



Dynalene System

From the original scope to startup, going through the design

Project and Community Workshop
August 12th, 2022

David Jiménez Mejías



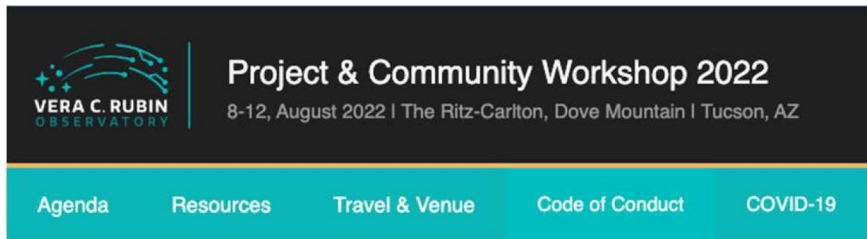
U.S. DEPARTMENT OF
ENERGY

SLAC

CHARLES AND LISA SIMONYI FUND
••• FOR ARTS AND SCIENCES •••



Friendly reminders - CoC & Covid





Home » Code of Conduct

Code of Conduct

Harassment and unprofessional conduct (including the use of offensive language) of any kind is not permitted at any time and should be reported.

Rubin Observatory adheres to the principles of kindness, trust, respect, diversity, and inclusiveness in order to provide a learning environment that produces rigor and excellence.



Check name-tags for these contact comfort level stickers.

Thank you for masking indoors!

Use the confidential email rubin2022-covid@lists.lsst.org to request a test, report your test results, or ask questions.

Reporting bullying, harassment, or aggression.

The Rubin 2022 Organizing Committee has appointed designated contacts:

- Ranpal Gill (rgill@lsst.org)
- Andrew Connolly (ajc@astro.washington.edu)
- Melissa Graham (mlg3k@uw.edu)

Contact via email, Slack, or the Community Forum.

Friendly reminders - virtual participation



Virtual participants should be muted when they're not speaking.



In-person participants should speak into the room microphone(s), or the chair should repeat all questions into the microphone, so that the virtual participants can hear what is said.



In the Rubin2022_PCW Slack Space, all participants can use the session's channel for Q&A and discussion. The channel name convention is, e.g.: #day1-mon-slot3a-intro-to-rubin

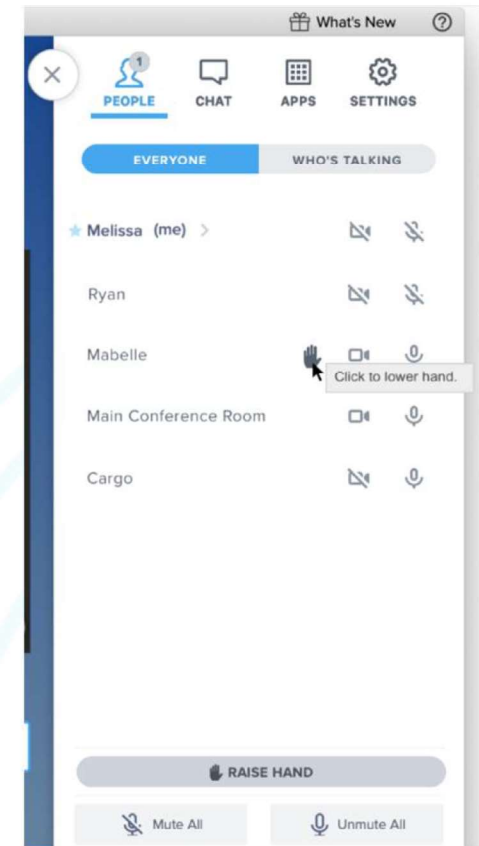


In BlueJeans, virtual participants should:

use the BlueJeans “raise hand” feature and wait for the moderator to call on you before speaking

or

use the BlueJeans chat functionality to ask questions or make comments.



Summary

- Introduction
- Refreshing about Dynalene System
- Telescope's particularities
- Learned lessons from outside
- Dynalene System scope, big and detailed pictures
- Design, Fabrication and Integration
- Schedule issues & Next steps



Introduction

David Jiménez Mejías - Electronics Engineer

Different positions during the last 10 years:

- Technical Operator
- Control Hardware Engineer
- Electronics and Controls Engineer
- Operation and Develops Engineer

At several Observatories and Institutions

- Instituto Astrofísica de Canarias (IAC) – Teide Observatory
- Observatorio Astrofísico Javalambre (CEFCA)
- Gran Telescopio Canarias (GTC Telescope)
- European Solar Telescope Project
- And since January 2021, joined to **Vera C. Rubin Observatory**

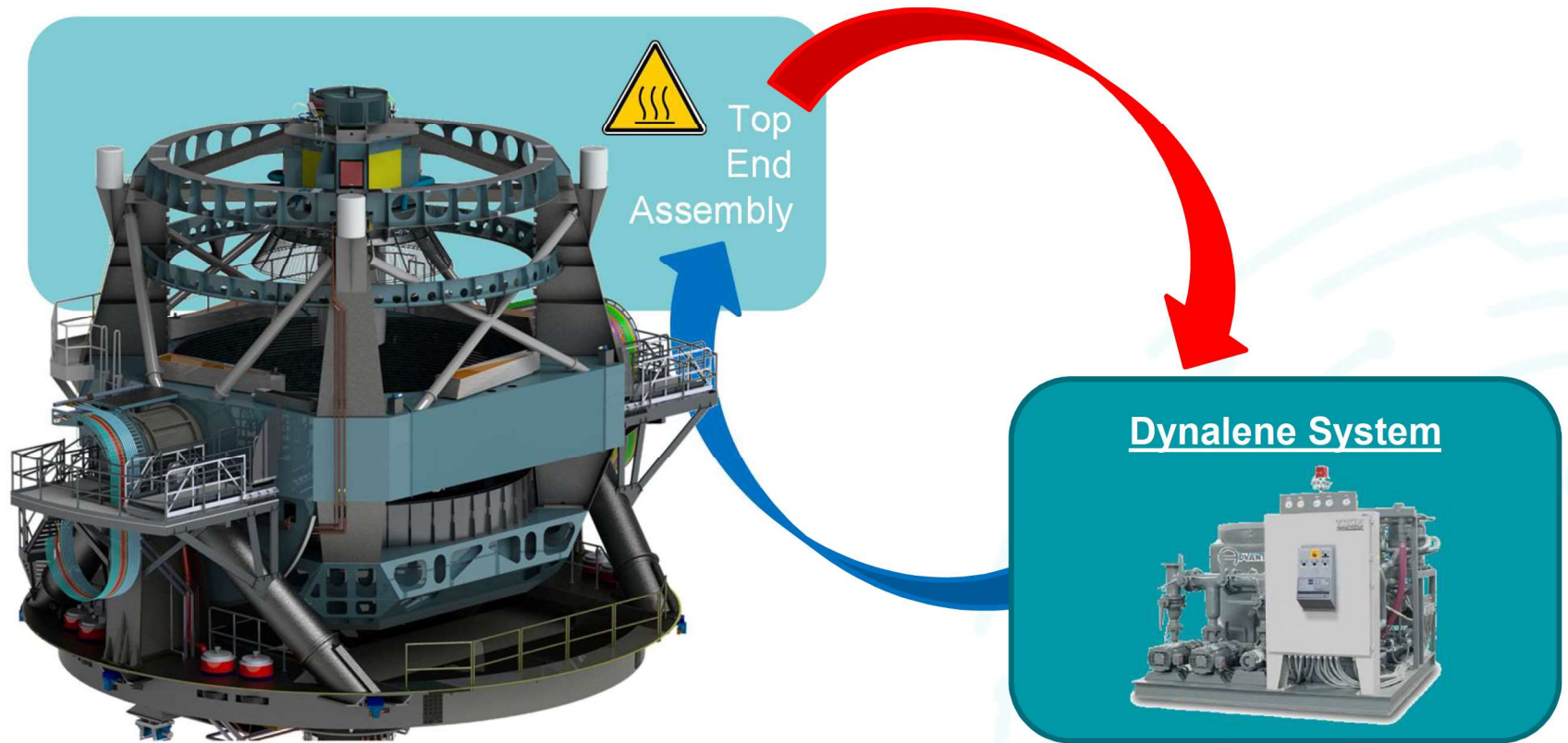


Centro de
Estudios de
Física del Cosmos
de Aragón

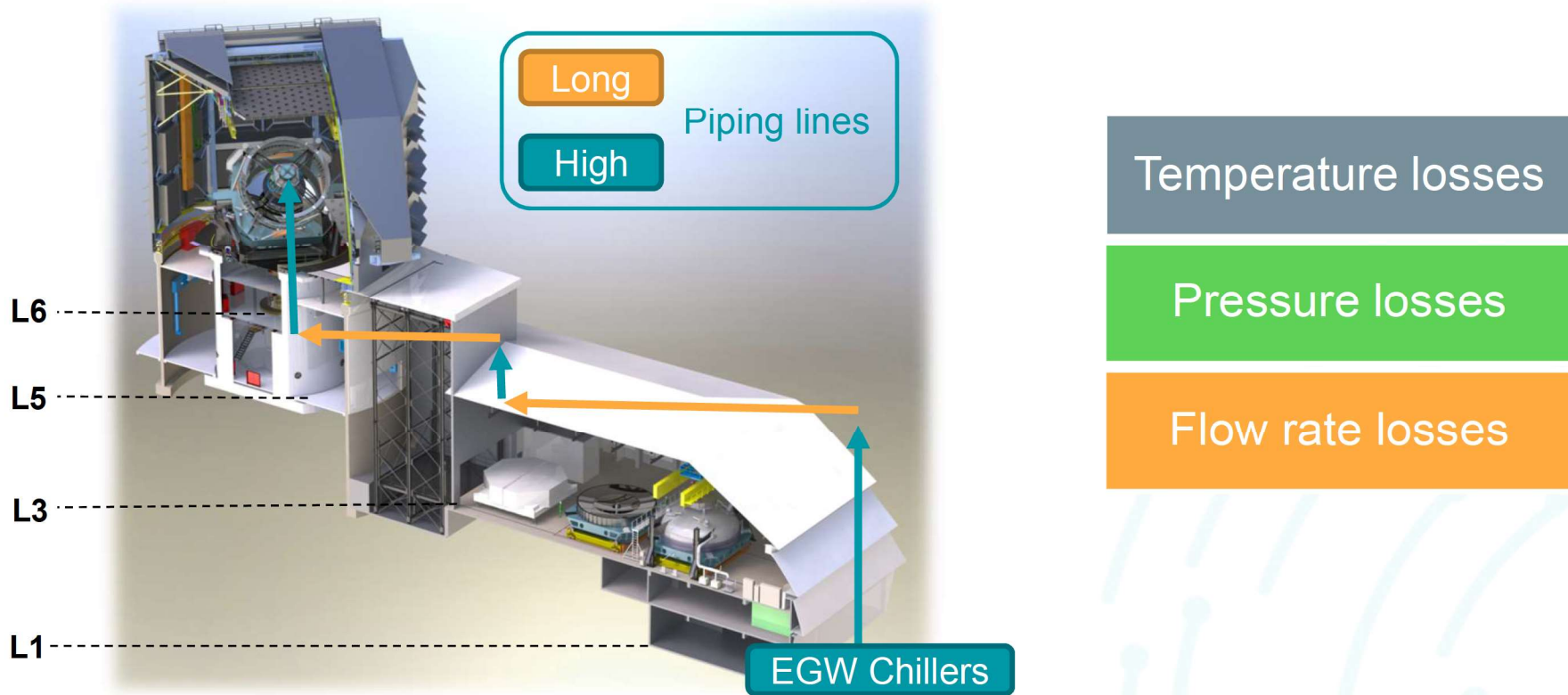


EST
european solar telescope

Refreshing about Dynalene



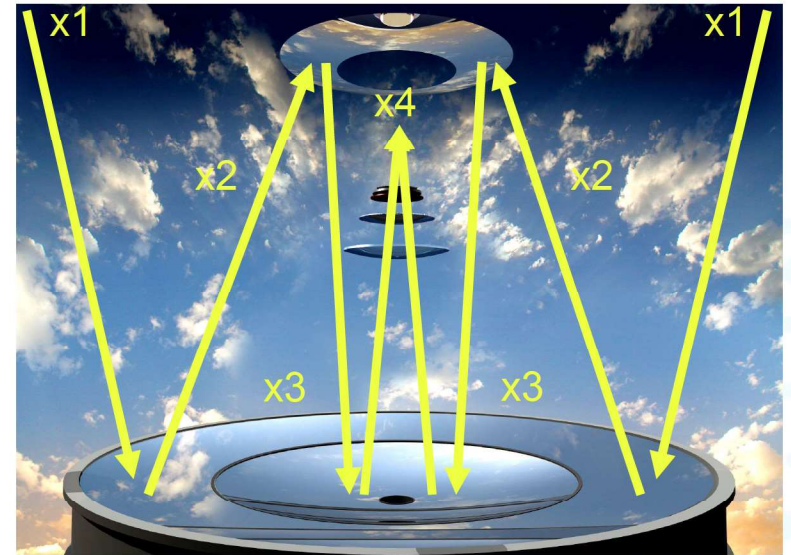
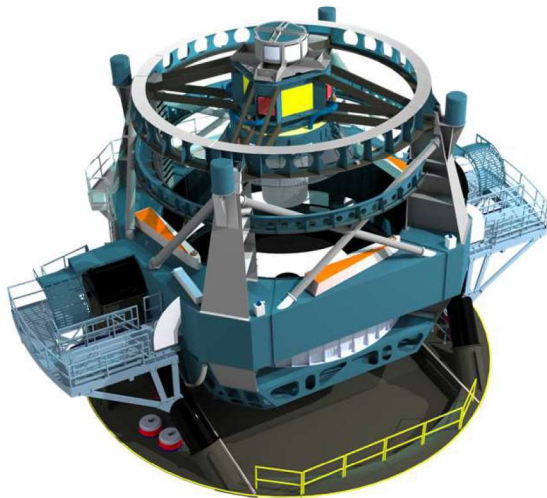
Refreshing about Dynalene



