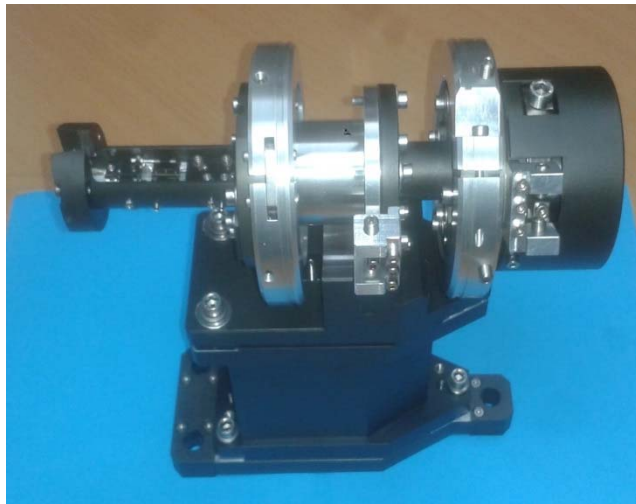




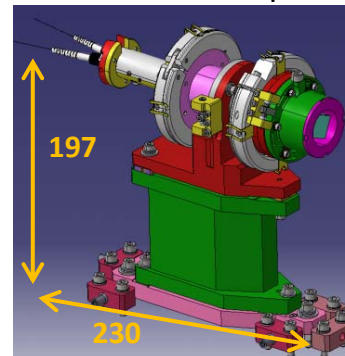
**Proactive R&D** provides valuable expertise, equipment and leadership on the field of Scientific Projects. We have a solid background in **Mechanical Engineering** and **Systems Integration** applied to **Astrophysics**.

Recently we have provided engineering support and equipment for the Near Infrared (NIR) channel of the instrument **CARMENES**.

### Fibber Exit Unit (FEU)

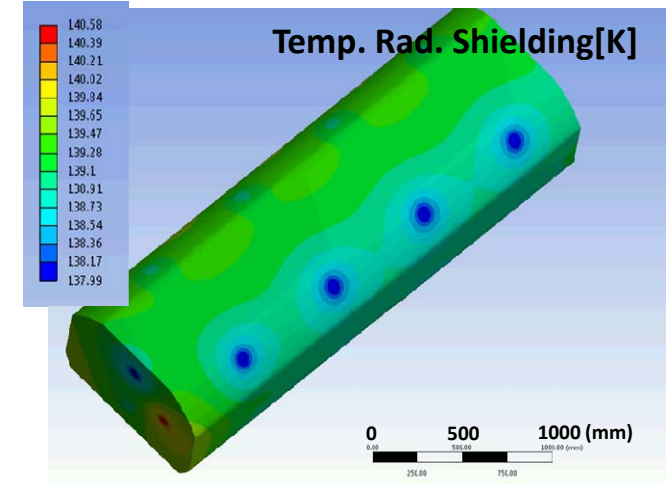


We have been in charge of the final design and the procurement of the optical mount for the FEU and we have provided technical support during the **optomechanics integration** and laboratory test.



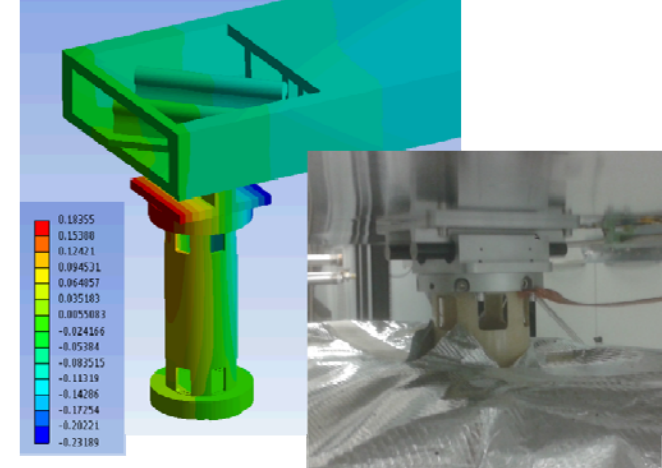
### Thermal and thermo-structural analysis of the cryostat

The main cryostat of **CARMENES** NIR operates in the cryogenic range (140 K) with a thermal **stability < 0.01 K**.



**Proactive R&D** have performed **complex thermal** and **thermo-structural** Finite Element Analysis involving **non-linear radiative** and **conduction** effects as well as **transient** analysis.

