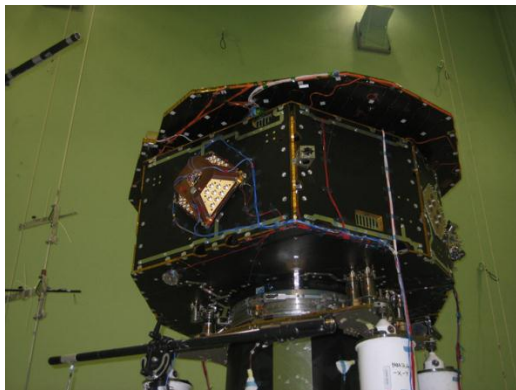
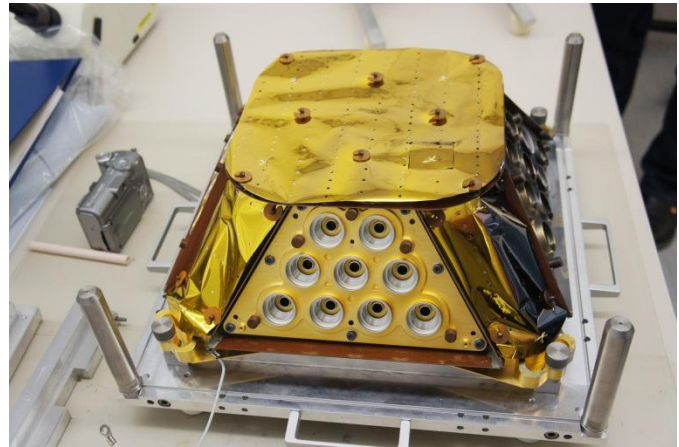


# Laser Interferometer Space Antenna Pathfinder

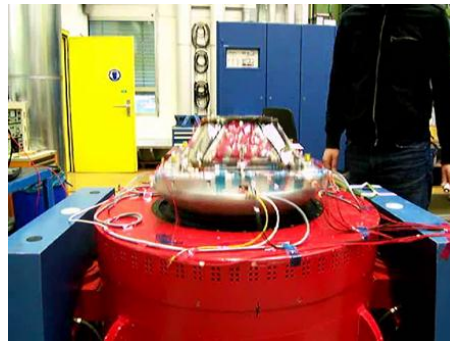
**Customer:** European Space Agency (ESA)  
**Project partner:** Astrium ST (Germany), Selex Galileo (Italy)  
**FHWN/FOTEC core tasks:** Development, manufacturing and test of FEEP thruster. Acceptance test, endurance test and thermal vacuum testing (TVT)

The LISA (Laser Interferometer Space Antenna) is a co-operative program between ESA and NASA to detect gravitational waves by measuring distortions in the space-time fabric. The program consists of two space missions: LISA Pathfinder, to be launched in 2009, and LISA itself, scheduled to launch in 2013. LISA will consist of three space-crafts flying in a triangular formation with a side length of several million kilometers. The position of each satellite with respect to its two counterparts has to be controlled with an accuracy of  $10^{-9}$  m to ensure sufficient accuracy of the scientific measurements. The extreme challenge in position control can only be satisfied with an ultra-precise propulsion system such as an Indium FEEP thruster.

FHWN and FOTEC together with Astrium ST are jointly developing a flight design for an Indium FEEP Microthruster-Cluster suitable for LISA Pathfinder. An extensive test program with three different demonstration units will provide the verification of the FEEP technology and the general thruster cluster design. Each of the three units will have to pass through its individual test program. Amongst others, this includes environmental testing (vibration and thermal tests), off-nominal testing, thrust balance testing, and a lifetime test phase over several thousand hours.



Demonstration unit during the acoustic noise test in the ESTEC test center (Netherlands)



Demonstration unit during the Environmental testing (vibration) at Astrium Friedrichshafen (Germany) (for video click [Demo](#))