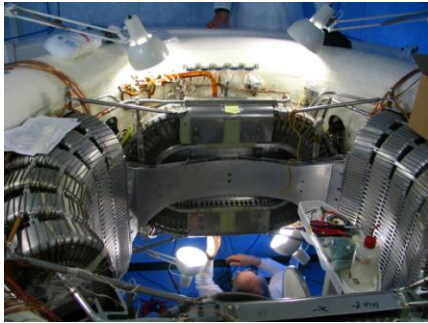


AMS-2: Alpha Magnetic Spectrometer experiment will be launched with the Space Shuttle Discovery and installed on the International Space Station in July 2010. Dark missing and anti-matter research. It is designed to perform precision spectroscopy of many different cosmic-ray species including electrons and positrons. While the nature of dark matter is as yet unknown, dark matter annihilating in the Galactic halo is a well-motivated source of cosmic-ray electrons and positrons. ([Design and manufacture of the cryogenic harnesses](#)).



AMS-2 Harness Installations.



Herschel Satellite: ESA (European Space Agency) Cornerstone Space Observatory. Herschel is the largest space telescope of its kind in space. Herschel's 3.5-metre diameter mirror will collect long-wavelength infrared radiation from some of the coolest and most distant objects in the Universe. Herschel will be the only space observatory to cover the spectral range from far-infrared to sub-millimetre wavelengths.

Combined data from SPIRE & Hubble are producing pictures of unseen galaxies. Herschel is located at L2.L2 is the second Lagrangian point 1.5 million Km from Earth.



SPIRE Instrument: Spectral and Photometric Imaging Receiver. Beam Telescope – 2K Detectors – Spectrometer Scan Mirror – Detector Array Modules (Instrument harness assemblies).

Cardiff University: filters, internal calibrators, thermal system, instrument test support.

CEA, Saclay, France: instrument control and detector readout electronics; Software contribution

CEA, Grenoble, France: detector cooler

IPAC, Pasadena, USA: software contribution, instrument test support

IFSI, Rome, Italy: digital electronics

MSSL, Surrey, UK: instrument enclosure, thermal system

JPL NASA, Pasadena, USA; detector arrays, instrument test support

OAMP, France: instrument optics; Spectrometer mechanism

RAL, Oxfordshire, UK: Instrument assembly and testing; project management and system engineering

UK ATC Royal Observatory, Edinburgh, UK: beam steering mirror

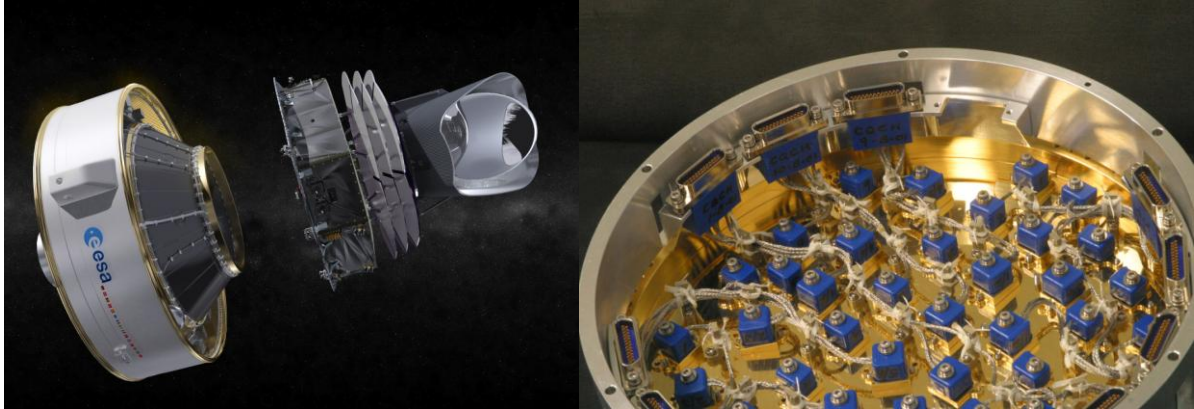
University of Colorado, USA: detector optics; instrument test support



PLANCK Satellite: ESA (European Space Agency) Cornerstone Space Observatory. Located at L2 1.5 million Km from Earth.

HFI Instrument: The High Frequency Instrument (HFI) is an array of 48 bolometric detectors which will be placed in the focal plane of the Planck telescope, and will image the sky in six frequency channels between 100 and 857 GHz.

