

Lunar Exploration (2)  
Lunar Exploration (3) (3)

Author: Mr. Bernhard Hufenbach  
European Space Agency (ESA), The Netherlands, Bernhard.Hufenbach@esa.int

Mr. Francesco Liucci  
European Space Agency (ESA), The Netherlands, francesco.liucci@esa.int

Mr. Fabrice Joly  
European Space Agency (ESA), The Netherlands, fabrice.joly@esa.int

Mr. Javier Ventura-Traveset  
European Space Agency (ESA), France, javier.ventura-traveset@esa.int

Mr. Pietro Giordano  
ESA - European Space Agency, The Netherlands, pietro.giordano@esa.int

Mr. Wael El-Dali  
European Space Agency (ESA), United Kingdom, wael.eldali@esa.int

Mr. David Gomez Otero  
European Space Agency (ESA), United Kingdom, david.gomez.otero@esa.int

MOONLIGHT INITIATIVE: CONNECTING EARTH WITH THE MOON

**Abstract**

The interest in Moon exploration has substantially grown in the latest years, positioning the Moon as an attractive testbed to develop the required technologies and capabilities for human Deep Space exploration. This change of paradigm is given by two major milestones: the planned human missions to Mars and the recent discovery of water ice in the South Pole of the Moon.

In past decades, lunar missions have almost entirely relied on Direct-to-Earth (DTE) communications, whilst using ranging from Earth for navigation. The growing trend in the number of missions to the Moon is creating demand for the deployment of a lunar communications and navigations infrastructure to support the international community. This in turn can act as a catalyst for additional public and private world-wide CIS-lunar initiatives.

The European Space Agency's vision represented in the Moonlight initiative, is to gradually develop and deliver communications and navigation services that will support the next generation of institutional and private Lunar Exploration Missions, including enhancing the performance of those missions currently under definition.

This paper presents an overall strategy for the deployment of a sustainable high performing lunar communications and navigation service and associated infrastructure components. Furthermore, it looks into the interrelation to other cis-lunar elements, covering interoperability and scalability aspects. The paper concludes with an assessment on the end-user perspective and the potential impacts and benefits for the user community.