

Maintenance of Mechanical Elements for LST (MPP Part)

Holger Wetteskind, Christopher Jablonski, Robert Stadler
Dep. Mechanics/Design @ MPP Munich

Overview (with PBS codes)

- 8.1.1.3.1 Rail (incl. Crown Gear)
- 8.1.1.3.3 Central Pin
- 8.1.1.1 / 8.1.2.1 Telescope Structure with sub components
- 8.1.1.4 / 8.1.2.3 Access Elements
- 8.1.1.2.1 / 8.1.1.2.3 / 8.4.5.9 / 8.4.5.10 / 8.4.5.11 / 8.4.5.12 Elevation Drive with subsystems
- 8.2.2.2 Interface Plates for Mirrors
- 8.1.4 Camera Access Tower with subsystems
- 8.4.8.1 / 8.4.8.2 Azimuth Cable Chain / Elevation Cable Chain

no maintenance needed during lifetime of LST

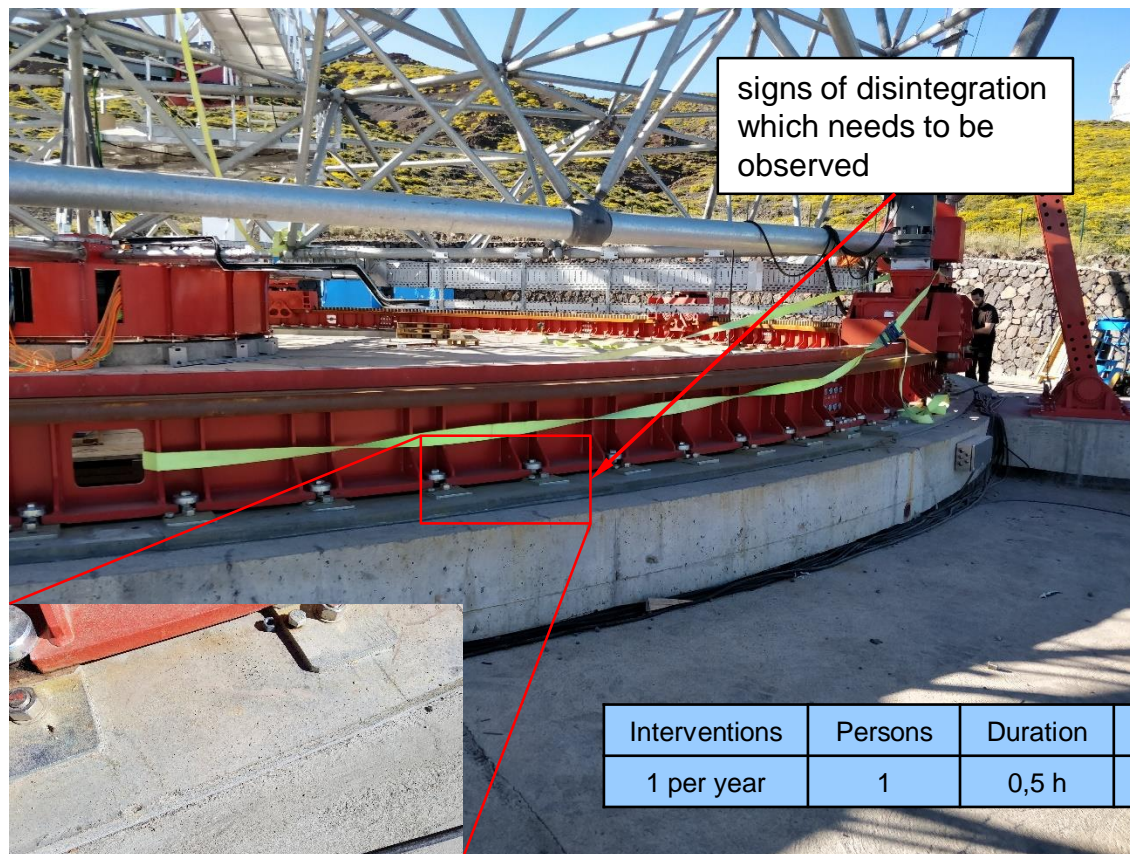
maintenance recommended

see dedicated talks

Interface Rail to Foundation

Visual inspection of grout poured around the rail girders:

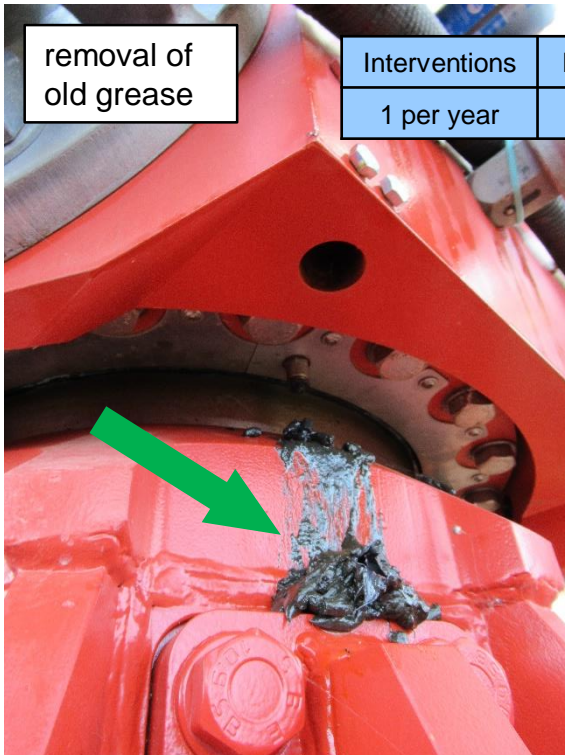
→ preventive maintenance needed mainly due to problems coming from pouring



Central Pin

Preventive Maintenance:

