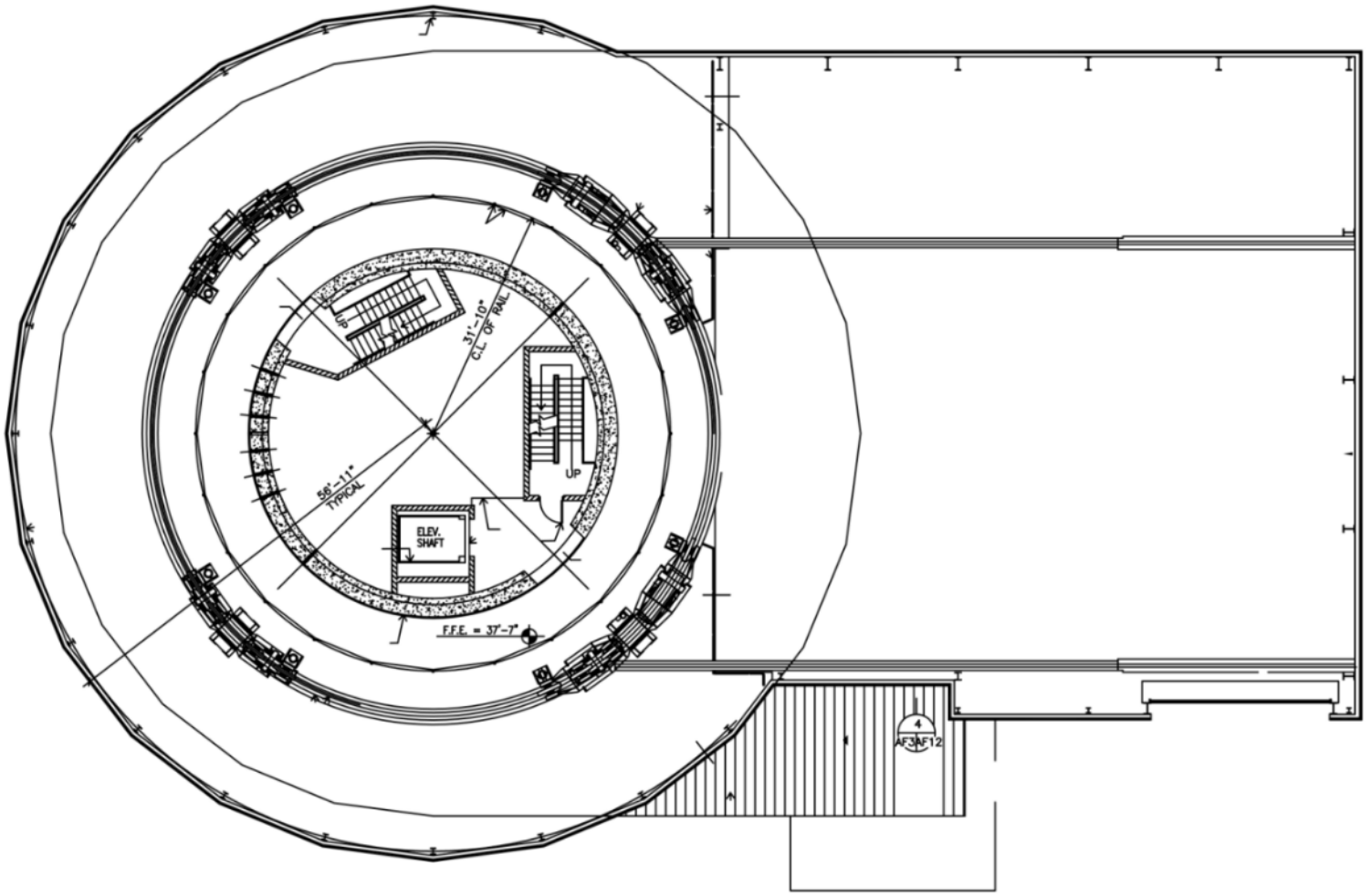
	I1	I2	I3	I4	I5	I6	I7	I9	I8	I10	I11	
Arrival @ LBT	11. Jun. 15	08. Nov. 15	12. Jan. 16	23. Feb. 16	01. Mar. 16	12. Apr. 16	obsolete	04. May 16	26. May 16	10. Jun. 16	15. Sept. 16	
Start	11. Jun. 15	09. Nov. 15	12. Jan. 16	23. Feb. 16	01. Mar. 16	12. Apr. 16		04. May 16	26. May. 16	10. Jun. 16	15. Sept. 16	
Departure LBT	17. Jun. 15	25. Nov. 15	28. Jan. 16	04. Mar. 16	16. Mar. 16	26. Apr. 16		11. May 16	09. Jun. 16	21. Jun. 16	29. Sept. 16	
Breaks included	0	2	2	1	2	2	2	0	2	1	2	
Nights @ LBT	6	17	18	10	15	14	14	7	14	11	14	
Team size	2	8	4+4	5	3	4	0	5	4	5	9	
MPIA												# Trips
Tobias Adler		✔		✔							✔	3
Harald Baumeister	✔	✔		✔							✔	4
Thomas Bertram		✔		✔	(✔)	✔				✔	✔	5
Jürgen Berwein						✔			✔			2
Peter Bizenberger				(✔)	✔					✔	✔	3
Florian Briegel	✔			(✔)	✔					✔	✔	4
Tom Herbst		✔	✔					✔	✔		✔	5
Ralph Hofferbert		✔										1
Frank Kittmann			✔					✔				2
Kalyan K. R. S.						✔			✔			2
Werner Laun				✔						✔	✔	3
Ulrich Mall										✔		1
Tobias Maurer		✔									✔	2
Lars Mohr		✔		✔								2
Javier Moreno-Ventas				(✔)	✔	✔						2
Ralf-Rainer Rohloff		✔									✔	2
INAF												# Trips
Carmelo Arcidiacono									✔			1
Marco Dima			✔									1
Maria Bergomi			✔					✔				2
Jacopo Farinato			✔									1
Luca Marafatto			✔					✔				2
Valentina Viotto			✔					✔				2