Telescope particularities



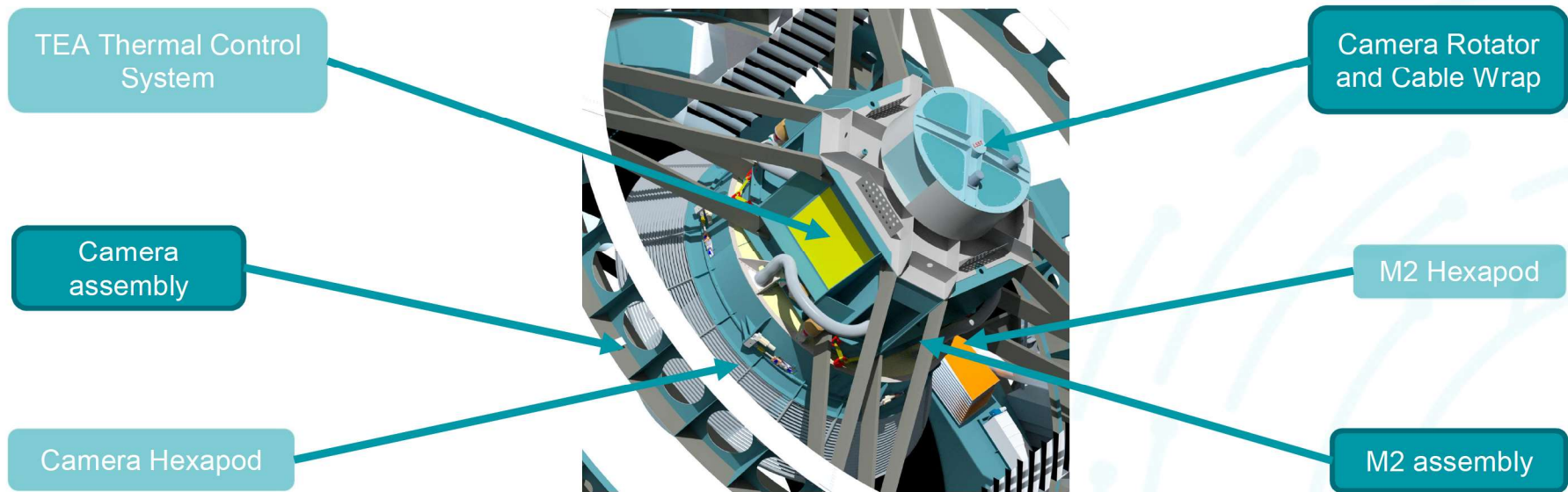
Simonyi
Survey
Telescope



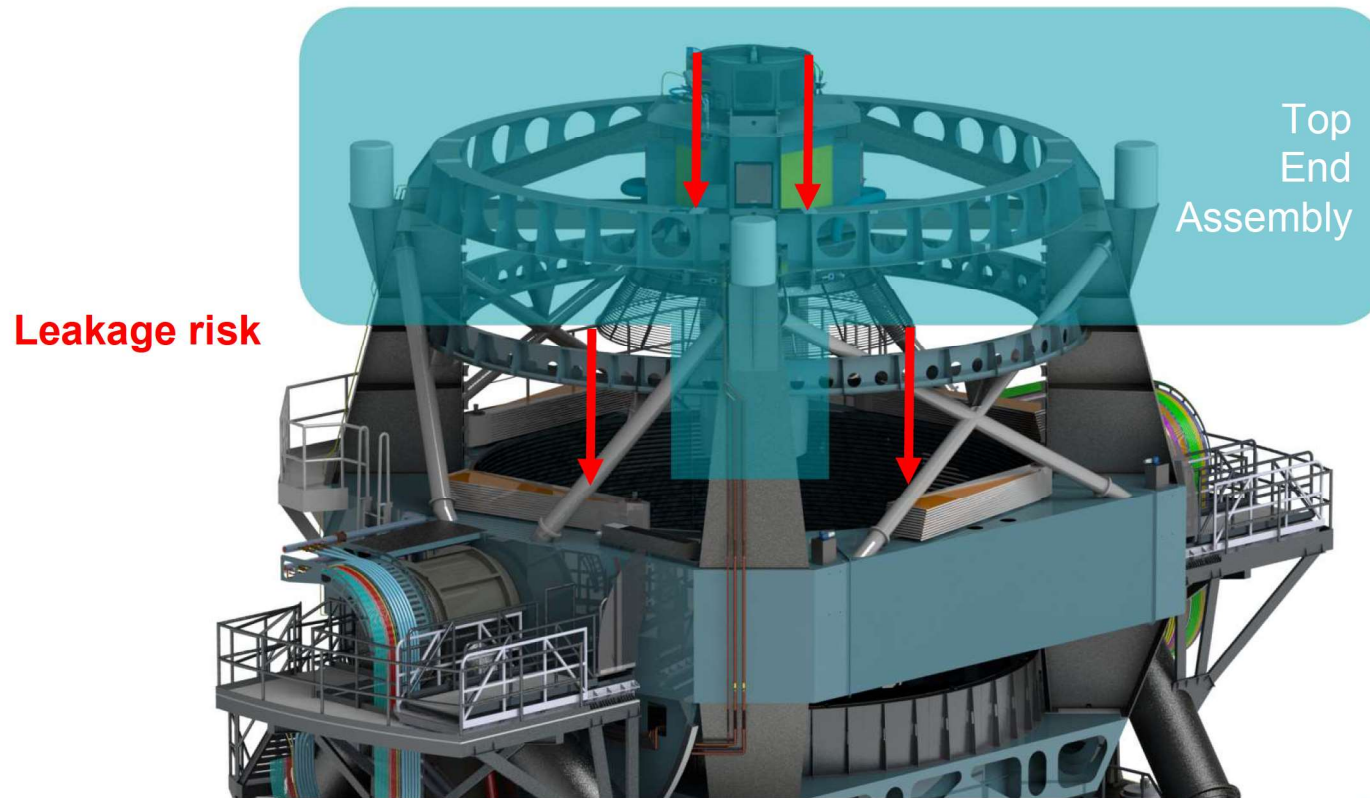
4 total crosses for the optical path

Top End Assembly (TEA)

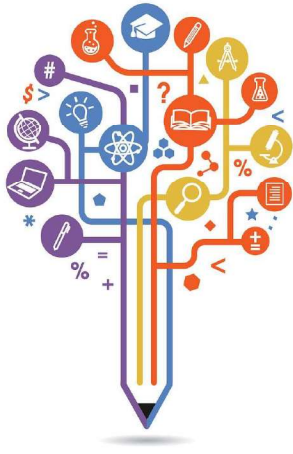
Many subsystems are attached to the TEA:



Leakage risk



Lessons learned



Optical damages



Electrical issues



Operational
impact



Economical
resources

Subaru Telescope incident

Leakage point
Prime Focus (Suprime-Cam)
Secondary Mirror

Nasmyth Focus (Optical)

Tertiary Mirror

Nasmyth Focus (Infrared)

Primary Mirror

Cassegrain Focus (FOCAS)

(c) MBTA Corporation, Japan #150132

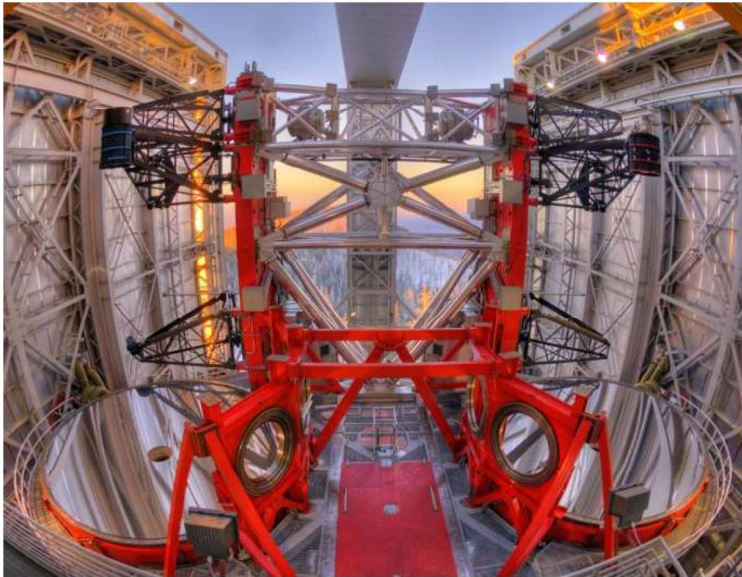
Credit: National Astronomical Observatory of Japan

Subaru Telescope incident recovery

- Observational outage
- Survival observational schedule for 2 years
- Engineering and Technical resources for 2 years

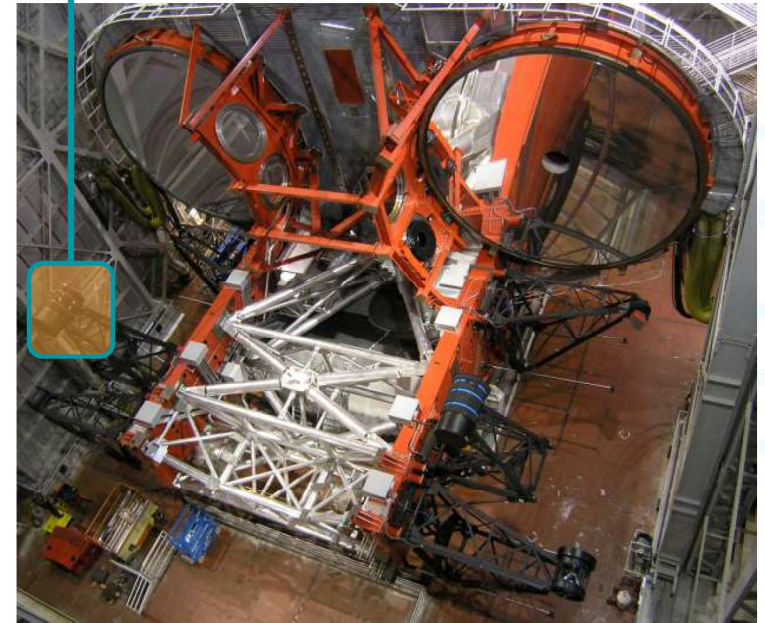
The Telescope totally recovered after the M1 recoating 2 years after the incident.

