

## Rotation and Expansion Performing Assembly

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## ➤ Objectives:

REPA (Rotating and Expansion Performing Assembly) is an advanced test facility for evaluation of flexible connections for linear receiver tubes (ball-joints, flex hoses and hybrid assemblies).

REPA has been jointly designed&implemented by DLR and CIEMAT at the PSA. This is the first facility of this type available in a R+D centre.

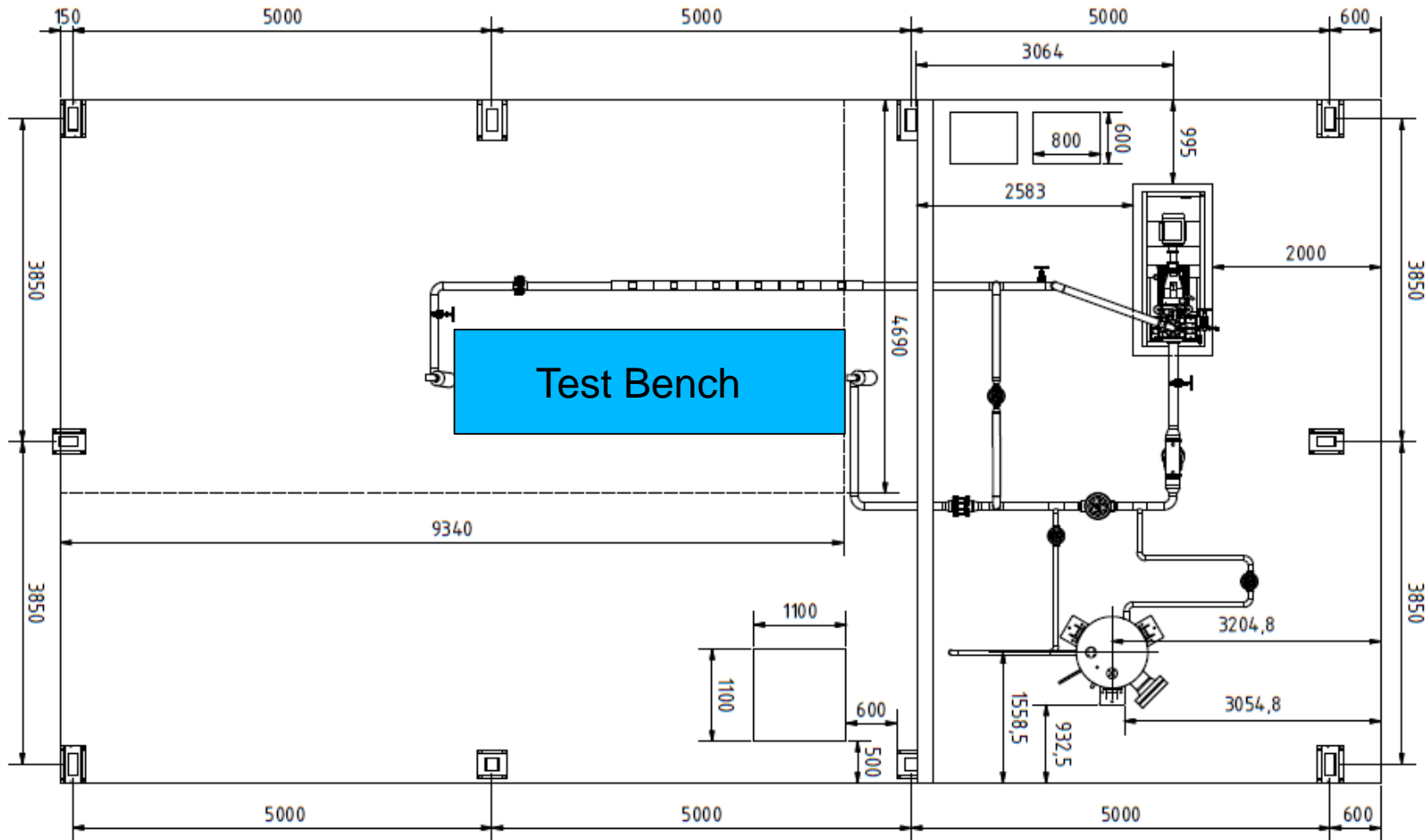
## ➤ Background:

REPA is the result of merging CIEMAT activities in Task 14.4 of SFERA-II and the DLR project StaMeP