- visual checks
- exchanging of automatic lubricator cartridges
- cleaning



removal of
old grease

Interventions	Persons	Duration	Type
1 per year	1	1 h	Local Engineer



exchanging of
cartridges

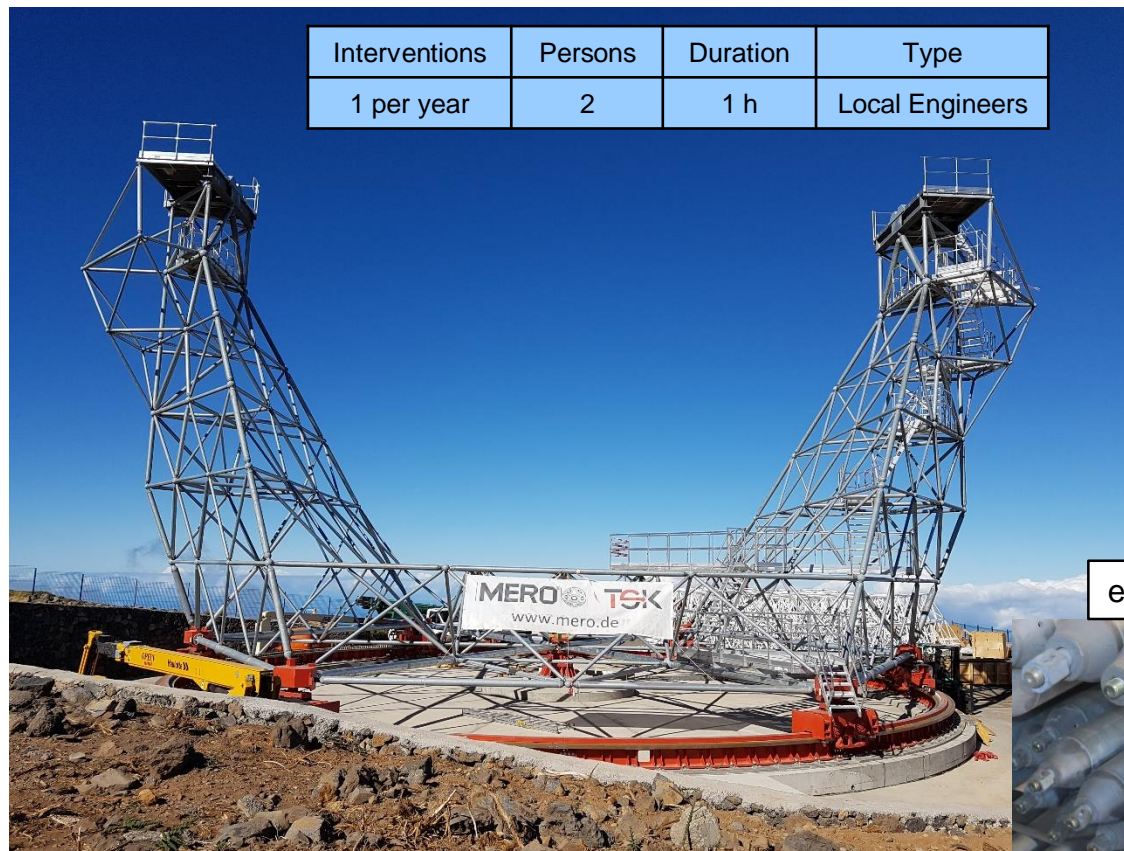


visual
inspection

Telescope Structure

Preventive Maintenance of Lower Structure:

- visual inspection of tubes, end-pieces and connections
- climbing equipment and cherry picker needed



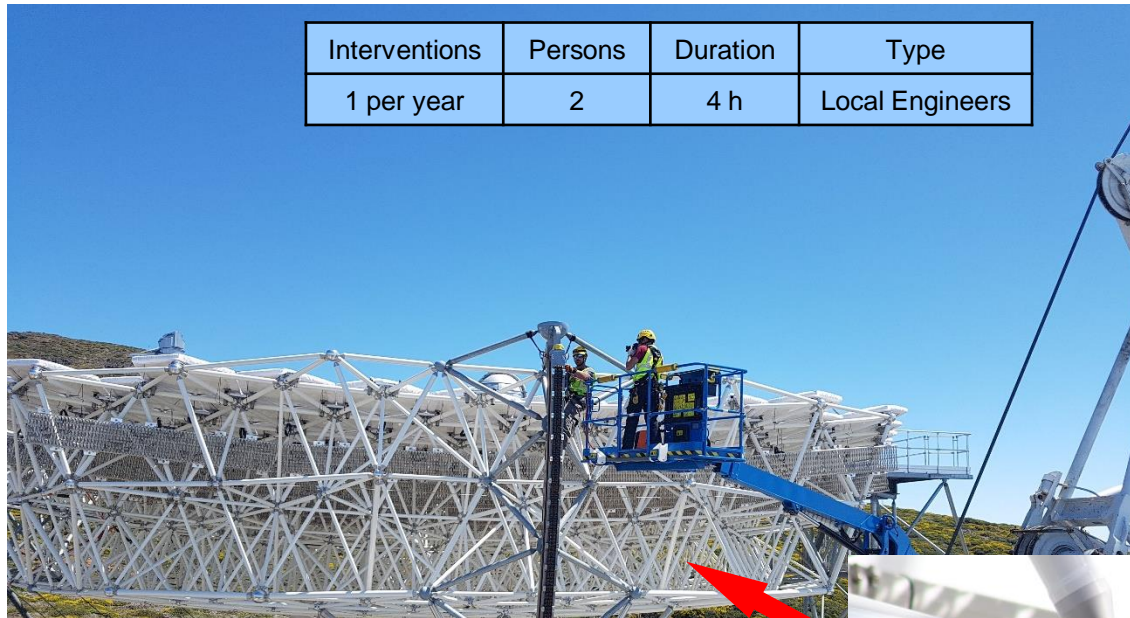
Interventions	Persons	Duration	Type
1 per year	2	1 h	Local Engineers

Telescope Structure

Preventive Maintenance of Dish Structure (Space Framework):