Large Binocular Telescope incident



DX-AdSec

M2 Coating damages
Electrical/Electronics
General Facility



The adaptive M2 has not been recoated due to the task several risks involved

Learning conclusions

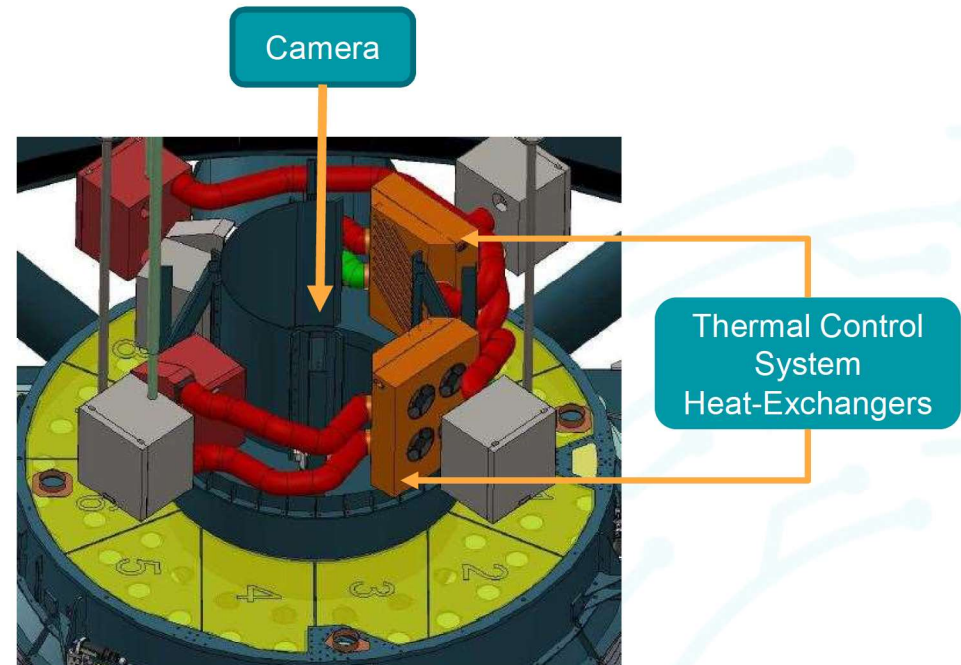


Reduce client final points to 2

Coolant to Air cooling interface

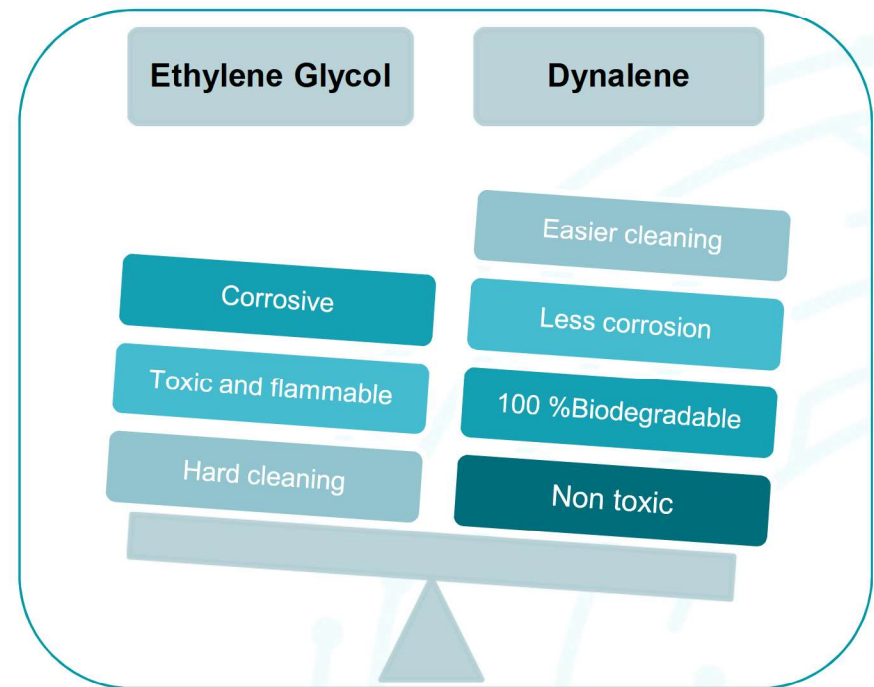
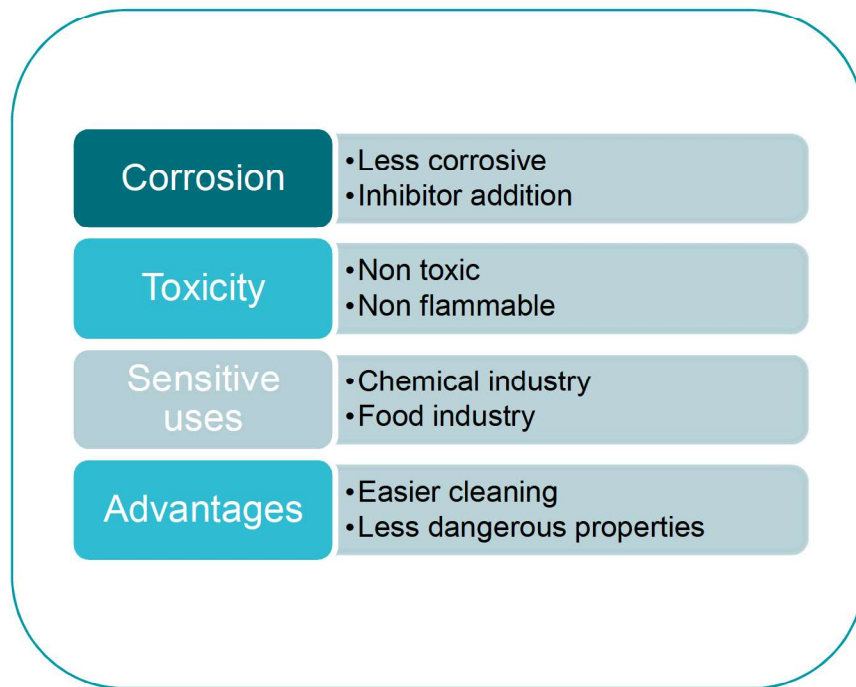
Friendlier coolant

- Less corrosion/toxicity
- Easy cleaning process
- Less damage to optics and electronics

