



Title: Theoretical Concept of Satellite Navigation System for Mars – GNSS FATIMA

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The planetary science of recent days is very focused on our neighbor, planet Mars. Current navigation and positioning systems used by surface rovers or orbital systems are often complicated and their possible maintenance requires a huge effort of the ground control teams on Earth. Construction and design of these probes is expensive, due to necessary redundancy of their on-board systems, usually consisting of computers, sensors, navigation cameras and other intelligent technologies. Complexity of these current systems is making them very sensitive. Any small error in position calculation can result not only in wrong direction or in bad position determination, but can even endanger the whole mission. For example when such vehicle reaches some danger zone – like the edge of a crater, valley, or rocky area. Precise navigation and timing is one of the key factors of the next steps of Mars research. We are heading towards the next giant leap of Mankind, when the first humans will possibly land on a surface of Mars. Advanced robotic missions including flying robots, surface rovers, new orbital probes and possible future human mission, will need the one universal positioning system and one the universal time service. This can be resolved by proposed global navigation satellite system for Mars. We have used the name FATIMA as acronym for such system, which simply means Fix And Time provisioning system for MArS. The constellation of FATIMA satellites orbiting Mars will provide real time positioning service, navigation service and timing service, for multiple users. This system will not be analogy to our Earth based GPS, Galileo or Glonass systems, but will be more complex and possibly maintained by the international control body on Earth. The system will be suitable also for the geodetic measurements and for the possible tectonic research of Mars. It will allow us to come personally beyond our own current human world.

Biography

Jozef Kozar is a PhD candidate at the Faculty of Aeronautics of Technical University of Kosice in Slovakia. He is member of more international scientific and planetary research organizations

and is author of several scientific papers focused primarily on Mars, its natural and physical characteristics and their influence on advanced planetary exploration and navigation systems. He is editor-in-chief of international journal of Mars research – Science Mars Journal.

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