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Human Exploration of the Moon and Cislunar Space (1)

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ENHANCEMENT OF THE ESA MOBILE PROCEDURE VIEWER (MOBIPV) BEYOND LOW  
EARTH ORBIT

**Abstract**

MobiPV was initially designed to provide improved procedure navigation, visualisation and hands-busy interaction support for astronauts on-board the International Space Station. mobiPV also supported distributed team work through a series of collaboration services between on-board crew members and ground experts. Its underlying architecture, however, is not limited to operations on-board the ISS. In fact, a number of use cases can be identified in the realm of human exploration beyond Low Earth Orbit. This paper details some of the opportunities and challenges, whilst at the same time identifying additional mobiPV services that will be required in this novel context. Specifically, the paper shows how the current mobiPV system can be easily extended to support these new use cases. Examples are given in the context of Cislunar and Moon Village operations, with emphasis on optimally distributed cognitive support for task execution. The discussion also includes a proposed communications infrastructure to enable enhanced mobiPV operational deployment. Spin-in technologies from the consumer market, including Internet-of-Things (IoT), as well as virtual and augmented reality are shown to fit well in the path towards a user friendly and easily accessible system. Finally, the paper highlights how - in an iterative manner - early "beyond LEO" prototypes of the system can be demonstrated and evaluated - both as technology building blocks and as exploration operations support infrastructure - at terrestrial analogue environments such as the LUNA facility at the European Astronaut Centre, Cologne.