SPACE OPERATIONS SYMPOSIUM (B6)
New Operations Concepts, Advanced Systems and Commercial Space Operations (2)

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VIRTUAL OPERATIONS CENTER FOR SPACE SCIENCE

Abstract

The Strategic Pioneer Program on Space Science (SPPSS), which is the most important program on space science in China. The fundamental research related to this program during the "Twelfth Five-Year Plan" period (2011 - 2015) focus on some frontier fields such as the properties of black hole, the nature of dark matter, the analysis of non-locality of quantum mechanics and so on. There are 5 satellite missions encompassed by this program during the "Twelfth Five-Year Plan" period. The National Space Science Center (NSSC), the Chinese Academy of Sciences, is demanded to build one operations center for all the satellites missions, supported and to be supported by SPPSS, for financial reason and to seek the creative ways of operations.

The concept of Virtual Operations Center (VOC) comes from the experiment of developing the operations center for SPPSS and is proposed in this article. We focus on the operations for human satellites used for science research. The end users for this type of satellites are the scientists in specific fields. They decide the activities of the satellite and use the data produced by it. They are usually familiar with and focus on the scientific goals. However, they don't care about the complex operational processes, but are always involved in them unavoidable.

The purpose of VOC is to make the complex operational processes transparent to the scientists. With VOC, they are provided friendly interface to set the scientific goals and automatic planning and scheduling tools to produce the plan satellite to execute. They can get real time visualized scenes of satellite and get the preliminarily processed experiment result data and fertile information about what the satellite has done in short time. VOC is a cross satellites platform. The satellites belong to different missions may cooperate to meet the needs of the scientists with help of VOC.

The article presents several scenarios of how scientists use the satellites with VOC at first. And then, the advantages of VOC are analyzed, such as saving the cost for operations, promoting the effectives, making full use of the satellites, and so on. Moreover, how to build VOC is presented. The architecture of VOC is introduced. Finally, the lessons related to VOC we learned from the development of the operations center of SPPSS are shared.