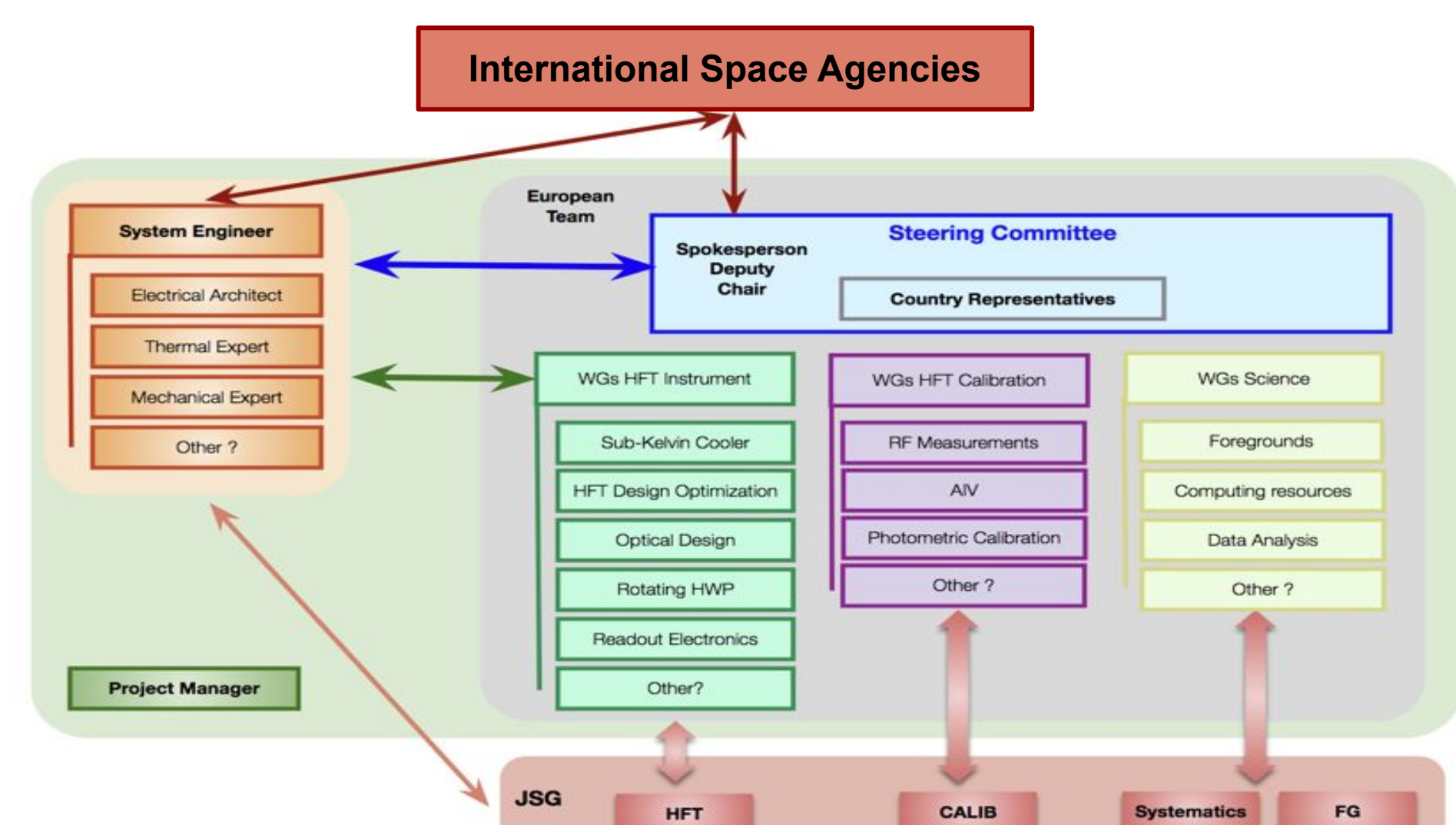


LiteBIRD-Europe

Team

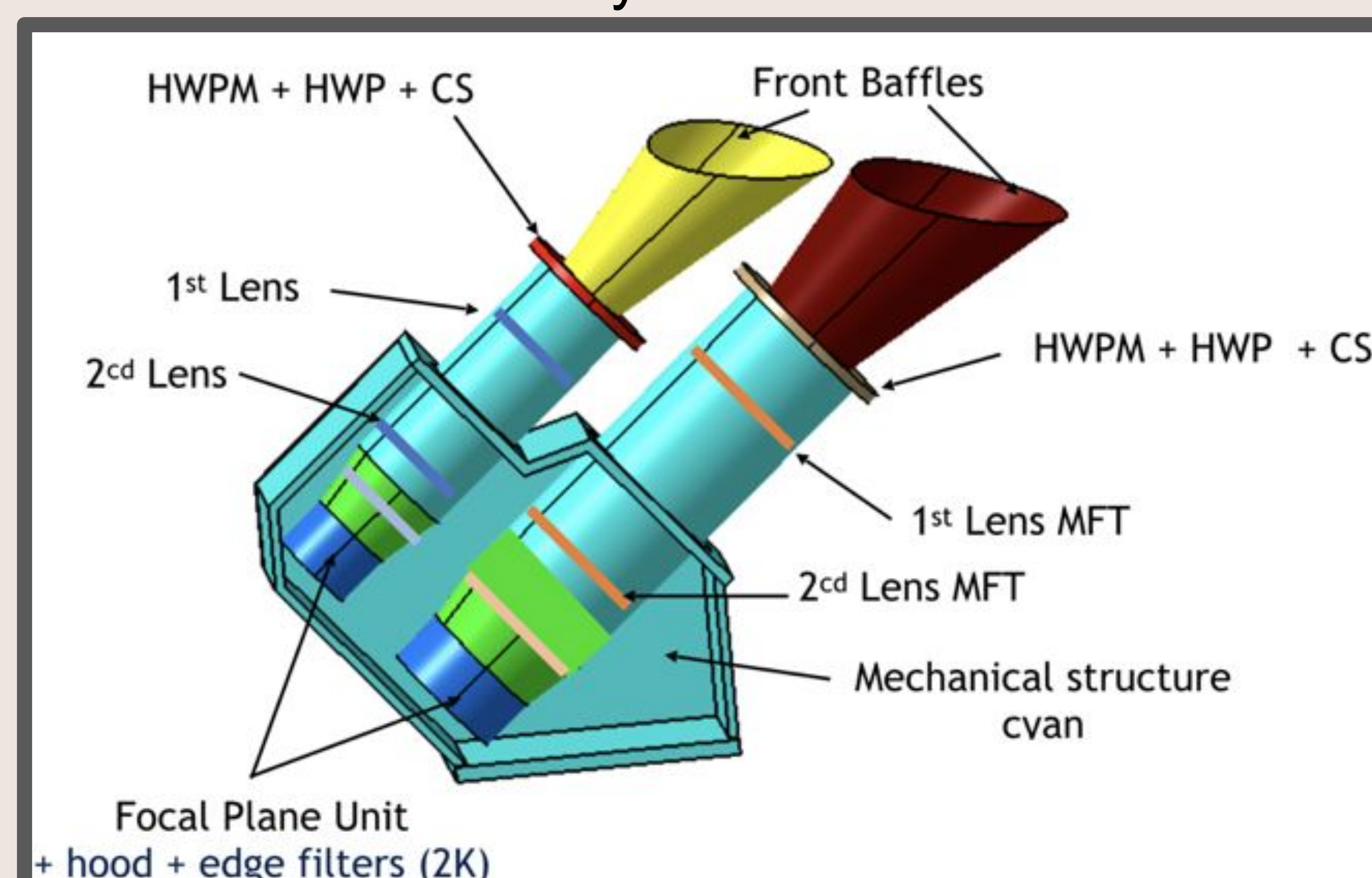
The European collaboration consists of 9 partners: France, Italy, United Kingdom, Germany, Spain, Sweden, Norway, Ireland, the Netherlands, with a total of about 200 members.

Since 2018, we have settled a European Steering Committee composed of the representatives of all partners, and reinforced by a system engineer and an engineering team.



MHFT Instrument & sub-K stage

The European collaboration is responsible of the sub-K stage of the cryo-chain, and of the Mid- and High-Frequency Telescopes (MHFT), covering a large frequency range from 89 to 224 Hz and 166 to 448GHz, respectively. Both refractive telescopes are cooled down at 4.8K, with two half-wave plates rotating continuously. The two focal planes, cooled down at 100mK, consist, respectively, in 2074 and 1324 detectors delivered by the US.



Overview of the MFT and HFT telescopes

JSG Activities

Systematics: (For Europe: G. Patanchon)

Involvement in most important aspects of systematic studies: beam, gains, 1/f noise, HWP related systematics, polariser angles, band-pass mismatch.

Foregrounds: (For Europe: C. Baccigalupi, E. Komatsu)

The European consortium has been making fundamental contributions to the progress of all aspects of the FG JSG: Creation of state-of-the-art sky models, Development and comparison of different FG removal/component separation methods, Study of the impacts of FG on systematics, such as beams, bandpass and calibration, and place the requirements on them.

