

# KMTNet Filter Shutter Assembly(FSA) replacement procedure for CTIO

21<sup>st</sup> NOV 2018

# Preparation material

- ① Lifting part
- ② Dubuque clamp
- ③ Jib crane controller
- ④ 3/16 inch allen wrench
- ⑤ 5/32 inch allen wrench
- ⑥ Small flat screw driver for connector
- ⑦ Jib crane fixing plate
- ⑧ Working table on the scissor lift
- ⑨ 17 mm wrench
- ⑩ 17 mm socket and ratchet handle
- ⑪ Pullyman
- ⑫ Portable drill
- ⑬ Nipper



# 1. Go to service position by operator

- Move the telescope to South side limit
- Insert the stow pin to DEC hole on South side
- Turn off the power of motor and FSA



## 2. Jib crane power connect

- Connect the plug from the tail side of the telescope to the transformer (110V)
- **Jib crane must be connected on 110V!**



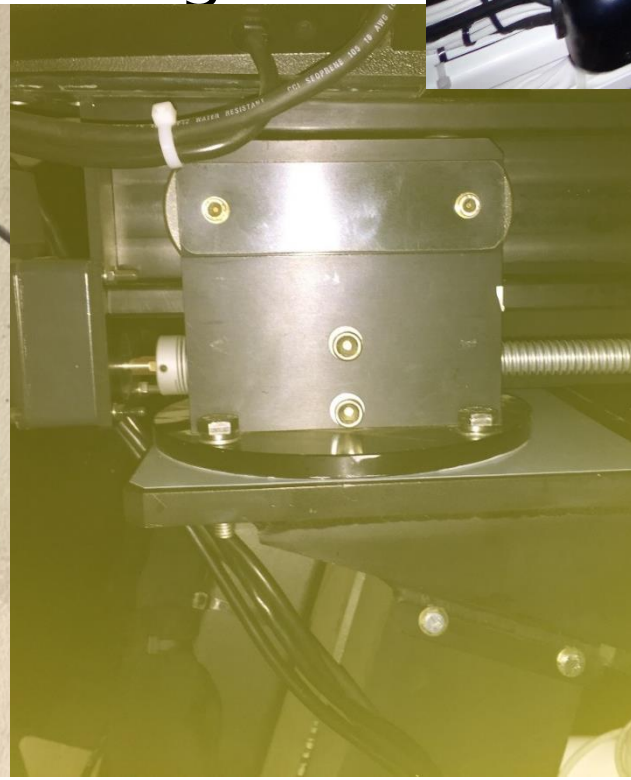
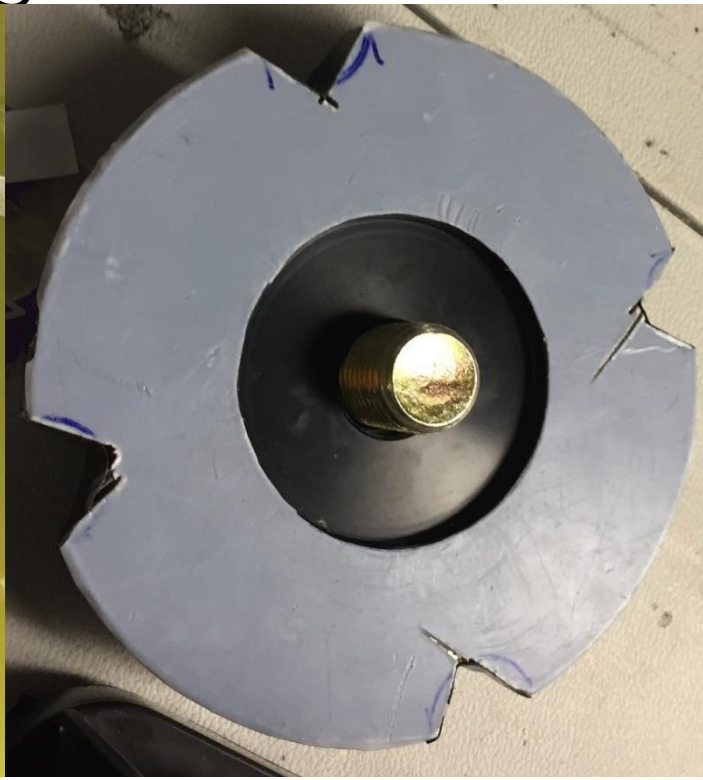
### 3. Jib crane wire release

- Release the winch wire(push '하' button on the remote controller)
- Disconnect the spring from the wire



# 4. Install the fixing plate

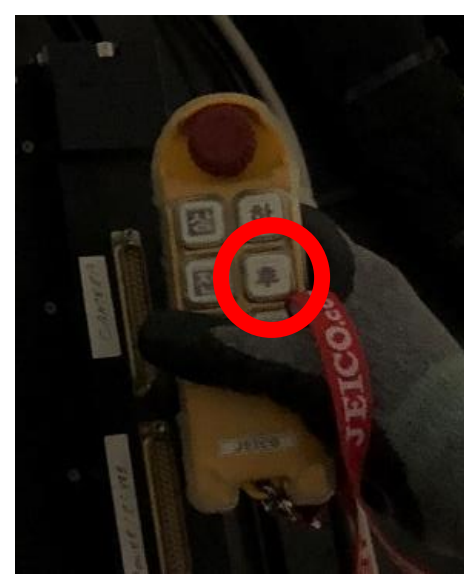
- Install the fixing plate under the jib crane
- Remove the fixing bolts and nuts for the Jib crane
- Ensure that the electrical wires will not be twisted or caught on the structure during work





# 5. Rotate the jib crane

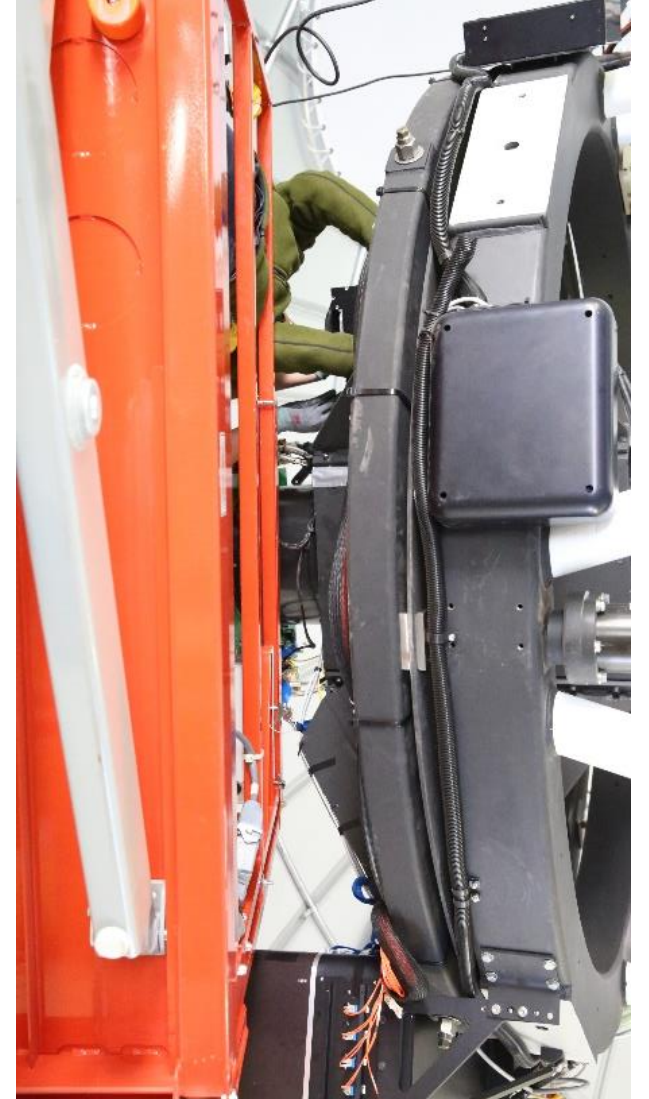
- Push the '←' button on the remote controller (Move the backward)
- Rotate the jib crane – be careful the pulley





