Guidance, Navigation, & Control

Call for Papers

(Complete) Draft Manuscript Deadline: 22 May 2025[1]

Final Manuscript Deadline: 2 December 2025

Submissions: http://www.aiaa.org/SciTech

Organizing Committee

Technical Discipline Chair	Deputy Technical Discipline Chair	Deputy Technical Discipline Chair
Puneet Singla The Pennsylvania State University	Jack Langelaan The Pennsylvania State University	Kamesh Subbarao The University of Texas at Arlington
psingla@psu.edu	jwl16@psu.edu	subbarao@uta.edu

Event Synopsis

The AIAA Guidance, Navigation, and Control (GNC) Technical Committee is inviting submission for the GNC technical discipline tracks of the 2026 AIAA Science and Technology Forum and Exposition (SciTech), an event that provides the world's premier forum for presentation, discussion, and collaboration on science, research, and technology related to the aerospace industry.

The AIAA GNC technical discipline at SciTech consists of numerous **technical sessions** (including joint sessions with other disciplines), **GNC invited sessions**, and a **GNC graduate student paper competition** sponsored by the GNC Technical Committee.

Individual papers may be submitted to the appropriate technical sessions, as detailed in the below Technical Area descriptions. Special topics may be proposed as Invited Sessions, per the below Invited Session guidelines. Eligibility criteria and submission requirements for the Graduate Student Paper Competition are also detailed below.

Please carefully read and follow the below submission requirements.

[1] The GNC technical discipline requires a **full draft manuscript** for all non-invited sessions. Refer to GNC guidelines below for further info.

GNC Invited Sessions

Key Dates:

Invited Session Proposal Deadline: 30 April 2025

Notification of Invited-Session Acceptance/Rejection: 16 May 2025

Invited session proposals are solicited in any of the topic areas listed below as well as in new or emerging technical areas. Papers and presentations in an invited session should form a cohesive focus on the relevant topic. Inclusion of a reasonable diversity of viewpoints is encouraged.

Note: The procedure for submitting an invited session proposal is different from the normal paper submission procedure.

Procedure: The invited session organizer should submit the completed session proposal, in its entirety, to BOTH the technical chair and co-chair below by the above proposal deadline. Invited session organizers should invite authors to participate, collect the required information, assemble the Session Proposal, and submit the Session Proposal as one file to the Invited Session chairs listed below.

Session Proposal: The Session Proposal should be submitted as a single document that includes a Session Title and a one- or two-page Summary Statement that describes the motivation and relevance of the session. The document should have the session organizer contact information, and details on each paper, including title, authors, author affiliation, and a few sentences describing the paper. Note that SCITECH sessions rarely exceed six papers, so larger proposals will likely require multiple sessions. The Invited Sessions chairs will directly notify the organizer of the acceptance/rejection of their session. Note that invited workshops are also being considered on a limited basis and could consist of invited presentations alongside a focal workshop discussion – if approved, alternate instructions on submission process will be provided – workshops with topics common to multiple domains (e.g. space, aeronautics, etc.) would be most encouraged.

Individual Paper Submission: Following the acceptance of a proposed invited session, each individual contributing author is required to submit an extended abstract to the AIAA SciTech submission website, with the topic and subtopic selected as "GNC" and "GNC Invited Session", respectively. Extended abstracts should be at least 1000 words (not including references) and must include sufficient detail to demonstrate the purpose of the paper, the technical foundation for the topics to be discussed, preliminary results to date, and the expected results of the final paper, including key figures, equations, tables, and references. Sufficient information must be included in the submission to convince the Invited Sessions chairs and reviewers that the author(s) will have a strong likelihood of completing the final manuscript by the final manuscript submission deadline.

The individual extended abstracts must be submitted by the SciTech forum abstract/draft manuscript deadline, and final manuscripts by the SciTech forum final manuscript deadline. Authors of individual papers must send their paper tracking number to the organizer of their invited session. The invited session organizer, in turn, must forward to the GNC Invited Session Chair and Co-Chair, the complete list of paper tracking numbers for their invited sessions.

Evaluation of Individual Submissions: Please note that at the discretion of the Technical Program Committee, individual papers may be rejected and/or removed from proposed sessions and replaced by an appropriate contributed paper. Likewise, selected papers from rejected Invited Sessions may be placed into the regular program.