- visual inspection of tubes, end-pieces and connections
- Access both from dish catwalks and by cherry picker → climbing equipment needed

Interventions	Persons	Duration	Type
1 per year	2	4 h	Local Engineers



end-pieces
of Al tubes



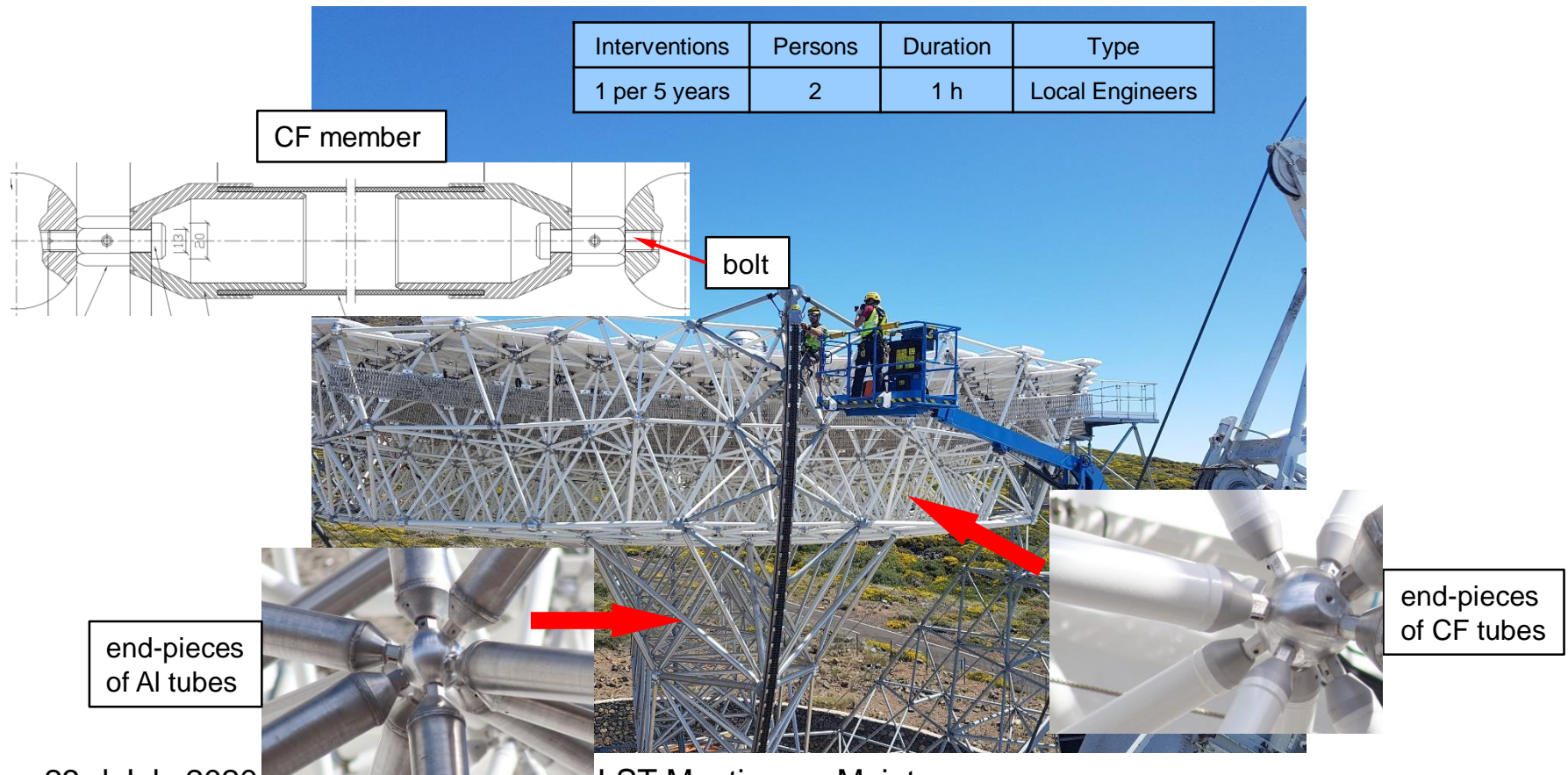
end-pieces
of CF tubes



Telescope Structure

Corrective Maintenance of Dish Structure (Space Framework):

- replacement of one damaged member (tube + end-pieces) or bolt (part of end-piece)
- climbing equipment and/or cherry picker needed (depending on the location)



Telescope Structure

Preventive Maintenance of Elevation Drive Arch:

- visual inspection and greasing of drive chain with applicator
- climbing equipment and cherry picker needed