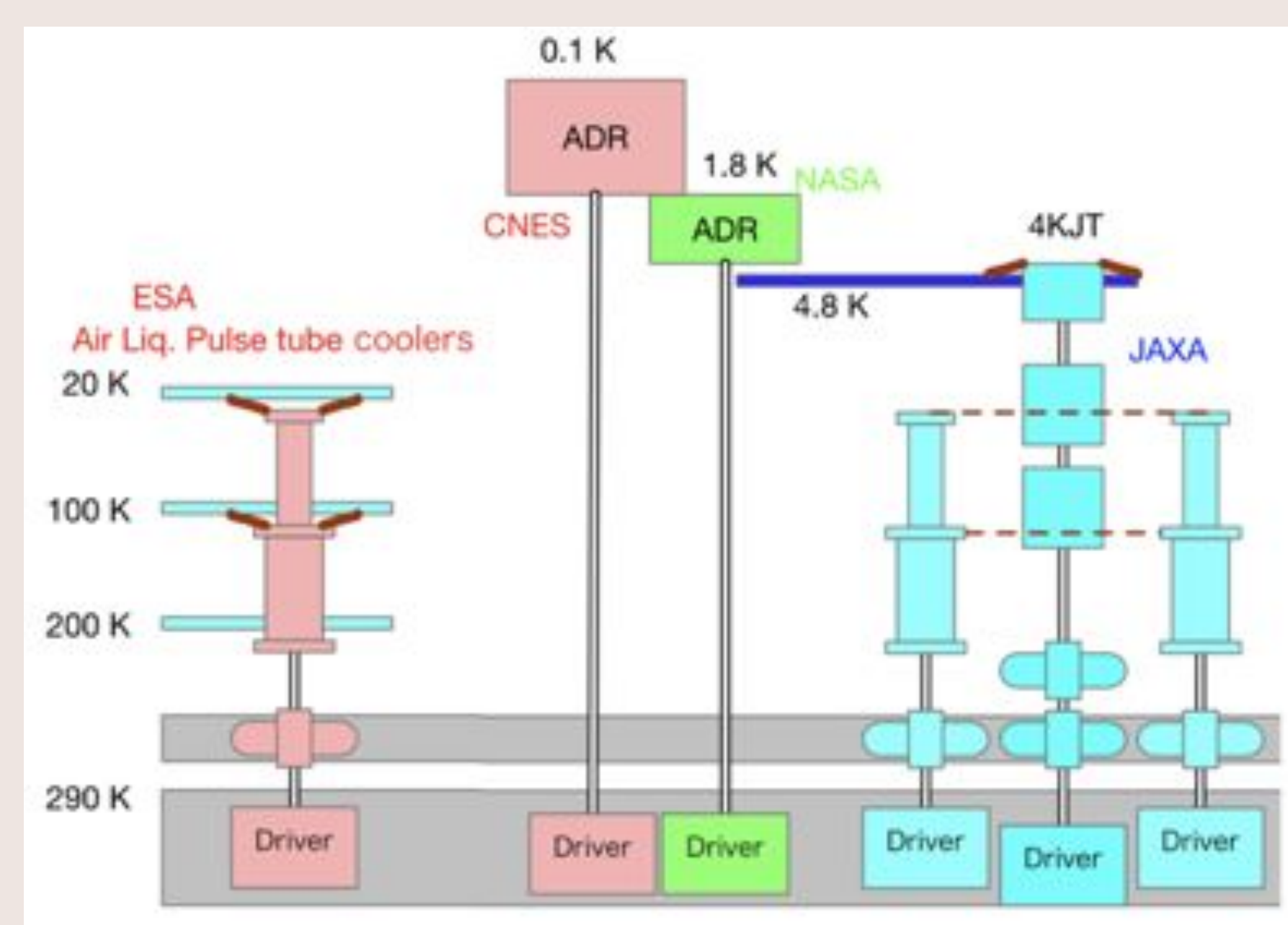
Payload: (For Europe: B. Mot)

Huge responsibility taken by the European part of the collaboration on the MHFT design and optimisation, associated with the cryo-chain in the context of the phase-A1 exit review and JAXA down-selection. This work was initiated during the CDF study led by ESA in 2018.

Calibrations: (For Europe: S. Henrot Versillé)

European members are deeply involved in the preparation of the overall calibration plan from RF tests and cold flight-like characterizations on ground (component level up to integrated system) till in-flight calibrations.

The cryogenic design is based on shield cooling and mechanical coolers. Shield cooling will be done with passive cooling and 15K PT coolers from ALAT. A single cryogenic chain will cool both instruments. A 4K stage is cooled with a ⁴He Joule Thomson cooler from JAXA, precooled by a Stirling coolers. The current baseline of the sub-5K stage is based on a Multi-stage ADR (Adiabatic Demagnetization Refrigerator) which will be optimized to provide continuous cooling at 1.8 K, 300 mK and 100 mK. 7 ADR stages provided by NASA and CEA/CNES are required.



Overview of cryo-chain

Task Sharing