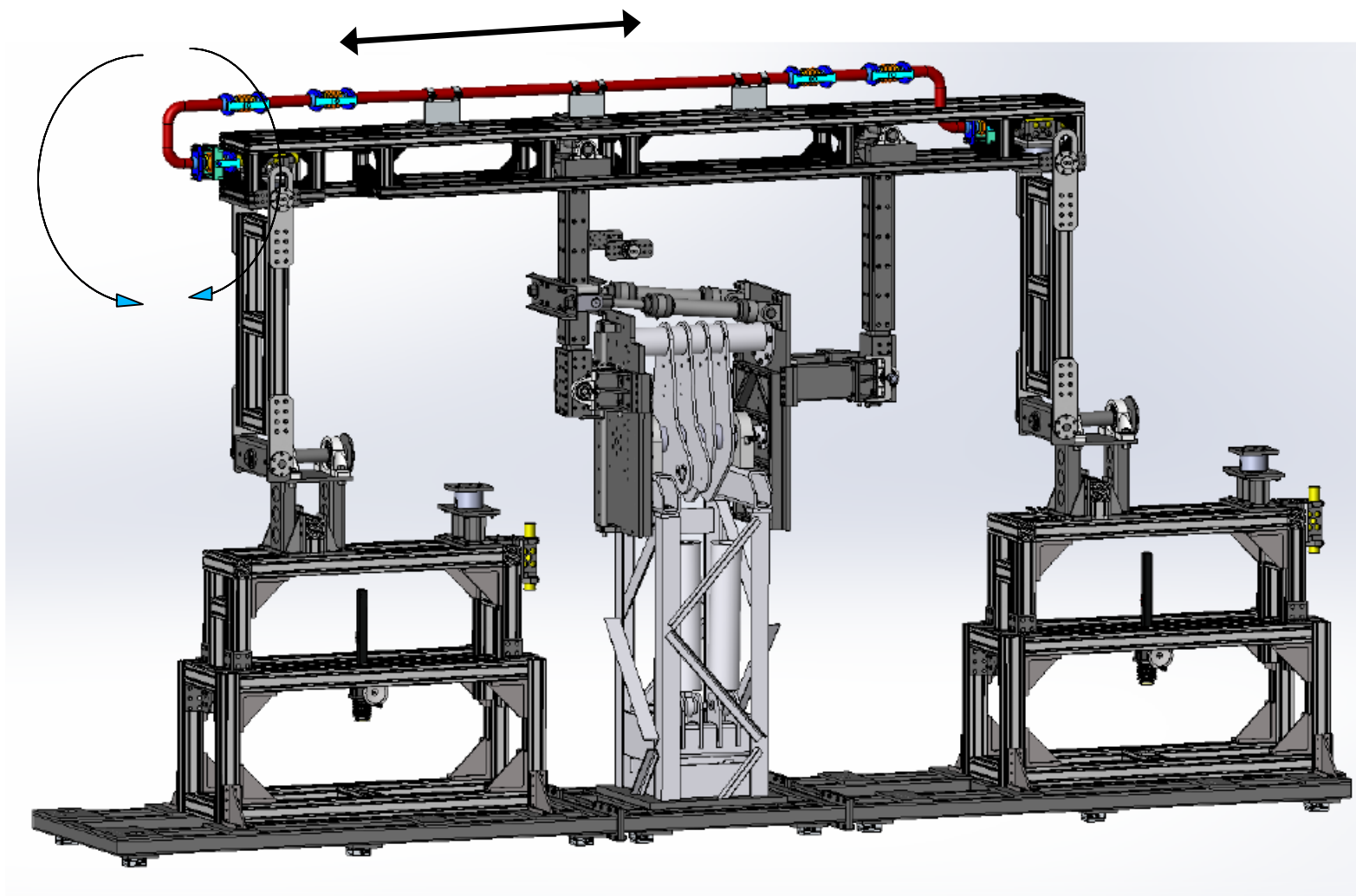
## ➤ Budget:

331 k€ , shared by CIEMAT and DLR

# Lay out of REPA facility



# Front view of REPA Test Bench



# REPA Test Bench in Vertical Position



# REPA Test Bench in Stow Position





# REPA HTF Circuit



# REPA Technical Features



- **KINEMATIC UNIT:** Prepared for rotational and translational movements speeded for simulating accelerated life cycles.
- Drive pylon: modified EuroTrough drive pylon structure.
- It allows simultaneous installation of two sets of the rotating devices to be tested.
- Rotating angle is  $205^\circ$  and stow position in  $25^\circ$  facing down.
- Up to  $45^\circ$  of lateral motion, representing absorber tube thermal expansion.
- Prepared for dimensions of new PTC designs. The radius can be in the range of focal lengths from 1m to 2.3m.
- It is suitable for flexible hoses and ball joint assemblies.
- Measuring the reaction forces and torques of the assemblies under testing (prediction failure before it actually takes place as part of the safety concept).



# REPA Technical Features



- **BALANCE OF PLANT:** The HTF circuit carries the fluid through the test objects at adjusted mass flow, temperature, and pressure.
  - HTF centrifugal pump: Compatible design with thermal oil and silicone oil. Maximum temperature/flow 450°C/60 m<sup>3</sup>/h
  - Electrical band heaters: Formed by six individual collars mounted all around the pipe, individually operated. Heating process temperature controlled.
  - HTF Expansion vessel: for compensating changes of HTF volume.
  - Blanketing system: Inert gas (N<sub>2</sub>) atmosphere to avoid fluid vaporization and keeping the system free of oxygen.
- **SCADA:** Supervisory Control And Data Acquisition system for a complete monitoring and control of the whole test loop.
- **SECURITY SYSTEM:** Smoke detectors, Pressure loss detection, Leakage detection, Reaction force/torque monitoring.

## Rotation and Expansion Performing Assembly

## End of Presentation

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