

49th ANNUAL AAS GUIDANCE & CONTROL CONFERENCE

February 5 – February 10, 2027

Sponsored by the American Astronautical Society
Rocky Mountain Section

Please see our website: <http://aas-rocky-mountain-section.org/> to submit an abstract or to obtain additional information about the Conference

For additional questions, please contact the Conference Chairperson:
Alexandra Dukes, Lockheed Martin, alexandra.m.dukes@lmco.com

**Paper and Poster Abstracts are due September 21, 2026
(Submit through the AAS GN&C Conference [website](#))**

TENTATIVE CONFERENCE AGENDA

Registration

Room check-available at the Beaver Run Resort front lobby.

Conference registration 6:30 AM to 10:00 AM and 4:00 PM to 6:00 PM daily at the Conference Center.

Buffet Breakfast Daily from 6:00AM – 9:00AM (Saturday Feb. 6th – Wed. Feb. 10th)

Thursday February 4, 2027

8:30 AM – 4:30 PM Classified Session (Sierra Space, Centennial, CO)

Friday February 5, 2027

8:30 AM – 12:30 PM Classified Session (Sierra Space, Centennial, CO)

6:00 PM – 9:00 PM Conference Opening Reception (Beaver Run Resort, Breckenridge, CO)

Saturday February 6, 2027

7:00 AM – 10:00 AM Technical Sessions
10:30 AM – 12 PM Cosmic Careers Mixer
4:00 PM – 5:00 PM NASA Astronaut for Children
5:00 PM – 8:00 PM Technical Exhibits

Sunday February 7, 2027

7:00 AM – 10:00 AM Technical Sessions
11:00 AM – 3:30 PM Tutorial Session
4:00 PM – 7:00 PM Technical Sessions
7:30 PM – 9:30 PM Social Hour/Casino Night

Monday February 8, 2027

7:00 AM – 10:00 AM Technical Sessions
10:30 AM – 3:30 PM Tutorial Session
4:00 PM – 6:00 PM Technical Sessions
6:15 PM – 7:30 PM Industry Panel Discussion & Cocktail Hour

Tuesday February 9, 2027

7:00 AM – 10:00 AM Technical Sessions
10:30 AM – 3:30 PM Tutorial Session
4:00 PM – 7:00 PM Technical Sessions

Wednesday February 10, 2027

7:00 AM – 10:00 AM Technical Sessions

MAIN CONFERENCE SESSION INFORMATION

Conference Registration and Welcome Reception

Friday February 5, 2027 from 6:00-9:00 PM

Beaver Run Conference Center, Breckenridge, CO

The Conference Welcome Reception will be held in the Imperial Ballroom at the Beaver Run Resort in Breckenridge on Friday evening. This will be an opportunity to learn more details about the specifics of the planned program, meet new colleagues and renew connections with old friends. Early conference registration will be available from 6:00 PM to 9:00 PM in the Conference Center.

Conference Technical Session Topics

Saturday February 6 – Wednesday February 10, 2027

Beaver Run Conference Center, Breckenridge, CO

(Session Schedule To Be Announced)

The conference sessions will be scheduled from Saturday, February 6th at 7:00 AM to Wednesday, February 10th at 10:00 AM. The final agenda will be available in the Fall of 2026. Tutorial sessions will be scheduled in between the technical sessions on Sunday, Monday and Tuesday. The following technical sessions are being planned for the 2027 conference.

CLASSIFIED SESSION INFORMATION

Thursday February 4 – Friday February 5, 2027

Sierra Space, Centennial, CO

The classified sessions will be held at the Sierra Space facility located in Centennial, Colorado on February 4-5th, 2027. All eligible conference participants may attend the classified presentations.

Attendees must be US-citizens and must possess the necessary clearances prior to registration.

Registration deadline (specific to the classified session) of January 28th to allow processing time

Pre-registration is required and will be controlled (walk-ins will NOT be admitted). Questions on clearance requirements or steps on submitting an abstract should be directed to:

aas_special_session@lists.aero.org

Location of Classified Session: Sierra Space, Centennial, CO

Technical Exhibits

THEME: The Technical Exhibits Session is a unique opportunity to observe displays and demonstrations of state-of-the-art hardware, design and analysis tools, and services applicable to advancement of guidance, navigation, and control technology. The latest commercial tools for GN&C simulations, analysis, and graphical displays are demonstrated in a hands-on interactive environment, and include lessons learned and undocumented features. Associated papers not presented in other sessions are also provided and can be discussed with the author. Come enjoy and excellent complimentary buffet and interact with the technical representatives and authors. This session takes place in a social setting and family members are welcome!