Interventions	Persons	Duration	Type
1 per year	2	2 h	Local Engineers

maintenance partly
possible from catwalk
arriving at Elevation Drive



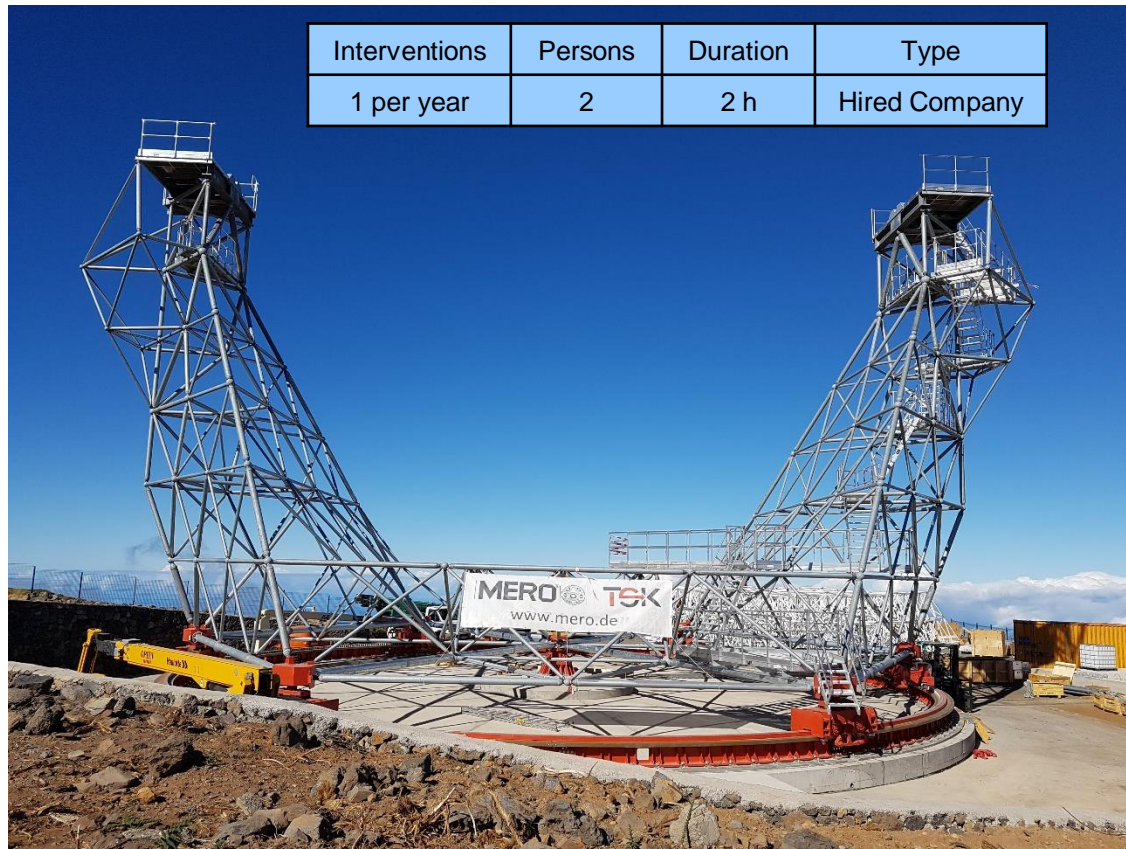
23rd July 2020

LST Meeting on Maintenance

Access Elements

Preventive Maintenance of Mount Access:

- visual inspection of stairs, catwalks and platforms
- climbing equipment and cherry picker needed

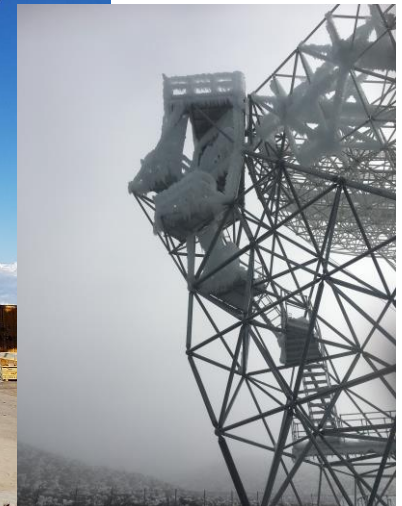
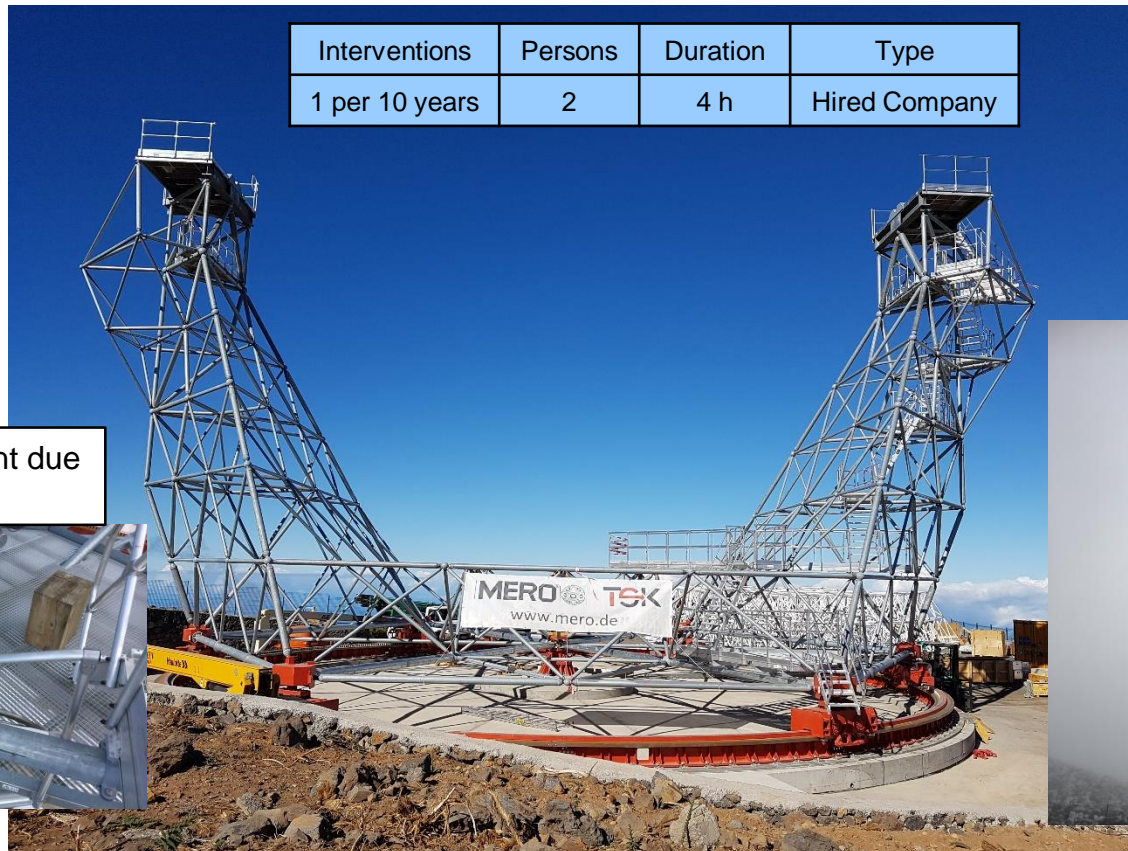