Contributing to Established Invited Session Tracks: the GNC Technical Committee has already established three invited session tracks that are seeking contributions from the GNC community in the following areas. Please directly contact the specified POCs for more details on and consideration of a submission into the invited tracks.

- Entry, Descent and Landing GN&C Technologies (POC: John.M.Carson@nasa.gov)
- NASA Generic Urban Air Mobility (GUAM) Autonomous Vehicle Community Challenge Problems (POC: irene.m.gregory@nasa.gov)
- Autonomous Collision Avoidance (ACA): targets perception, prediction and planning using the Baseball Avoidance Multirotor (BAM) simulation, with high fidelity visualization, located on NASA github. (POCS: michael.j.acheson@nasa.gov, irene.m.gregory@nasa.gov)

Invited Sessions Chair
John M. Carson III
NASA Johnson Space Center
john.m.carson@nasa.gov

Invited Sessions Co-Chair
Dengfeng Sun
Purdue University
dsun@purdue.edu

Draft Manuscript Submission Guidelines for GNC Technical Areas

Paper selection for non-invited sessions at the GNC track will be based on a **full draft manuscript** of the proposed technical paper, which must include sufficient detail to allow informed evaluation by the assigned reviewers. ***There are no exceptions to the draft manuscript requirement.***

Draft manuscripts and final papers must not exceed a total length of 25 pages, formatted in accordance with the AIAA SciTech manuscript template. Each draft must begin with a 100- to 200-word abstract, followed by an introduction that includes a brief assessment of prior work by others and an explanation ofthe paper's main contributions.

Technical Topics

Papers covering all aspects of guidance, navigation, and control of aerospace systems may be submitted. Specifically, papers should describe novel analytical techniques, applications, and technological developments in areas such as: the guidance, navigation, and control of aircraft, spacecraft, satellites, launch vehicles, missiles, aerospace robotics, unmanned/autonomous systems, and other aerospace systems; in-flight system architecture and components; navigation and position location; sensors and data fusion; aerospace vehicle performance analysis; multidisciplinary control; uncertainty quantification for GNC performance analysis; and validation and verification.

Please refer to the following individual technical area descriptions to determine the topic that most closely aligns with your paper. If your paper aligns with multiple topics, please choose the topic that seems most closely aligned. If you have further questions, please contact the technical discipline chairs of the individual area chairs.

Detailed descriptions of the topic areas follow (or, click on the topic):

Please note that, at the discretion of the Technical Program Committee, papers may be moved between topic areas during the review or paper session disposition processes.

Control Theory for Aerospace Applications

Papers are sought that develop new theories, generate new algorithms, derive new analyses/techniques/design-tools, or modify and improve existing techniques for general application to the control of aerospace systems. Topics of interest include robust control, nonlinear control, optimal control, multivariable control, adaptive and intelligent control, fault detection and compensation, redundancy management, formal verification and validation methods, and bio-inspired control.

Papers describing new analysis and synthesis techniques with illustrative and realistic aerospace control examples are also strongly encouraged. Papers discussing applications of existing control theoretic methods should be submitted to other technical areas based on which one most closely matches the application. Examples of specific topics appropriate for this area include the following:

- **Robust Control**: techniques for control design of systems with uncertainty; gain scheduling; multivariable stability margins.
- **Nonlinear Control**: techniques and methods for control of nonlinear models; Lyapunov techniques and their extensions; linear matrix inequalities; applications of nonlinear control methods, such as sliding mode or feedback linearization techniques. Stability and robustness analysis using contraction mapping.
- **Optimal Control**: optimization algorithms and methods; objectives and issues in optimal control of nonlinear systems; dynamic programming; solution methods; case studies in analysis and design of optimal controllers; robustness and stability margins; design tradeoffs; computational tractability.
- **Adaptive Control**: Model Reference Adaptive Control and variants, Lyapunov stability analysis of adaptive control laws; direct and indirect adaptive control for linear and nonlinear systems; computational challenges; adaptation rules; verification of margins for flight-critical systems; models and learning rules in artificial neural networks; neural networks in system identification and control.
- **Fault Detection and Reconfiguration**: algorithms to detect sensor and effector faults; switchover control laws; simulations with fault injection and recovery performance.
- **Control Allocation**: control allocation laws including management of multiple effectors; verification and validation of redundancy management methods; implementation in real-time software.
- **Verification and Validation**: formal safety assurance techniques including model checking and theorem proving for studying complex aerospace systems; abstraction schemes; computational challenges; run-time assurance; implementation in real-time.
- **Other**: original theoretical contributions and arising areas of control and autonomy theory, motivated from aerospace applications, will also be considered.