630 person-days

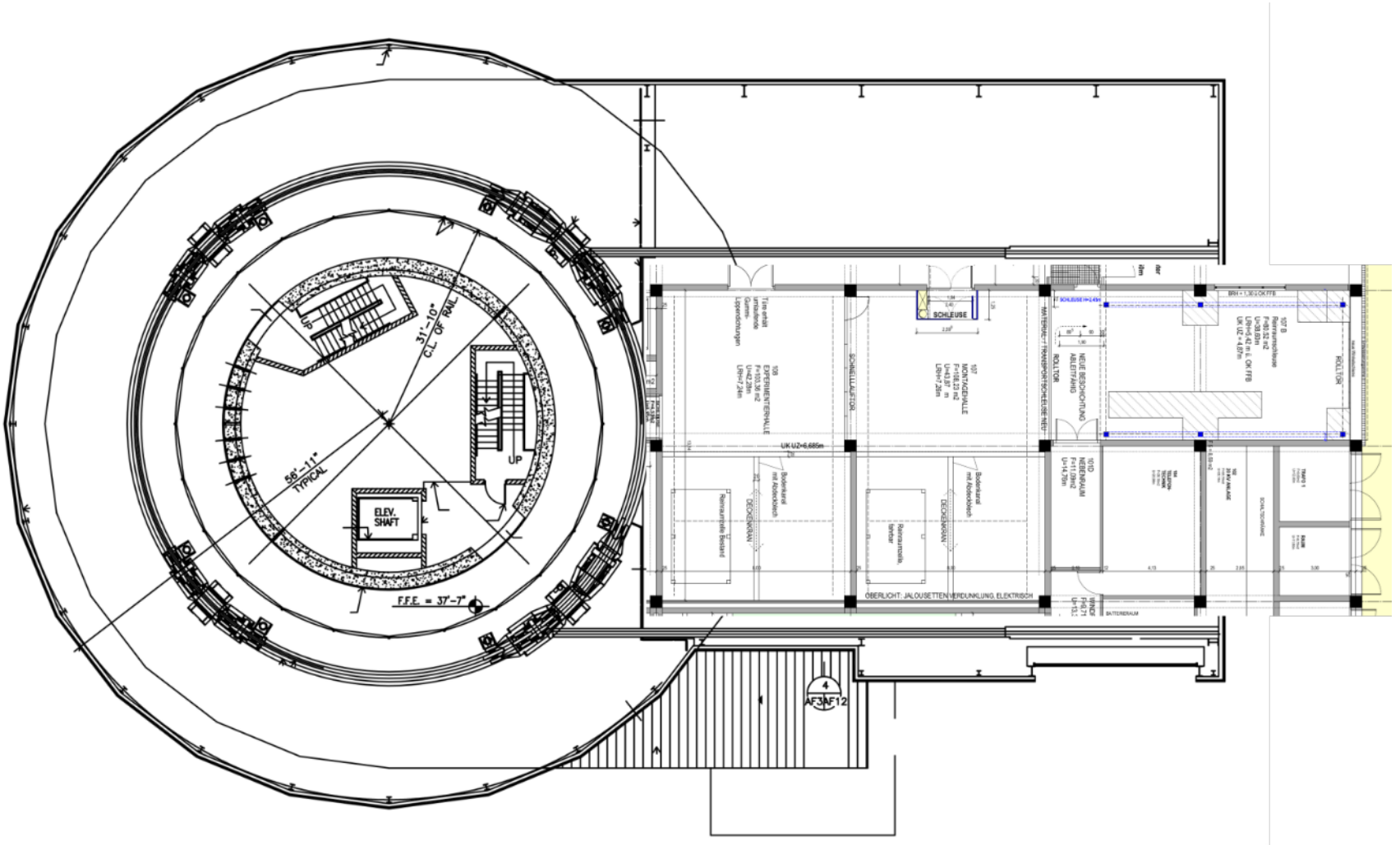
Procedures


8.2 Lifting onto the Instrument Platform
Fixing cables on the bench.
check mark

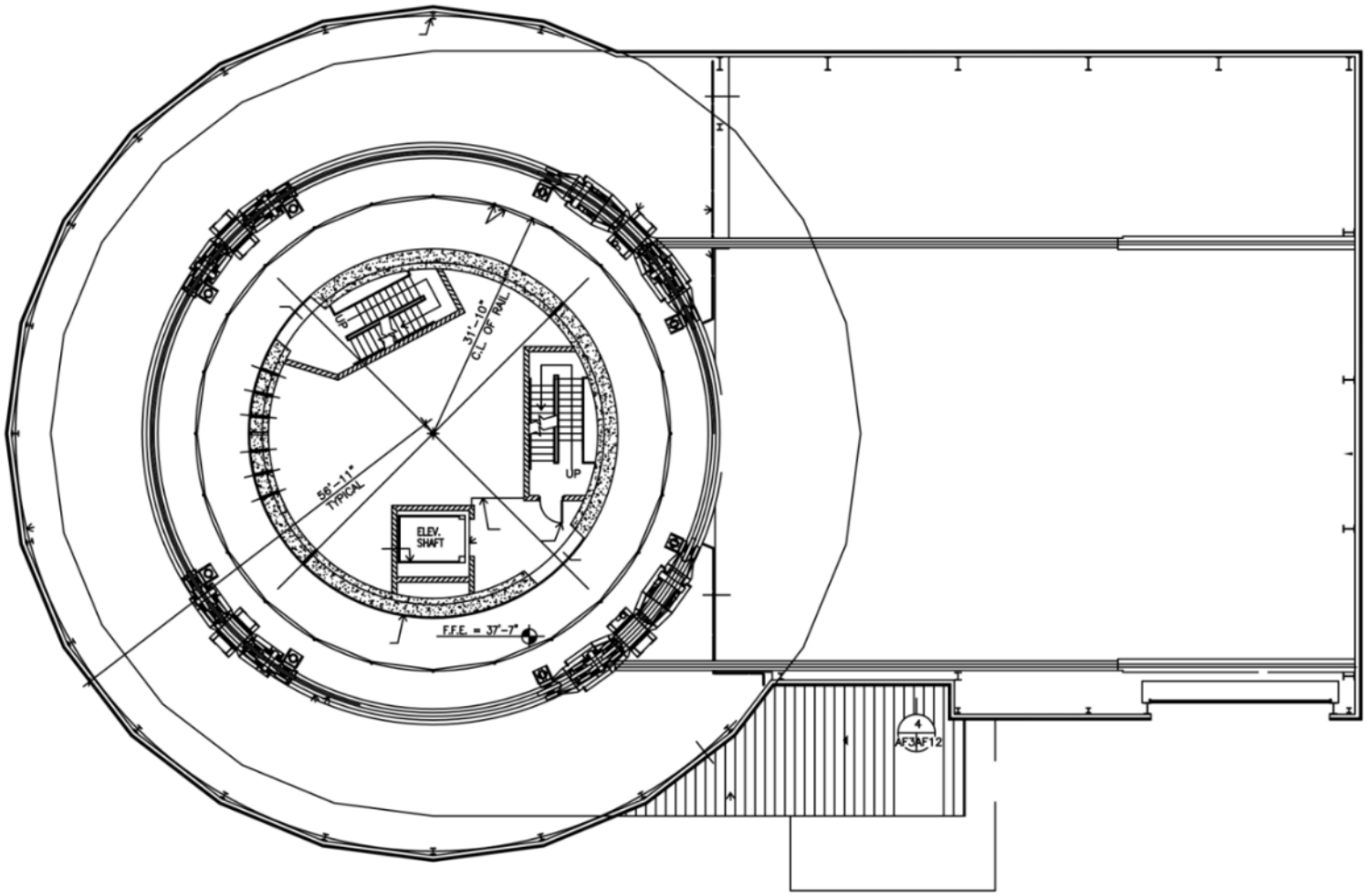
Space


UP
31'-10"
C.L. OF RAIL
56'-11"
TYPICAL
UP
ELEV.
SHAFT
F.F.E. = 37'-7"
4
AF3/AF12

Space


31'-10"
C.L. OF RAIL
56'-11"
TYPICAL
UP
UP
ELEV.
SHAFT
F.F.E. = 37'-7"
SCHLEUSE
UK UZ=6.685m
ÜBERLICHT, JALOUSETTEN VERDUNKLUNG, ELEKTRISCH
4
AF3/AF12