The 100Mk plate detectors are operating at the coldest level in space. (Cryogenic harnesses).

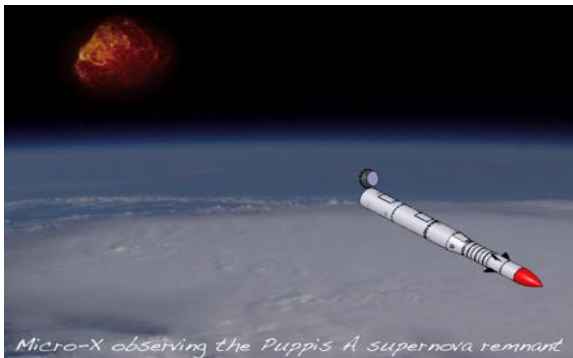


- Caltech California Institute of Technology, in Pasadena (USA)
- NASA Jet Propulsion Laboratory, in Pasadena (USA)
- Stanford University, in Stanford (USA)
- Canadian Institute for Theoretical Astrophysics, in Toronto (Canada)
- Cardiff University, in Cardiff (UK)
- Centre d'Etudes Spatiales des Rayonnements, in Toulouse (F)
- Centre de Recherche sur les tres Basses Temperatures, in Grenoble (F)
- Imperial College, in London (UK)
- Institut d'Astrophysique de Paris, in Paris (F)
- Institut des Sciences Nucleaires, in Grenoble (F)
- Laboratoire de l'Accelérateur Lineaire, in Orsay (F)
- Max-Planck-Institut fuer Astrophysik, in Garching (D)
- Rutherford Appleton Laboratory, in Chilton (UK)
- Space Science Dep't of ESA, in Noordwijk (NL)

Micro-X: The High-Resolution Microcalorimeter X-ray Imaging Rocket is an X-ray space telescope payload being developed for NASA's sounding rocket program. We will fly the first TES in space and take a high resolution spectrum of the Puppis-A supernova remnant.

(Nano density harness assemblies).

MIT – GSFC – NIST – U Wisconsin – U Florida – U Miami
Laurence Livermore - Lockheed Martin – Space Science Institute.



JWST: James Webb Space Telescope. JWST will have a large mirror, 6.5 meters (21.3 feet) in diameter and a sunshield the size of a tennis court. Both the mirror and sunshade won't fit onto the space craft fully open, so both will fold up and open once JWST is in outer space. JWST will reside in an orbit about 1.5 million km (1 million miles) from the Earth.

JWST is an international collaboration between NASA - European Space Agency (ESA), - Canadian Space Agency (CSA).

The NASA Goddard Space Flight Centre is managing the development effort.

Northrop Grumman is the prime contractor.

The Space Telescope Science Institute will operate JWST after launch.

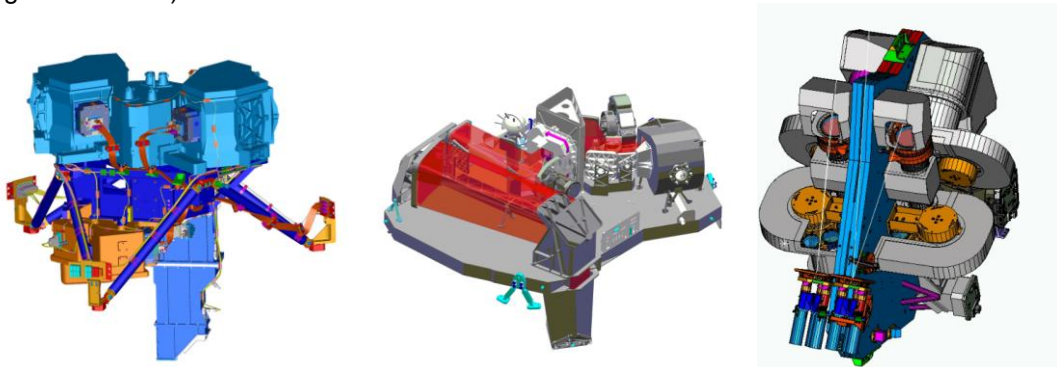


JWST Instruments: MIRI: begins cool down before testing.

The verification model of the Mid-Infra-Red Instrument (MIRI) is currently cooling inside RAL's main vacuum test chamber to a final temperature of 6.2 K. All MIRI's subsystems, designed by collaborators in Europe and NASA's Jet Propulsion Lab, are soon to be tested inside the custom-built cryogenic test facility at RAL. This cryogenic facility simulates the harsh 40 K environment in which the instrument will have to operate when inside the JWST. (House keeping/test harnesses).

