Working Group Outbrief
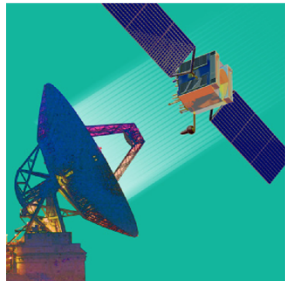
Ground System Architectures Workshop

Session 11A

Cloud Computing for Ground Systems VIII

Ramesh Rangachar and Craig Lee

The Aerospace Corporation

- Discuss the best practices, lessons learned, and current trends in Cloud Computing

  - What are the key mission requirements for the adoption and migration of ground systems to cloud computing environments?

  - What are the benefits and challenges to the adoption of cloud computing for ground systems?

  - What are the enablers required for cloud computing in ground systems to become a reality?

  - How does the convergence of cloud computing and big data impact ground systems?

  - How can multiple clouds and the boundaries among multiple missions running on those clouds be managed, i.e., how can we manage cloud and mission federations?

Ground System Architectures Workshop

Presenters/Panelists

Title	Presenter	Organization
Introduction	Ramesh Rangachar	The Aerospace Corporation
Flying SmallSat Constellations in the Cloud	Justin Boss Chris Beam	Kratos
Cloud-based Product Generation Platform – Lessons Learned	Justin Sanchez	Harris Corporation
The Architecture of Major Tom: Bringing Modern Cloud Patterns to Ground Operations	Dave Sims Wynn Netherland	Kubos
An Agile, Cloud Based Common Software Framework	Virginia Cevasco Joe McNamee	Booz Allen Hamilton
Using the NIST Big Data Reference Architecture (NDBRA) to Define Ground System Architecture	Ramesh Rangachar Steve Marley	The Aerospace Corporation
Town Hall Meeting: Cloud Computing Solution for Ground Systems		

Key Points

- Flying Small Satellite Constellations in the Cloud

  - Satellite ops feasible with significant cost savings

- Cloud-based Product Generation Platform – Lessons Learned

  - No significant roadblocks; Constant security awareness needed

- The Architecture of Major Tom

  - A closed-source, multi-tenant SAAS application

- An Agile, Cloud Based Common Software Framework

  - Faster project start-ups, lower cost and barrier for entry

- NIST Big Data Reference Architecture

  - Directly applicable to managing big data in ground system architectures

- Townhall Discussion

  - Cloud federation enables the management of multiple clouds and missions

  - How to you ensure that you have deleted data on the cloud

Conclusions

- The adoption of cloud computing continues

  – Cloud computing is not going away!

- Adoption and migration issues abound

  – No one is saying this is easy, but the advantages are undeniable

- What "ground system software" means is changing

  – Ground systems will no longer be monolithic software edifices

  – They will be conglomerations of open source, container-based micro-services, chat-based communications, ...

  – The boundaries between clouds, missions and organizations will be managed on-demand, in software, i.e., through *federation*

- **NIST/IEEE Workshop on Federated Cloud**

  – **March 20-21, Gaithersburg Holiday Inn, MD**

  – **https://federatedcloud.eventbrite.com**