



2015 NIAC Symposium

Cocoa Beach, Florida - January 27-29, 2015



Tuesday, January 27

- 8:30 **Welcoming Remarks** *Karen Thompson, Center Chief Technologist, NASA Kennedy Space Center*
- 9:00 **Introduction & Overview** *Jay Falker, NIAC Program Executive*
- 9:30 Break**
- 10:00 *Marco Pavone, Stanford University*
Spacecraft/Rover Hybrids for the Exploration of Small Solar System Bodies
- 10:30 *Thomas Prettyman, Planetary Science Institute*
Deep mapping of small solar system bodies with galactic cosmic ray secondary particle showers
- 11:00 *Marco Quadrelli, NASA Jet Propulsion Laboratory*
Orbiting Rainbows Phase II
- 11:30 Lunch**
- 1:00 *Justin Atchison, Johns Hopkins University*
Swarm Flyby Gravimetry
- 1:30 *Eugene Boland, Techshot, Inc.*
Mars Ecopoiesis Test Bed
- 2:00 *Webster Cash, University of Colorado*
The AragoScope: Ultra-High Resolution Optics at Low Cost
- 2:30 *Bin Chen, NASA ARC*
3D Photocatalytic Air Processor for Dramatic Reduction of Life Support Mass & Complexity
- 3:00 Break**
- 3:30 *Masahiro Ono, NASA JPL*
Comet Hitchhiker: Harvesting Kinetic Energy from Small Bodies to Enable Fast and Low-Cost Deep Space Exploration
- 4:00 *Young Bae, Y.K. Bae Corporation*
Propellant-less Spacecraft Formation-Flying and Maneuvering with Photonic Laser Thrusters
- 4:30 *Robert Hoyt, Tethers Unlimited*
SpiderFab: Architecture for On-Orbit Construction of Kilometer-Scale Apertures
- 5:00 *Babak Saif, NASA GSFC*
A Gravitational Wave Detector Based on an Atom Interferometer
- 5:30 Adjourn**



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Wednesday, January 28

8:30 **NIAC Plans and Announcements** *Jay Falker, NIAC Program Executive*

9:30 **Keynote Address** *Ellen Stofan, NASA Chief Scientist*

10:30 Break

11:00 *Robert Hoyt, Tethers Unlimited*
WRANGLER: Capture and De-Spin of Asteroids and Space Debris

11:30 *Vytas SunSpiral, NASA ARC*
Super Ball Bot - Structures for Planetary Landing and Exploration

12:00 Lunch

1:30 *Timothy Miller, Johns Hopkins University*
Using the Hottest Particles in the Universe to Probe Icy Solar System Worlds

2:00 *Jeffrey Nosanov, NASA JPL*
PERISCOPE: PERIapsis Subsurface Cave OPTical Explorer

2:30 **TRANSPORT TO NASA KSC (drive or take pre-arranged shuttle to KSC)**

3:00 **KSC LOT 4: NASA KSC Bus Tour Boarding**

3:30 **KSC LOT 4: NASA KSC Bus Tour Departure**

5:00 **KSC LOT 4: NASA KSC Bus Tour Ends**

5:00 **Dinner on your own- Orbit Cafeteria or nearby dining locations**

7:00 – 8:30PM **EVENING EVENT for NIAC Fellows and NEC Members**
KSC Visitor's Center, Space Shuttle Atlantis Exhibit



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Thursday, January 29

- 8:30 **NIAC Phase II Q&A and Other Topics** *Jay Falker, NIAC Program Executive*
- 9:00 **Keynote Address** *Joe Haldeman, Science Fiction Author
"Science Fiction and Space Travel"*
- 10:00 Break**
- 10:30 *Steven Oleson, NASA GRC*
Titan Submarine: Exploring the Depths of Kraken
- 11:00 *Brett Streetman, Draper Laboratory*
Exploration Architecture with Quantum Inertial Gravimetry and In Situ ChipSat Sensors
- 11:30 *Bruce Wiegmann, NASA MSFC*
Heliopause Electrostatic Rapid Transit System (HERTS)
- 12:00 Lunch**
- 1:30 **Keynote Address** *William Pomerantz, Vice President of Special Projects, Virgin Galactic*
- 2:30 *Christopher Walker, University of Arizona*
10 meter Sub-Orbital Large Balloon Reflector (LBR)
- 3:00 *S.J. Ben Yoo, University of California, Davis*
Low-Mass Planar Photonic Imaging Sensor
- 3:30 Break**
- 4:00 *Larry Matthies, NASA JPL*
Titan Aerial Daughtercraft
- 4:30 *David Wettergreen, Carnegie Mellon University*
Nomadic Exploration: Following routes of solar sustenance and temperate climate
- 5:00 *Robert Winglee, University of Washington, Seattle*
Sample Return Systems for Extreme Environments
- 5:30 Adjourn**



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ABOUT NIAC:

The NASA Innovative Advanced Concepts (NIAC) Program supports early studies of visionary concepts that could one day “change the possible” in space and aeronautics. NIAC studies develop and assess revolutionary, yet credible, aerospace architecture, mission, and system concepts. They aim to enable far-term capabilities, and spawn exciting innovations to radically improve aerospace exploration, science, and operations.

NIAC also contributes to the Nation's leadership in key research and technology areas, and fosters outreach, education, and economic benefits. Part of the Space Technology Mission Directorate, NIAC is the most open-ended and far-reaching program in NASA.

2015 NIAC SYMPOSIUM SPEAKERS:



Welcoming Remarks

Karen Thompson

Center Chief Technologist, NASA Kennedy Space Center

Karen Thompson is the Chief Technologist of the John F. Kennedy Space Center. Prior to joining NASA, Karen worked in industry as a research polymer chemist, developing specialty materials principally for Department of Defense applications.