Space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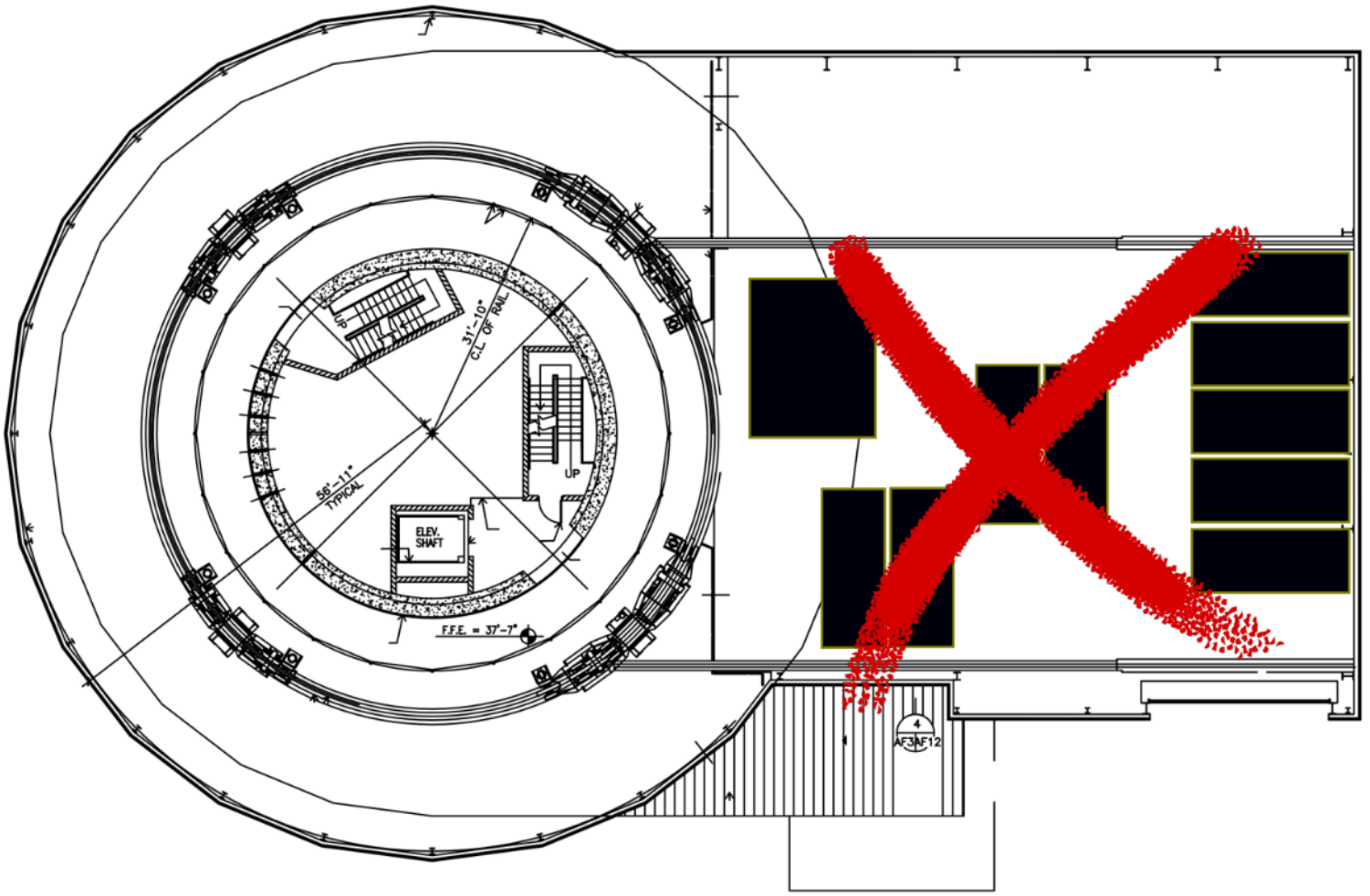
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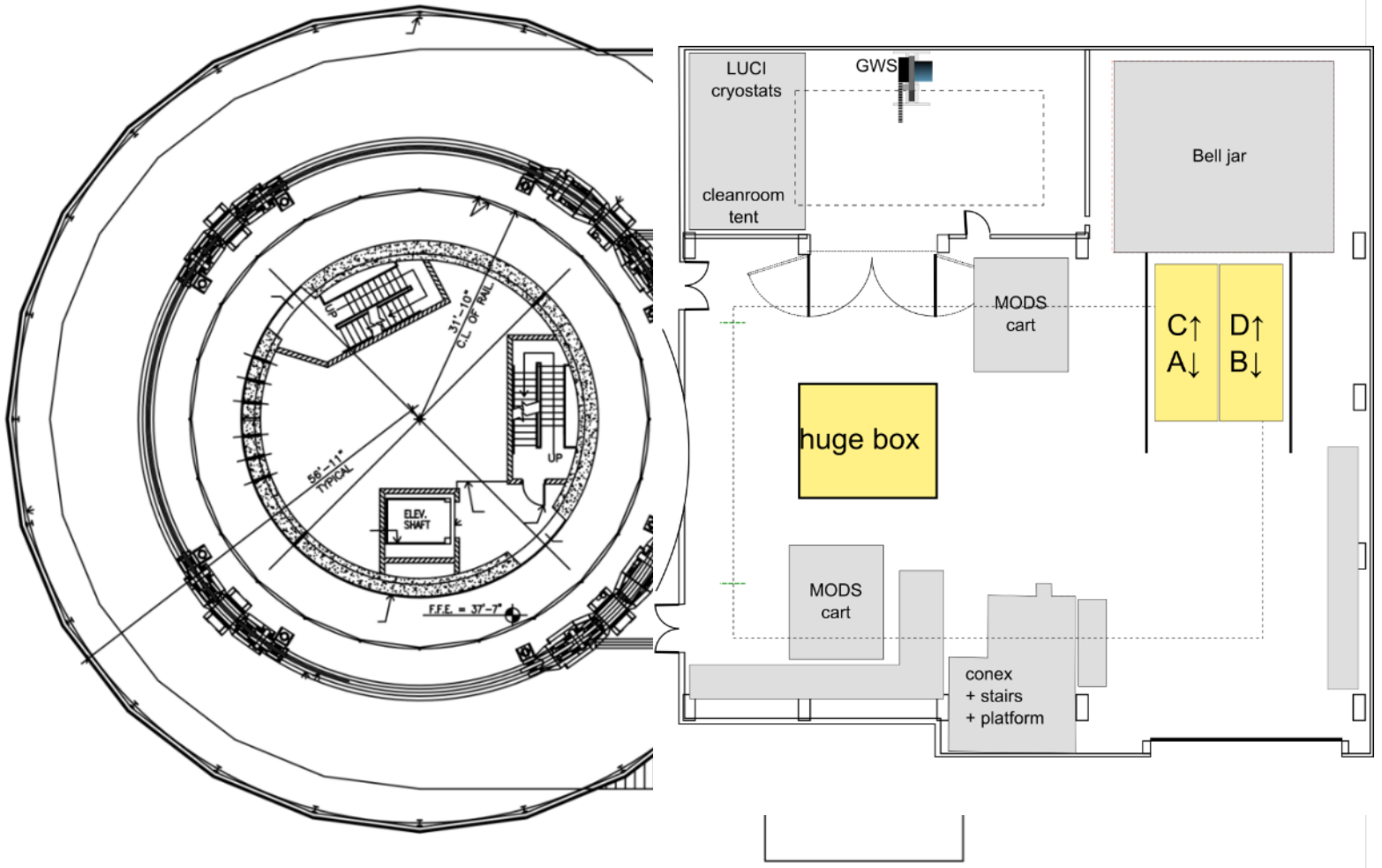
LUCI
cryostats
GWS
cleanroom
tent
Bell jar
MODS
cart
C↑
A↓
D↑
B↓
huge box
MODS
cart
conex
+ stairs
+ platform
UP
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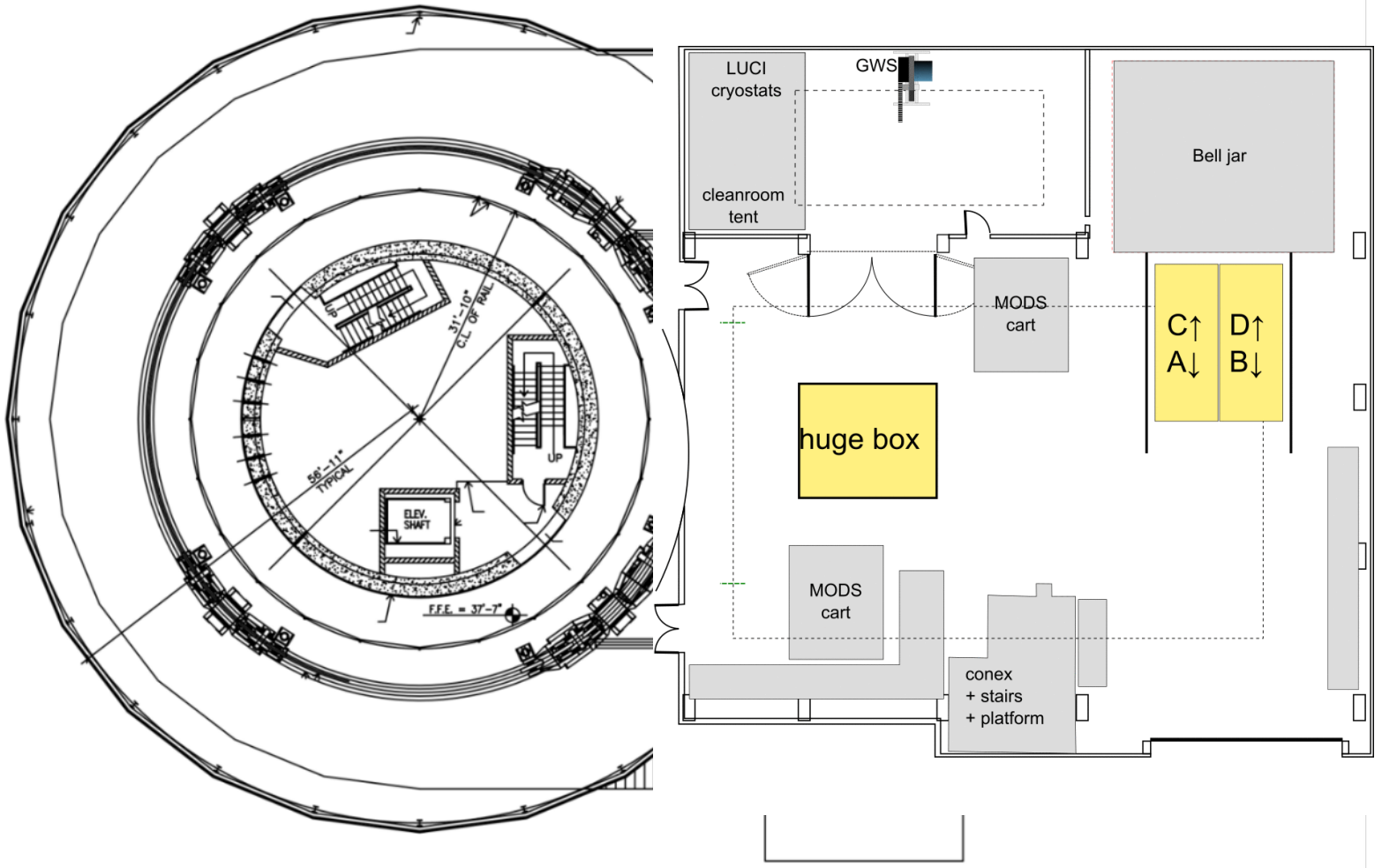
Space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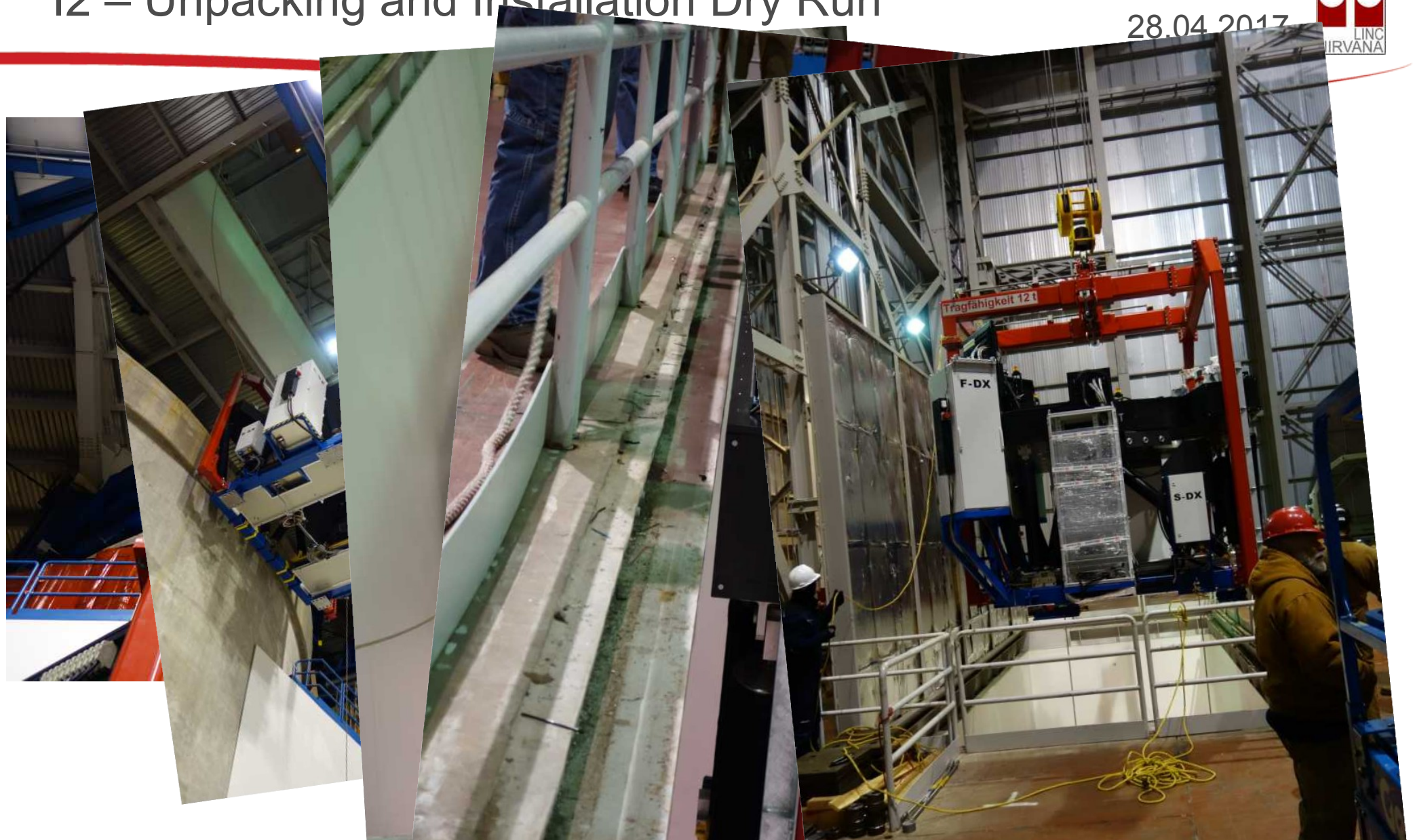
Space