Organizers

Kristina Forystek, Innovation RM, kristina@innovationrm.com

Graeme Ramsey, Lockheed Martin, graeme.d.ramsey@lmco.com

Jake Crouse, BAE Systems, jake.crouse@baesystems.us

Advances in GN&C Hardware

THEME: Many programs depend on heritage hardware, but the future is advanced by those willing to design and implement new and novel architectures, technologies, and algorithms to solve GN&C problems. This session is open to papers with topics ranging from theoretical technologies to innovative solutions using existing hardware technologies. These hardware technologies typically involve GN&C sensors or actuators that will advance the state of the art, reduce the cost of applications, and speed the convergence to hardware, numerical or design trade solutions.

Organizers

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National Chairpersons

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Advances in Navigation

THEME: Advances in Position, Navigation, and Timing (PNT) seek to push the boundaries of spacecraft navigation and timing technology for cross-cutting applications. Deployments of large-scale constellations in Earth orbit and the need for maintaining a safe orbital environment for all operators require new PNT techniques and robust architectures to complement the existing ground based and GNSS systems. Lunar, interplanetary, and interstellar mission concepts require novel ways for collecting and processing observations from non-traditional sources. In this session, we explore novel and advanced ground-based, space-based, and autonomous spacecraft PNT approaches. Topics of interest include methods for inter-satellite navigation, lost-in-space scenarios, and new filtering techniques for processing radio and optical observations, pulsar observations, and other deep space signals of opportunity. Additionally, the development of geodetic systems (both reference systems and time scales) to enable safe navigation in future environments (such as the Moon and Mars) need to be understood both in terms of the resulting definition and how the generic processes involved can be derived and expanded from terrestrial approaches (as in support of navigation satellite systems). Of high interest are cross-cutting navigation applications, approaches, and algorithms that can be utilized across flight regimes, with particular focus on their capabilities, pathway to verification, and demonstrable readiness ahead of usage for critical operations.

Broadly, the solicited topics are (per summary in my favorite LLM):

- Position, Navigation & Timing (PNT) Innovations
- Applications within Large-Scale Constellations & Orbital Safety
- Non-Traditional Observation Sources
- Autonomous & Space-Based PNT Approaches
- Advanced Filtering & Estimation Techniques
- Geodetic & Time-Scale Development for Extraterrestrial Environments
- Navigation Applications & Algorithms V&V and Demonstrated Flight Readiness

Organizers

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Advances in Propulsion

THEME: The development of advanced propulsion technologies is critical for enabling spacecraft platforms ranging from CubeSats to ambitious human and robotic space exploration missions. Innovative developments in chemical, electric, nuclear, and propellantless propulsion will provide higher performance and greater operability, enabling new approaches ranging from launch to interstellar travel. This session will highlight advanced propulsion technologies and enabling subsystems matured by NASA, DOD, industry, and academia.

Organizers

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National Chairpersons

Jeff Sheehy (To Be Confirmed), NASA Space Technology Mission Directorate, jeffrey.sheehy@nasa.gov

Control, Mitigation, and Management of Liquid Propellant Dynamics

THEME: Predicting, managing, and controlling space vehicle liquid propellant dynamics continues to present broad-reaching challenges in physics-based modeling, computational methods, control theory, and systems engineering. Emerging concepts in space access, including launch systems, planetary landers, and novel spacecraft are challenged to reduce traditional mass penalties like baffles and vanes while configurations evolve toward increasing propellant mass fractions. The use of cryogenics in high-performance designs adds further complications, as thermal management, propellant settling, and GN&C requirements intersect. This session explores advances in slosh modeling and slosh suppression in both microgravity and high-g flow regimes, particularly in the context of vehicle dynamics, test-based or semi-empirical methods, vehicle-CFD co-simulation, and novel techniques for sensing, estimation, and/or control of liquid motion. In addition, efforts to verify and validate dynamic models are of particular interest given the unique scaling challenges between ground test capability and the flight environment.