Technical Area Chair
Kameron Eves
Utah Tech University
kameron.eves@utahtech.edu

Technical Area Co-Chair
Jeffrey Kornuta
jkornuta@gmail.com

Navigation, Estimation, Sensing, and Tracking

Papers are sought that develop new and novel theory and general approaches, techniques, and design tools associated with navigation, estimation, sensing and tracking for aerospace systems. Examples of specific topics appropriate for this area include the following:

- **Navigation**: navigation techniques using traditional, novel/alternative, or fused measurement sources, such as biologically inspired, vision-based, X-ray source-based, terrain-guided, and radio navigation; autonomous navigation and control (including integrated GPS and inertial navigation, as well as integrated sensor modeling and fusion); simultaneous localization and mapping; navigation in GPS-denied environments.
- **Estimation**: parameter estimation; robust and adaptive filtering; nonlinear filtering and smoothing; nonlinear observers; distributed estimation; hybrid estimation; integrated estimation/control.
- **Sensing**: sensor testing and performance evaluation results from actual hardware; new techniques for designing, modeling, simulating, prototyping, calibrating, and fielding sensors for use in estimation, navigation and tracking applications
- **Tracking**: nonlinear and multi-hypothesis tracking; data association; combined detection/tracking; sensor management; situational awareness; geolocation.

Papers that emphasize mission- and vehicle-specific applications should be submitted to the Aircraft, Spacecraft and Launch, Missile, or Multi-Vehicle GNC technical areas.

Technical Area Chair
Robin Vaughn
Johns Hopkins University Applied Physics Laboratory
vaughan.aiaa.ma@gmail.com

Technical Area Co-Chair
Adyasha Mohanty
adyasha06@gmail.com

Distributed, Cooperative, and Multi-Vehicle Guidance, Navigation, and Control

Papers are sought that deal with the theory and application of all aspects of distributed and cooperative control of multi-vehicle and/or human-in-the-loop systems within aerospace GNC. Of particular interest are manuscripts concerning innovative developments, implementation and certification issues, planner/controller/estimator design, distributed/cooperative decision-making and control of autonomous agents, and mixed initiative control of semi-autonomous teams for a variety of aerospace applications.

Examples of specific topics appropriate for this area include the following:

- **Planner, Controller, and Estimator Design**: multi-vehicle or distributed planners, controllers and estimators designed using rule-based and model-based techniques, machine learning, evolutionary algorithms, and bio-inspired control techniques.
- **Cooperative Decision and Control of Autonomous Agents**: cooperative task assignment and trajectory optimization; biologically inspired group behavior and control schemes.
- **Mixed Initiative Control of Semi-Autonomous Teams**: team tasking, auto-routing, and coordinated rendezvous.
- **Cooperative Control and/or Navigation with Uncertainty**: accommodation of effects of model, vehicle, or environment uncertainty, for multi-vehicle/cooperative system objectives, such as formation flight or dynamic tasking.
- **Applications**: distributed and cooperative control and estimation applications for aircraft, missiles, spacecraft, smart autonomous vehicles, mission-planning management, multi-objective control, system integration, fault detection, identification, and accommodation issues. Platforms include but are not limited to: Unmanned Aircraft Systems (UAS) / Unmanned Aerial Vehicles (UAVs), Unmanned Combat Air Systems (UCAS), Unmanned Ground Vehicles (UGVs), Unmanned Underwater Vehicles (UUVs), Wide Area Search Munitions (WASMs), and satellite constellations and/or clusters.

Particular interests include the stability and robustness of complex distributed control tasks and in-real-time implementations.

Technical Area Chair
Lorenzo Pollini
Università di Pisa
lorenzo.pollini@unipi.it

Technical Area Co-Chair
Yashwanth Nakka
Georgia Institute of Technology
ynakka3@gatech.edu

Autonomy and Artificial Intelligence for Aerospace Vehicle Guidance, Navigation, and Control

Papers on the application of novel methods of autonomy , machine learning, and artificial intelligence to the design and execution of guidance, navigation, and control algorithms for aerospace vehicles are sought. Of particular interest are papers that address the challenges and missions associated with manned, unmanned, and advanced air mobility systems.

