

# TECHNOLOGY DEMONSTRATION

## PROJECT

### ENERGY-EFFICIENT LAMPS FOR THE FUTURE

THE ARGES  
EXPERIMENT  
ON BOARD  
THE ISS

The energy-saving plasma lamps, developed by Philips and the Eindhoven Technical University, have been successfully tested on board the International Space Station (ISS). During the Delta Mission, ESA-Astronaut André Kuipers carried out - amongst many others - the ARGES Experiment aimed at improving the function of High-Intensity Discharge lamps (HID), a new generation of energy-saving plasma lamps. The HID technique is gaining ground in the lightening industry, as the lamps are very efficient and therefore ideal to be used in energy-consuming lighting of outdoor facilities such as sport stadiums or roads.



The plasma lamps were tested on the ISS

Philips and the Eindhoven Technical University were eager to further improve the HID technique, as there were two minor imperfections to be investigated. The reason for those is the very nature of the way HID generates light: an electrical current runs through the lamp and stirs the metal gases

inside its ceramic container. The metal atoms in the gas pick up electric energy and radiate light: They begin to 'glow'. By-and-by, the gases de-mix, so that the glowing atoms are no more evenly divided in the bulb - there are different intensities of light in different parts of the lamp. A second problem is that the plasma sometimes starts rotating in the shape of a corkscrew inside the lamp. This might cause flickering or even break the HID, as it may cause cracks in the wall of the lamp.

The zero gravity environment of the ISS was essential to understand those phenomena and for the success of this research, as the gravity on Earth causes deviations that make it impossible to monitor the de-mixing process of the gases properly. In addition, gravity destabilises the plasma. The ARGES experiment led to surprising results, as head scientist of Eindhoven Technical University, Gerrit Kroesen, pointed out: "We received the first result directly from André via radio link-up. It was apparent that in space the gases didn't start to rotate, this wasn't what we had expected."

This experiment on the ISS will be of great value for improving plasma lamps in the future: the findings will help identifying and eliminating the sources of error. This shall help Philips to dig deeper into the profitable and forward-looking market of efficient, energy-saving lighting. ■

INNOVATION  
THROUGH  
SPACE  
RESEARCH

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