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Advances in GN&C Software

THEME: Successful GN&C system performance is often dependent on innovative algorithms and software. This session is open to all development processes and systems ranging from vehicle code used to operate the spacecraft system, novel algorithms, ground software used for operations/analysis, or simulations/frameworks used to test, validate, or develop GN&C systems. The intent is to include current best practices as well as challenges in future software development.

Organizers

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Autonomy in GN&C

THEME: Satellite constellations have expanded exponentially over recent years. These constellations are all competing over finite resources such as human operator bandwidth, operator personnel limitations, communication bandwidth limitations, latency, non-Keplerian orbits/dynamics, and even direct competition. These challenges are driving the advancement of next-generation space systems to consider autonomous decision making as a key enabling tool. Autonomy, in contrast to automation, is an advanced algorithm-enabled software suite that allows platform-based decision making to perform mission- and engineering-level tasks, as well as provide human-unassisted situational and environmental assessment to inform independent decision making and cooperation in satellite systems. The goal of autonomy is to alleviate the burden of directly operating and scheduling a satellite system and allow the system itself the objective of maintaining operational persistence and mission life extension within this new satellite operational paradigm. In addition to the logistical challenges, large and small multi-spacecraft systems must also work through autonomous operational complexities such as conjunctions, formation flying, fractionation, docking, structural assembly, tethering, station keeping for sparse aperture configurations, and on-orbit servicing and reconfiguration. Some key system and subsystem challenges for autonomous operations include resource management, health management, task management and decision making, trusted and trust-aware autonomy, formation control and rendezvous management, expanded autonomous control, on-orbit calibration, space traffic management, human-autonomy interfaces, and verification and validation approaches for adaptive and autonomous spacecraft behaviors. These evolving capabilities are also motivating a rethinking of traditional GN&C architectures to integrate autonomy, onboard decision making, distributed coordination, and resilient mission operations more tightly. All these topics have a direct impact on GN&C and must be considered when architecting next-generation autonomous space systems. All papers related to these topics are welcome.

Organizers

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Using AI/ML in GN&C

THEME: As Guidance, Navigation and Control (GNC) algorithms become increasingly autonomous, there is a natural progression towards incorporating Artificial Intelligence (AI) and Machine Learning (ML) technologies into the capabilities of today's autonomous and GNC systems. When combined with established systems and control theory, AI and ML algorithms can harness the wealth of information available from data obtained by sensors and other systems over time. This session will highlight research and demonstrations focused on the theory and methods of learning, control, and computational intelligence for GNC systems. Some example topics for this session include novel applications of AI systems in traditional GNC systems, performance comparisons between classical GNC methods and ones that leverage AI or ML, demonstrations of design and/or test of GNC systems that utilize ML, and techniques and challenges for the verification and validation (V&V) of systems incorporating these technologies.

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RPOD, Guidance/Targeting and Trajectory Design

THEME: Autonomous rendezvous, proximity operations, and docking (RPOD) systems are key enablers to supporting objectives such as commercial servicing of existing spacecraft, orbital debris removal, on-orbit refueling, the next generation of space tugs and asteroid missions, or returning humans to the moon to establish a sustained presence. Constellations of satellites and multistage missions are increasing the desire to optimize trajectories. This session explores aspects of enabling technologies for guidance and targeting, optimal trajectory design, control, and safety of flight to support this class of mission.

Organizers

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RPOD, Relative Navigation and State Estimation

THEME: Autonomous rendezvous, proximity operations, and docking (RPOD) systems are key enablers for many different types of spacecraft and missions including commercial servicing of existing spacecraft, orbital debris removal, on-orbit refueling, the next generation of space tugs and asteroid missions, or returning humans to the moon to establish a sustained presence. Many design challenges of spacecraft development, such as the need to minimize mass and volume as well as computational footprint, missions comprised of large constellations, and multivehicle missions to distant celestial bodies has generated new, exciting, and innovative solutions to the relative navigation and state estimation problem. Thus, the need for new and innovative relative navigation has been growing. This session explores aspects of enabling technologies for relative navigation, state estimation, and computer vision to support these various mission classes.

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Entry, Descent & Landing GN&C

THEME: Entry, descent, and landing (EDL) technologies enable the exploration of planetary surfaces and the safe return of payloads to Earth. Recent advances in atmospheric entry systems, autonomous guidance, navigation and control, and powered descent technologies have improved landed mass capability for missions to the Moon and Mars, while enabling the routine reuse of launch vehicle first stages on Earth. Continued collaboration among government, industry, and academia will drive the next generation of EDL capabilities for increasingly ambitious exploration and commercial missions. This session provides a forum for discussing advances in entry, descent, and landing systems, including guidance, navigation and control technologies for powered and unpowered descent and landing. Topics include precision navigation and targeting, state estimation, novel guidance and control methodologies, terrain-relative navigation, hazard detection and avoidance, autonomous landing, and flight demonstrations.

