

PRESS RELEASE

## SENER Poland successfully completed the functional tests of a mechanism for the European Space Agency's ATHENA mission

The goal of ATHENA, one of ESA's largest missions, will be to study the formation of galaxies and black holes. SENER Poland has completed functional tests of the prototype mechanism necessary to carry out the mission.

The instrument selection mechanism (ISM) designed by [SENER Poland](#) engineers is used to change the position of the telescope mirror so that the beam of rays goes to one of two scientific instruments. Functional tests of the ISM prototype confirmed that the device works as intended, is suitable for further development and can be used in the space mission. While implementing this project, SENER Poland cooperated with 38 Polish partners and research institutes that were responsible for the production of components and devices.



ATHENA mission's instrument selection mechanism video: <https://www.youtube.com/watch?v=5QmHbRtqZdk>

*"The biggest engineering challenges arise from the size of the mirror - it is over 2 meters in diameter and weighs over a ton. During the start, our mechanism will have to withstand strength of 15 g. When designing the mechanism, we used the innovative SENER solution - the device is a hexapod,*

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*i.e. a structure that uses six actuators to move the mirror precisely in many planes* "- says Katarzyna Okulska - Gawlik, SENER Poland Project Manager.

The ATHENA probe is a huge 12-meter x-ray telescope. Space is widely believed to be filled with cold void, but x-ray astronomy has shown that the universe is hot and full of energy, to the point that stars appear to be low-temperature objects. The surface temperature of the stars ranges between 2,000 and 30,000 Kelvin. Meanwhile, most of the ordinary matter of the universe can be enclosed in gas clouds hotter than a million Kelvin. At such temperatures, the gas shines brightly on X-rays. The goal of ATHENA's mission is to study Warm-Hot Intergalactic Medium (WHIM) and black holes - how they grow and how they affect the shape of the universe. The probe will make many point observations of selected parts of the Universe - about 300 observations per year are assumed. The mission is planned for a minimum of 5 years, but all systems are designed to operate twice as long.

In the space sector, scientific missions such as ATHENA are among the most demanding. They also contribute the most to scientific and technological progress, because new discoveries require the creation of completely new devices.

The ATHENA mission uses another SENER Poland product - the HDRA (Hold-Down and Release Actuator) mechanism, which will ensure that the huge telescope mirror remains immobilized until the probe is in the right orbit. Then the mechanism will be released and it will be possible to move the telescope mirror.

### **Space sector and the coronavirus epidemic**

The coronavirus outbreak has an impact on the space sector. From March 16<sup>th</sup>, no flights from the Kourou Space Center in French Guiana will take place until further notice. The mission of the European Martian robot ExoMars, which was to launch in July this year, has been postponed by two years. SENER Poland has already delivered the finished product to this mission - the Umbilical Release Mechanism, which is critical for the mission's success.

Space projects, however, have a long-term perspective. A good example is the ATHENA mission. ESA began preparations for it many years before the launch planned for 2031. This is the specifics of the ESA scientific program "Cosmic Vision" - within it are implemented technically and scientifically ambitious projects, the implementation of which is planned for decades:

*"On the one hand, it allows the development of really advanced technologies, the development of which takes many years. On the other hand, scientific missions like ATHENA, JUICE or Euclid ensure stable demand in the European space sector. European companies know that part of the ESA's budget is intended for financing stable, multi-annual programs. This allows us to create development strategies and invest in promising technologies"* - explains Ilona Wojtkiewicz, Ph.D., development director of SENER Poland.

### **About SENER Poland**

*SENER Polska started in 2006 and focuses on the aerospace sector, namely defence, space engineering and aeronautics. SENER Polska's main area of activity in the aerospace sector is mechanical engineering, including in particular mechanisms and structures of space vehicles. The company's other areas of activity in Poland include mechanical ground support devices (MGSE)*

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and space vehicle navigation. Although little time has passed since Poland joined ESA in 2012, SENER Poland has become one of the major players on the space market and has launched projects that contribute to building a stronger space sector in Poland. Among the important projects, it is worth mentioning ExoMars, Proba-3, Euclid, E.Deorbit, Saocom-CS, Athena, JUICE, as well as the "ESA Incentive Scheme", which supports the development of the space industry in Poland.

### **About SENER Aeroespacial**

SENER Aeroespacial has been a leading supplier of high performance aerospace systems for Space, Defence and Science for [more than 50 years](#), with high added value technological developments. In Space, it supplies electromechanical components and systems, navigation systems (GNC/AOCS), communications, astronomy and optics systems for Space, and it is currently participating in the main programs of ESA and NASA (including Euclid, Meteosat Third Generation, Solar Orbiter, JUICE, Proba-3, Hubble, Galileo, Rosetta, Gaia, Herschel and Planck, IXV, BepiColombo and Mars 2020) and the European Southern Observatory; in the Space commercial market, is a leading supplier of telemetry and telecommand antennas and a regular supplier of all types of antennas, passive equipment and radio frequency assets for the leading international manufacturers of communications satellites, even in programs for the so called New Space. In Defence, it develops electromechanical systems, COMINT (communications intelligence) and communications links (D-Link), as well as helicopter modernization services. In Astronomy and Science, it produces precision mechanical equipment for terrestrial telescopes and engineering services. And, finally, its ATC & Broadcast division is a supplier of antennas and passive units.

SENER Aeroespacial is part of the SENER engineering and technology group, founded in 1956. The SENER Group has 2,300 professionals in offices in four continents and the group's operating revenue exceeded 589 million Euros (2018 data).

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