Title: **FiReSpARX** – FinTech/RegTech in Space for Trustful Autonomous Robotic Interaction

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Abstract:

In the not-so-distant future, space agencies and private enterprises will embark on resource-harvesting missions in outer space. These missions will likely involve multiple robots from various entities operating in the same celestial vicinity. To enhance operational efficiency, these robotic entities must collaborate, share data, and offer services, such as interplanetary communication. However, the unpredictability of outer space means that pre-planned cooperation is only sometimes feasible. Therefore, these robots must possess the autonomy to make economic decisions aligned with the interests of their respective parent companies. They must be capable of determining the value of services, engaging in negotiation, and executing transactions.

The FiReSpARX project is dedicated to designing market mechanisms, incentives, and governance frameworks for these autonomous economic interactions. Furthermore, we implement and evaluate a prototype system within SnT's LunaLab, an environment that replicates lunar conditions.

This video introduces the blockchain-based Multi-Robot System (MRS) for distributed mapping in In-Situ Resource Utilization (ISRU) scenarios. The MRS system optimizes global efficiency by fostering coopetitive (cooperative and competitive) interactions among robots, ultimately streamlining the mapping process in ISRU scenarios—a pivotal advancement for the emerging space economy.

The video provides an insightful overview of the system's architecture, emphasizing the integration of blockchain technology to ensure trustworthy and transparent data sharing and smart contract execution. It underlines its potential to redefine how robots collaborate and share information in space. Additionally, the video underscores the system's vital role in advancing the fields of robotics and automation, particularly in space exploration.

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