Organizers

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Deep Space and Cislunar Exploration

THEME: There has been a substantial shift from the exploration of the Moon and Mars to the development and settlement of these bodies, notably with the recent announcement of Moon Base and NASA's announcement of the Ignition initiatives. The emphasis is not just at NASA, but appears in every sector of the larger space community. The development of the Moon and Mars requires innovation in a diverse set of GN&C sub-fields, including propulsion technologies, spacecraft and surface autonomy, landing technologies, human-machine interfaces, and an array of subsystem developments to support these technologies. This session focuses on such innovation to develop the Moon and Mars, describing the challenges, solutions, and opportunities developed within the GN&C community.

Organizers

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Vision Based Navigation

THEME: Vision Based Navigation (VBN) is a critical component of many GN&C and ADCS algorithms. Applications span numerous mission phases, including interplanetary cruise, planetary orbit, proximity operations, descent and landing, and surface operations. An image from a visible, IR, LIDAR, or similar sensor can offer a wealth of information about a space vehicle's navigation state, but this information must be distilled into measurements that can be ingested by downstream GN&C algorithms. The success of any vision-based system therefore depends not only on how effectively it extracts salient information from an image in the presence of noise, clutter, and other real-world challenges, but also on how seamlessly those extracted measurements integrate with the state estimation, guidance, and control algorithms that consume them. This session is dedicated to papers spanning the full vision-based navigation pipeline—from raw image processing (IP) through measurement extraction, to the downstream estimation, guidance, and control algorithms that close the loop. Topics include, but are not limited to: IP algorithms for feature detection, tracking, and identification; IP techniques based on AI and ML; on-board rendering and synthetic image generation; uncertainty quantification of IP outputs; processing of IP outputs into measurements for navigation filters; vision-based state estimation and sensor fusion; vision-in-the-loop guidance and control; feedback and feedforward between IP and GN&C algorithms; co-design and joint optimization across the VBN pipeline; hosting platforms and architectures spanning CPUs, FPGAs, GPUs, and other processing units; challenges of on-board, real-time vision-based processing; testing, verification, and validation of VBN algorithms; and lessons learned from past experience.

Organizers

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Recent Experiences

THEME: This session focuses on recent experiences in spaceflight GN&C, providing a forum to share insights gained through successes and failures. Discussions typically include GN&C experiences ranging from Earth orbiters to interplanetary spacecraft. This session is a traditional part of the conference and has shown to be most interesting and informative.

Organizers

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National Chairpersons

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Oscar Alvarez-Salazar, Jet Propulsion Laboratory, oscar.s.alvarez-salazar@jpl.nasa.gov

Small Body Exploration

THEME: Recent years have witnessed a remarkable increase in planetary exploration missions to asteroids, comets, and other small bodies, with several new missions currently underway. These missions have driven significant advances in optical navigation, sensing, modeling, autonomy, and guidance, navigation, and control technologies required to accomplish increasingly challenging mission objectives. From the initial characterization of small bodies following arrival to proximity operations, navigation in microgravity environments, and surface interaction, these missions present unique technical challenges. This session invites contributions highlighting advances in GN&C technologies, mission operations, flight experiences, lessons learned, and future challenges associated with the exploration of asteroids, comets, and other small bodies.

Organizers

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National Chairpersons

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Jay McMahon, University of Colorado Boulder, mcmahojw@colorado.edu

Small Satellite GN&C

THEME: As small satellites, including CubeSats, NanoSats, and ESPA-class platforms, take on increasingly complex roles in defense, science, and commercial missions, advancements in Guidance, Navigation, and Control (GN&C) are critical to enabling precision, autonomy, and mission success. This session invites contributions on the design, testing, and implementation of GN&C systems for small spacecraft. Topics of interest include precision attitude control, autonomous navigation, fault-tolerant GN&C systems, formation flying, agile pointing, and in-space maneuvering. This may include innovations in onboard sensors and actuators, software algorithms, real-time GN&C processing, onboard autonomy and artificial intelligence applications, and operational concepts that push the boundaries of current smallsat capabilities. Submissions that share lessons learned from flight missions or on-orbit experiments are especially encouraged. Research efforts from students and academic teams working on relevant GN&C challenges are also welcome.