Access Elements

Corrective Maintenance of Mount Access:

- replacement or repair of access elements (e.g. catwalk lattice floor, handrail)
- climbing equipment and/or cherry picker needed (depending on the location)

Interventions	Persons	Duration	Type
1 per 10 years	2	4 h	Hired Company



Access Elements

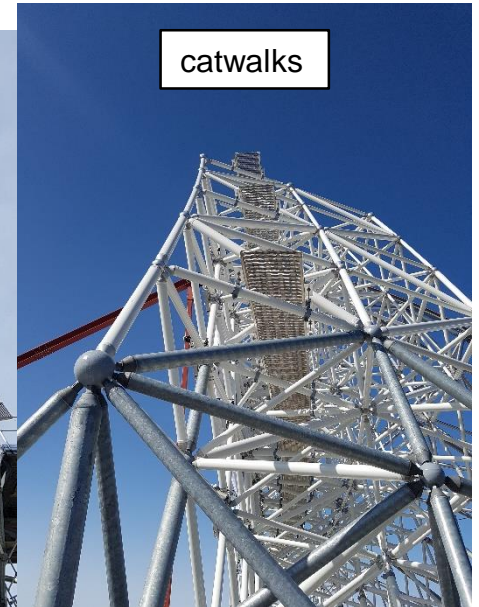
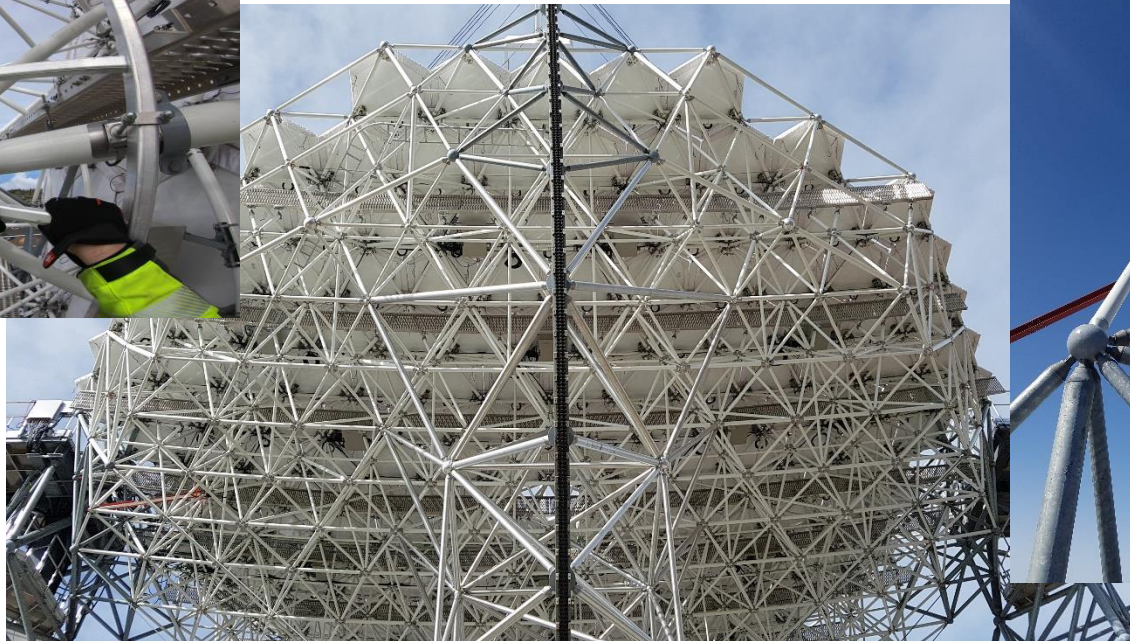
Preventive Maintenance of Dish Access:

- visual inspection of catwalks and vertical ladders
- climbing equipment needed

Interventions	Persons	Duration	Type
1 per year	2	2 h	Local Engineers

vertical ladders

catwalks



Access Elements

Corrective Maintenance of Dish Access:

- replacement of access elements (e.g. catwalk, ladder or fixation element)
- climbing equipment needed