Examples of specific topics appropriate for this area include the following ML/AI-enabled:

- **New Designs/Capabilities**: new vehicle designs and the interaction between the vehicle design and control synthesis process; sensor processing and control algorithms that enable operations such as manned-unmanned teaming; autonomous perching and in-flight docking.
- **Sensors and Data Fusion**: autonomous navigation and perception; AI-driven state estimation algorithms suitable for implementation on autonomous systems; navigation in GPS-denied environments; innovative and new sensors, especially for unmanned systems.
- **Flight Dynamics and Control**: dynamic modeling of autonomous systems; effects of realistic atmospheric conditions on modeling and flight control; flight control architectures; digital twins and data analytics driven modelling.
- **Trajectory Planning**: planning algorithms suitable for implementation on autonomous systems; operation in constrained, uncertain, and/or unstructured environments near obstacles; effects of realistic atmospheric conditions on flight trajectories; planning across heterogenous fleets.
- **Experiments**: demonstration/performance analysis of autonomous and AI-driven GNC algorithms in hardware and in high-fidelity simulation and co-simulation.

Please note that papers dealing with classical methods associated with multiple unmanned vehicles (large or small) should be directed to the Distributed, Cooperative, and Multi-Vehicle GNC technical area except the case in which the specific multiple vehicle implementation is driven through artificial intelligence methods.

Technical Area Chair
Gokhan Inalhan
Sloane Institute
inalhan@sloaneinstitute.org

Technical Area Co-Chair
Raghvendra (Raghu) V. Cowlagi
Worcester Polytechnic Institute
rvcowlagi@wpi.edu

Aircraft Guidance, Navigation, and Control

Papers are sought that address the development, simulation, and flight testing of GNC systems for fixed-wing and rotary-wing vehicles. Papers on GNC concepts in Air Traffic Management are also encouraged. Papers that emphasize novel theoretical designs, including high-fidelity and detailed simulation/simulator results, and/or experimental results are given priority. Examples of specific topics appropriate for this area include the following:

- **Augmented Flight Control Systems**: stability and control augmentation; automatic flight path and speed control; auto pilot design; integrated guidance and control; trajectory generation and energy management; interdisciplinary flight control and vehicle performance; nonlinear flight control; structural control and vibration suppression; aeroservoelasticity; adaptive/morphing structures for flight control; limitations of control effectors (*e.g.*, saturation).
- **Fault Tolerance and Recovery Systems**: self-repairing or reconfigurable systems; situational awareness; command and decision support; flight envelope protection; trajectory recomputation and reconfiguration; failure/fault detection and isolation; stall recovery and control.
- **Navigation and Flight Management Systems**: navigation algorithms; GNSS positioning; alternative navigation sensors; autonomous navigation; GPS performance and status; trajectory design; flight director design.
- **Flight Control Analysis and Flight Test Evaluation**: aircraft handling qualities; human-machine interface; pilot-in-the-loop; integrated vehicle ground testing; taxi testing; robustness and performance analysis; hardware-in-the-loop.
- **Formation Flight Control with Uncertainties**: aircraft formation flight for drag savings/fuel reduction; swarming, platooning, mobile sensor air networks; accommodation of atmospheric uncertainties on formation control.
- **Aircraft GNC Sensors**: sensor testing and performance evaluation results from actual hardware; new GNC sensor concepts; new techniques for designing, modeling, simulating, and prototyping sensors; sensor calibration techniques; fielding of sensor systems that support GNC; miniaturization of hardware and applications; redundancy management of multiple sensors used by the onboard avionics systems.
- **GNC Concepts in Air Traffic Management**: development and testing of new air traffic control (ATC) decision support tools; future ATC concepts for separation assurance; development and testing of new flight-deck avionics and communication, navigation, and surveillance capabilities; integration of future concepts; new uses of weather information and integration in the cockpit; enhanced planning and scheduling concepts.