NIRSpec: The Near Infrared Spectrograph (NIRSpec) enables scientists to obtain simultaneous spectra of more than 100 objects in a 9-square-arcminute field of view. This instrument provides medium-resolution spectroscopy over a wavelength range of 1 to 5 micrometers and lower-resolution spectroscopy from 0.6 to 5 micrometers. (Flight harnesses).

NIRCam: The Near Infrared Camera (NIRCam) is an imager with a large field of view and high angular resolution. The NIRCam covers a wavelength range of 0.6 to 5 micrometers and has ten mercury-cadmium-telluride (HgCdTe) detector arrays. (Flight harnesses).



The **Atacama Large Millimetre/submillimetre Array (ALMA)**, one of the largest ground-based astronomy projects of the next decade, is a major new facility for world astronomy. ALMA will be comprised of a giant array of 59 x 12-m submillimetre quality antennas, with baselines of several kilometres. An additional, compact array of 7-m and 12-m antennas is also foreseen. Construction of ALMA started in 2003 and will be completed in 2012. The ALMA project is an international collaboration between Europe, Japan and North America in cooperation with the Republic of Chile. ESO VLT/VLTI Observatory.



Tekdata Interconnections systems:

Cryostats: STFC Science and Technology Facilities Council UK

Band 3 Receivers: NRC (National Research Council of Canada) Herzberg Institute of Astrophysics

Band 6 Receivers: NRAO National Radio Astronomy Observatory. Charlottesville, VA

Band 9 Receivers: SRON Netherlands Institute for Space Research.



Bolocam II: Galactic Plane Mapping of Our Milky Way Galaxy with Exploring.

Sunyaev-Zeldovich Effect (Red Shift) Studies of Galaxy Clusters. Caltech Submillimeter Observatory

SPC: South Pole Telescope: The South Pole telescope (or SPT) is a new telescope deployed at the South Pole that is designed to study the Cosmic Microwave background.

Cryogenic detector harnesses for: JPL NASA - U Chicago – UC Berkeley – U Illinois – Case WR U

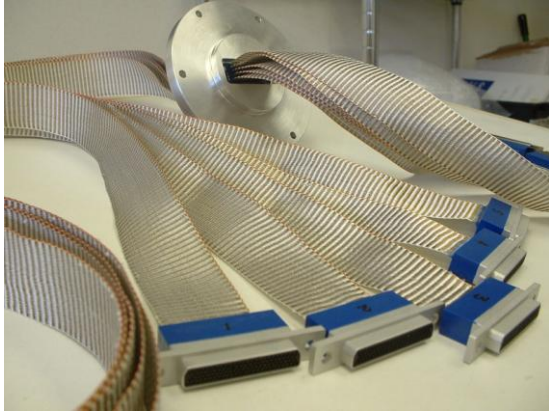
Smithsonian – McGill U - CU Boulder – UC Davis – U Wales



CRESST: Cryogenic Rare Event Search with Superconducting Thermometers is a dark matter search experiment. Located in Gran Sasso, Italy.
Max-Planck-Institut für Physik Munich - University of Oxford - Technische Universität München
Eberhard Karls Universität in Tübingen - Laboratori Nazionali del Gran Sasso. Cryogenic central detector readouts. These experiments search for the elastic scattering of WIMPs (Weakly Interacting Massive Particles).

SCUBA & SCUBA 2: Instrument on the James Clerk Maxwell Telescope in Hawaii. Studying dust and planets around nearby stars, Galaxy Formation and Evolution, and Nearby Young Stellar Populations.

ATC Royal Observatory Edinburgh - Cardiff University - Scottish Microelectronics Centre at the University of Edinburgh - The National Institute of Standards and Technology (NIST) – Universities of Waterloo and British Columbia - Joint Astronomy Centre in Hawaii (JAC).



University of Oxford: Physics: ATLAS Detector: [CERN](#) Hadron Collider

Cryoconnect

Reaching into the cold..... CERN LHC (Large Hadron Collider): ATLAS Experiment

Cryoconnect: accelerating time to results

CORPORATE MEMBER
Cryogenic Society of America

JPL NASA
JPL Pasadena Laboratory
Approved Supplier

osai Approvals
EPCSS-020
EPCSS-070



APEX Telescope: Atacama Pathfinder Experiment. A modified ALMA prototype antenna as a single dish.