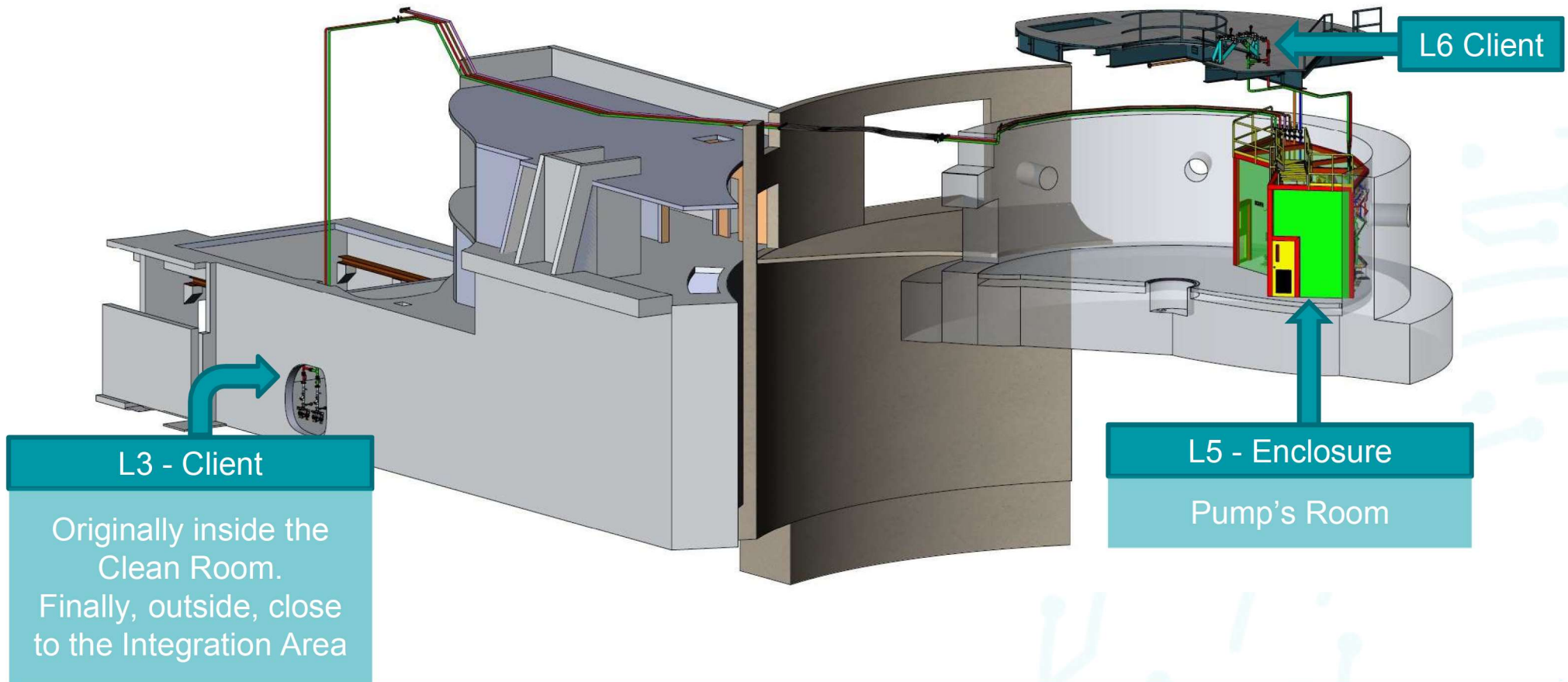


Alternative coolant

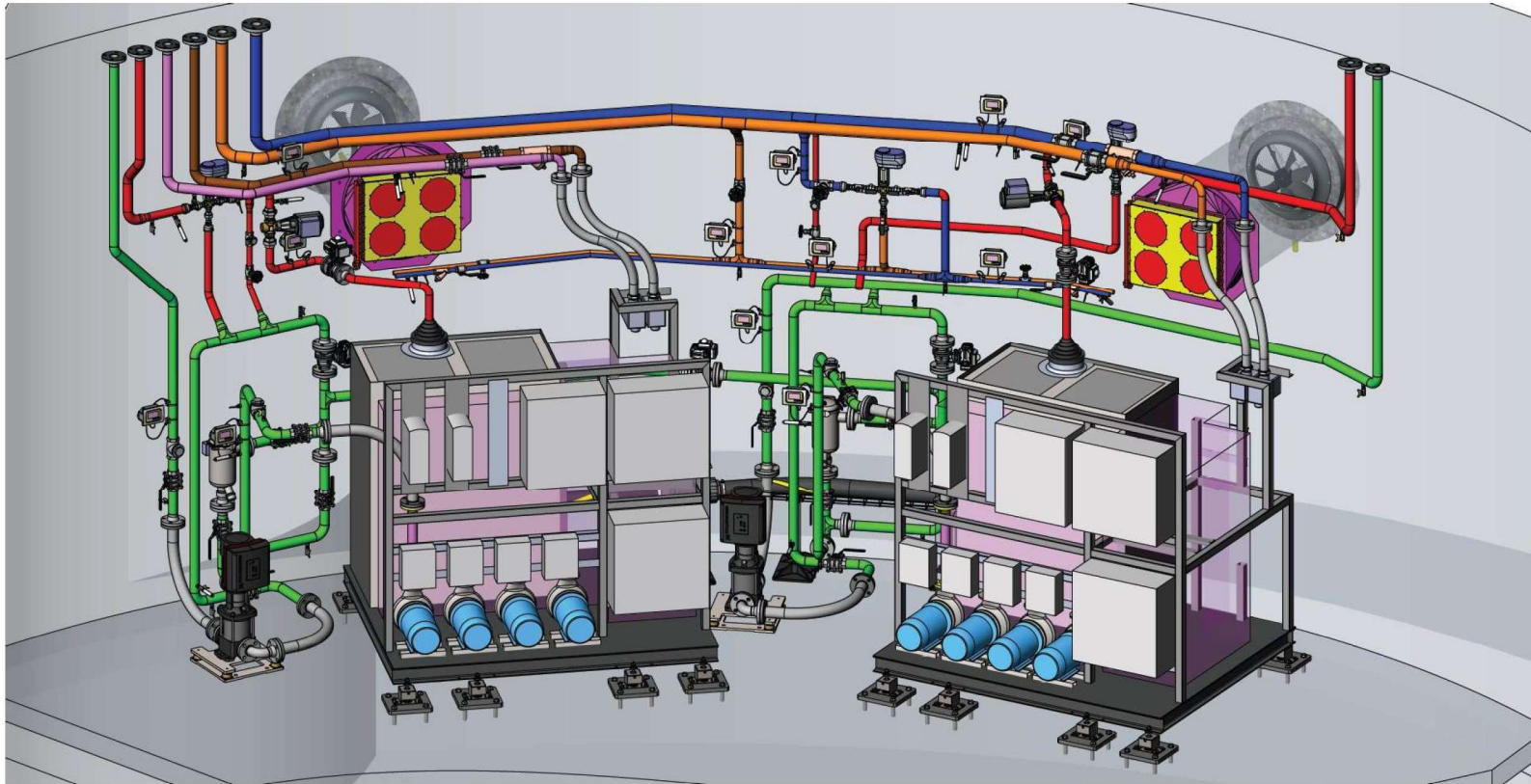
DYNALENE



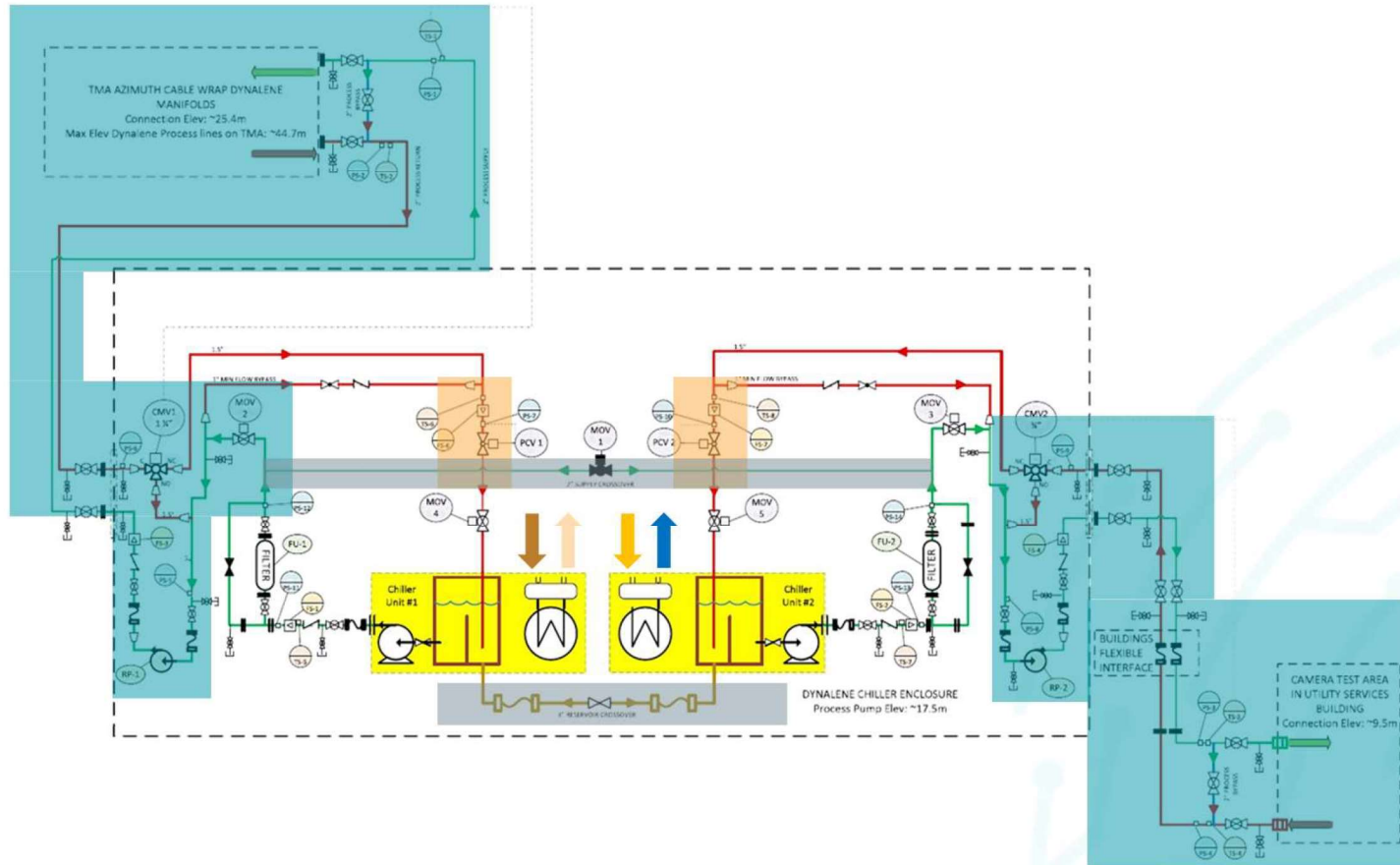
Dynalene big picture



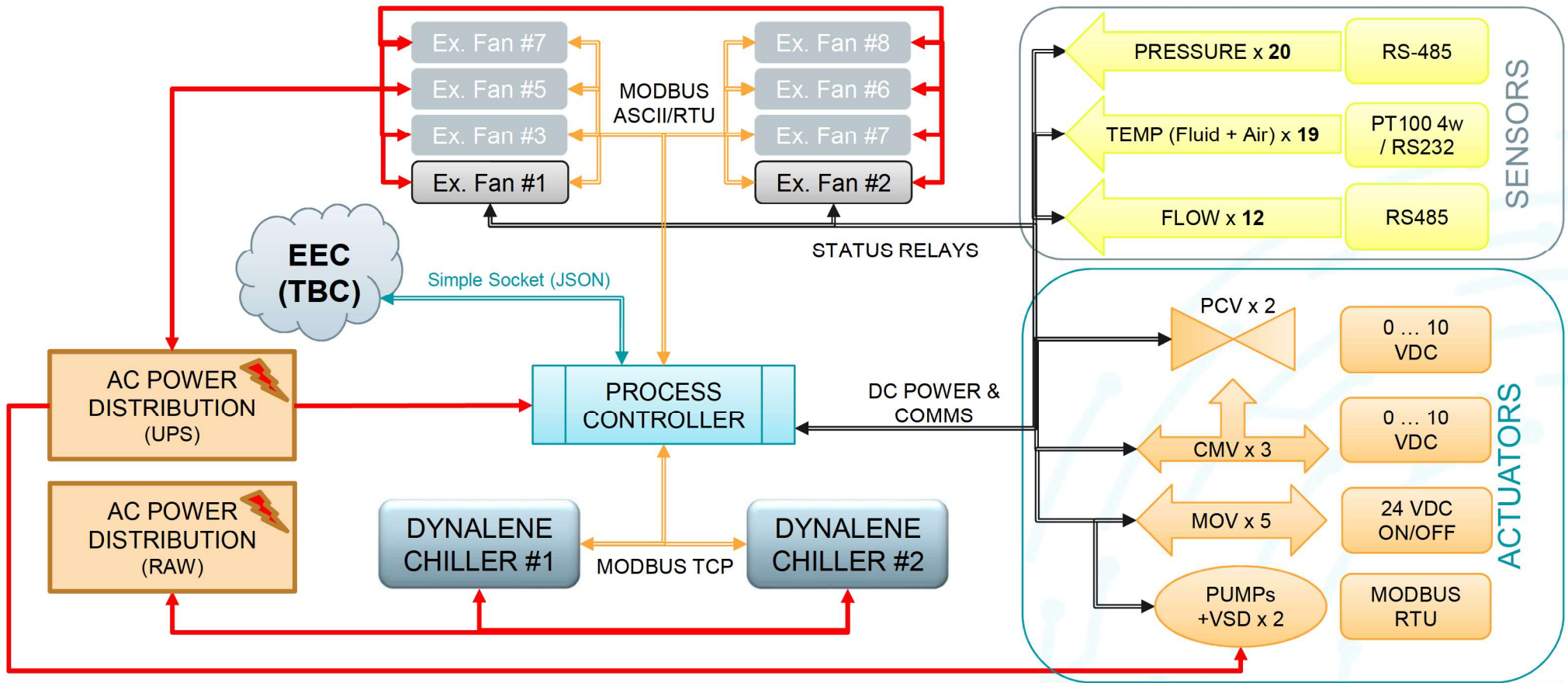
Inside enclosure



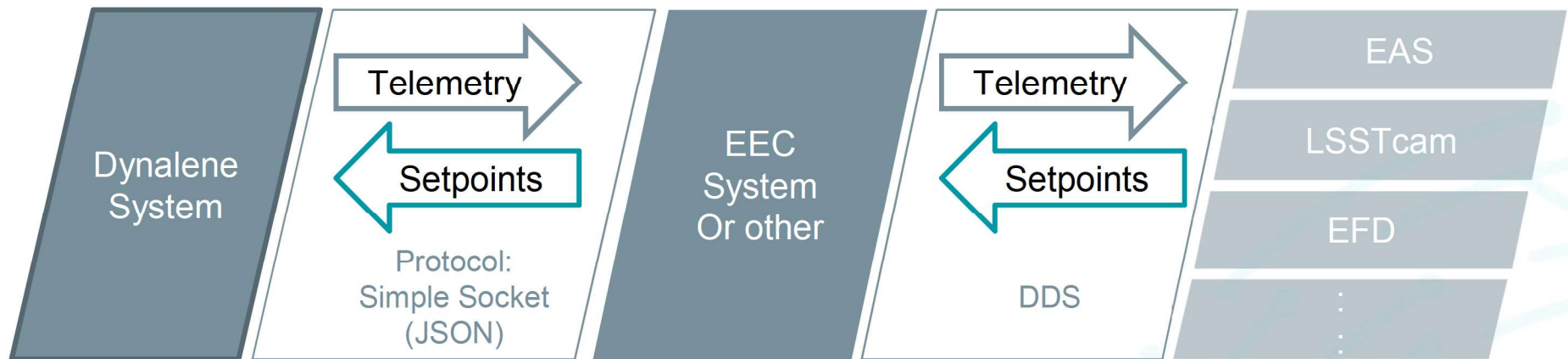
P&ID



Sensors and actuators summary

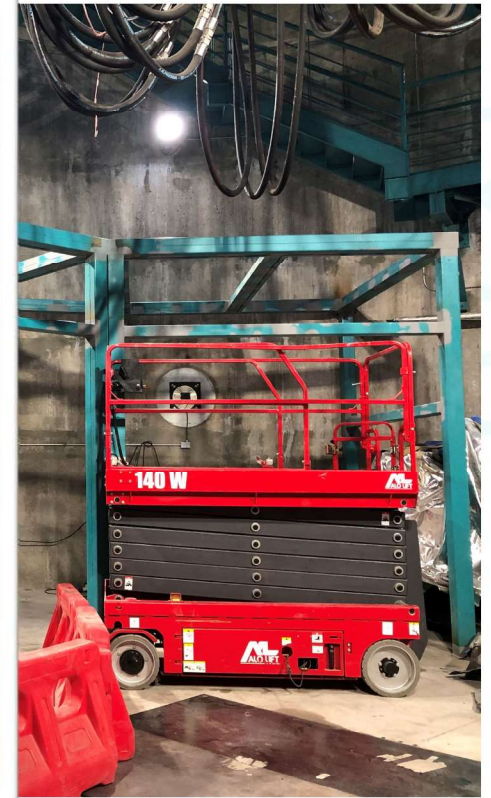


External Communication Protocol



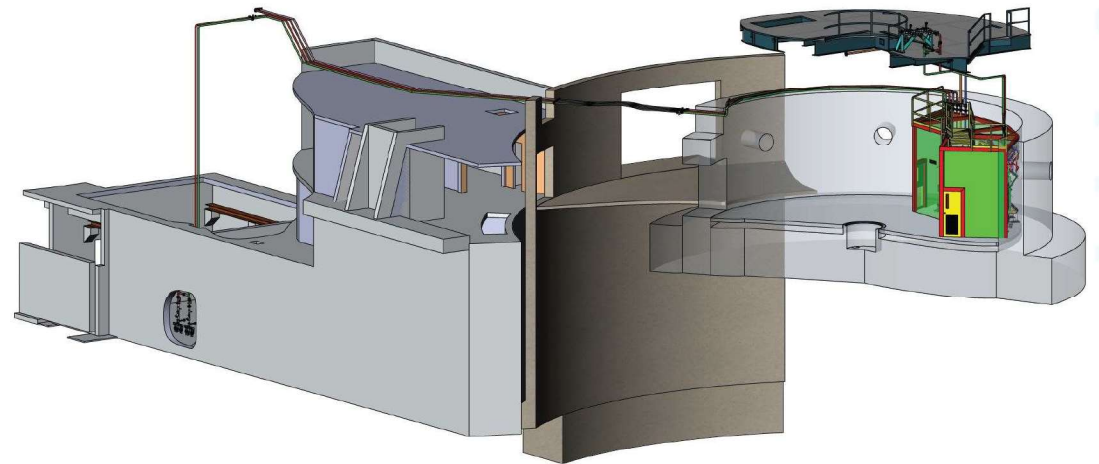
External Communication Protocol (ECP)
[Not developed yet]

Dynalene construction starts

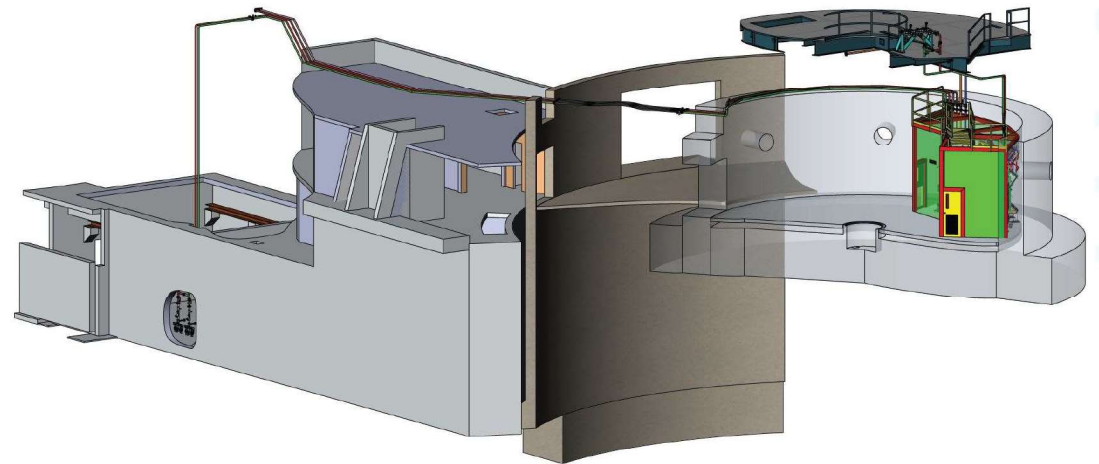
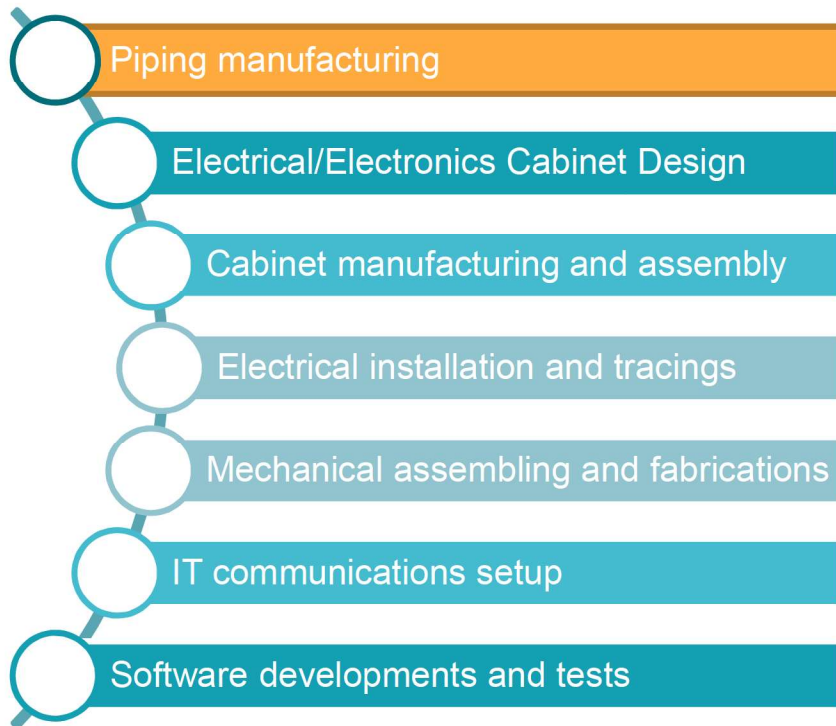


Dynalene System construction

- Piping manufacturing
- Electrical/Electronics Cabinet Design
- Cabinet manufacturing and assembly
- Electrical installation and tracings
- Mechanical assembling and fabrications
- IT communications setup
- Software developments and tests



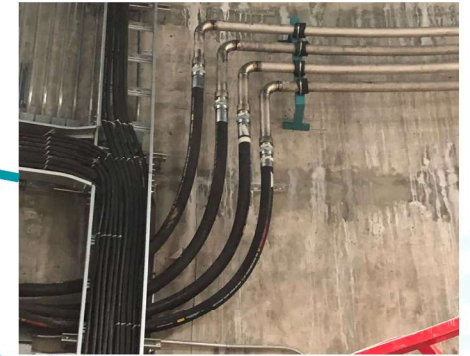
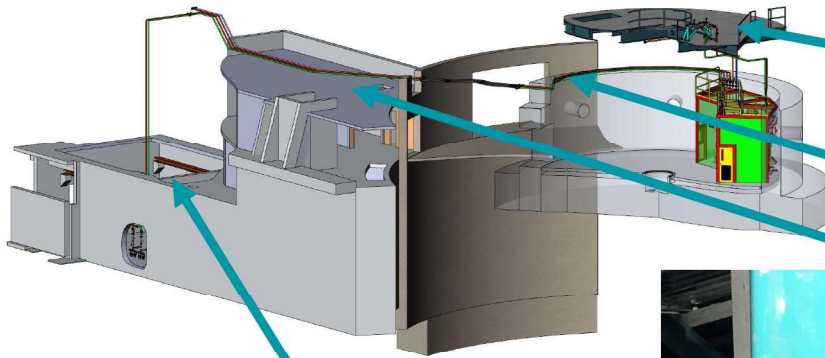
Dynalene System construction