- **Special Session: Flight Testing Guidance, Navigation, and Control Systems (joint FT/GNC)**

Technical Area Chair
Joshua Clemens
Lockheed Martin Aeronautics
Joshua.w.clemens@gmail.com

Technical Area Co-Chair
Antonios Tsourdos
Cranfield University
a.tsourdos@cranfield.ac.uk

Spacecraft and Launch Guidance, Navigation, and Control

Papers are sought on GNC of launch and spaceflight systems. Broad areas cover design challenges for on-orbit operations; studies of human or unmanned missions; GNC algorithms, analysis, and test results for all mission phases; novel sensors, avionics, actuators, and mechanisms; multidisciplinary mission/system dynamic, modeling and design; and flight software development and testing. Examples of specific topics appropriate for this area include the following:

- **Mission Phase GNC:** algorithms and analysis specific mission phases; methods for increased trajectory design automation over complex, fault detection and correction, multi-phase missions; mission design under model uncertainty; dynamical theory analysis of mission design.
- **Attitude and Orbit Determination and Control:** estimation and control of spacecraft orbit and/or attitude; novel methods and mechanisms for vehicle/payload pointing and articulation; spacecraft formation control (*e.g.*, constellation and formation design, control and execution; collision avoidance; distributed aperture satellite formations).
- **Space Situational Awareness:** conjunction analysis, space object motion models, tracking & characterization, resource allocation & sensor tasking, maneuver estimation, intent estimation, novel sensing architectures and extending conventional SSA concepts to the cislunar regime.
- **GNC Systems for Unmanned Space Missions:** algorithms/analysis for LEO & GEO Earth and deep space science missions, small satellite applications (including CubeSats); performance analysis of recent in-orbit GNC systems; methods for improving autonomy, capability, and reliability.
- **GNC for Human Exploration Missions:** design and analysis of new considerations and capabilities for manned asteroid, lunar, Mars, and beyond missions; design, analysis, and/or demonstration of GNC technologies that enable Commercial Crew Integrated Capability.
- **Space Vehicle Avionics:** avionics and sensor hardware testing and performance evaluation; designing, modeling, simulating, and prototyping flight hardware; sensor calibration; redundancy management; and real-time GNC implementation.
- **Complex Space System Analysis and Management:** coordination and control of multi-body and flexible systems; management of coupling between physical subsystems, actuation, and disturbances; verification and validation of complex systems; fault-tolerant GNC.
- **Innovative Techniques for Next Generation Space Systems:** GNC methods for next-generation spaceflight systems (*e.g.*, artificial intelligence, quantum computing); hardware miniaturization; GNC design based on high performance actuators (*e.g.,* electric propulsion) and sensors (*e.g.,* based on cold atoms); GNC for next-generation and reusable spaceflight systems; rapid trade study and conceptual analysis tools; methods for development time and cost reduction.

- **Special Session: Small Satellite Guidance, Navigation and Control (joint GNC/SATS)**

Technical Area Chair
Jean-Etienne Dongmo
NASA Goddard Space Flight Center
jean-etienne.t.dongmo@nasa.gov

Technical Area Co-Chair
Yang Cheng
XAnalytix Systems
yang.cheng@xanalytixsystems.com

Missile, Projectile and Rocket Guidance, Navigation, and Control

Papers are sought on GNC of missiles, projectiles, rockets, launch platforms, post-boost systems, and re-entry vehicles, covering subsonic to hypersonic flight regimes. Broad topics include design, analysis, simulation, and test of algorithms, subsystems, or complete systems with missile and other trans-atmospheric (i.e., exo- and endo-atmospheric or hypersonic) vehicle applications. Examples of specific topics appropriate for this area include the following:

- **Modern Intelligent Autopilot/G&C Approaches:** modern robust, stochastic, nonlinear and adaptive control algorithms; integrated/tightly coupled G&C; Machine Learning (ML) and Artificial Intelligence (AI) methods to enhance capabilities of modern weapon systems (guided projectiles, missiles, rockets); multiple vehicle sensing, guidance and control; and novel and low-cost actuation approaches for missile and trans-atmospheric vehicle guidance and control.
- **Estimation, Tracking, and Filtering Algorithms:** novel estimation approaches, particularly for improving performance with lower fidelity sensors and for hypersonic systems; redundancy management and data fusion for improved navigation and tracking performance with multiple sensors; verification and validation of target discrimination and tracking algorithms.
- **Trajectory Optimization:** design and analysis of guidance laws using optimization and/or ML approaches to achieve optimum and/or robust trajectories for mission planning, intercept guidance, and reentry applications.
- **Computer-Based Design and Analysis Techniques:** advances in numerical guidance and control design and performance analysis methods; novel developments in computer-aided decision making and mission planning; verification and validation methods for offensive and defensive systems, including engagement scenario simulations.
- **Conceptual GNC for Missile Applications:** GNC designs for applications such as semi-autonomous/autonomous missile and trans-atmospheric vehicle systems, ship defense, and strategic/theater missile defense systems. Theoretical discussions should be supported by simulation and/or test data where possible.
- **Missile and Trans-atmospheric Vehicle Sensors and Avionics:** sensor testing and performance evaluation results from actual hardware; new techniques for designing, modeling, simulating, and prototyping sensors and avionic subsystem components; sensor factory or in-situ calibration techniques; fielding of sensor systems that support GNC; miniaturization of hardware and applications; implementation of GNC in real-time software.
- **Guided Projectile GNC:** Novel GNC solutions for guided projectile systems that include the following: modeling and stability analysis; flight control design; control allocation schemes; trajectory planning; closed-looped terminal guidance; projectile state estimation; target state estimation; miniature SWAP sensor applications; fire control mission planning/targeting; and digital model validation and verification methods including SWIL, HWIL, and Flight Tests.