Karen joined NASA in 1988, where she first worked as a research scientist-with her best known accomplishment her invention of electrically conducting polymer coatings that can be sprayed or brushed onto surfaces, thereby imparting corrosion resistance to the coated surface. Karen was the original inventor of this breakthrough technology and led a team of NASA and Department of Energy Los Alamos National Laboratory (DOE LANL) employees to further develop these novel coatings, with the resultant patent winning the Distinguished Patent Award in 1997 from the LANL. In 1993 Karen moved into management in NASA where she served in a series of positions, including managing collaborative partnerships involving NASA and external partners, managing advanced technology programs for KSC, supervising teams of researchers, serving as the Exploration Science and Technology Manager for KSC, and serving as Associate Director of the Applied Technology Directorate prior to her current position. Karen has received many awards for her accomplishments while working for NASA, including the prestigious NASA Exceptional Service Medal, KSC Invention of the Year, Certificates of Commendation, an Executive Safety Forum Award in 2009, and Space Act Awards. Karen has chaired several technical conferences (national and international), associated with such organizations as the American Chemical Society, the Gordon Research Conferences, and the American Society of Testing and Materials. Karen enjoys spending time in the Blue Ridge Mountains with her family and friends in the "getaway" cabin designed and built by her husband, a retired scientist.



Keynote Address

Ellen Stofan

NASA Chief Scientist, NASA Headquarters

Dr. Ellen Stofan was appointed NASA chief scientist on August 25, 2013, serving as principal advisor to NASA Administrator Charles Bolden on the agency's science programs and science-related strategic planning and investments.

Prior to her appointment, Stofan was vice president of Proxemy Research in Laytonsville, Md., and honorary professor in the department of Earth sciences at University College London in England. Her research has focused on the geology of Venus, Mars, Saturn's moon Titan, and Earth. Stofan is an associate member of the Cassini Mission to Saturn Radar Team and a co-investigator on the Mars Express Mission's MARSIS sounder. She also was principal investigator on the Titan Mare Explorer, a proposed mission to send a floating lander to a sea on Titan.

Her appointment as chief scientist marks a return to NASA for Dr. Stofan. From 1991 through 2000, she held a number of senior scientist positions at NASA's Jet Propulsion Laboratory in Pasadena, Calif., including chief scientist for NASA's New Millennium Program, deputy project scientist for the Magellan Mission to Venus, and experiment scientist for SIR-C, an instrument that provided radar images of Earth on two shuttle flights in 1994.

Stofan holds master and doctorate degrees in geological sciences from Brown University in Providence, R.I., and a bachelor's degree from the College of William and Mary in Williamsburg, Va. She has received many awards and honors, including the Presidential Early Career Award for Scientists and Engineers. Stofan has authored and published numerous professional papers, books and book chapters, and has chaired committees including the National Research Council Inner Planets Panel for the recent Planetary Science Decadal Survey and the Venus Exploration Analysis Group.



Keynote Address

Joe Haldeman, Science Fiction Author

Named a Grand Master by the Science Fiction and Fantasy Writers of America, Joe Haldeman has earned steady awards over his 45-year career: his novels *THE FOREVER WAR* and *FOREVER PEACE* both made clean sweeps of the Hugo and Nebula Awards, and he has won four more Hugos and Nebulas for other novels and shorter works. Three times he's won the Rhysling Award for best science fiction poem of the year. He won the World Fantasy Award for short story in 1993 for "Graves." In 2012 he was inducted into the Science Fiction Hall of Fame. His latest novels are a trilogy, *MARSBOUND*, *STARBOUND* and *EARTHBOUND*, and just out this year is *WORK DONE FOR HIRE*. Joe was a combat soldier in Vietnam, which strongly influences some of his work. Ridley Scott has bought the movie rights to *THE FOREVER WAR*. When Joe's not writing or teaching – he's just retired from M.I.T., where he has taught every fall semester since 1983 -- he paints and bicycles and spends as much time as he can out under the stars as an amateur astronomer. He's been married for 49 years to Mary Gay Potter Haldeman.



Keynote Address

William Pomerantz

Vice President for Special Projects, Virgin Galactic

At work: Will is the Vice President for Special Projects at Sir Richard Branson's Virgin Galactic, the world's first spaceline. Virgin Galactic is building on the legacy of the ANSARI X PRIZE-winning SpaceShipOne, bringing a fleet of privately-built spacecraft into regular commercial service. Will helps extend Virgin Galactic's efforts beyond the realm of space tourism, developing efforts such as the LauncherOne small satellite launch vehicle and the use of SpaceShipTwo as a research platform.

Outside of work: Will is married to Diana Trujillo, an engineer at NASA's Jet Propulsion Laboratory. He is a Trustee and Chairman of the Board of Advisors of Students for the Exploration and Development of Space, the world's largest student space organization. In addition to countless presentations given on behalf of Virgin Galactic and past employers, he has given a TEDx talk explaining why humans explore space, and tracks things that cost more than space exploration.

In the past: Will is a graduate of Harvard, the NASA Academy, and the International Space University. From 2005 - 2011, he worked at the XPRIZE Foundation, the world-leading incentive prize organization, where he served as the primary author and manager of the \$30 million Google Lunar XPRIZE and the \$2 million Northrop Grumman Lunar Lander XCHALLENGE. Additionally, Will has worked at Brown University, the Futron Corporation, and the United Nations, and he was the co-founder and Editor-in-Chief of SpaceAlumni.com, an early social network for space professionals.