# 6. Move the scissor lift to working area

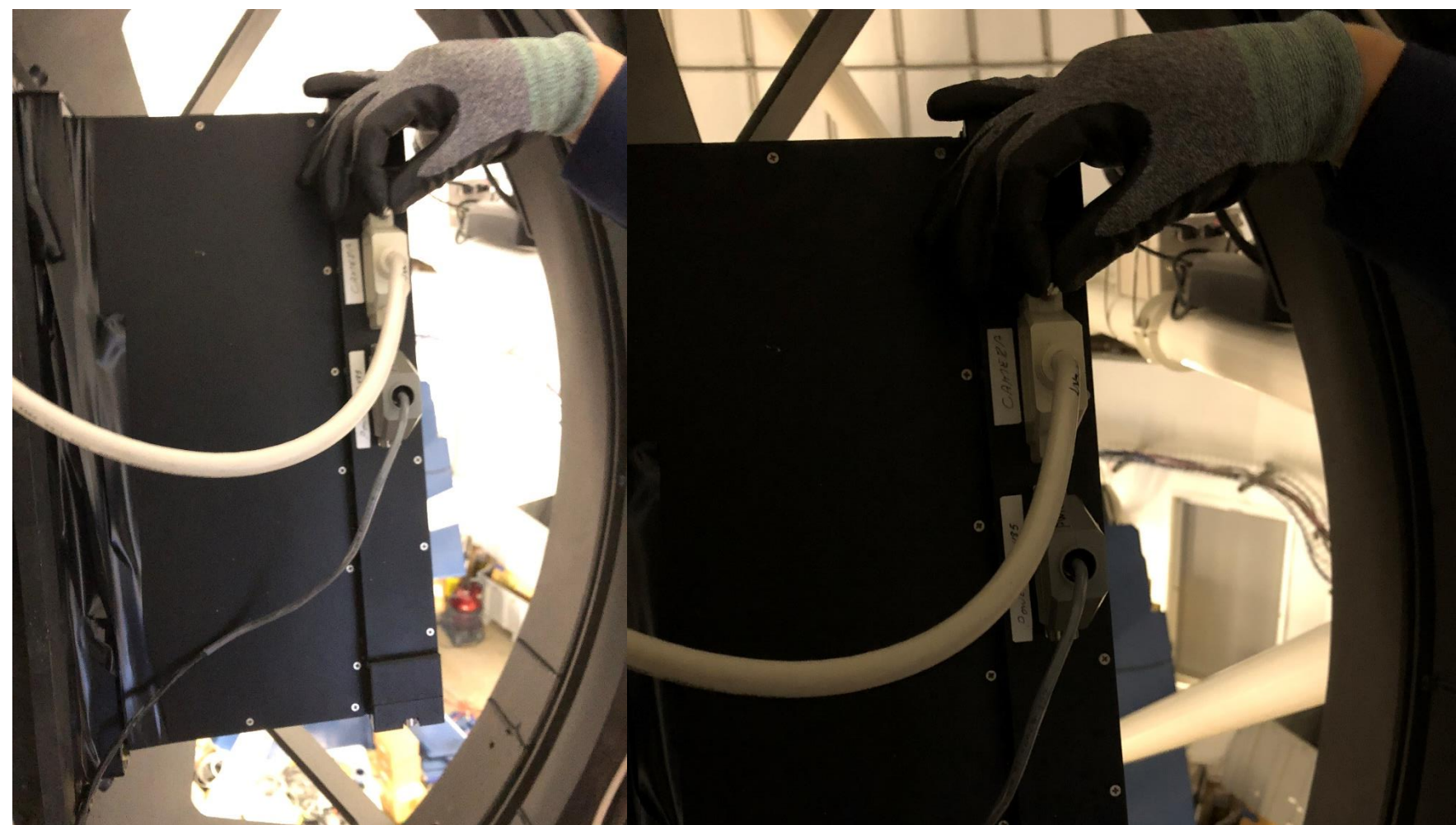
- Scissor lift has to be parked with care not to touch the camera and HE box





