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**Abstract**  
**USING NEW TECHNOLOGIES IN SUPPORT OF**  
**FUTURE SPACE MISSIONS**

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What will Mission Operations be like in the future? How will future space missions benefit from new technologies being developed today? Is it possible to operate an entire spacecraft, or even a constellation or family of spacecraft, from your desktop PC?

This paper will explore these topics, forming a perspective of how new technologies such as onboard autonomy and Internet-like protocols will change the look and feel of operations. It will analyze the concept of a "lights-out" mission operations control center and its role in future mission support and it will describe likely scenarios for evolving from current concepts. It will contemplate the concept of smart satellites which monitor their own well-being (and perhaps the well-being of other satellites within a local constellation) and plan their own operational activities, both to perform the mission objectives and also to recover from detected problems. Alternative methods for space to ground communications will be explored, such as the use of private sector communications satellite providers to provide a "Phone-Home" service whereby spacecraft in Earth-orbit may be given commercial telephone numbers.

Along with discussing how operations and architectures will change, the paper will address one of the many concerns which surface when discussing system automation and autonomy, i.e., how does a project organization maintain the knowledge and expertise to handle problems which may occur later in a missions life, once all of the experts have moved on to support new projects? The paper will therefore examine the capabilities of **tools for capturing spacecraft knowledge and the potential for using this knowledge to perform automated monitor and control**. It will also emphasize the increasing need for standards and standardization, without which it will be impossible to bring down the cost of operating spacecraft - at least not without increasing risk - much beyond what it is today.

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