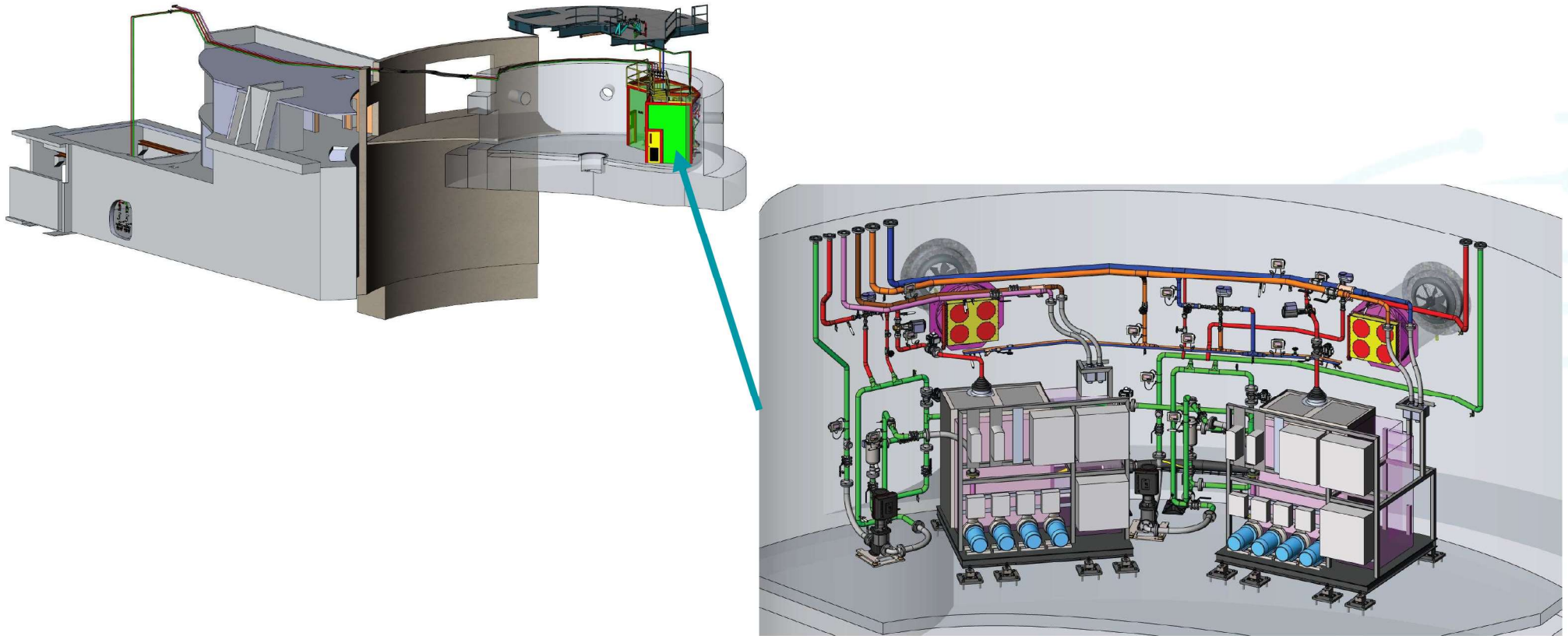
Dynalene System construction: Piping



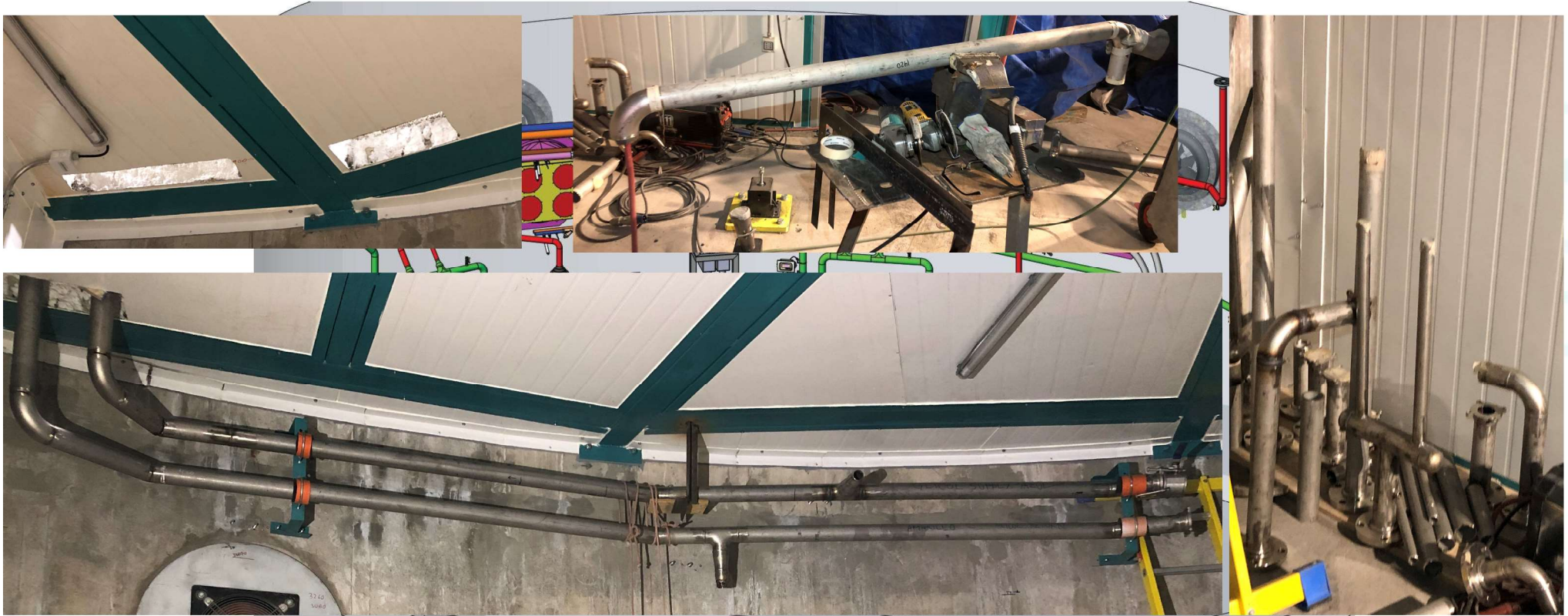
Dynalene System construction: Piping



Dynalene System construction: Piping



Dynalene System construction: Piping



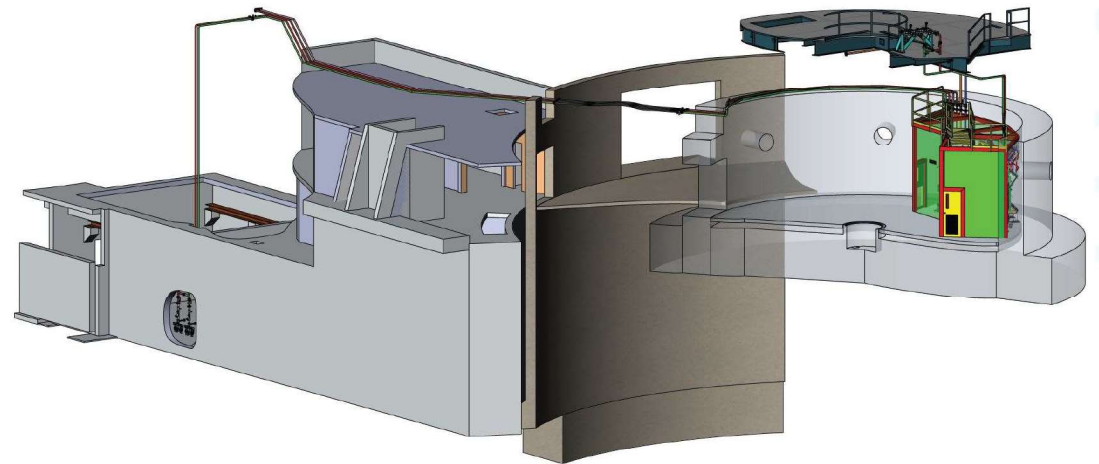
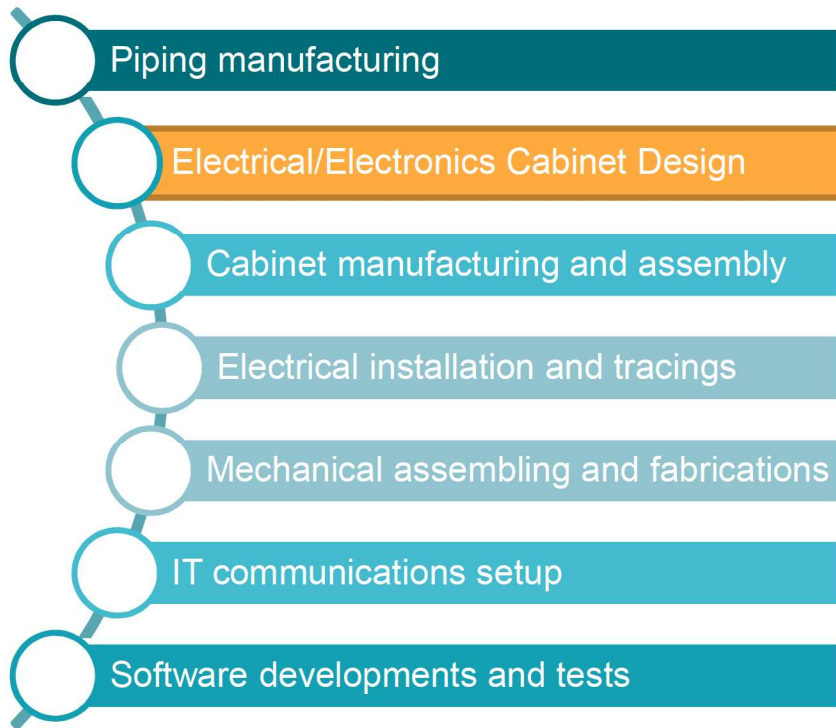
Dynalene System construction: Piping