# 7. Remove the connector

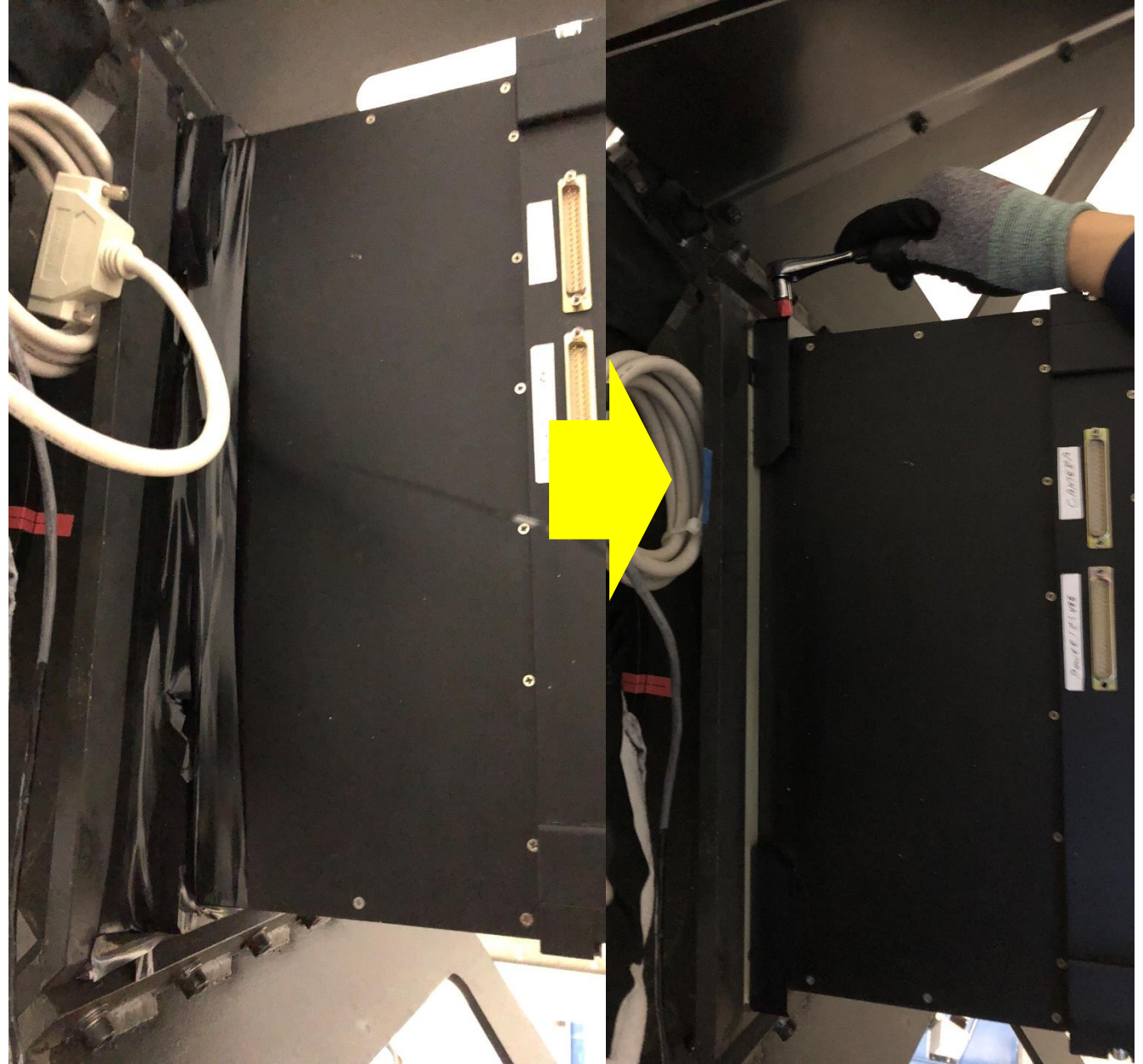
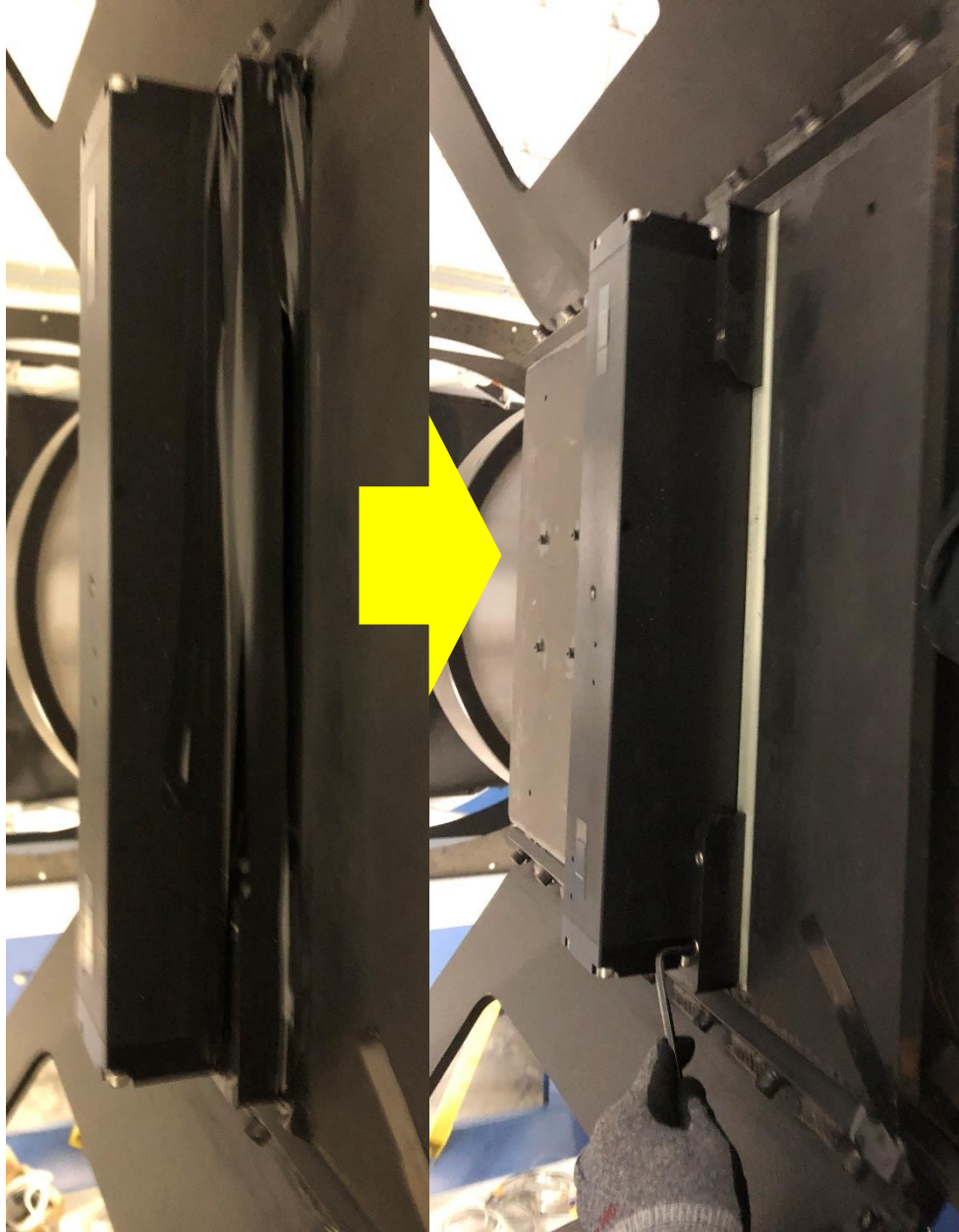
**Caution: Since it uses same connector, please make sure the mark (CAMERA and RS485) when you plug in the connector.**



