



Ground System Architectures Workshop
Stronger Together: Improving Interoperability
for Users and Operations

February 22–March 2, 2023 | The Aerospace Corporation | El Segundo | California

***Leveraging New Space for Ground
System Enterprise Evolution***

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A satellite in orbit with solar panels and a ground station with a large parabolic dish antenna.

Session Goals

- **Commercial offerings such as Commercial Ground Stations and Commercial SATCOM Service are beginning to disrupt traditional ground system business models with government agencies**
- **Innovations in flight architectures needs to be enabled through innovation in the ground enterprise**
- **The session goal was to facilitate a collaborative forum for the discussion of the evolution of future ground systems through the engagement of a broad range of government agencies, industry, and international partners to discuss the role of commercial services in the future satellite ground enterprise**
- **We explored the reimagining of the government/contractor relationship, including the exploration of relevant technology and business services offerings that may transform daily operations, and consider strategic business issues such as the acquisition, regulatory, and cultural transformations necessary for government agencies to exploit relevant commercial technology and business services effectively, affordably, and securely**



Presenters/Panelists

Time	Presentation/Panel
9:00 - 9:10	Introduction Michael Bonadonna – NGES Program Lead NOAA/NESDIS/OSAAP
9:10 - 9:40	Embracing the Aerospace Community Through Strategic Engagement Dr. Ruma Das – Deputy Office Chief for the Commercialization, Innovation, and Synergies (CIS) Office, NASA/ESC
9:40 - 10:10	Delivering Capabilities Dr. Joseph McNamee –Tranche 1 Ground Segment Program Manager USSF/SDA
10:10 - 10:40	NESDIS Long Term Sustainability & Commercial Services Dr. Steve Marley - Ground Enterprise Architect NOAA/NESDIS/OSAAP (The Aerospace Corporation)
10:40 - 11:10	An approach for industrializing software systems for ESOC Operations Dr. James Eggleston – Head of Data Systems Infrastructure Section ESA/ESOC/MODS
11:10 - 11:30	Fireside Chat Costin Radulescu - Program Chief Engineer, NASA's Multi-mission Ground System and Services Program NASA/JPL

Working Group B



Key Points

- **Most current agency operational services are not future proofed**
 - *Operational costs will become a larger fraction of the life-cycle budget*
 - *Agencies will need to change business practices going forward in order to achieve affordable adaptability and resilience*
- **User Engagement is key for mission success**
 - *Customer needs must inform requirements and service from mission formulation and throughout the life-cycle*
- **Emerging technologies and business practices offers a viable path forward**
 - *Cloud-based solutions reduces hardware footprint through reduced redundancy*
 - *New technologies improve asset utilization through multi-mission use*
- **Commercial Services offer viable options for establishment of common service pathways**
 - *Buying commercial services reduces up front investment and ongoing sustainment costs while providing operational scalability*
- **Emerging paradigm shifts in the way capability is delivered**
 - *Software Communities – Agency Software Public License (open source) & Agency Software Community License (restricted to ESA Member State territories)*
 - *End-to-end services – Enhancing common software for missions with common processes used by all missions*



Conclusions

- **The “New Space” revolution is driving the need for innovation on the ground**
 - *Traditional approaches are not economically sustainable in the coming decades*
 - *Several technology trends including small/micro satellites, high-volume production, and Cloud services have paved the way for the emergence of a new generation of global businesses*
- **Many government agencies are facing similar challenges when integrating commercial services into their strategic ground enterprise**
 - *The pace of space industry innovation drives the need for acquisition agility. Technology innovation in commercial industry is moving at an unprecedented pace. However, acquisition processes are traditionally long and bureaucratic*
 - *To leverage commercial services, we must shift from the “widget delivery” style of contracting that dominates traditional space programs to a “service delivery” model based on integrating into a “system of services” that meets objectives*
 - *To meet the challenges facing the new space enterprise, workforce evolution will be necessary*
- **There are opportunities to implement an integrated approach across the government agencies’ ground enterprise systems:**
 - *Provides a consistent demand signal to industry, enabling better leverage of innovation*
 - *Enables better reuse/sharing of services across the federal ground enterprise that can be extended internationally*