Interventions	Persons	Duration	Type
1 per 10 years	2	8 h	Local Engineers

vertical ladders

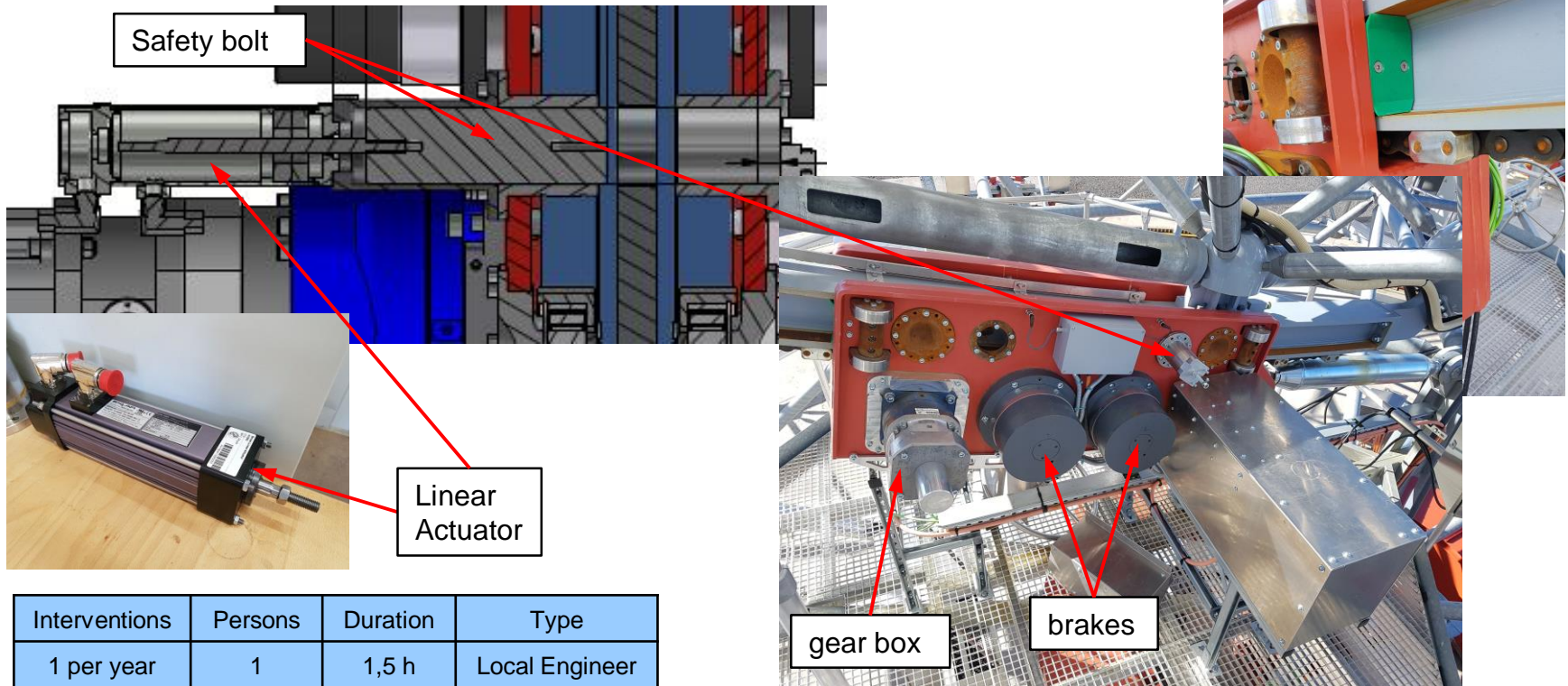
catwalks



Elevation Drive

Preventive Maintenance:

- visual and functional checks (gear boxes, brakes, safety bolt, guiding wheels)
- cleaning and greasing (chain wheels, bearings, mud flaps, etc.)

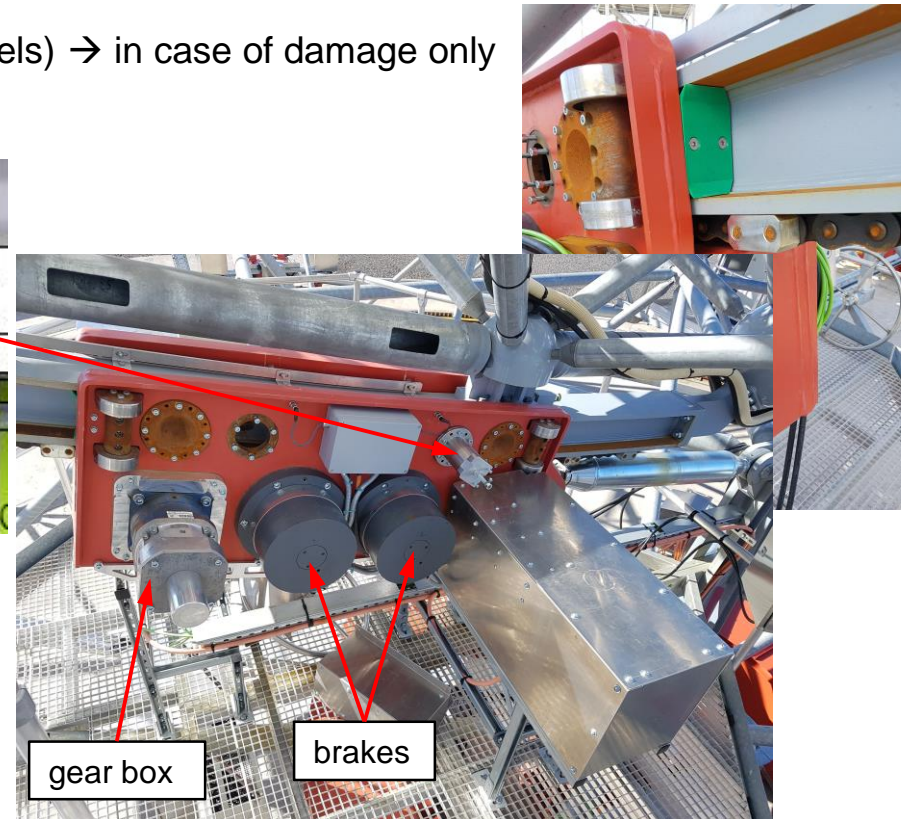
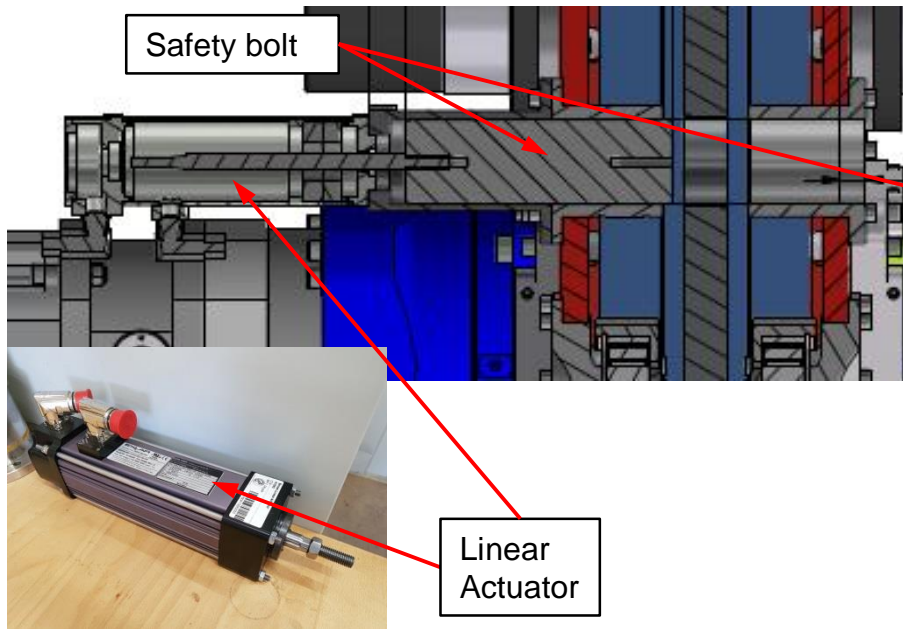