Connector	FSA
Camera	Camera
PWR	Power/RS485



## 8. Remove the black tape



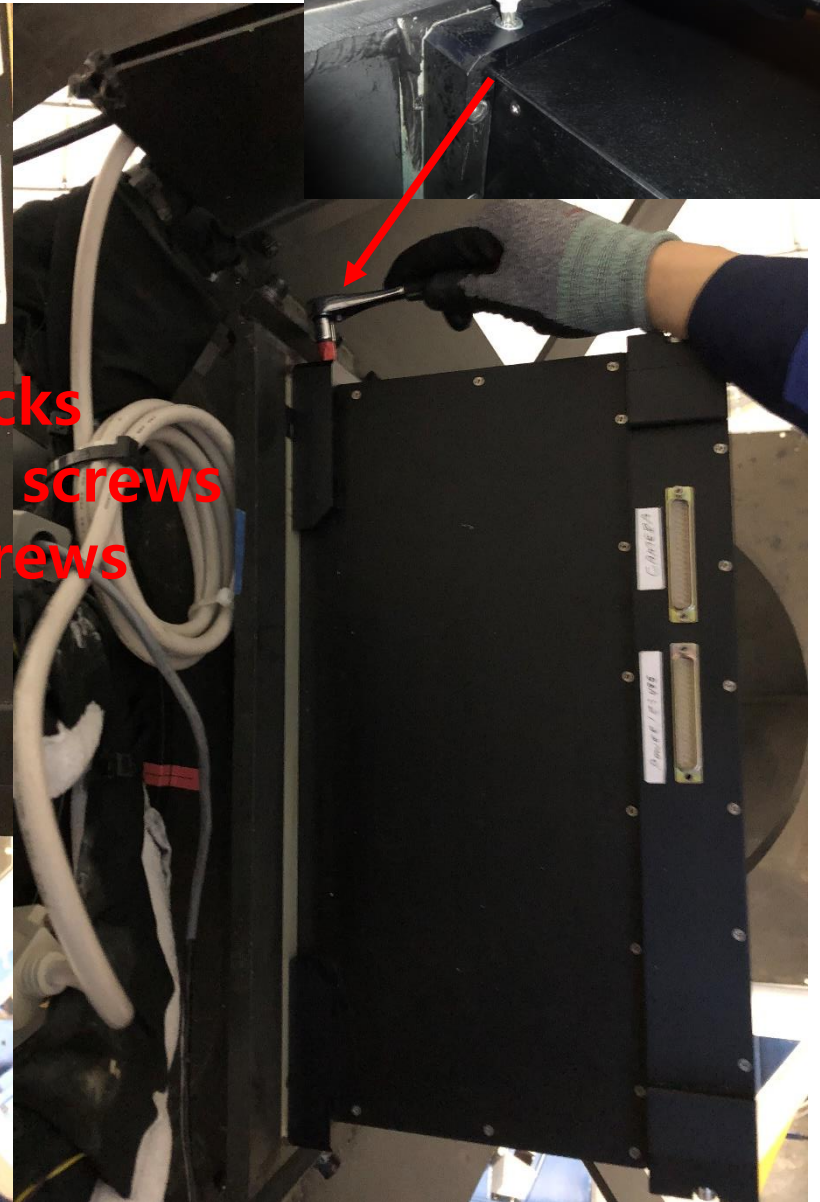
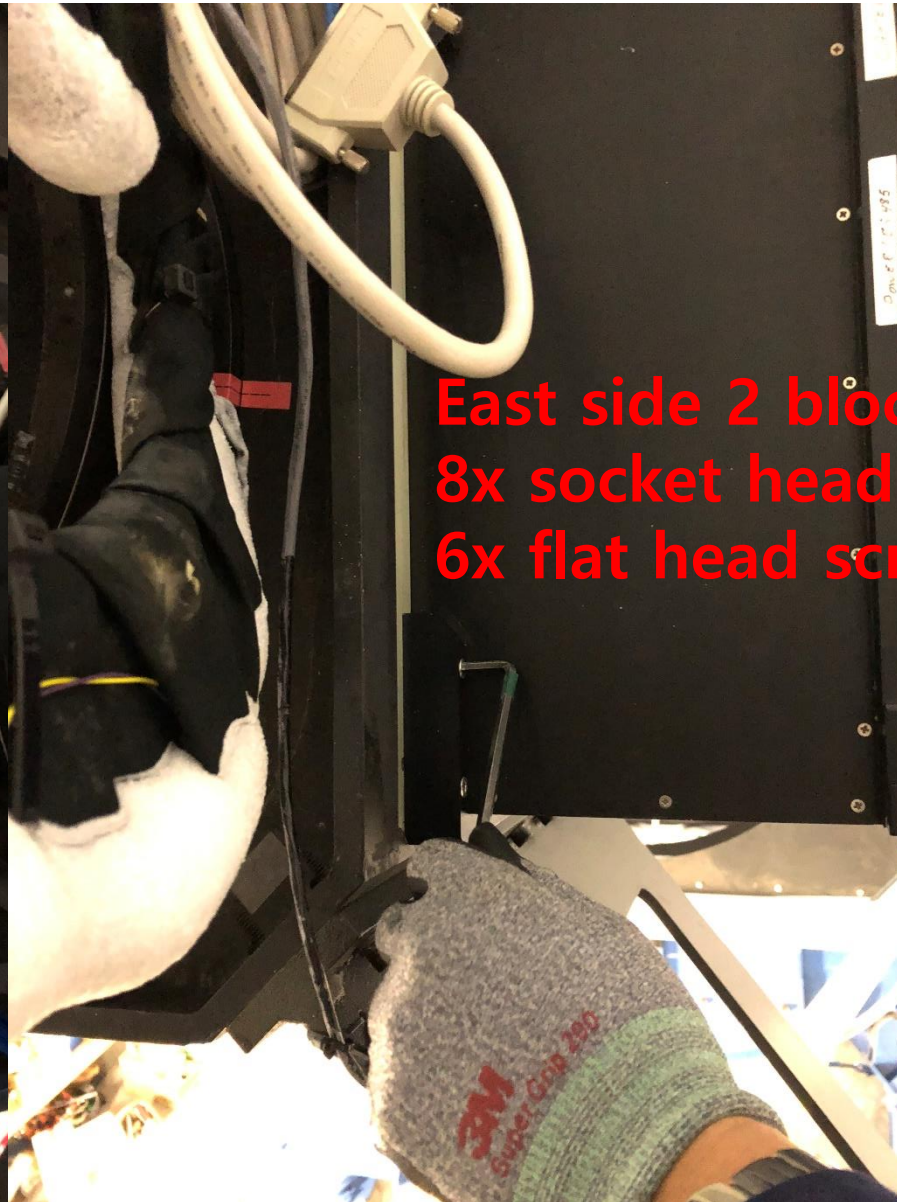


# 9. Remove the four □ shape blocks

West side 2 blocks  
8x socket head screws  
2x flat head screws



East side 2 blocks  
8x socket head screws  
6x flat head screws





# 10. Disengage the FSA using Dubuque clamp

- Use a butterfly bolt on the top of the Dubuque clamp to remove the FSA since it is difficult to pull it out by hand
- Pull out the FSA until FSA window appears