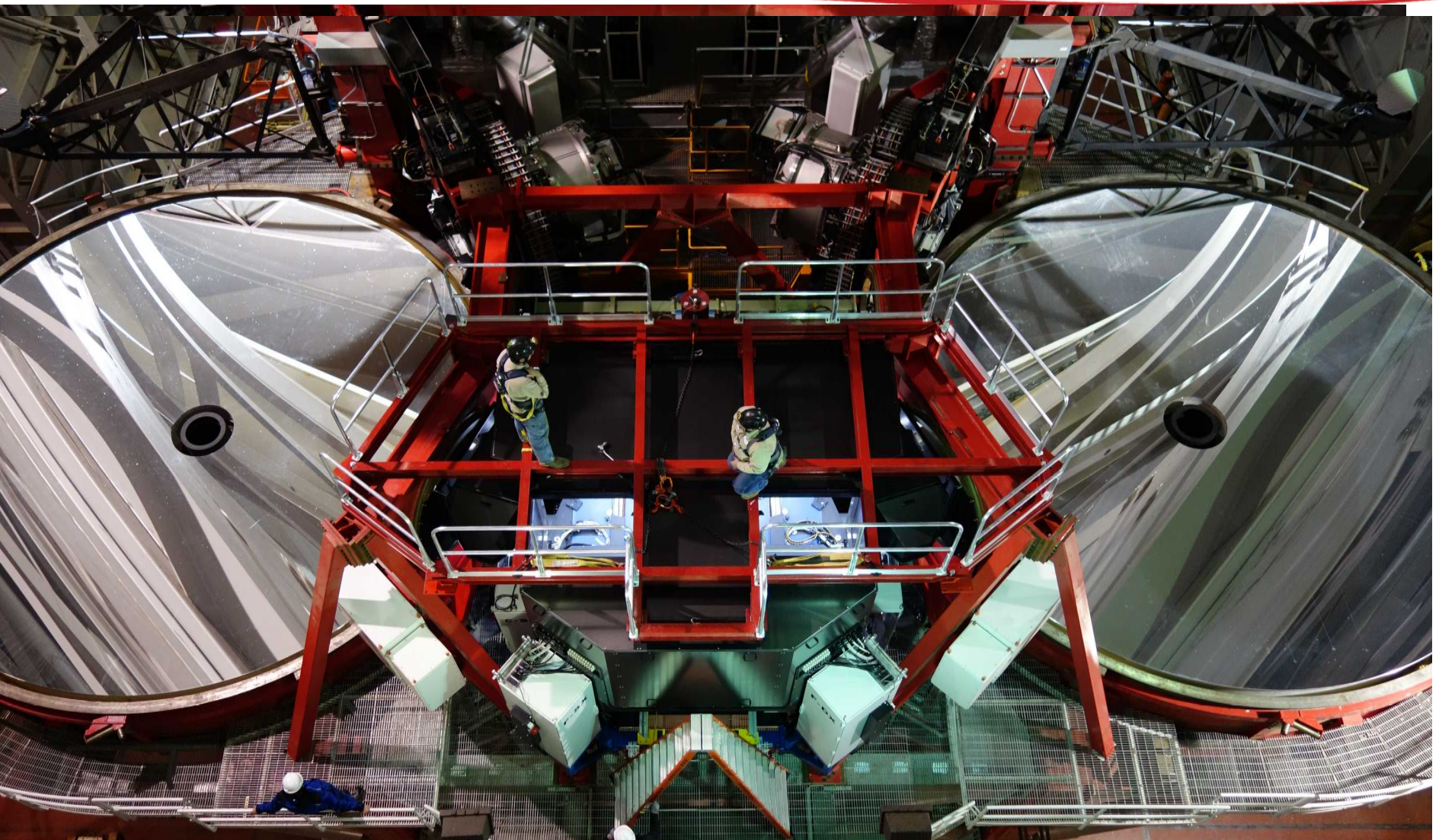
I2 – Unpacking and Installation Dry Run

- Unboxing of the bench
- Installation of the Bench Traverse
- Container logistics
- Assembly of the Cover
- Fit-Check Test of Bench and Cover
- Laser Tracker Measurements
- Preparation of the Laboratory

I2 – Unpacking and Installation Dry Run



I2 – Unpacking and Installation Dry Run



I2 – Unpacking and Installation Dry Run

I3 – GWS alignment / Computing Environment

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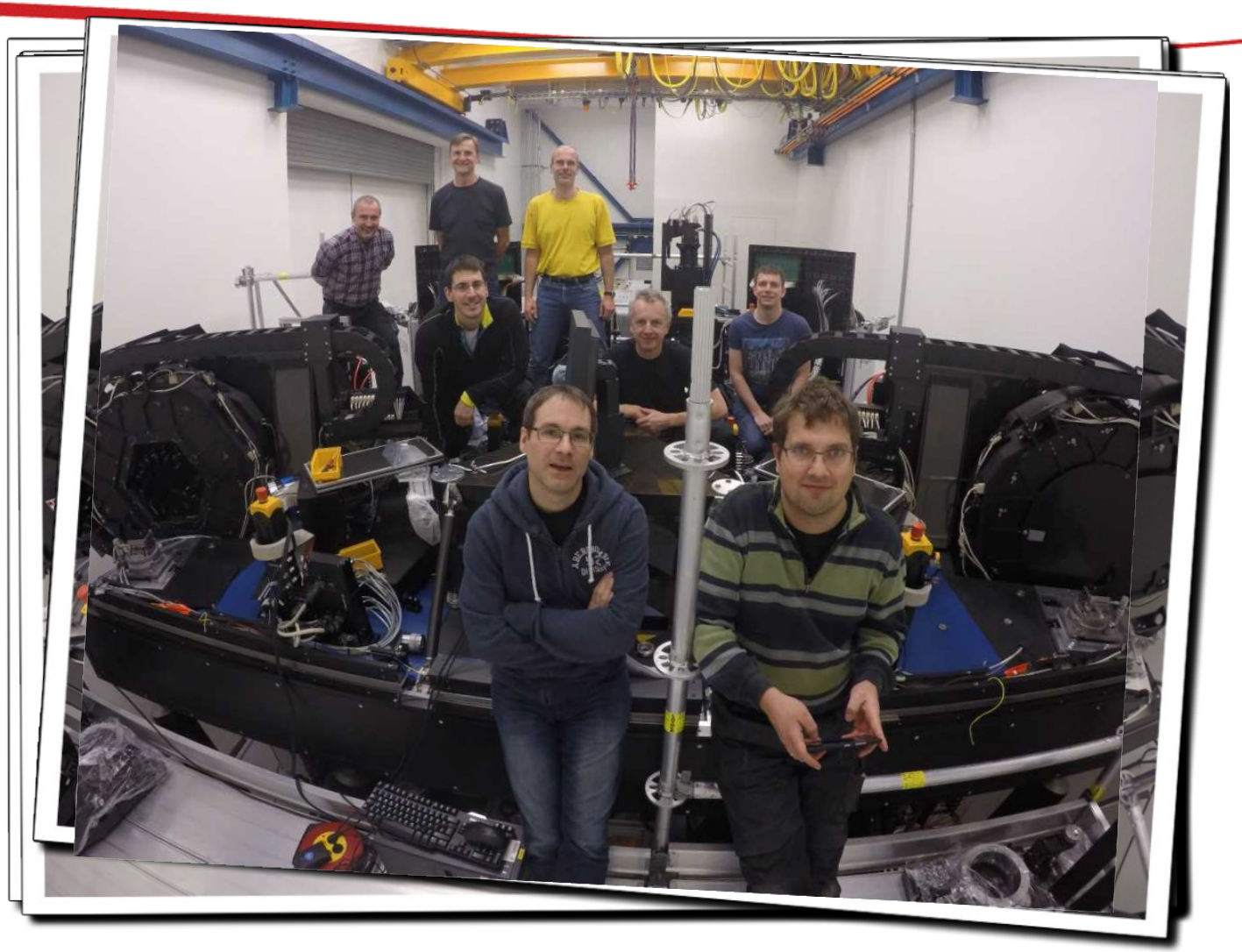
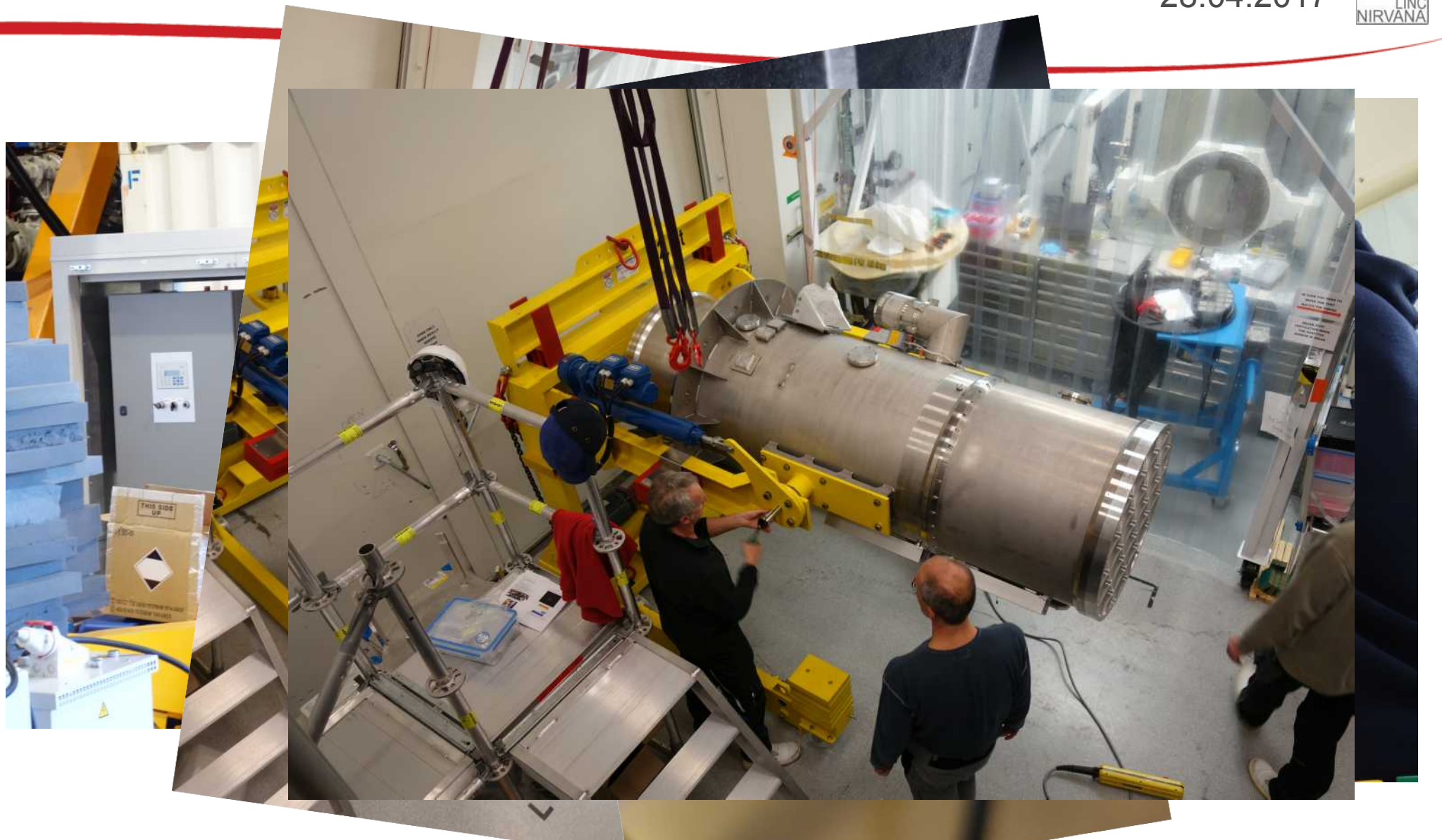
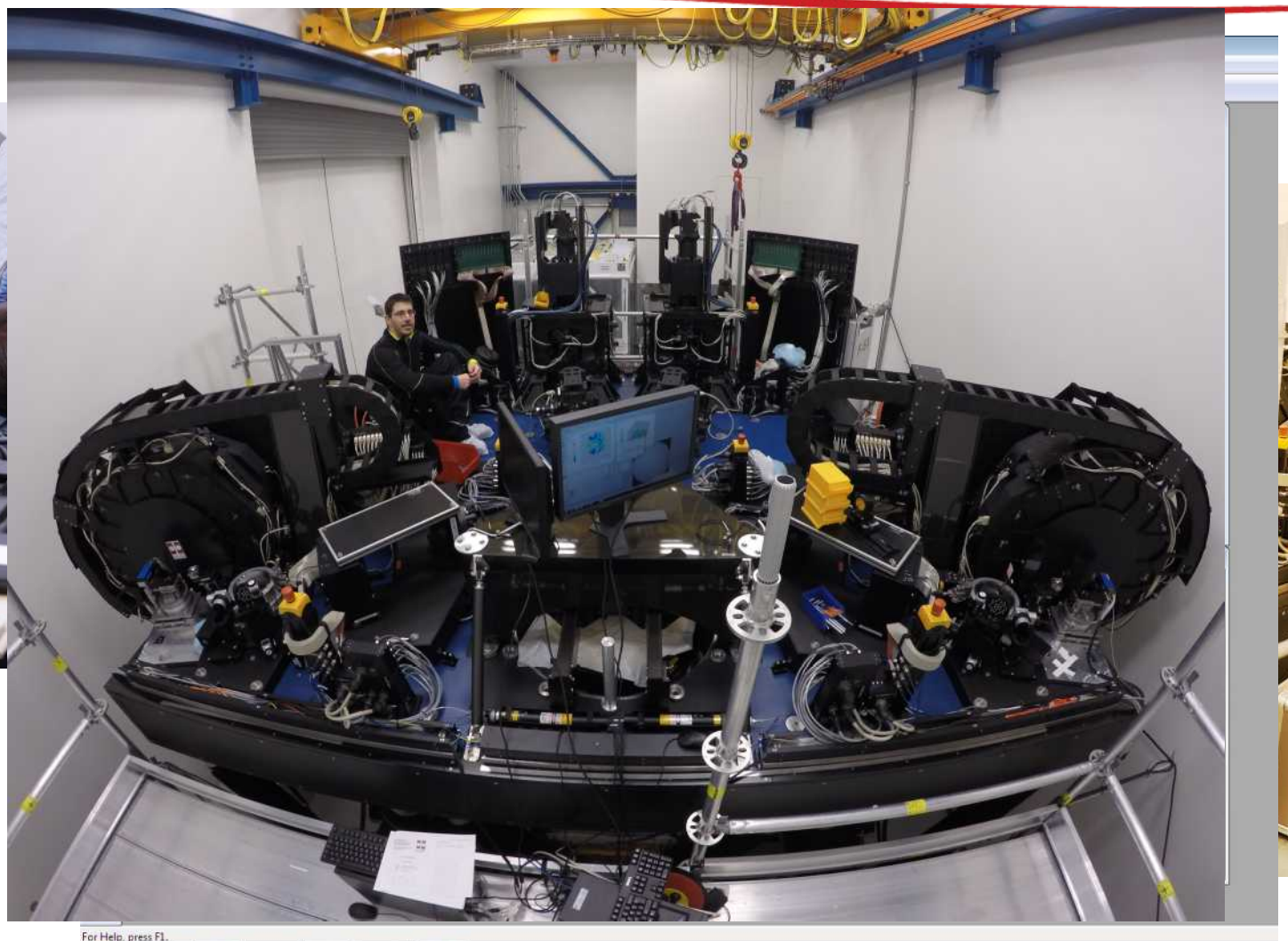
- Container logistics
- Stirling Cooler Test and Setup
- Installation of Groundlayer Wavefront Sensors
- Electronics
- Integration of the Cryostat
- Tests