### Optical Bench support vertical def. [mm]



## Astrophysics capabilities

**Proactive R&D** proposes an extremely **flexible** and **collaborative** framework according to the customer's needs. We can provide from punctual and specific support within one single phase of the project, until full end-to-end **-from concept design to final verification of the hardware-** work packages.

We have capabilities and expertise in:

- Optomechanical design,
- High precision mechanics,
- Complex Finite Element Analyses,
- UHV design,
- Cryogenics design,
- System integration,
- Procurement of equipment.

Our team is composed by senior professional with large experience in the fields of Scientific, Aeronautic and High Technology projects.



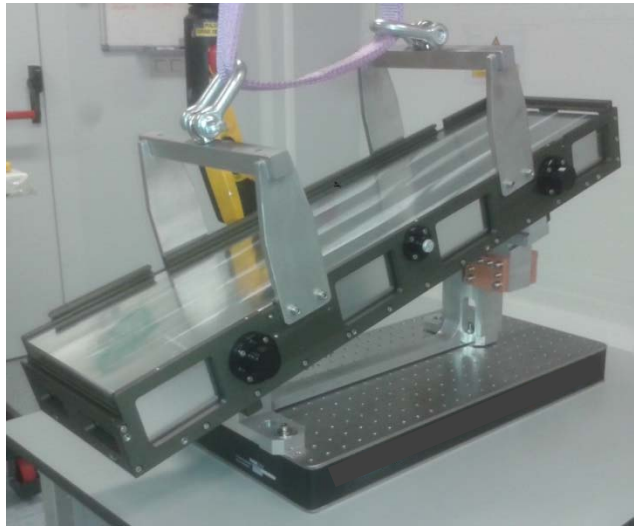
[www.proactiverd.com](http://www.proactiverd.com)  
[info@proactiverd.com](mailto:info@proactiverd.com)

Proactive Research and Development S.L

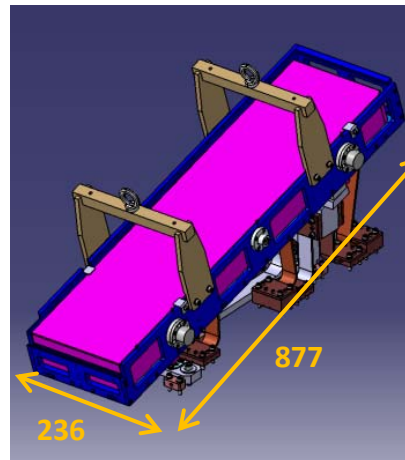
Av. Diagonal 429, 3r  
 08036 Barcelona - Spain

Ribera del Loira 46, edificio 2  
 28042 Madrid - Spain

### Echelle optical mount



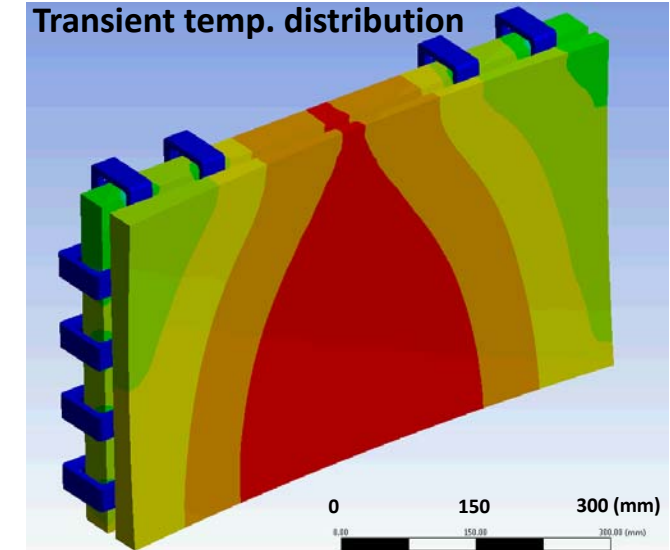
The echelle mount is a critical component of **CARMENES** instrument as it has to support in a **very stable** way a 35 kg massive optical element with flatness requirements in the range of **10 um** on 500 mm. **Proactive R&D** has been in charge of the final design and procurement of this critical component. Thermal studies have been required in order to guarantee the performances of this optics in the transitory and operating conditions. We have also participate in the optics integration process.



### Collimator thermal and thermo-structural analysis

The deformations of the collimator under the temperature effect can have a huge impact in the instrument final performances.

#### Transient temp. distribution



Our engineers performed thermal and thermo-structural analysis in order to optimize the design and learn about the behaviour of this critical optical element during the transitory cooling phases.