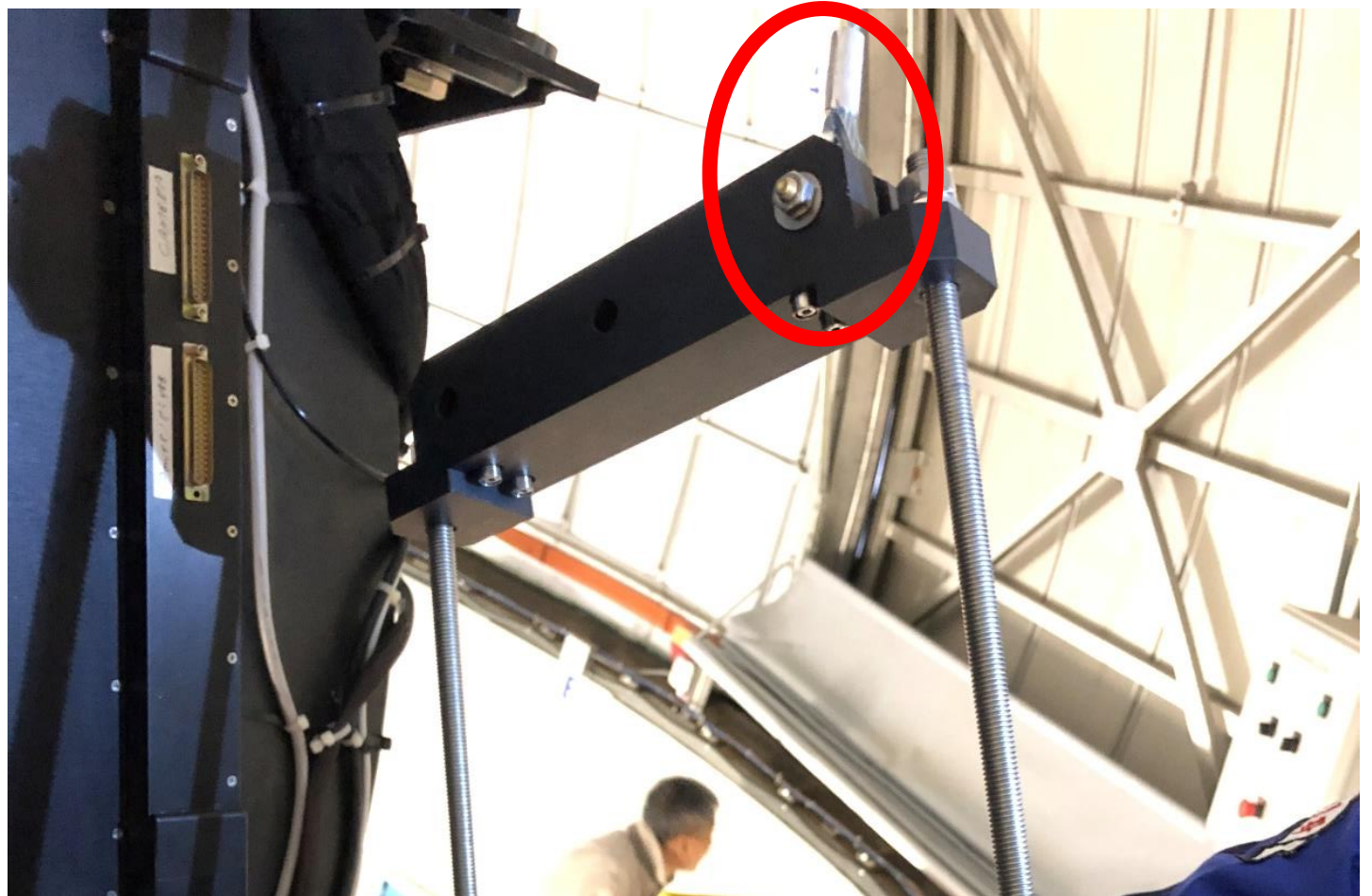
**→ Do not pull to much, since it is hanging only 40 centimeter within corrector box**





# 11. Attach the lifting part

- Release the winch wire(push '하' button on the remote controller)
- Connect the wire to lifting part





# 11. Attach the lifting part

Insert the screw cap into the hole on the top of the FSA



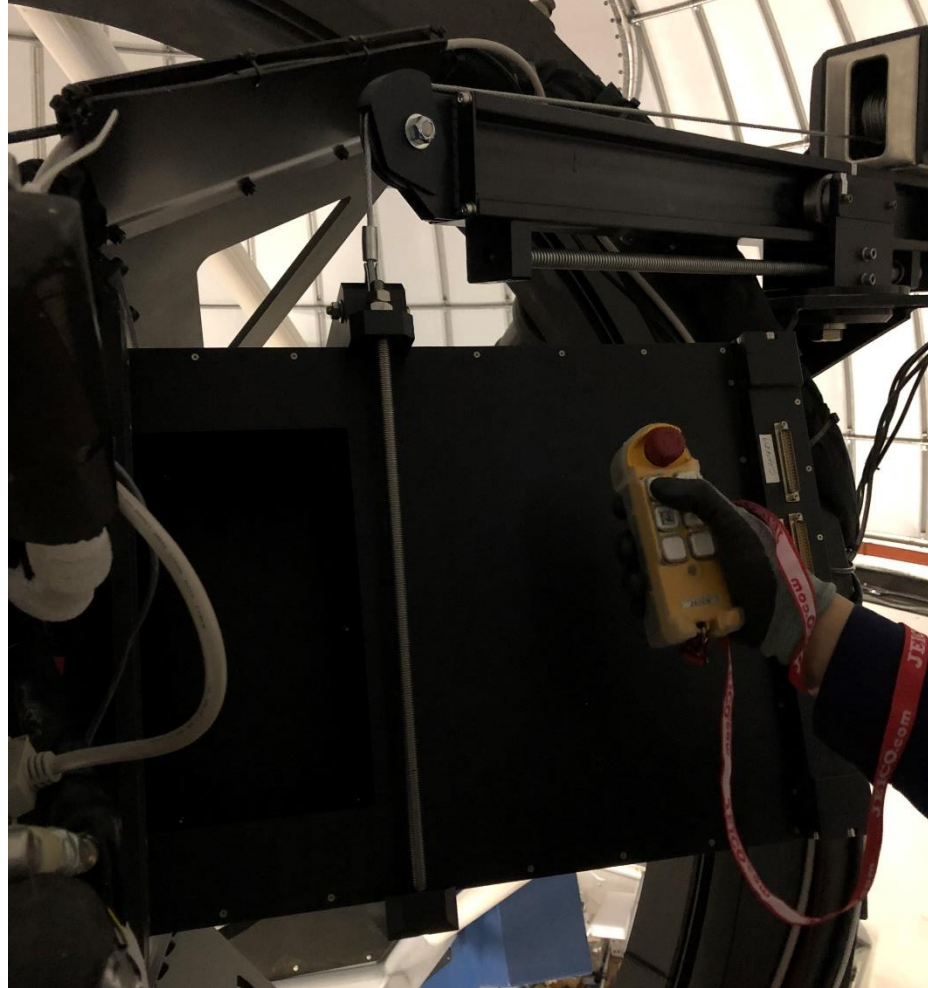
Assemble the bottom part of the lifting part using two thread rods





# 12. Slide out the FSA by jib crane

- As the lifting part is attached on the FSA, adjust the wire length and screw motion using remote controller as shown bellow.