I4 – Bench and Cryostat Integration



I5 – Optics Alignment



I6+I8 – High Layer Wavefront Sensors

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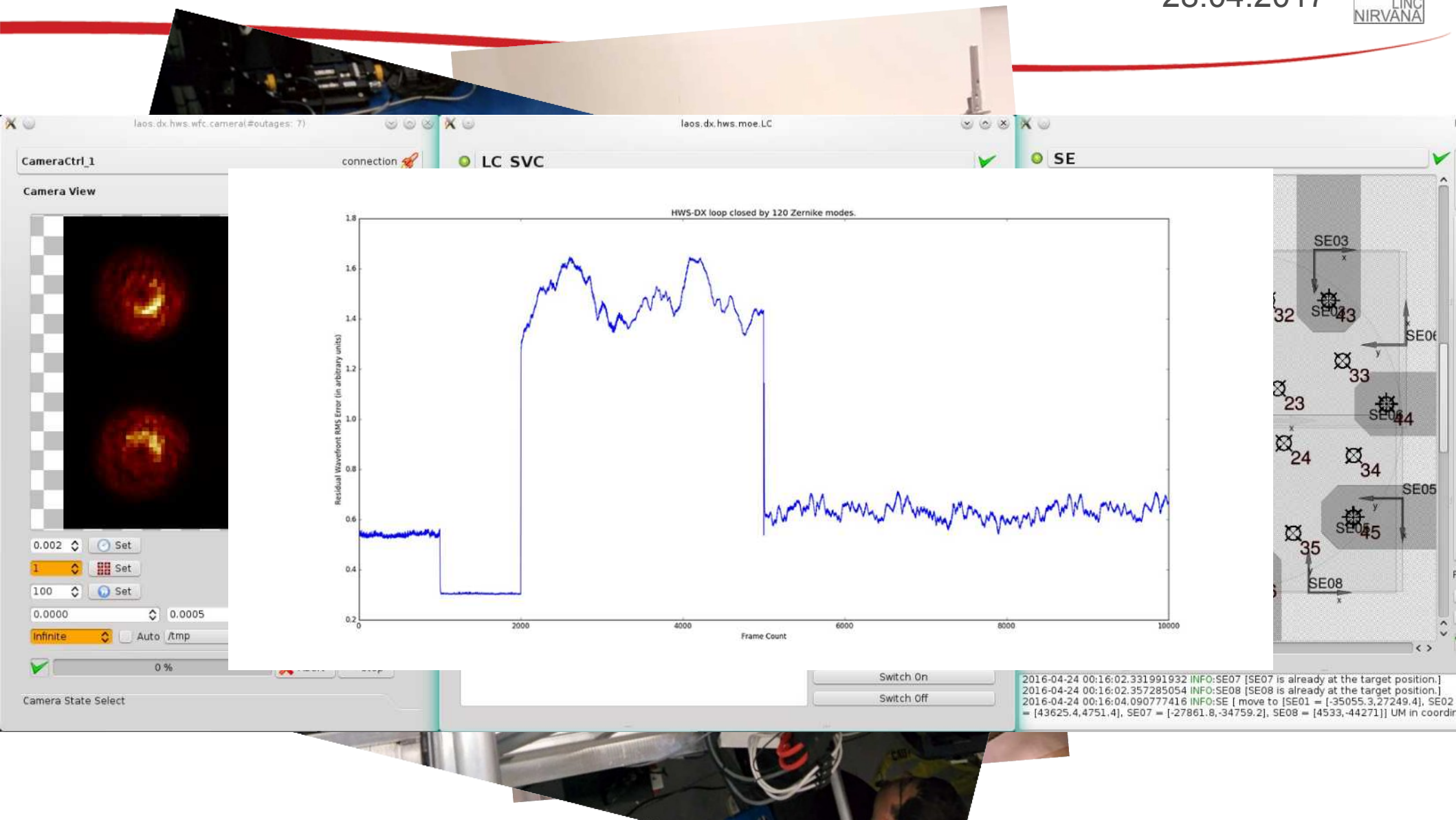
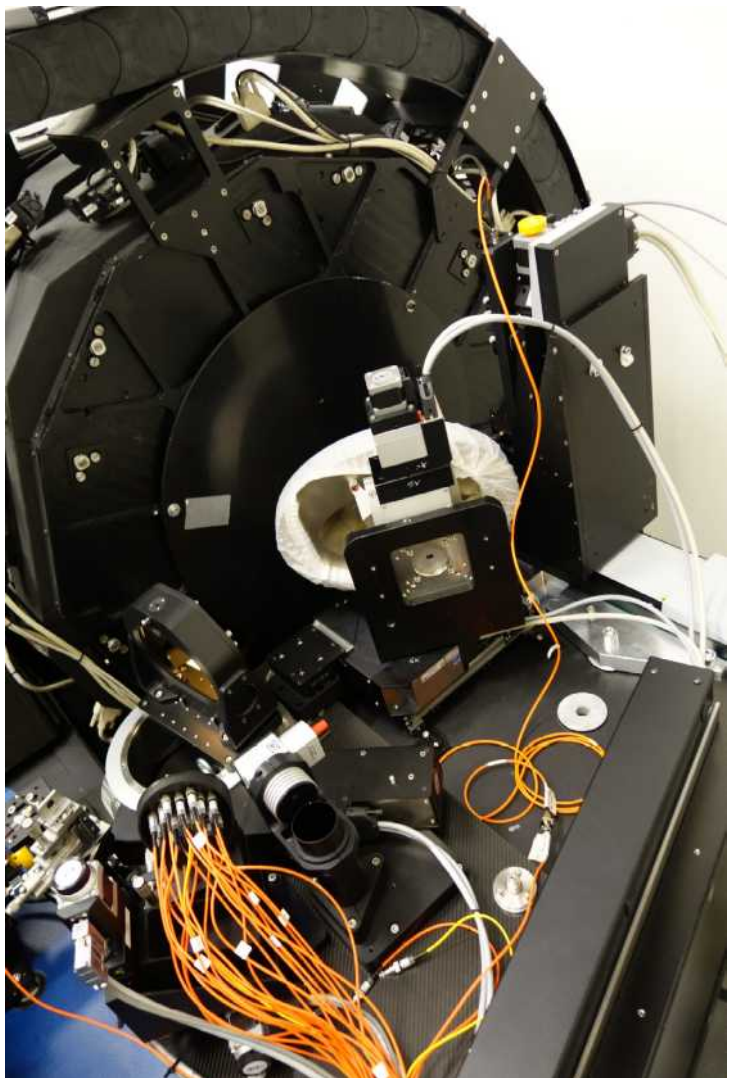
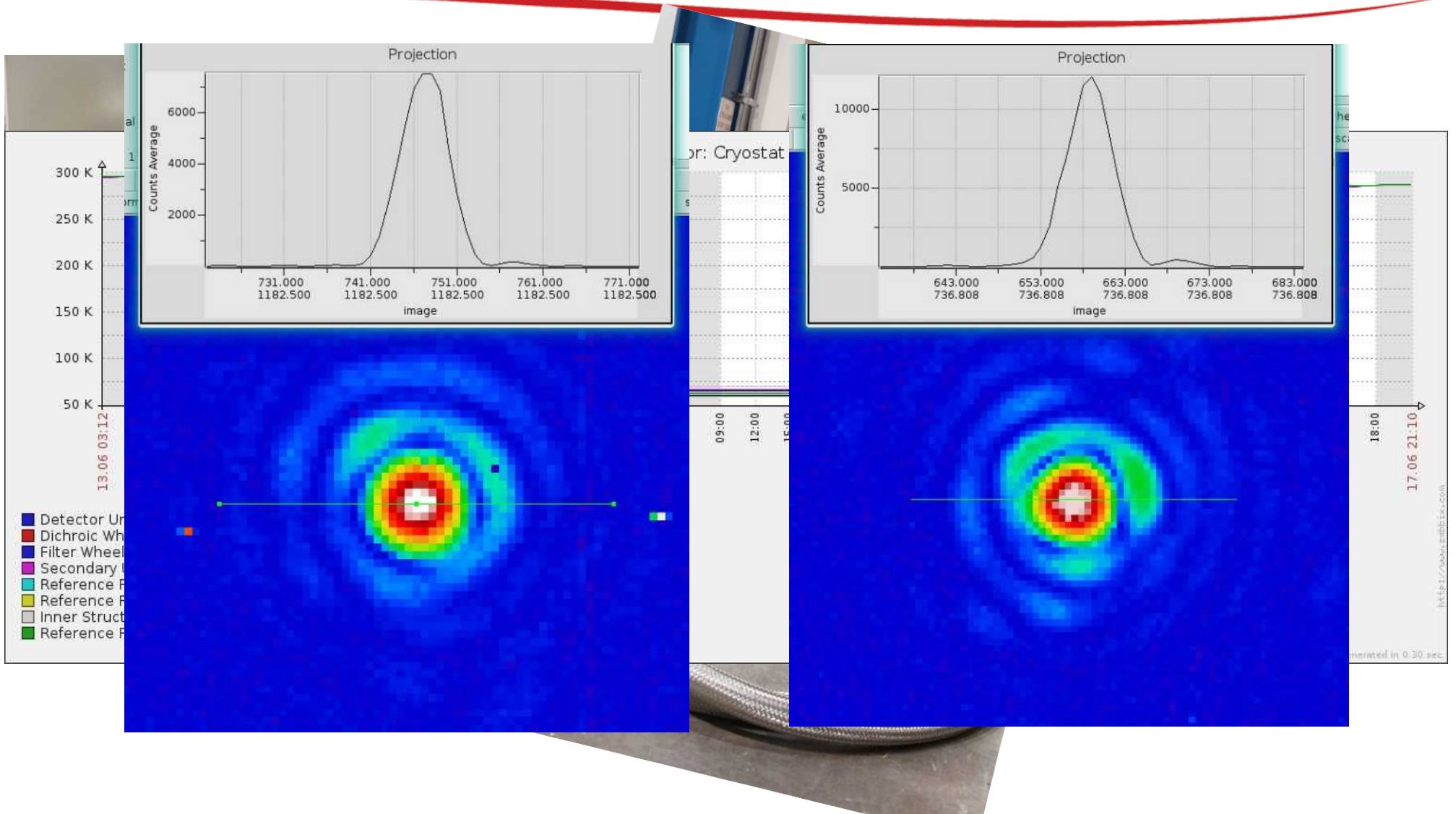


