|  |  |
| --- | --- |
| **Name of Group** | **6.08 Motion Imagery and Applications Working Group** |
| **Area** | Space Internetworking Services Area (SIS) |
| **Chairperson** | Rodney Grubbs |
| **Chairperson E-Mail Address** | rodney.grubbs@nasa.gov |
| **Chairperson Agency** | NASA |
| **Deputy Chairperson** | Osvaldo Peinado |
| **Deputy Chairperson E-Mail Address** | osvaldo.peinado@dlr.de |
| **Deputy Chairperson Agency** | DLR |
| **Mailing List** | sis-mia@mailman.ccsds.org  |
| **Scope of Activity** | Standardization for motion imagery and video applications in spaceflight primarily requires selection from a suite of existing protocols, sub-protocols, and interfaces. As motion imagery systems grow more diverse, they also provide a wide array of options for resolutions, compression, and input/output interfaces to choose from. Compatibility with down-stream communications architecture is highly desired. Representative issues to be addressed by this Working Group will include: • Packetization of compressed and uncompressed data streams • Metadata • Embedded audio • Command and control methodologies • Compression standards and implementations • Distribution formats • Remote operations of space-based MIA systems • Compatibility with avionics systems • Common references and quality standards |
| **Rationale for Activity** | In the early days of human spaceflight, motion imagery was accomplished with motion picture cameras, set at varying frame rates depending on lighting conditions.  Upon safe return the film was processed and eventually shared with the world via documentaries or television.  Inevitably live video became operationally desirable for situational awareness and to satisfy the public’s interest in high profile events such as the Moon landings or the Apollo-Soyuz test project.  Compromises were made with those first video systems to fit within the constraints of bandwidth, avionics, and transmission systems.  Even in the modern era, video systems on spacecraft are a hybrid of analog and digital systems, typically made to work within the spacecrafts avionics, telemetry and command/control systems. With the advent of digital cameras, encoding algorithms and modulation techniques, it is desirable to treat video as data and utilize commercially available technologies to capture and transmit live and recorded motion imagery, possibly in high definition or even better. Future Human Spaceflight endeavors are expected to be collaborations between many agencies, with complex interactions between spacecraft, and Lunar/Mars surface systems, with intermediate locations (EVA crew, habitats, etc.) requiring the ability to view video generated by another agency’s systems.  Therefore interoperability between these systems will be essential to mission success and in some cases crew safety.  Such interoperability will only be achieved by use of common references and joint agreement on international standards, either commercial or CCSDS or a combination of the two.   |
| **Goals** | The Motion Imagery & Applications Working Group will develop Green and Blue books to support streaming applications (including video and possibly voice), and documenting existing approaches to and results of using various existing and under-development internet protocols to support streaming. During this process the working group may identify additional follow-on work; if such work is identified the WG will propose further charter modifications and projects to carry out the work.  |
| **Survey of Similar Standards Efforts Undertaken in Other Bodies and elsewhere in CCSDS** |  |
| **Patent Licensing Applicability for Future Standards** | The MIA documents will include patented technology. However the research from the WG at this time gives us confidence that no programs from space agencies will have to pay any license fees. This is largely because the MIA documents will specify the usage of commercial hardware and software, and license fees apply to those manufacturers, not to end users. Additionally, as far as this WG can determine, the cited technologies are already standardized, and have been verified by ISO as Reasonable and Non Discriminatory (RAND).   |
| **Technical Risk Mitigation Strategy** | Low risk due to intent to utilize existing technologies and standards. Possibility of technology surpassing or out-dating any documents produced. Risk will be mitigated by referencing internationally recognized standards such as ISO, MPEG or Society of Motion Picture and Television Engineers vs. proprietary or commercial solutions or other unique applications of technologies.  |
| **Management Risk Mitigation Strategy** | Lack of resources or Agency support. The schedule outlined in this document is not so aggressive that WG members will be forced to choose between their other responsibilities and the group’s work.  Further, much of the group’s work should be able to be accomplished electronically.  Commitments to support the group’s objectives have been sought and obtained from other Agencies before pursuing working group status  |