Dynalene System construction: Piping

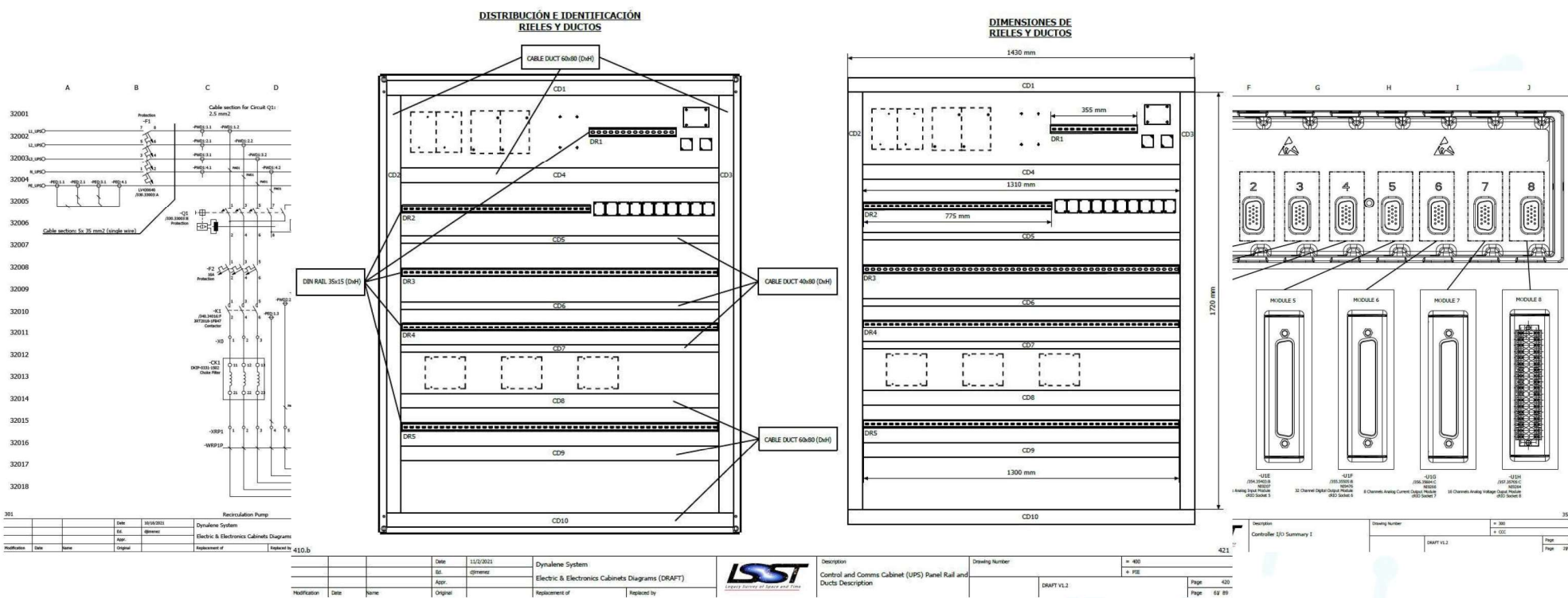


Dynalene System construction

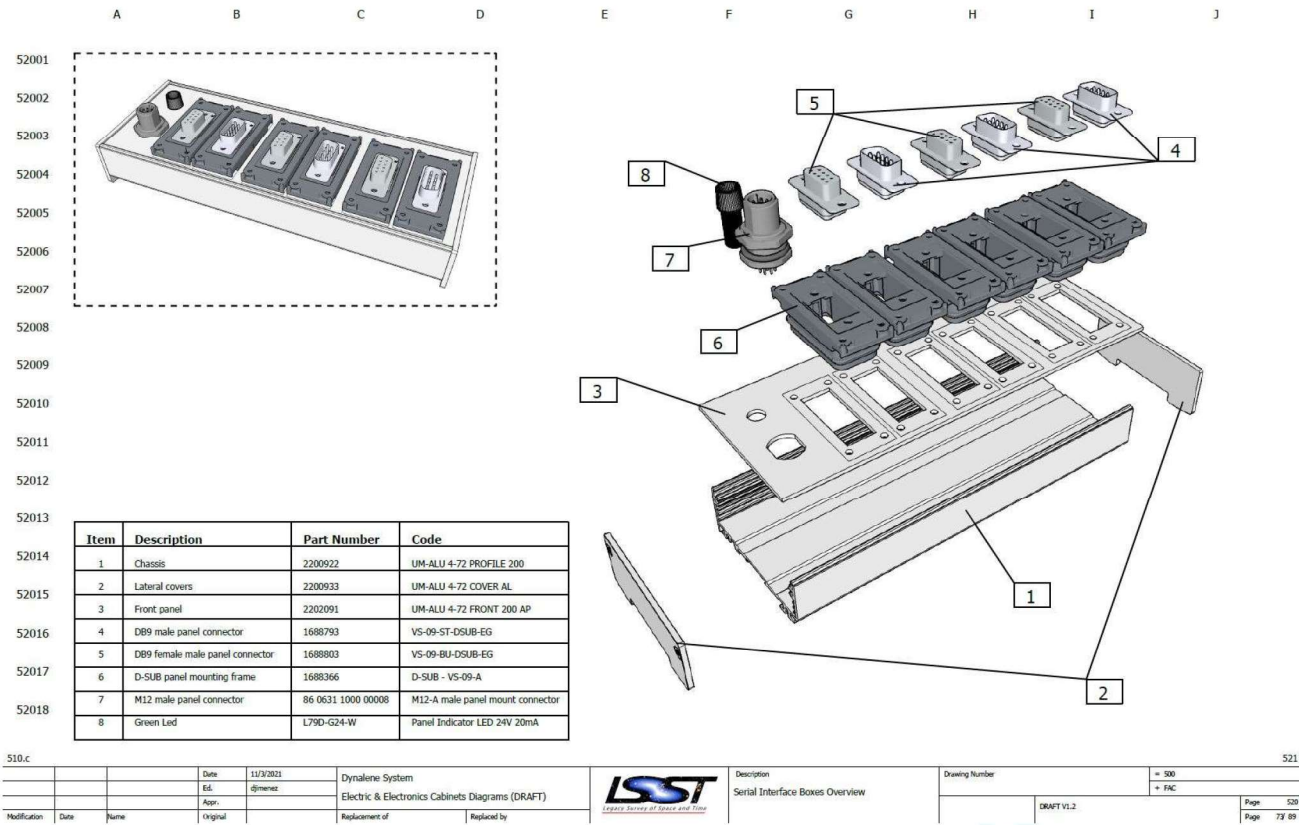


Dynalene System construction: Cabinet design

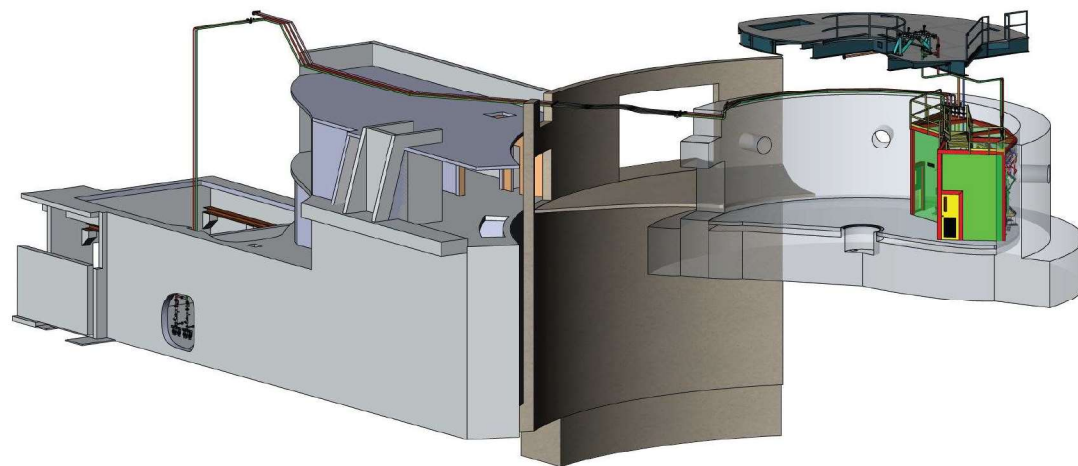
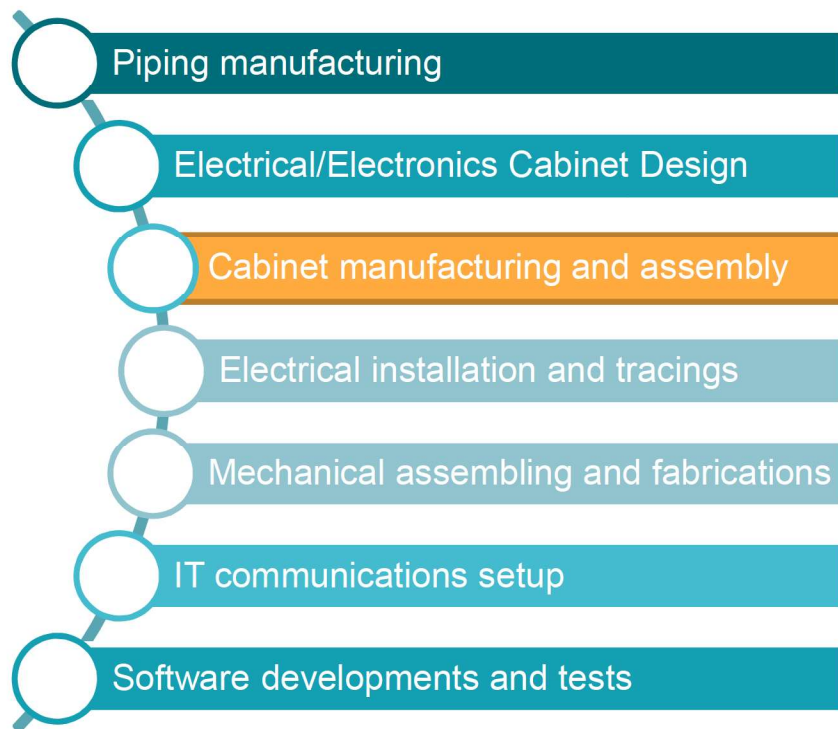
- Electrical drawings, October 2021 first release



Dynalene System construction: Cabinet design

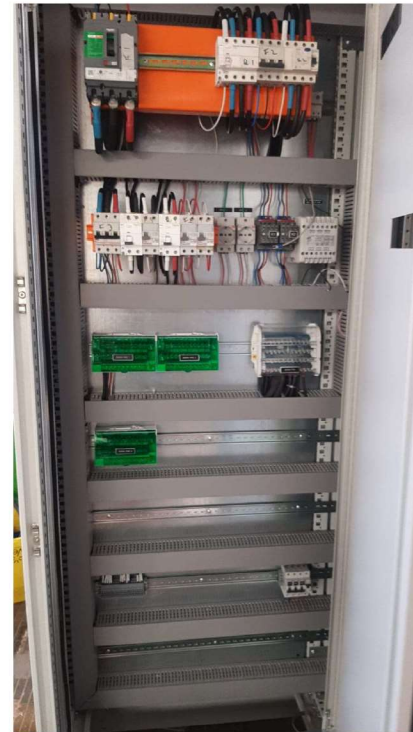
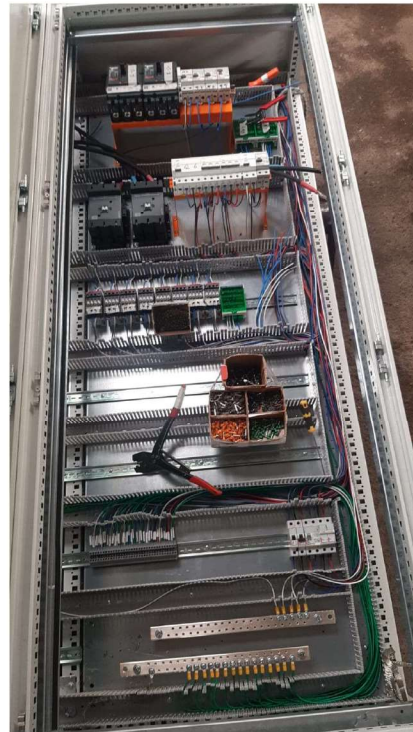


Dynalene System construction



Dynalene System construction: Cabinet assembly

- Basic Cabinet was manufactured by a contractor

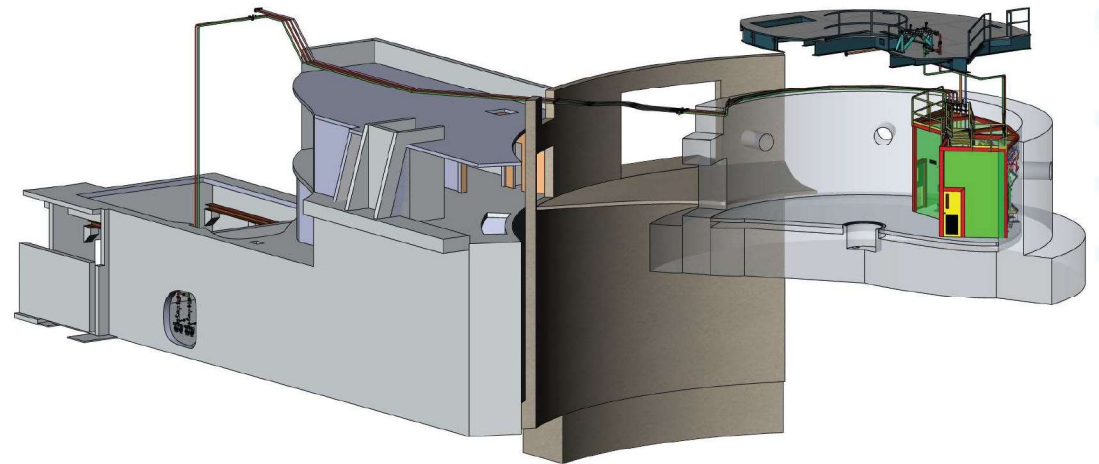
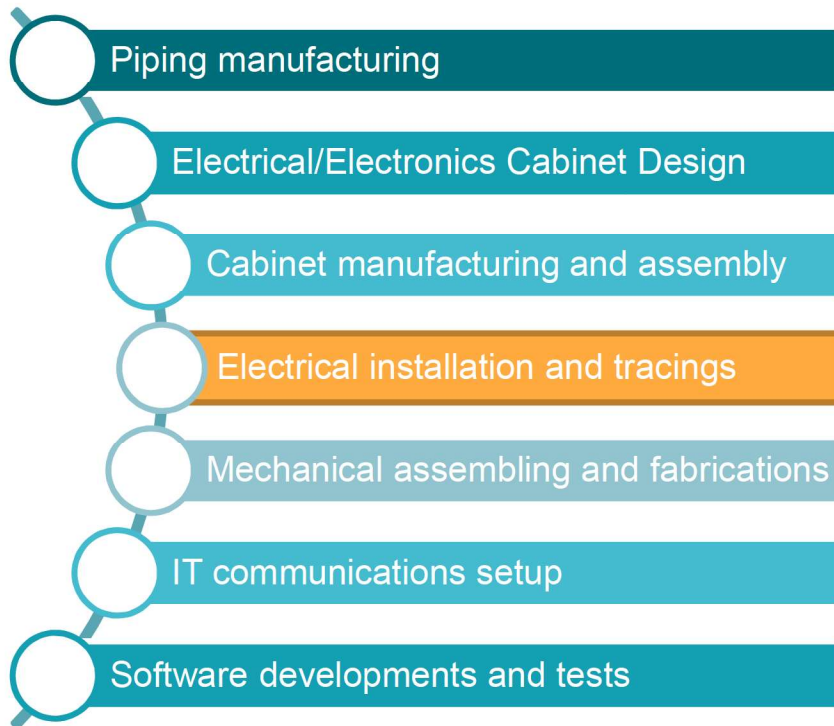


Dynalene System construction: Cabinet assembly

- Basic Cabinet was delivered and located at Electronic Lab for controls assembly



Dynalene System construction



Dynalene System construction: Electrical installation and plates tracing

- First step was to located it at the final place, the pier.

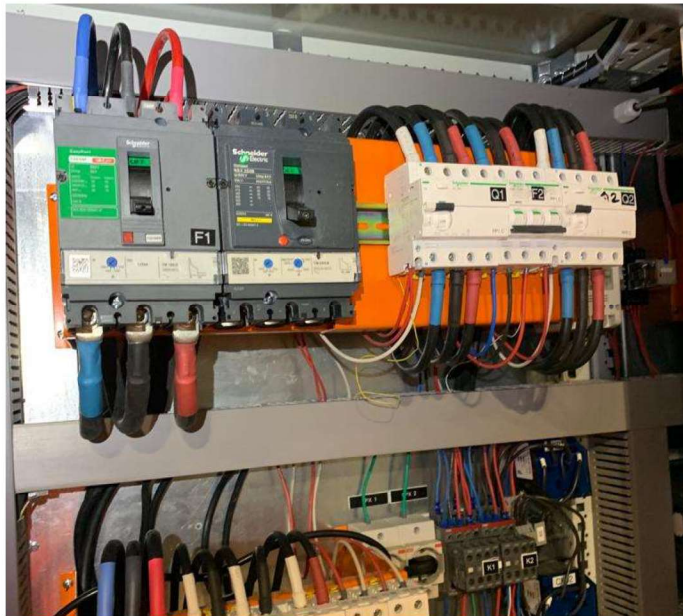
From the lab
to the Pier



Dynalene System construction: Electrical installation and plates tracing

- Second step, power up it from Commercial and UPS grids.