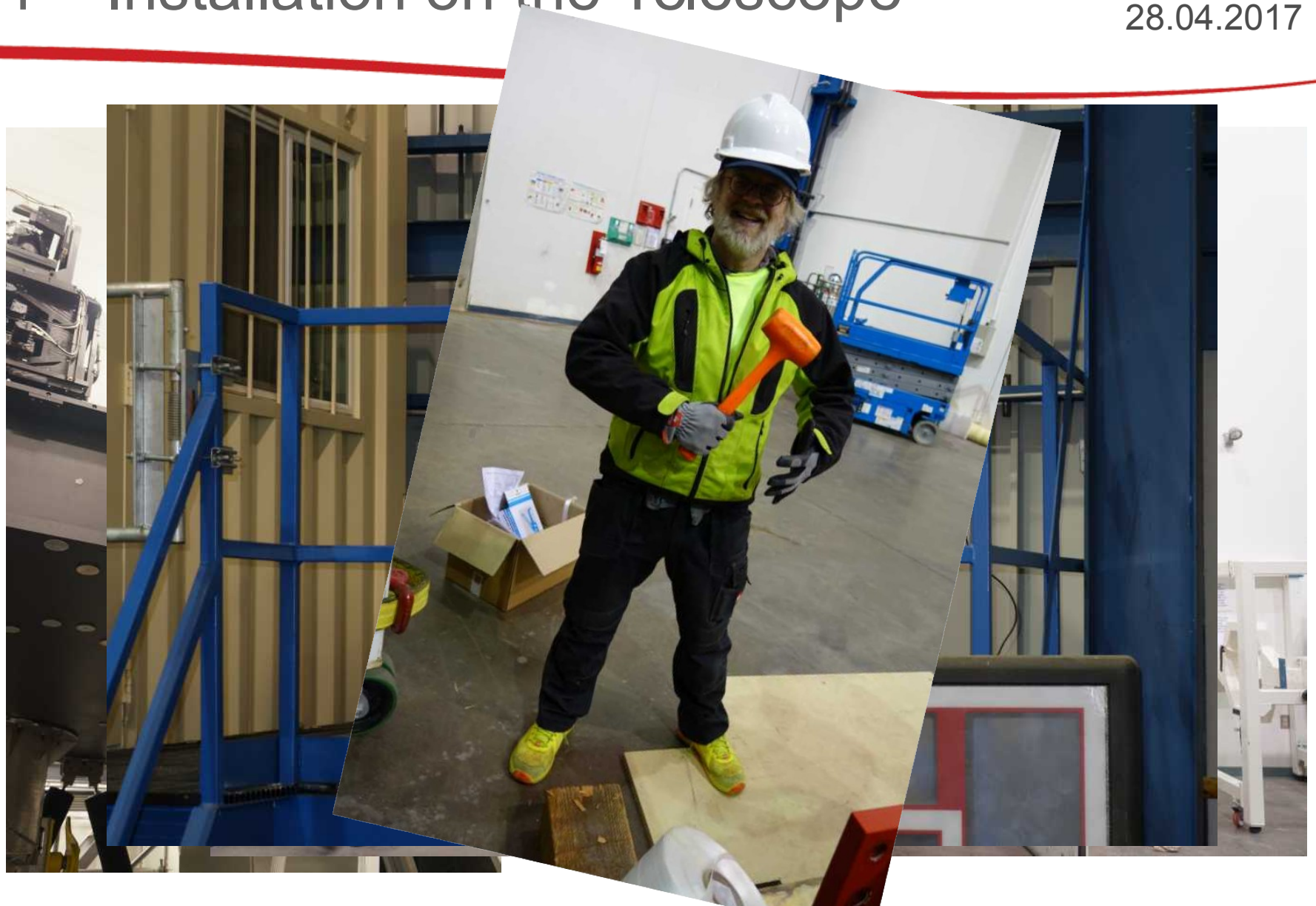
I9 – Annular Mirror Alignment



I10 – Cryostat and Instrument Verifcation



I11 – Installation on the Telescope



I11 – Installation on the Telescope

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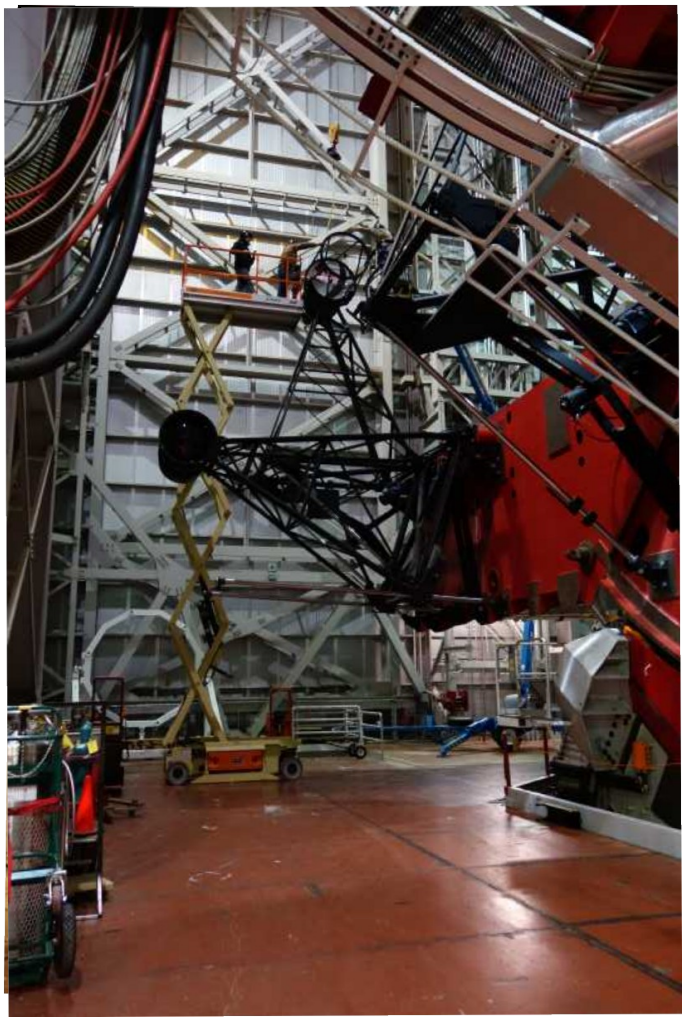
Commissioning