UC Berkeley - Max Planck Institut für Radioastronomie - Onsala Space Observatory - European Southern Observatory.



The APEX Telescope at Chajnantor

ESO PR Photo 21/05 (July 14, 2005)



SM3: Standard Missile-3 (SM-3) is being developed as part of the US Navy's sea-based ballistic missile defence system and will provide theatre-wide defence against medium and long range ballistic missiles. Restricted.

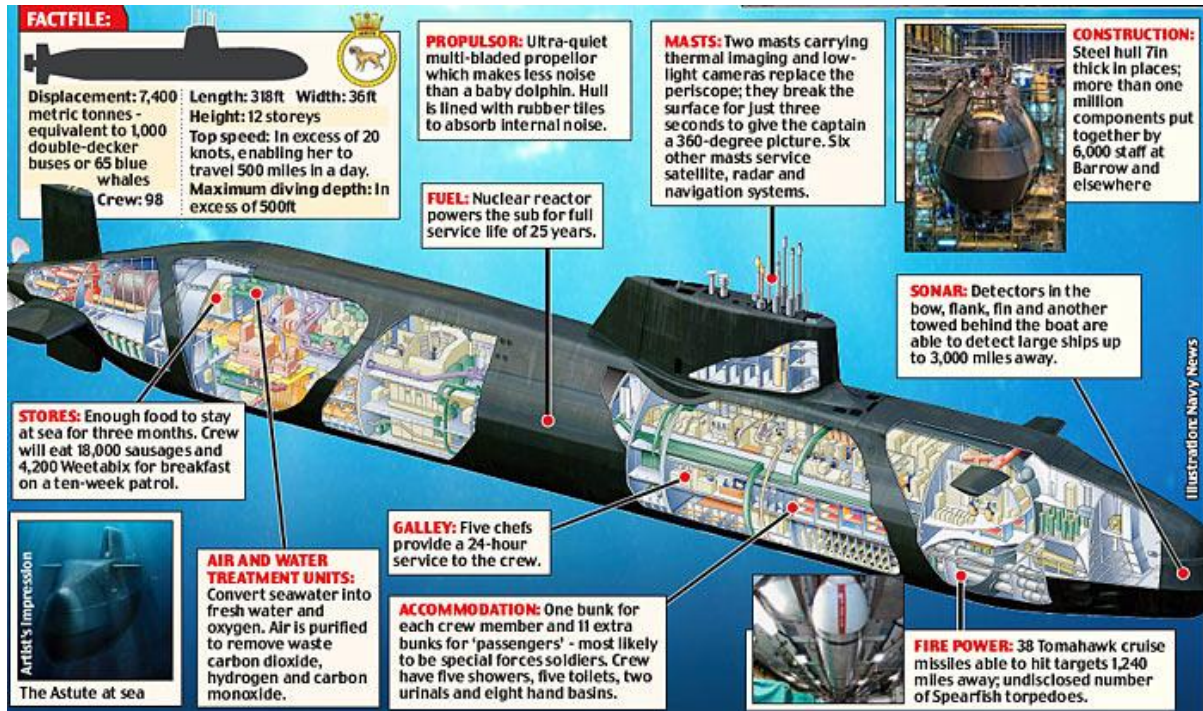
SM-6: The Extended Range Active Missile (ERAM), tentatively designated SM-6, will add an extended range, overland cruise missile defence capability. Restricted.

FALCON: Is an information infrastructure providing a tactical formation-level secure communications in theatre capability. This capability will meet all operational contingencies, including the Allied Rapid Reaction Corps (ARRC) role. FALCON will replace current in-service systems; principally Ptarmigan, Euromux, RT. (EMC/RFI Tempest class deployment assemblies).



Astute: SSN Astute Class Attack Submarine Astute is fitted with I-band navigation radars. The sonar is the Thales Underwater Systems (formerly Thomson Marconi Sonar) 2076 integrated passive / active search and attack sonar suite with bow, intercept, flank and towed arrays.

(On Board sonar cabinet build – Flank Array Detectors).



Cutlass: Explosive Ordnance Disposal and Mine Clearance Gallery – Army bomb detection and disposal equipment. Remotec's **CUTLASS**. Northrop Grumman is also preparing a CUTLASS variant for export for 2010, either as complete systems or with the platforms and payload offered separately. (Harness assemblies).

BAE Systems: Typhoon EFA Cabinet Build.