Interventions	Persons	Duration	Type
1 per year	1	1,5 h	Local Engineer

Elevation Drive

Corrective Maintenance:

- replacement of bearings (e.g. of guiding wheels) → in case of damage only
- replacement of wear parts (e.g. mud flaps)

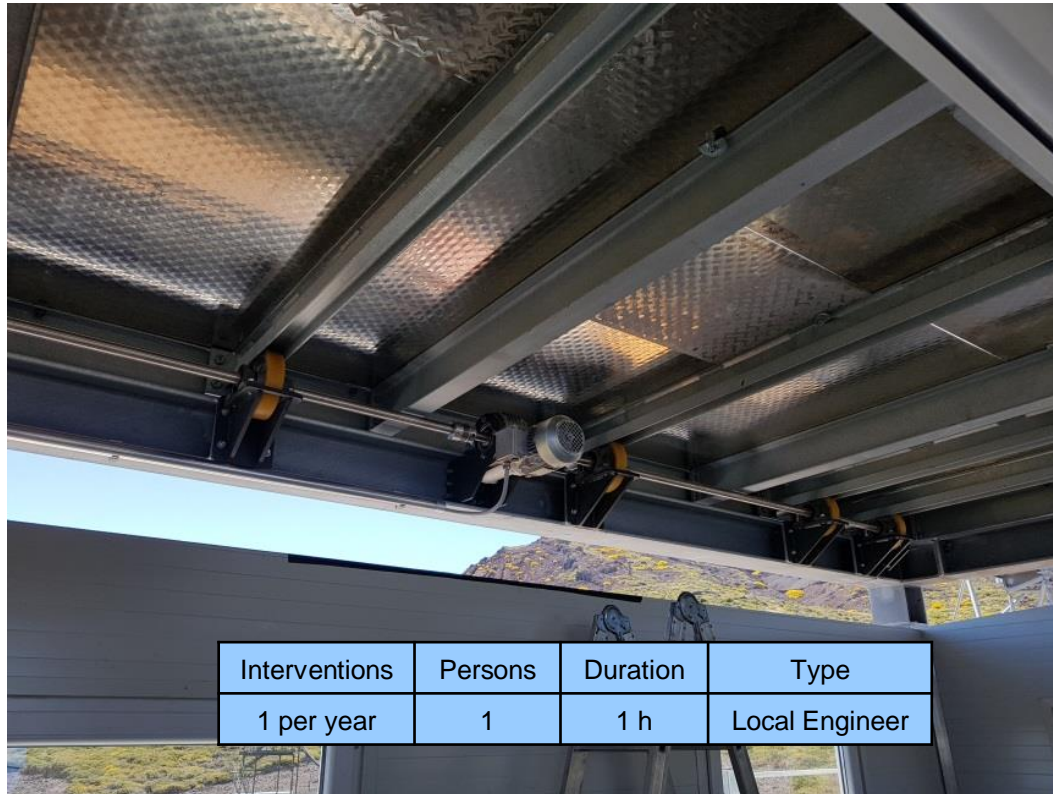


Failure	Interventions	Persons	Duration	Type
Damage	1 per 10 years	1	1 h	Subsystem Engineer
Wear-out	1 per 5 years	1	0,5 h	Subsystem Engineer

Camera Access Tower

Preventive Maintenance of moving platform drive:

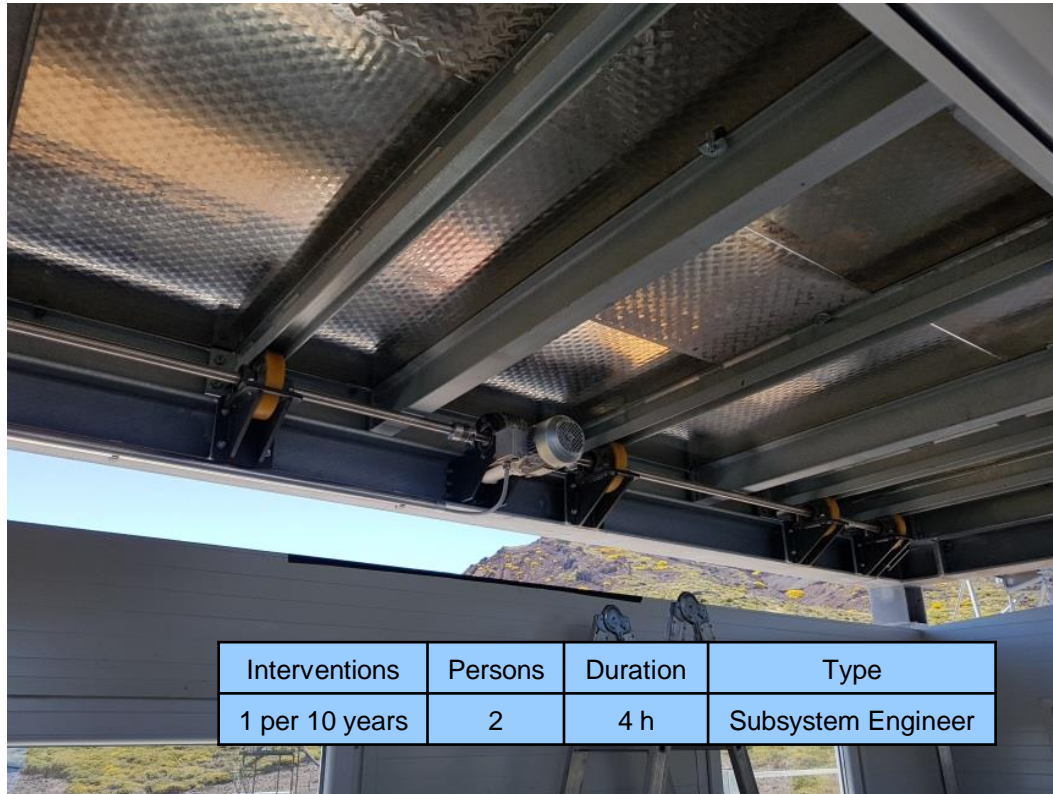
- visual and functional check
- cleaning and greasing