PC-1	Telescope Alignment / GWS Calibration	Nov. 16
PC-2	GWS SX Calibration	Feb. 17
COM-1	GWS SX on Sky, Autoguiding	Mar. 17
COM-2	HWS on Sky	Jun. 17
COM-3	Attempt MCAO	Fall 17
COM-4	MCAO	Fall 17

Same for 2018...

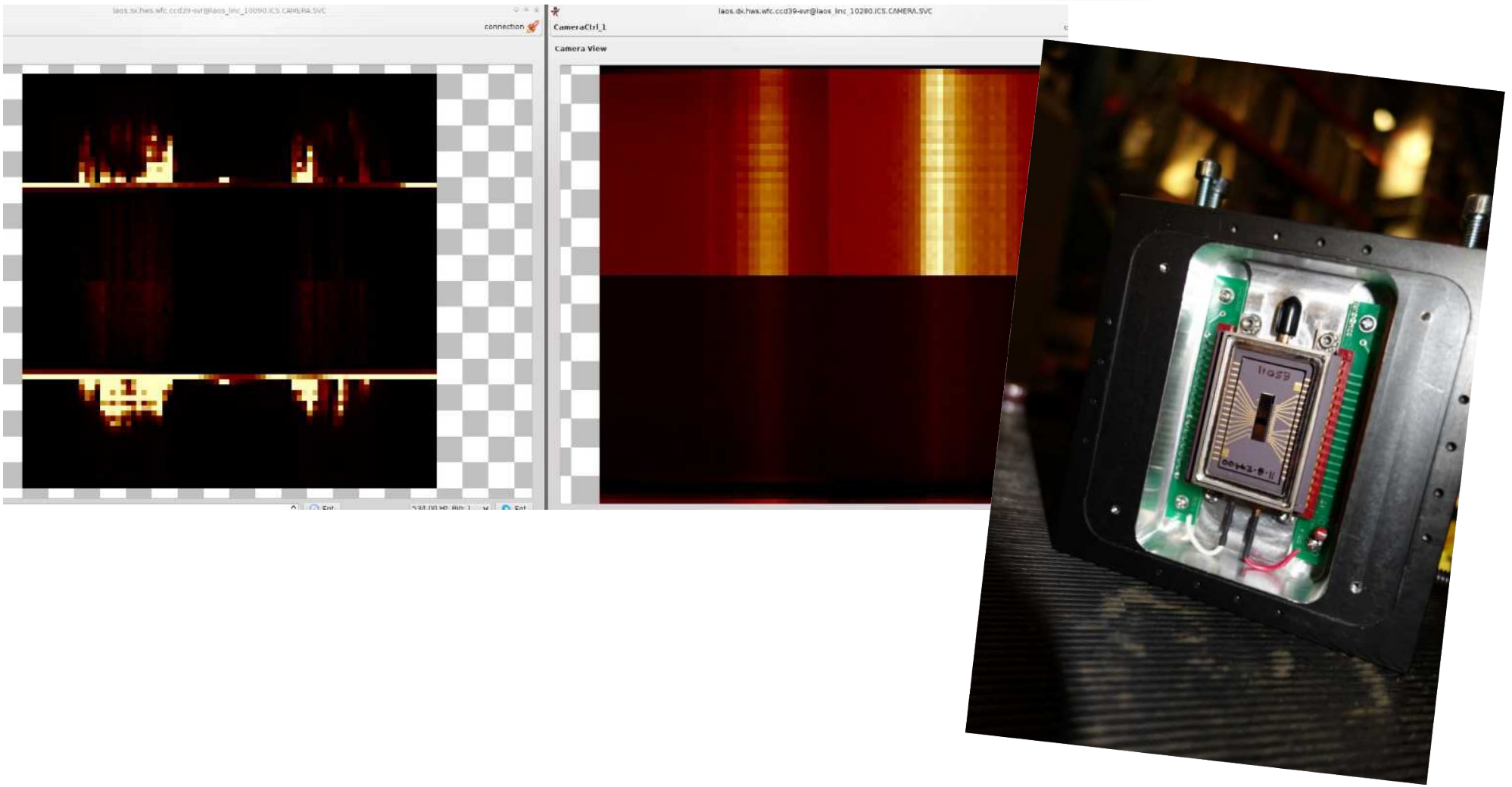
Pre-Commissioning

- Alignment of secondary and tertiary mirror to LINC-NIRVANA focal station
- Attempt GWS calibration with adaptive secondary mirrors



Pre-Commissioning

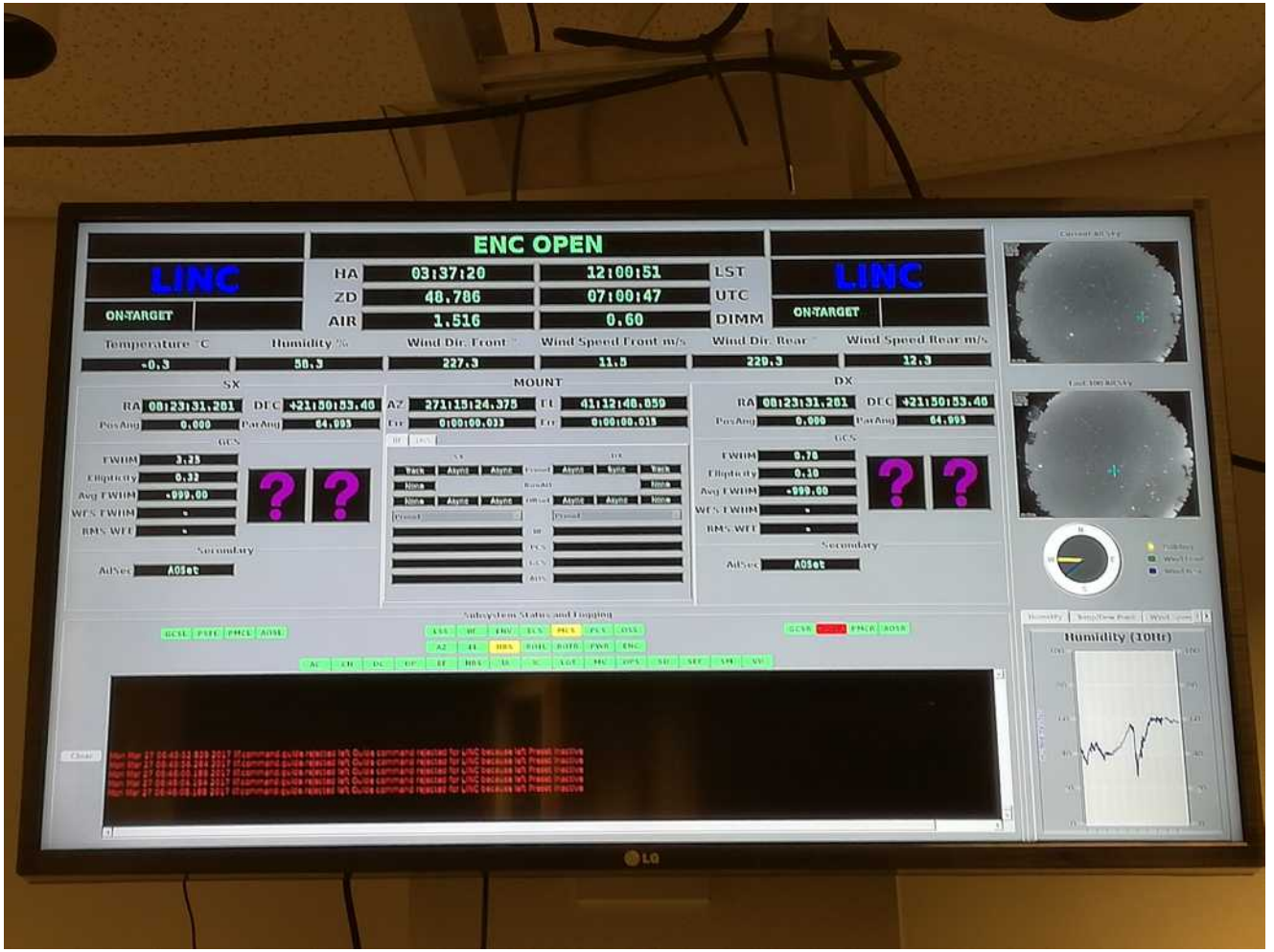
Pre-Commissioning



Pre-Commissioning

- PC-2 GWS SX Calibration (successful)