Organizers

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National Chairperson(s)

Scott Palo, University of Colorado Boulder, scott.palo@colorado.edu

Anubhav Gupta, University of Colorado Boulder, Anubhav.Gupta@Colorado.EDU

Student Innovations in GN&C

THEME: This session embraces the wealth of research and innovative projects related to spacecraft GN&C being accomplished in the university setting. Papers in this session address hardware/software research as well as component, system, or simulation advances. Papers submitted must have a student as the primary author and presenter. Papers will be adjudicated based on level of innovation, complexity of problem solved, perceived technical readiness level, applicability and field-ability to near-term systems, clarity of written and verbal delivery, number of completed years of schooling and adherence to delivery schedule. The session will be limited to 8 papers with the top 3 papers receiving monetary awards.

Organizers

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National Chairpersons

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GN&C Verification & Validation

THEME: As mission demands for greater performance and autonomy escalate, the Guidance, Navigation, and Control (GNC) of aerospace systems grows increasingly complex, making the Verification and Validation (V&V) process the most costly and lengthy bottleneck in the development lifecycle. To address this, we seek innovative, rigorous, and efficient V&V processes for advanced GNC. Submissions are invited on topics including modernized and AI-based V&V approaches, advanced optimization, sensitivity, and robustness analysis that address metrics for not only performance but stability metrics as well; and uncertainty quantification. We are especially interested in methods that leverage modern paradigms like Digital Engineering and Hardware-in-the-Loop (HWIL) simulation to solve challenges unique to reusable and autonomous systems. Furthermore, we encourage abstracts on potential 'spin-in' GNC V&V approaches, methods, and techniques from the non-space domain (e.g., autonomous air, terrestrial, and underseas vehicles) that could become steps on a V&V technology development roadmap for space-domain applications, as well as real-world benchmark problems, crucial lessons learned from past missions, and educational approaches for the workforce, all with the goal of defining a clear path toward the trusted certification of next-generation GNC systems.

Organizers

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National Chairpersons

Uday Shankar, Johns Hopkins University APL, uday.shankar@jhuapl.edu
Chris D'Souza, NASA, chris.dsouza-1@nasa.gov

Pioneers

THEME: This session will be reflections on the experiences of technologists who pioneered technology solutions in the Aerospace community from sounding rockets through human space flight to today's commercial applications.

Organizers

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National Chairpersons

Neil Dennehy, JHU APL, neil.dennehy@jhuapl.edu

Artemis II

THEME: The world was watching as Artemis II lifted off from Kennedy Space Center for NASA's first crewed Lunar Flyby in 50 years. Relive the excitement of 8.8 million pounds of thrust from NASA's super heavy-lift Space Launch System (SLS) propelling the crew on 10 day, 694,481 mile journey to the Moon and back. At its absolute farthest point, the Orion "Integrity" capsule took the crew beyond the Moon to a maximum distance of 252,756 miles from Earth. This session will explore Artemis II GN&C experience and lessons learned, including critical Guidance, Navigation and Control systems checkouts, a manually piloted Proximity Operations Demonstration, and others that have provided key insights and their implications for the upcoming Artemis III, IV and V missions planned for 2027 and 2028.

Organizers

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National Chairpersons

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Ben Burger, NASA, ben.burger@nasa.gov

Poster

THEME: Covering a wide variety of unique GN&C topics, this year's interactive Poster session falls on Sunday and Monday during the morning presentation sessions mid-point break. All Posters should be hosted by the author(s) during these two timespans and will include peoples' choice voting by conference attendees and subsequent awards to two winning Posters. Winners of the two categories, Presentation Quality and Material Interest, to be announced at the Monday night social event. Although the Posters will be on display for the full conference, conference attendees are highly encouraged to engage with poster hosts and cast their peoples' choice vote tokens specifically during the Sunday/Monday Poster session breaks.

Organizers

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Note to Authors:

Abstracts are due by September 21, 2026

We will continue to emphasize a 'paperless' method for collecting and distributing papers. Wireless service will be available at the conference.

Please submit paper and poster abstracts through the conference website, <http://aas-rocky-mountain-section.org/>

Additional conference details are also available on the website