IEEE SMC-IT 2021
8th IEEE International Conference on Space Mission Challenges for Information Technology
Virtual Conference: July 26-30, 2021

CALL FOR PARTICIPATION
Regular registration now open through to the conference.

Important note: All authors, speakers, and participants should register to obtain proper zoom login/password credentials.

Sponsored by: IEEE Computer Society and the Technical Committee on Software Engineering (TCSE)

General Information: http://smc-it.org
Email Inquiries: smc-it-chairs@baylor.edu
Registration: http://smc-it.org/registration
Agenda: https://smcit.ecs.baylor.edu/smcit-agenda.html

Every two years, the International Conference on Space Mission Challenges for Information Technology (SMC-IT) gathers system designers, engineers, scientists, practitioners, and space explorers with the objective of advancing information technology for space missions. The forum will provide an excellent opportunity for fostering technical interchange on all hardware and software aspects of IT applications in space missions.

The conference will focus on current information systems practice and challenges as well as emerging information technologies with applicability for future space missions. Information systems in all aspects of the space mission will be explored, including flight systems, ground systems, science data processing, engineering and development tools, operations, and telecommunications. The entire information systems lifecycle of the mission development will also be covered, such as conceptual design, engineering tools development, integration and test, operations, science analysis, and quality control.

Our list of confirmed Keynote Speakers include:

- Brig. Gen. D. Jason Cothern, Vice Commander, Space and Missile Systems Center, Los Angeles Air Force Base
- Lt. Gen. Larry D. James (USAF, Ret.), Deputy Director, NASA / JPL
- Juliane J. Gallina, Chief Information Officer, Central Intelligence Agency (CIA)
- Shri M Sankaran, Distinguished Scientist, Indian Space Research Organisation (ISRO)
- Dr. Eugene L. Tu, Director, NASA Ames Research Center
- Kevin D. Bell, Vice President, Space Program Operations, The Aerospace Corporation
- Rob Manning, Chief Engineer, NASA / JPL
- Dr. Anik De Groof, Instrument Operations Scientist, European Space Agency (ESA)

- Dr. Al Cangahuala, Mission System Manager, Europa Clipper Mission, NASA / JPL.
- Tim Canham, Software and Operations Lead for the Mars Helicopter, NASA / JPL
- Col. Janet Grondin (USAF, Ret.), Vice President of Defense Programs, Stellar Solutions
- Kalind Carpenter, Robotics Engineer, Robotic Vehicles and Manipulators Group, NASA / JPL
- Magdy Bareh, Principal Engineer, Flight Systems Engineering, NASA / JPL

A list of the mini-workshops within SMC-IT includes:

- The Space-Terrestrial Internetworking (STINT)
- Digital Twins
- OMG Space Domain Task Force (Presented by the Digital Twin Consortium)
- Open Source for Space
- Space Mission Challenges for Digital Engineering Environments/Ecosystems (MBSE)
- Trusted Artificial Intelligence (TUTORIAL)
- Machine Learning for Spacecraft Health
- Accelerating the Use of Autonomy on Robotic Space Missions
- 3rd Augmented, Virtual, and Mixed Realities Workshop
- Student Mars CubeSat Mini-Workshop
- Engineering of Autonomic and Autonomous Systems (EASe)

CONFERENCE HIGHLIGHTS:

We will have a keynote talk by Brig. Gen. D. Jason Cothern, Vice Commander, Space and Missile Systems Center (SMC) of the United States Space Force. The Space and Missile Systems Center is a center of technical excellence, and is involved in the development of highly advanced space systems. Prior to this role, Brig. Gen. Cothern was the Assistant Program Director for development at the F-35 Lighting II Joint Program Office.

This year SMC-IT will have special talks on the Mars 2020 Helicopter, Ingenuity, and future Mars missions, Commercial Space, the new concept of Digital Twins, the use of Open Source in Space, and robotic snakes for exploring deep crevasses and caves on icy worlds.

Other special themes will focus on space networking protocols for data exchange between space based and terrestrial network nodes that potentially could have very long delays (includes internationally recognized speaker Dr. Vint Cerf, co-Father of the Internet, and co-designer of TCP/IP and the architecture of the Internet), and another workshop that hopes to answer the question of what is holding back using autonomy in robotic space systems.

The featured “virtual” banquet speaker is Dr. Kevin Grazier, noted American planetary physicist, author, and science advisor to Hollywood. He is known for his work on the Cassini/Huygens Mission to Saturn and Titan where he had the dual roles of Science Planning Engineer and Investigation Scientist for the Imaging Science Subsystem instrument. He is an expert in

computational methods and planetary dynamics, and performs large scale, long term simulations of early Solar System evolution, dynamics, and chaos. He is also the science consultant for several television series and movies, most notably the series *Defiance*, *Battlestar Galactica*, and *Eureka*, and the films *Gravity* and *Pirates of the Caribbean: Dead Men Tell No Tales.*

Digital Twin Mini-Workshop – July 28, 2021
Join our workshop to explore the role of Digital Twins and enabling technology in tackling challenges in Space-IT. From remote monitoring of vital health stats via Digital Twin of the Self, to in-space additive manufacturing, to on-board real-time event decision and control, Digital Twins are being leveraged today for Space missions to monitor, diagnose, and improve secure data transfer, predictive maintenance operation and optimize performance and result outcomes.

Digital Twin Consortium Introduces OMG Space Domain Task Force Mini-Workshop – July 29, 2021
With the shift of government-led space projects toward deep-space missions, a commercial space industry is emerging to build the future of spaceflight and other activities in low-earth orbit. The space industry, whether working with the government or on new commercial projects, needs technical standards in order to focus on innovating new technologies while reducing associated costs, schedules and risks. An industry that once moved to the cadence of government projects – where innovation was measured in years – is now looking more like a start-up industry in need of the insights and experience of experts in government, industry and academia who help define standards. At this workshop, the Digital Twin Consortium presents the work being done within Object Management Group's Space Task Force.

CORPORATE SUPPORT:
Interested in exhibiting or providing sponsorship through a corporation grant? Corporate donors get group registrations, a daily breakout room for targeted talks, and other promotional opportunities. Interested companies should contact us at smc-it-chairs@baylor.edu

CALL FOR STUDENT VOLUNTEERS:
If you are a full-time student and have an interest in volunteering to help with conference operations, please drop us an email at smc-it-chairs@baylor.edu

We look forward to seeing you online in July 2021!

CONFERENCE CHAIRS:
General Chair: Yogita Shah (yogita.shah"at-sign"jpl.nasa.gov)
Co-General Chair: Michelle Carter (michelle.carter"at-sign"aero.org)
Finance Chair: James Oyama (James.Y.Oyama"at-sign"jpl.nasa.gov)

Advisors to the General Chair:

Dr. Larry Bergman (Larry.Bergman“at-sign”ieee.org)
Dr. Michael Campbell (michael.l.campbell“at-sign”aero.org)
Amalaye Oyake (Amalaye.Oyake“at-sign”outlook.com)

Program Chair: Dr. Michael Lowry (michael.r.lowry"at-sign"nasa.gov)
Program Co-Chair: Dr. Ivan Perez (ivan.perezdominguez"at-sign"nasa.gov)

ORGANIZING COMMITTEE:
Dr. María Dolores Rodríguez Moreno
Dr. Keith Schubert
Dr. Michela Munoz Fernandez
Brian Duncan
Luke Lucas
Dr. Ernesto Gomez

STEERING COMMITTEE:
Dr. Richard Doyle
Dr. Rupak Biswas
Jana Roche
Dr. Chris Mattman
Dr. Yisong Yue

##################################