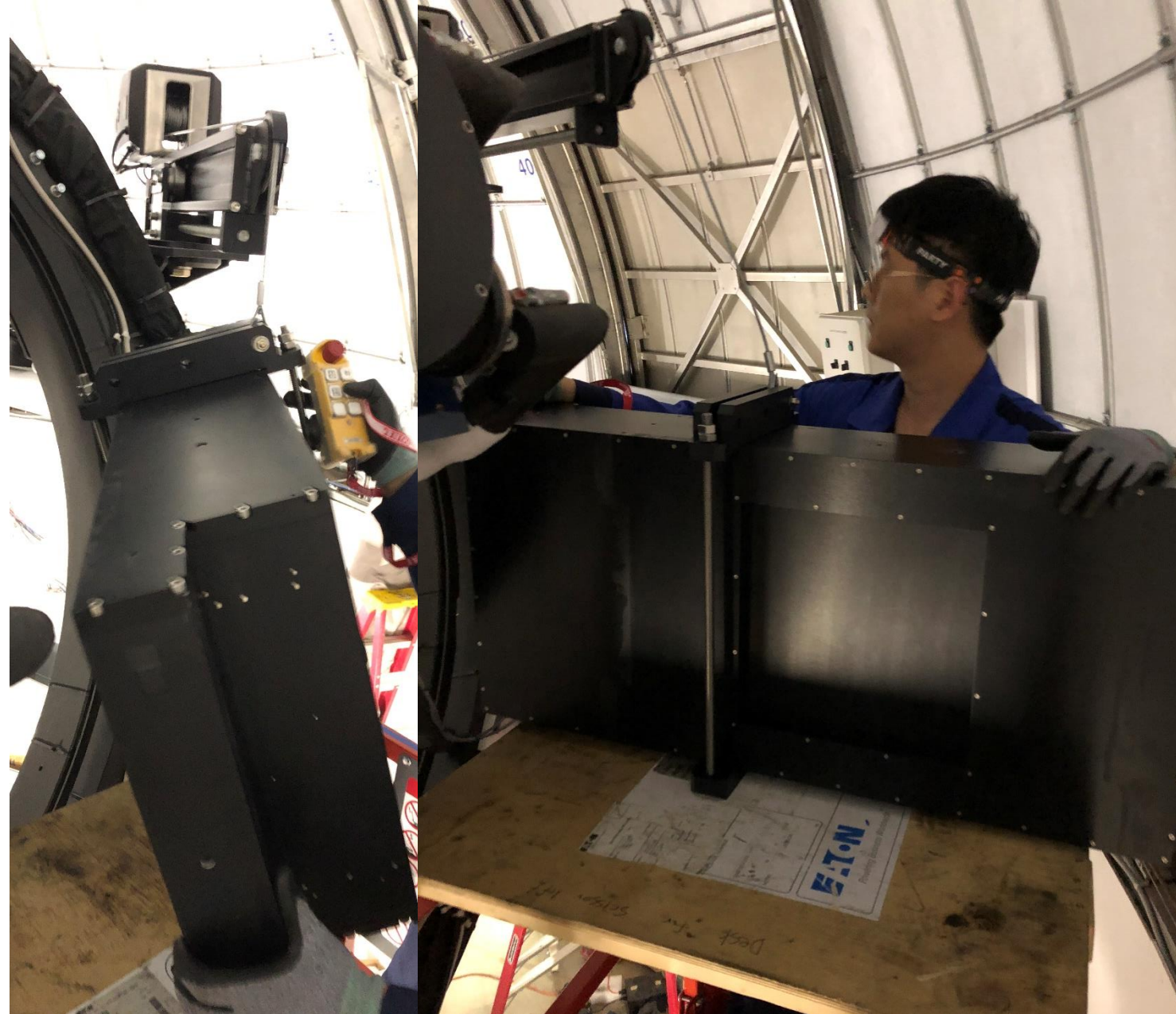


# 13. Put the FSA on the scissor lift

- Put the FSA on the working table on the scissor lift by jib crane

The winch uses self braking disk, so the operation time is very limited as less than 2 min. While the height of the working place is almost 5 meter and the winding speed is just 1 m/min. Therefore, you need to use the scissor lift to lower the FSA to the ground.