UPS

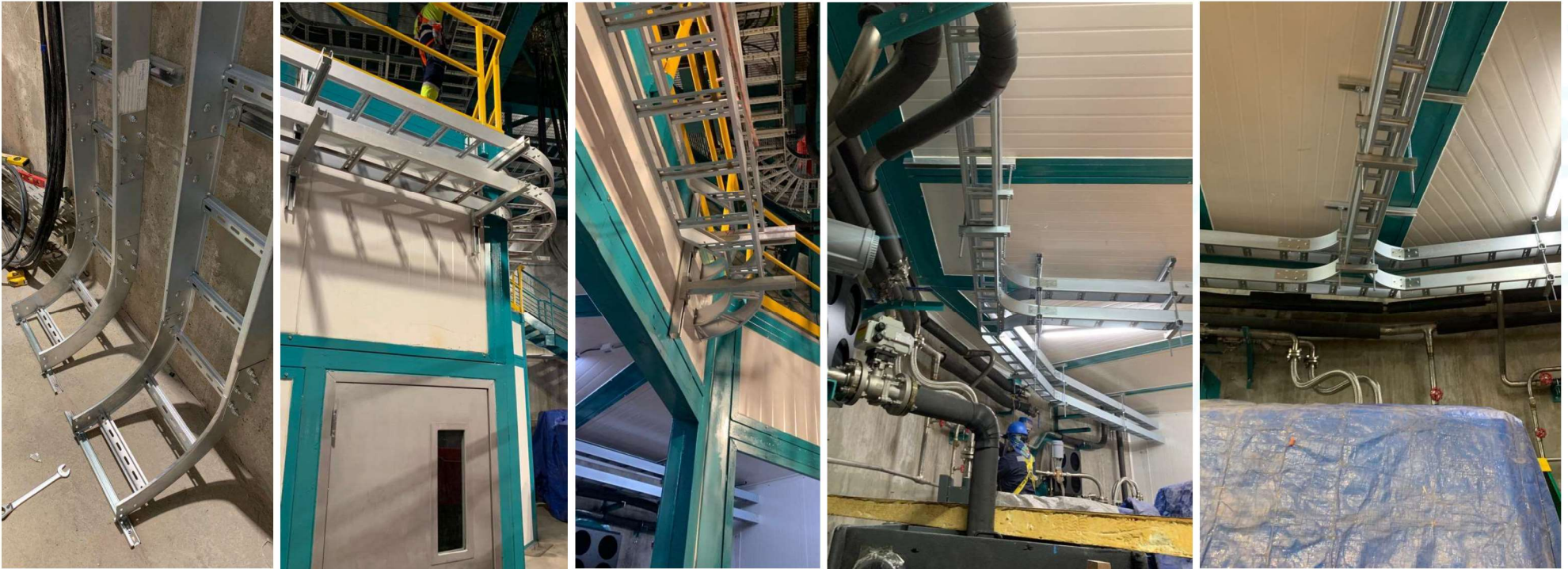


Commercial



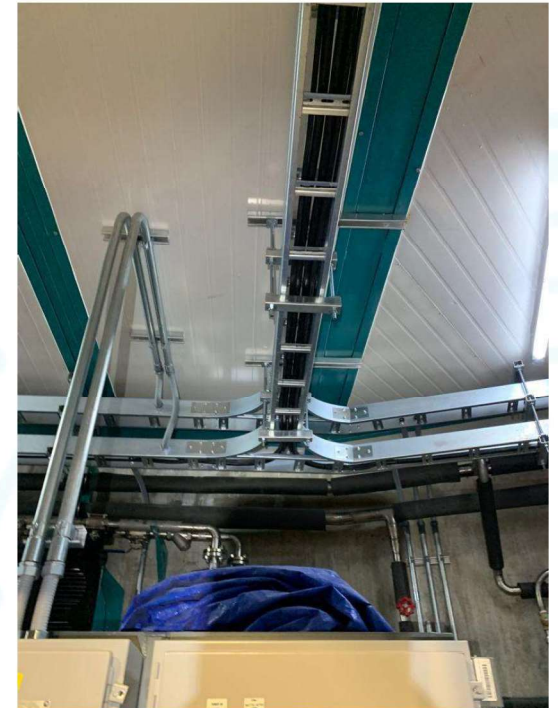
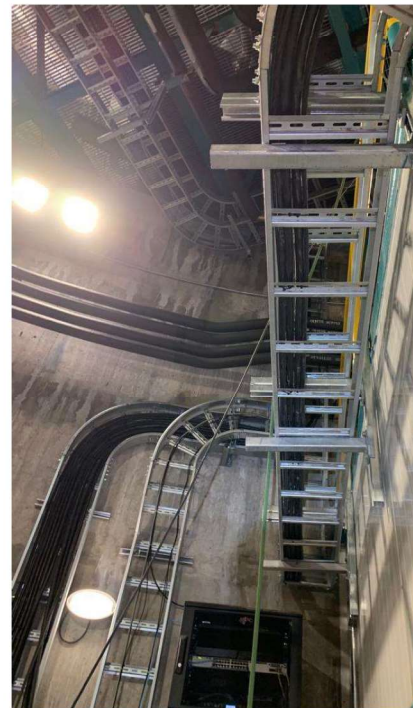
Dynalene System construction: Electrical installation and plates tracing

- Third step, is plates tracing and cable routing tasks.

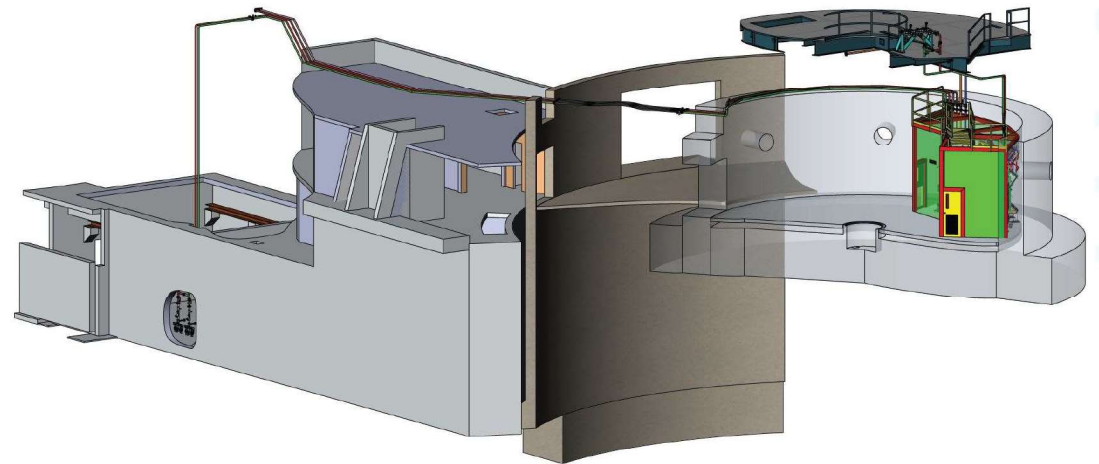
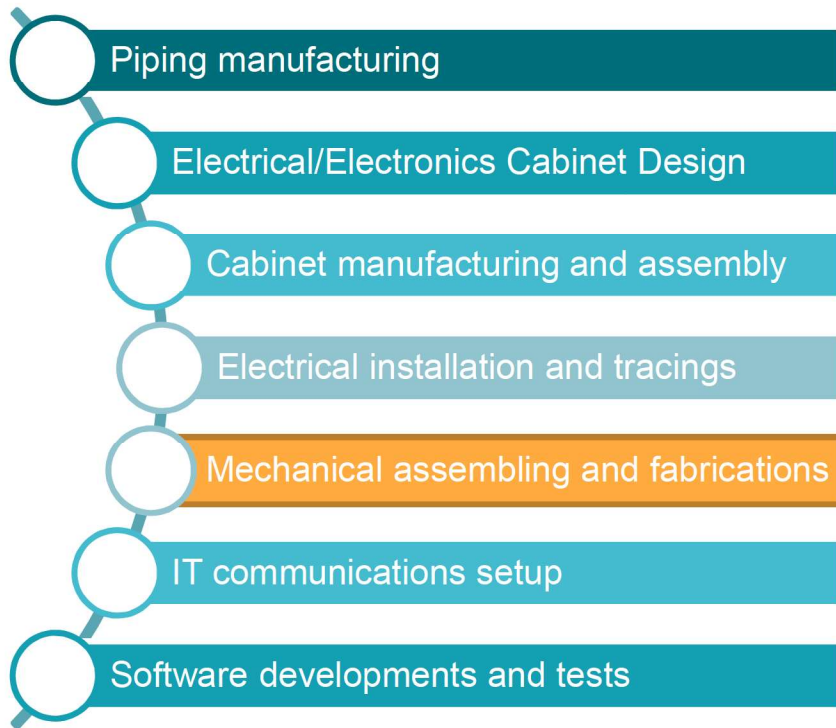


Dynalene System construction: Electrical installation and plates tracing

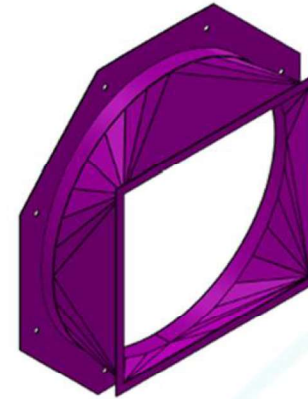
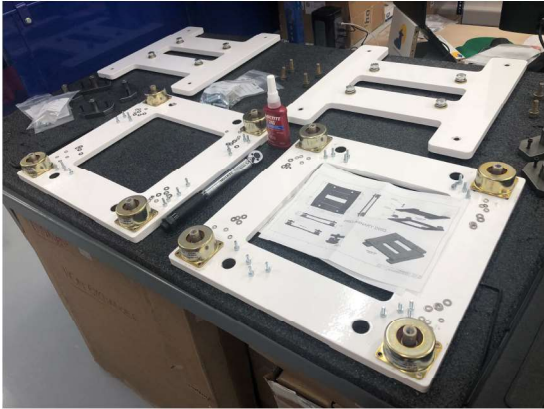
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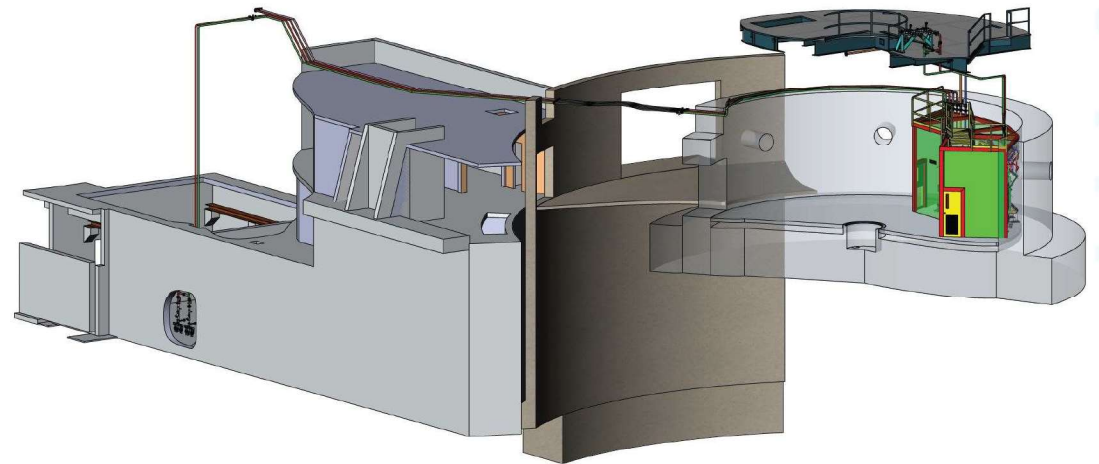
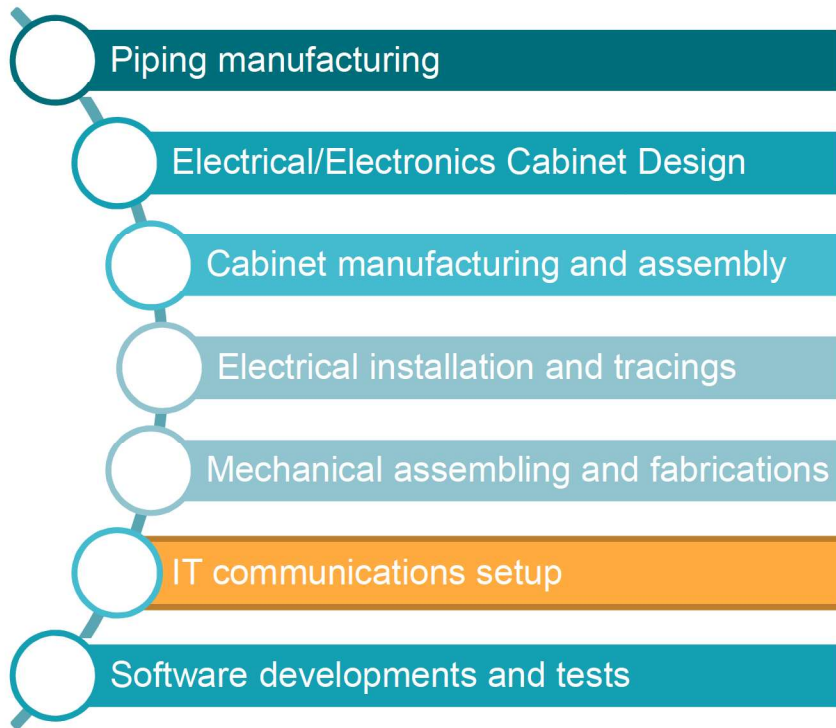
Dynalene System construction



Dynalene System construction: Mechanical



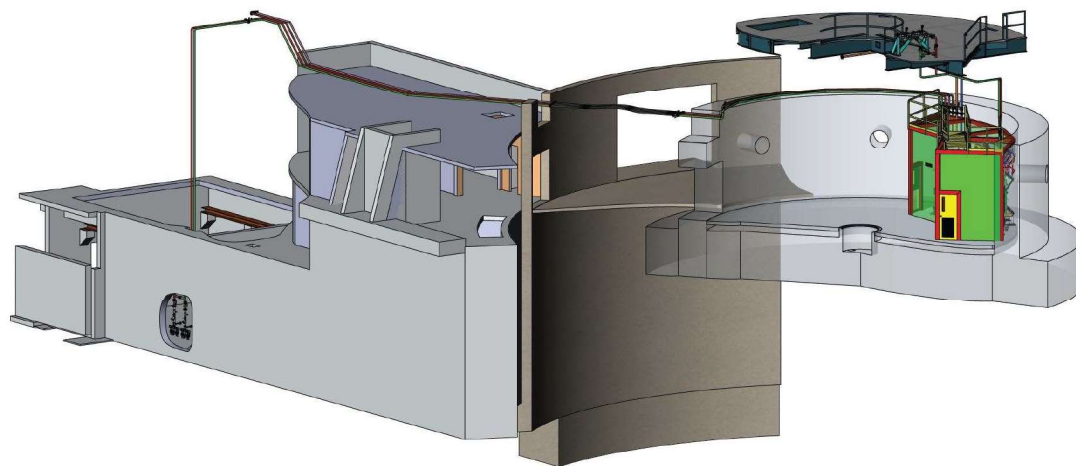
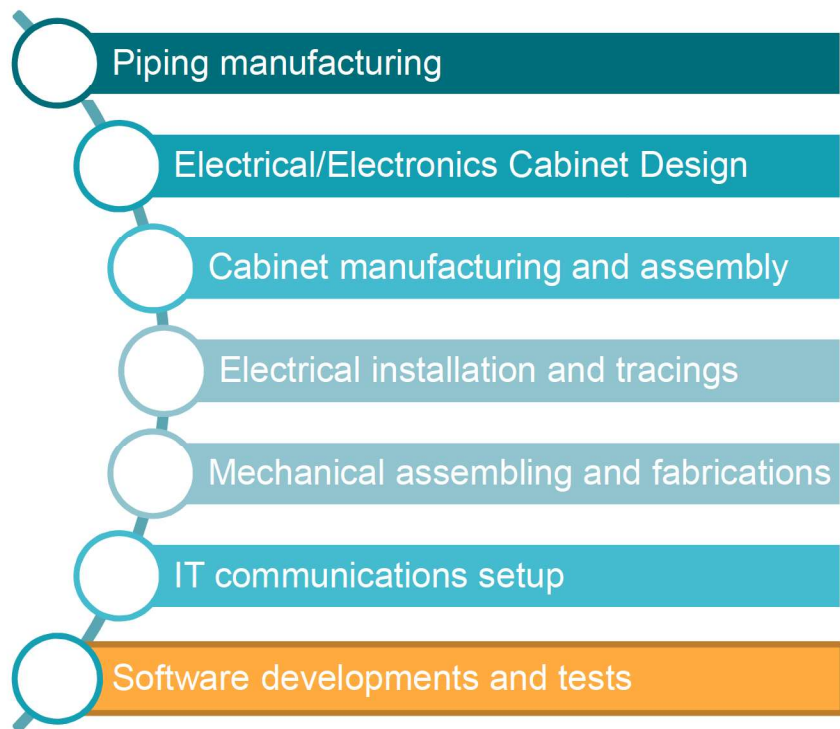
Dynalene System construction