Commissioning 1



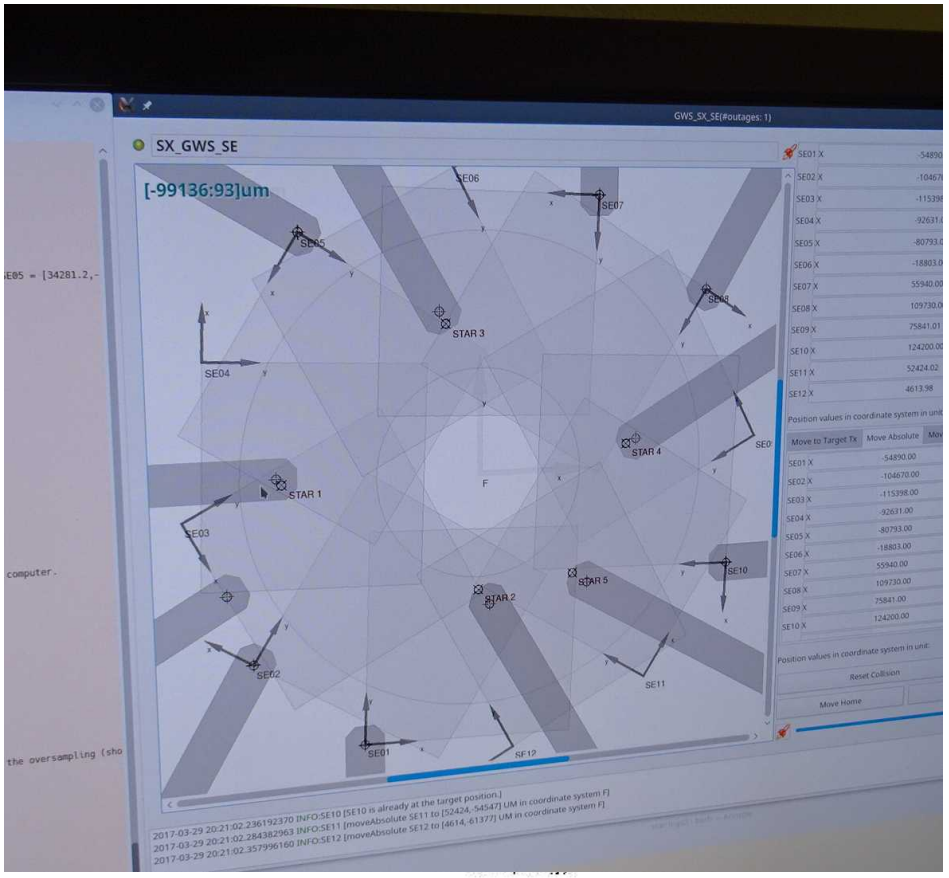
Commissioning 1

- 7 half-nights scheduled →4 usable
- GWS SX on-sky tests
- Autoguiding tests

- CCD39 problem fixed!

Commissioning 1

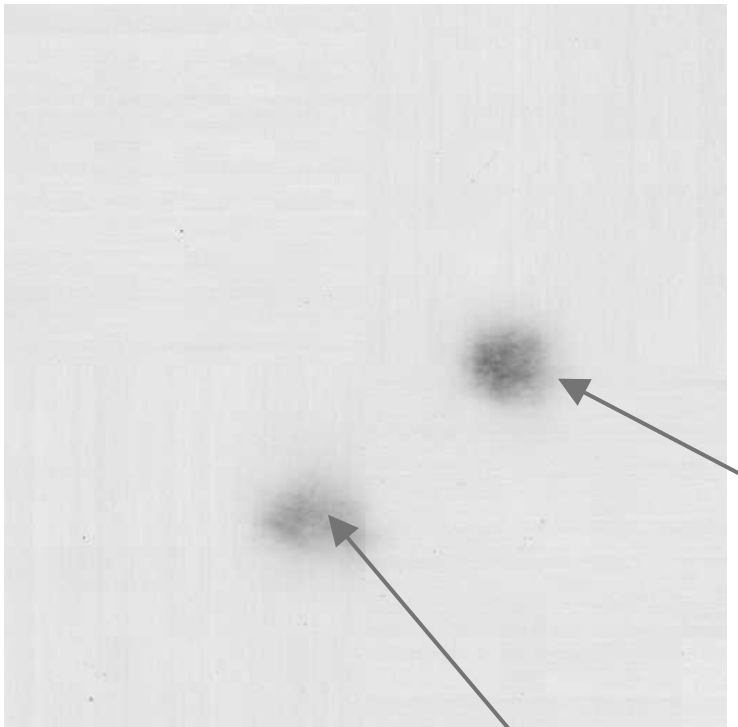
Commissioning 1



Target 08.9+11.9

- 5 GWS reference stars
- stellar target

Commissioning 1



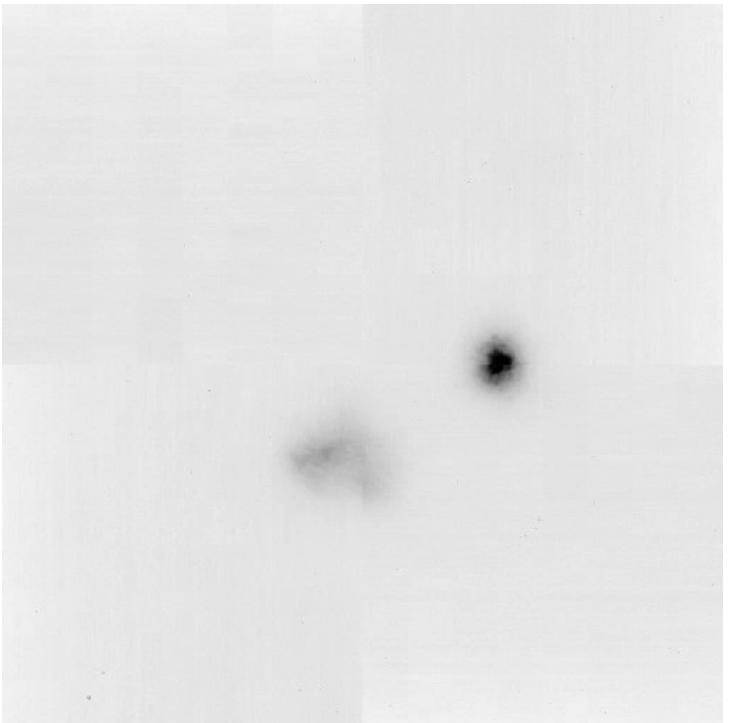
LN Science Channel
2k Hawaii-2
K' band

SX Target

DX Target (uncollimated)

29 March 2017
K-band seeing ~1"

Commissioning 1



LN Science Channel
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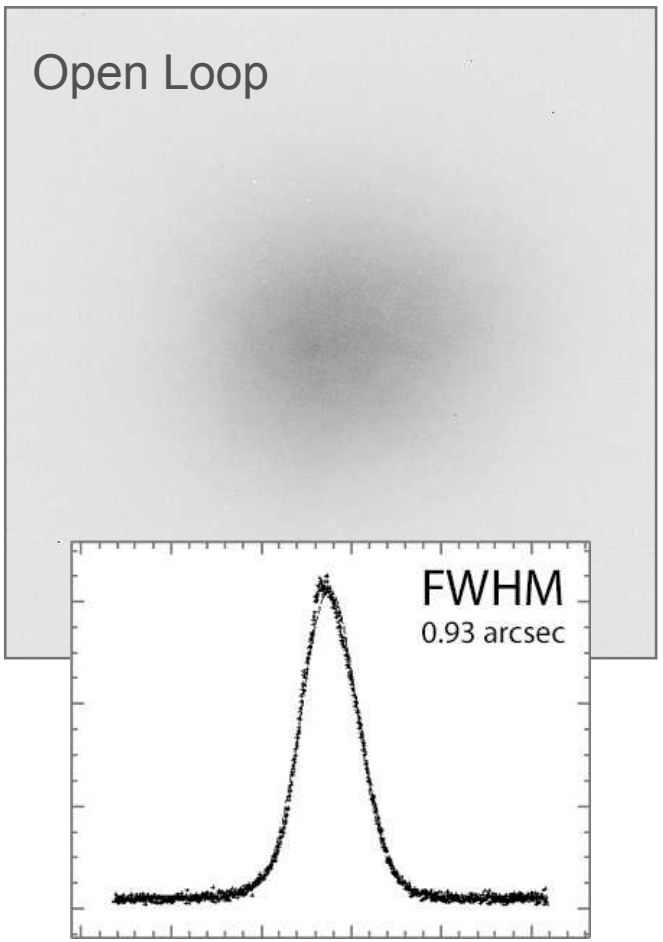
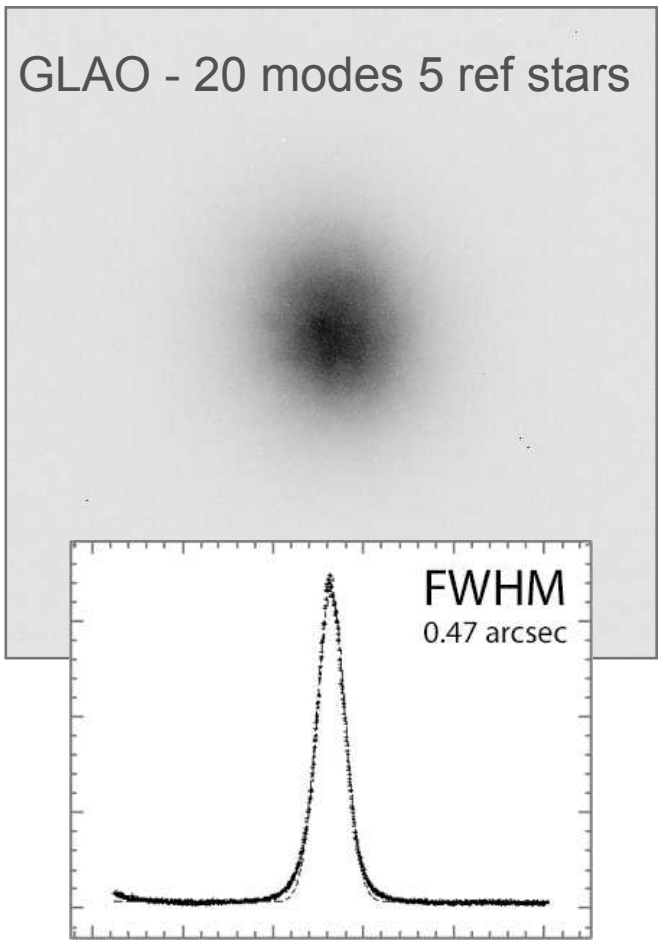
29 March 2017
K-band seeing ~1”

Commissioning 1





Commissioning 1


55M TONS

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Dr Pepper


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