**→ Do not operate the winch for more than one minute because of overheating!**



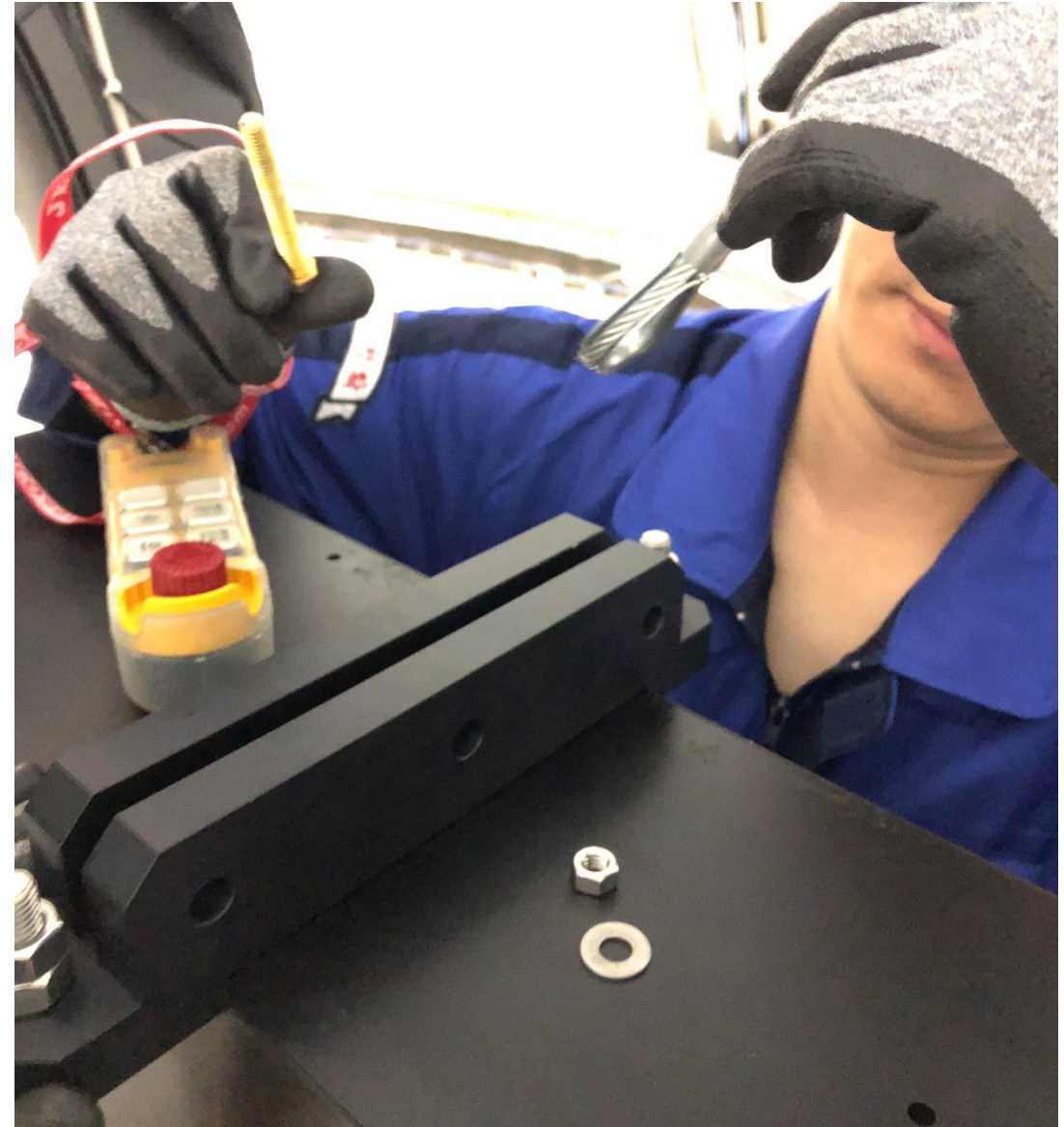


# 14. Connect the eye bolts and chain to the FSA

- Take off the winch wire from the lifting part
- **The FSA must be securely grabbed by hand while descending scissor lift**

# 15. Take off the winch wire

- Take off the winch wire from the lifting part
- **The FSA must be securely grabbed by hand while descending scissor lift**





# 16. Connect the pully man to jib crane

- One of the two blades of the shutter is free to move, so you may hear shutter sound during moving. It is normal.

# 17. Go down to ground

- One of the two blades of the shutter is free to move, so you may hear shutter sound during moving. It is normal.





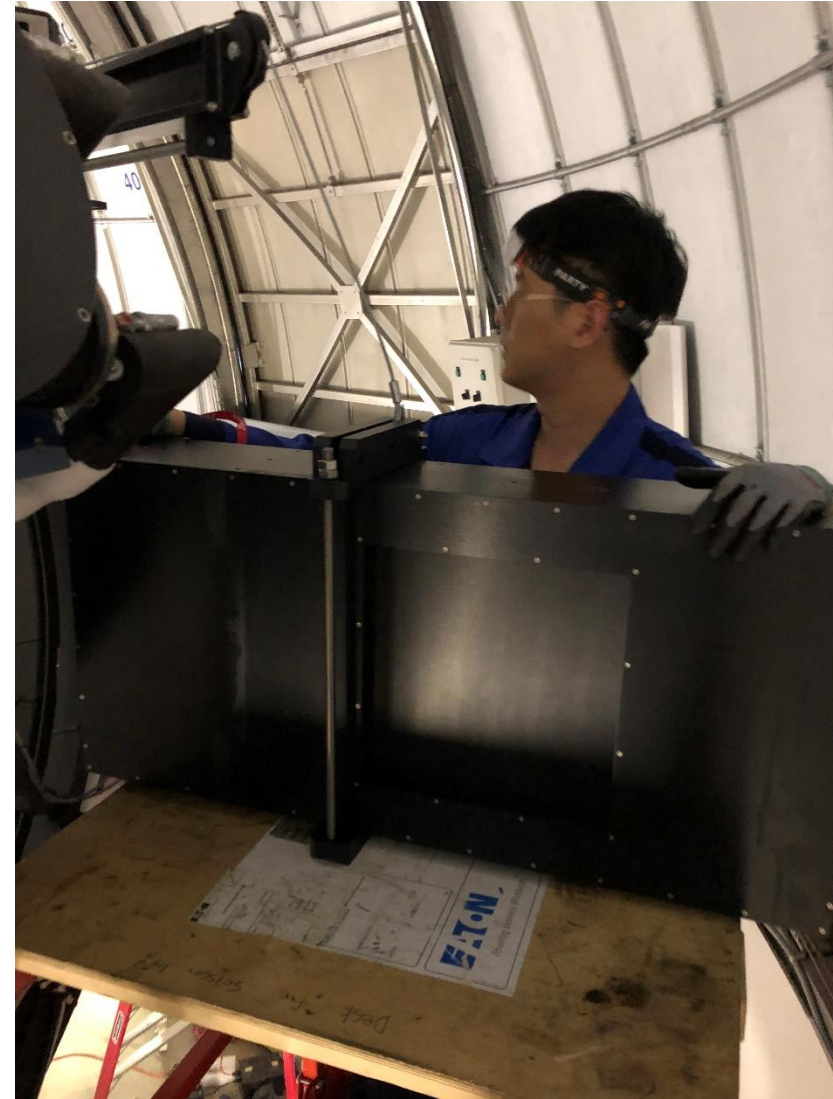
# 21. Lift up the FSA

- Assemble the lifting part to FSA on the ground
- Put the FSA on the working table on the scissor lift
- Lift up the scissor lift to work area
- **The FSA must be securely grabbed by hand while rising scissor lift**