Dynalene System construction: IT deployment



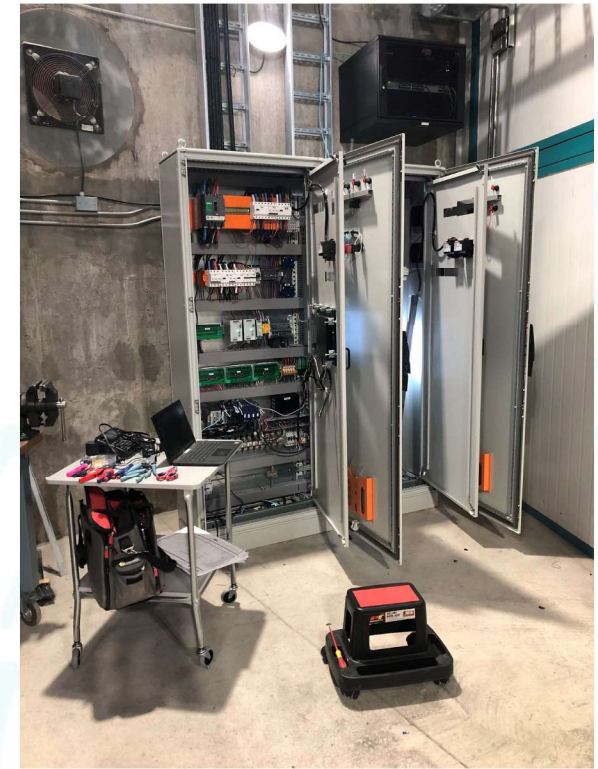
Dynalene System construction



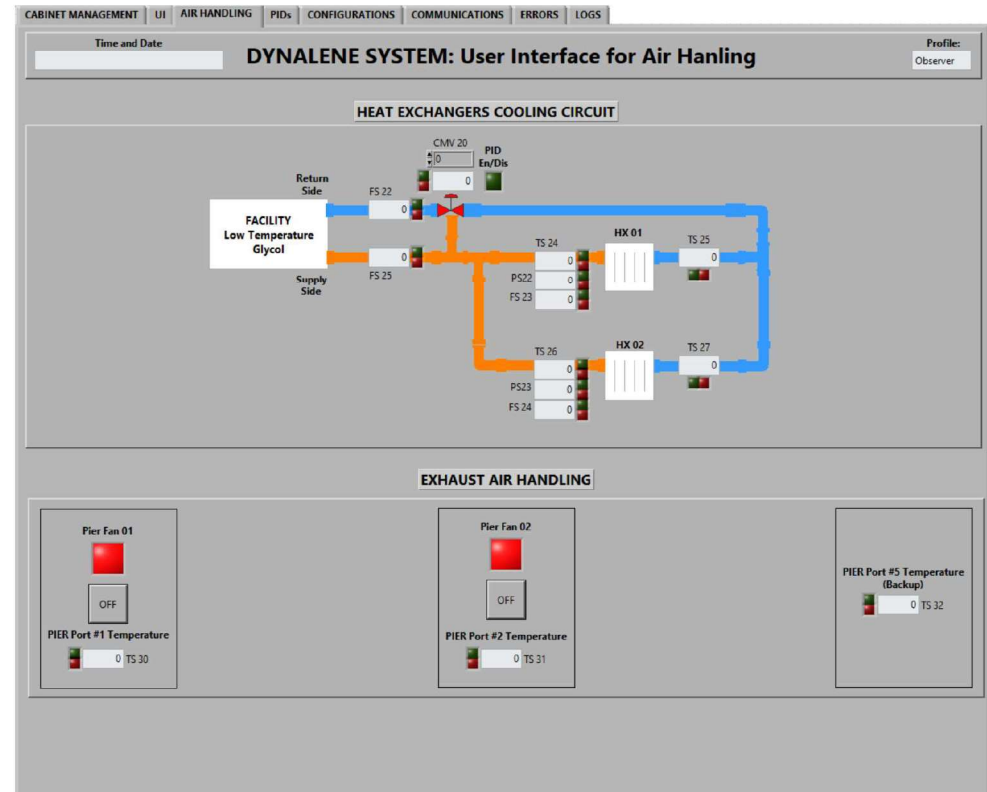
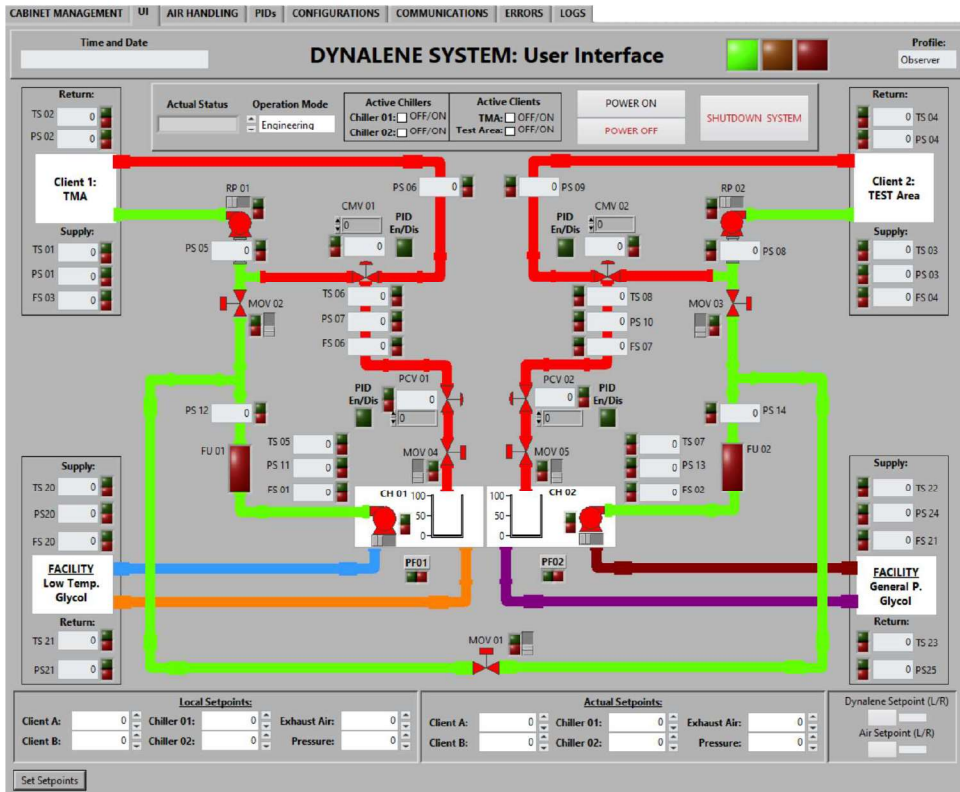
Dynalene System construction: Software devs



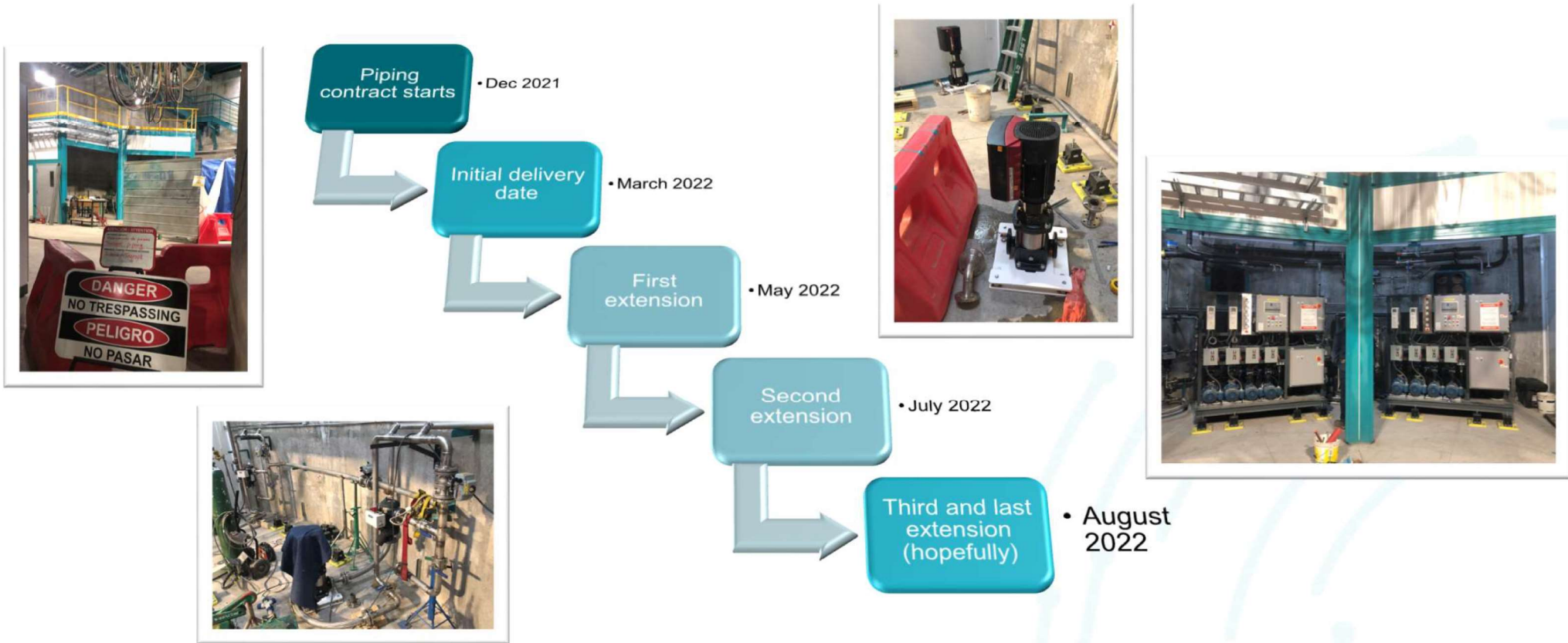
Dynalene System construction: Software devs



Dynalene System construction: Software devs



Schedule issues



Successful multi-team support and efforts



Next steps

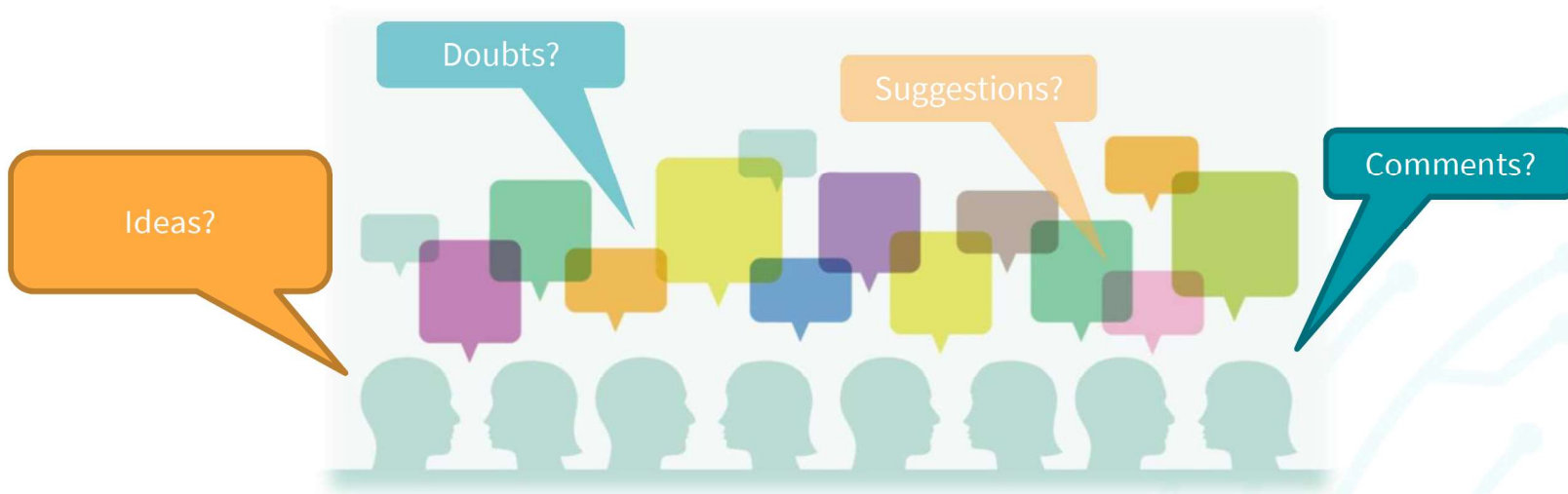


- Aug, 8th: The contractor is finalizing the last details/works.
- Aug, 16th: System verification and review by Rubin Team before delivery.
- Aug, 22^{sd}: **Delivering Piping Contract**



- Jul/Aug: Connectors assembly
- Jul/Aug: Field elements interconnections (power and controls)
- Aug/Sep: Software tests:
 - Field elements verifications
 - Control Loops PID tuning
- ~September: Chillers and Recirculation pump startup processes.
- ~September: First recirculation with distilled water.
- ~September: **First recirculation with Dynalene**

Thank you very much for your attention



David Jiménez Mejías – Electronics Engineer
djimenez@lsst.org