Camera Access Tower

Corrective Maintenance of moving platform drive:

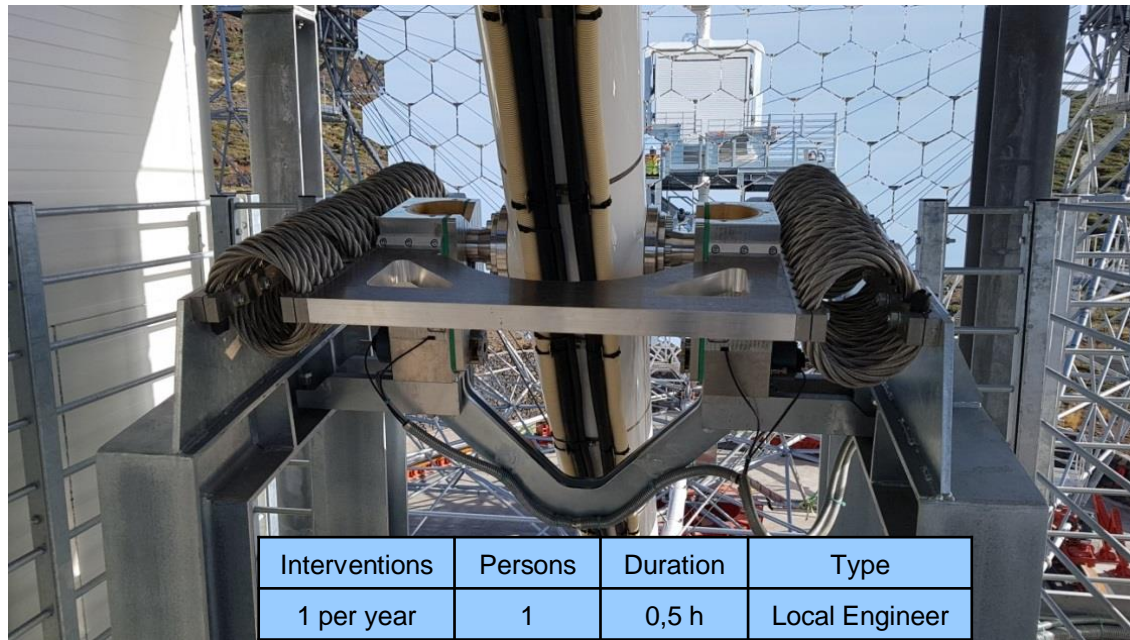
- replacement of a single part of the drive → in case of damage only
- ladder and climbing equipment needed
- functional check after replacement



Camera Access Tower

Preventive Maintenance of CSS Locking System:

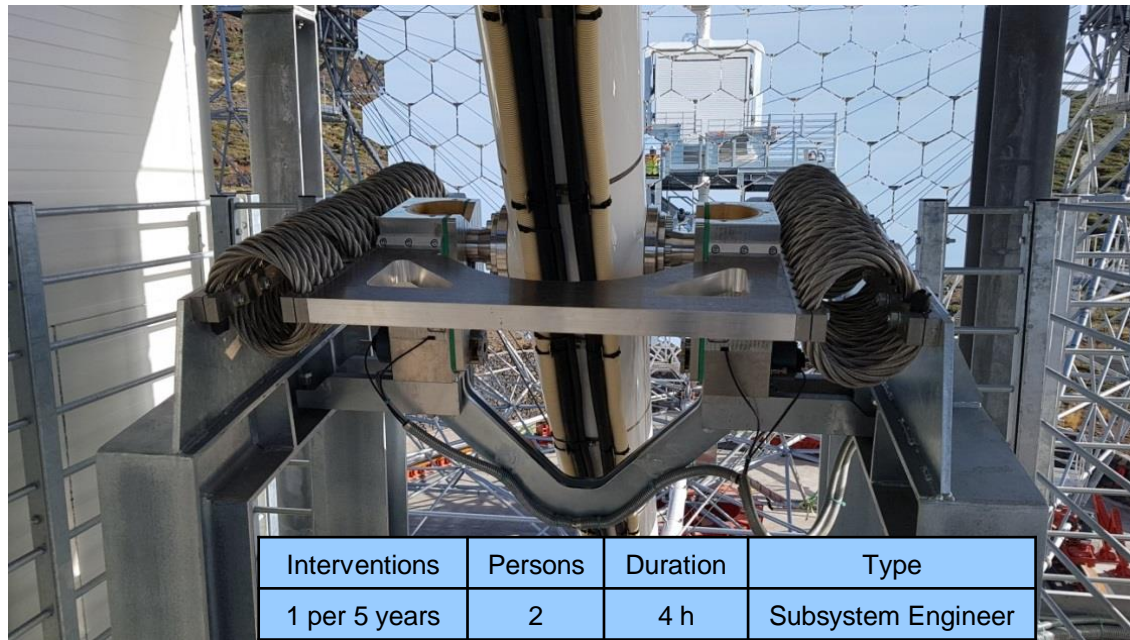
- visual and functional check
- cleaning



Camera Access Tower

Corrective Maintenance of CSS Locking System:

- replacement of a single part because of wear-out
- functional check after replacement



Camera Access Tower

Preventive Maintenance of Front Scaffolding:

- new component → not clear yet which effort for maintenance is needed