## 22. Connect the wire to lifting part

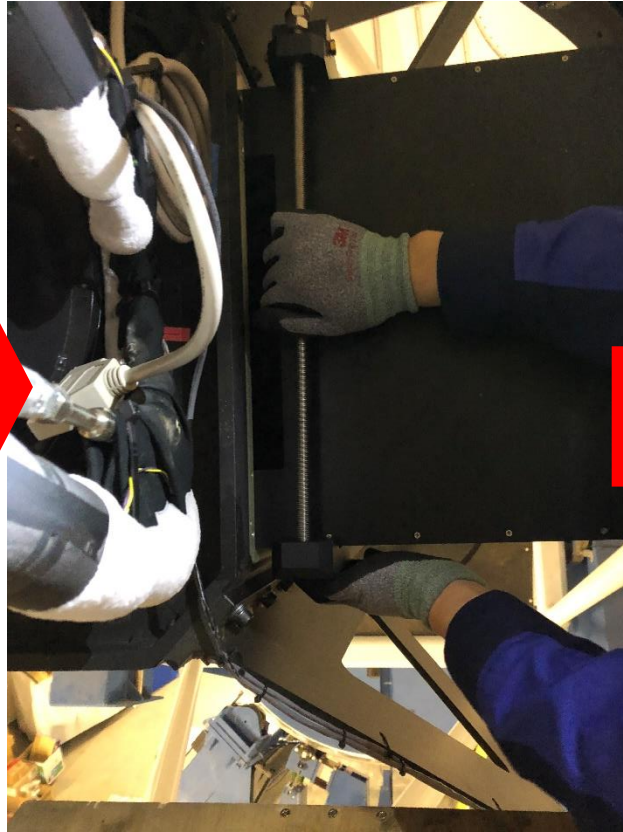
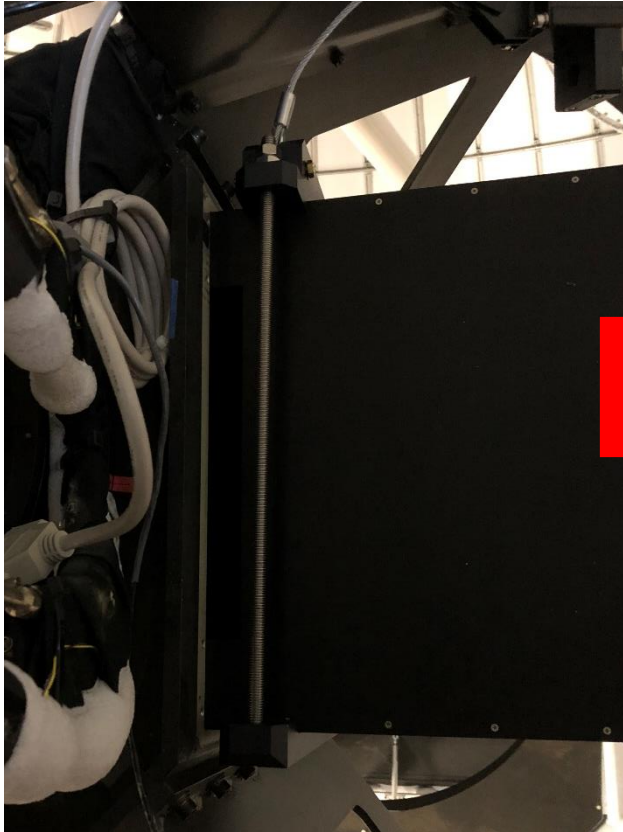
- Connect the winch wire to lifting part





## 23. Insert the FSA into the corrector box

- Insert the FSA into the corrector box using jib crane until the lifting part touches the corrector box
- Disassemble the lifting part



# 24. Hook up the FSA

- Tighten the four corners blocks with bolts
- Plug the connector

Connector	FSA
Camera	Camera
PWR	Power/RS485



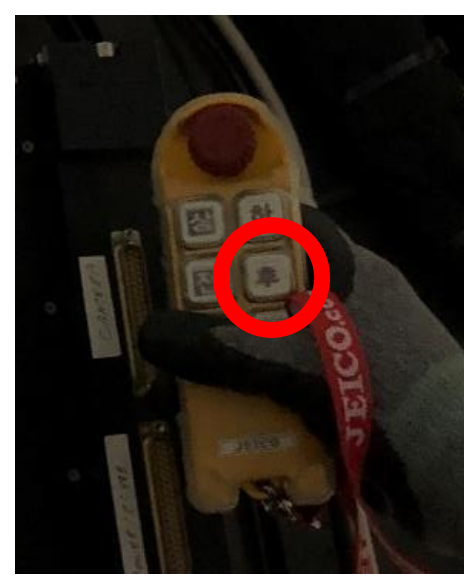


# 25. FSA operation test

- Power on the FSA by operator
- FSA operation test using KMTNet-Control-Software on AUX computer by operator

# 26. Rotate the jib crane

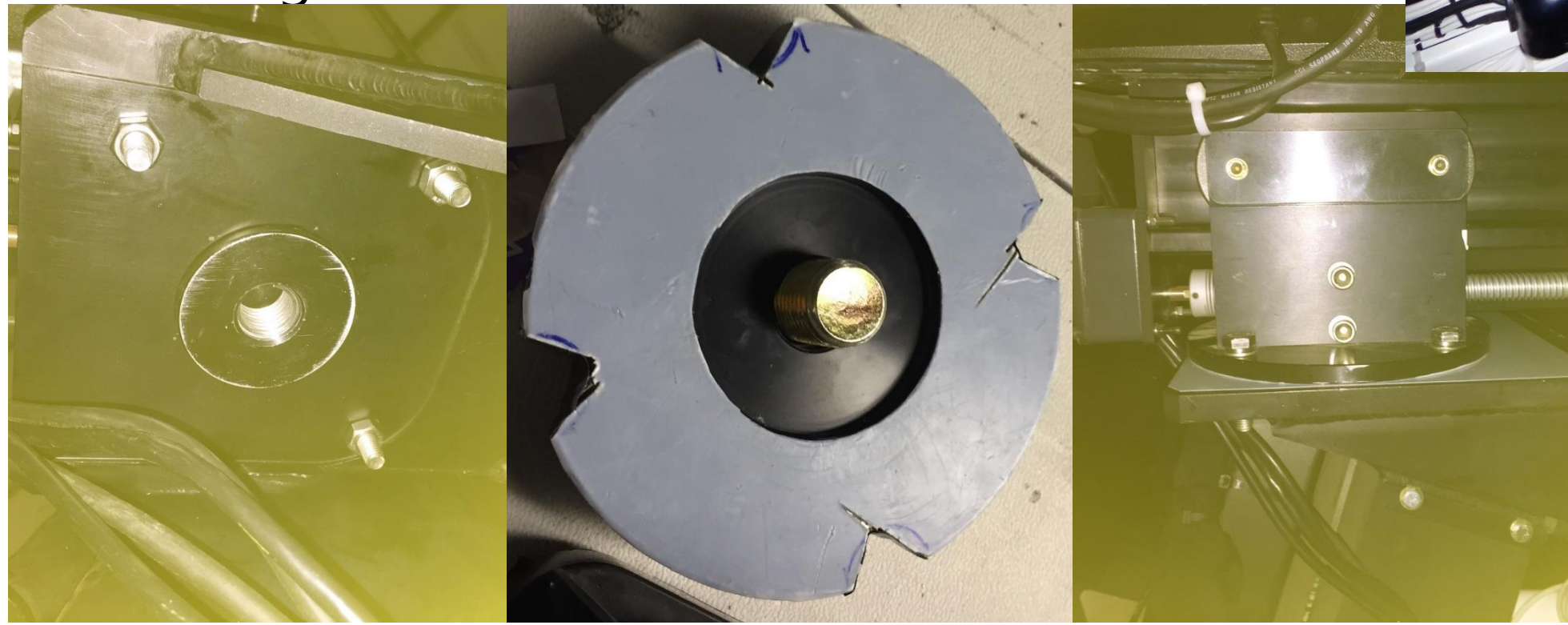
- Push the '후' button on the remote controller (Move the backward)
- Rotate the jib crane – be careful the pulley





# 27. Install the fixing plate

- Tight the fixing bolts and nuts for the Jib crane
- Remove the fixing plate under the jib crane
- Fix the electrical wires so that it does not get caught in the structure when the telescope is moving



## 28. Fix the jib crane wire

- Connect the spring to the wire
- Pull the winch wire(push '상' button on the remote controller)
- **Caution: DO NOT pull the spring too far**