Technical Area Chair
Nikhil Nigam
Johns Hopkins University Applied Physics Laboratory
nik_nigam@hotmail.com

Technical Area Co-Chair
Spilios Theodoulis
Delft University of Technology
S.Theodoulis@tudelft.nl

Motion Planning, Sensing, and Control for Spacecraft Robotic Systems

Papers are sought that deal with the GNC design and challenges related to spacecraft robotics systems. In particular, papers that present novel machine learning, control and robotics for proximity operations, rendezvous and docking, on-orbit servicing missions, and active space-debris removal are welcome. Broad subject areas include trajectory and motion planning, relative trajectory tracking control; pose tracking, computer vision/perception and relative navigation, dynamical modeling and control of robotic manipulators. Presentations of state-of-the-art spacecraft robotics facilities and related experimental results are also welcome. Examples of specific topics appropriate for this area include the following:

- **Computer vision/perception and relative navigation**: relative navigation algorithms and pose estimation based on computer vision sensors such as mono camera, stereo camera, laser range finder, and LIDAR; vision-based navigation systems using optical flow and occupancy grids; neural network-based approaches, simultaneous localization and mapping (SLAM) concepts; Kalman-filter relative navigation techniques.
- **Trajectory Planning and Control**: methods of relative trajectory and motion planning in uncertain and unstructured environments, including nonlinear optimal trajectory planning, probabilistic methods, artificial potential field; collision avoidance and rendezvous and docking path planning, pose tracking in proximity operations.
- **Robot Dynamical Modeling and Control**: equations of motion for unique robotic aerospace systems and robotic manipulators, including the treatment of motion or dynamic constraints and control challenges; free-floating robot deployment and maneuvering; robotic capture of tumbling targets.

Technical Area Chair
Steve Ulrich
Carleton University
steve.ulrich@carleton.ca

Technical Area Co-Chair
Animesh Chakravarthy
The University of Texas at Arlington
animesh.chakravarthy@uta.edu

Guidance, Navigation and Control in Intelligent Systems (joint GNC/IS)

This joint track co-hosted by the GNC and IS Technical Committees invites papers in the domain of guidance, navigation and control of intelligent, unmanned aerospace systems. In particular, papers that address interactions in unstructured, uncertain and dynamic environments are encouraged. Advancements in conflict resolution and planning under uncertainty, flight control certification and runtime assurance using classical model-based, data-driven, learning-based, or hybrid approaches are sought.

Note that submission to this joint track requires adherence to the GNC requirement of a full draft manuscript, which must include sufficient detail to allow informed evaluation by the assigned reviewers. Extended abstracts will be returned without review. Full draft manuscripts must not exceed a total length of 25 pages, formatted in accordance with the AIAA SciTech manuscript template.

Examples of specific topics include the following:

- **Conflict Detection and Resolution:** UAS situational awareness and conflict resolution in hybrid and integrated airspaces, conflict detection methods, sense-and-avoid under uncertainty, sensor/airspace-class specific methods for conflict resolution and collision avoidance.
- **Planning in a Dynamic, Uncertain Environment:** Multiagent planning and control, integration of decentralized sensing and computation, GPS-denied planning, planning under sensor conflict, dynamic and/or unstructured obstacles, planning in a three-dimensional environment, resource constrained planning, real-time trajectory planning, learning-based planning methods, and intelligent decision making/replanning.
- **Flight Control Certification:** Certification of novel control architectures, intelligent systems, hybrid methodologies, and safety metrics.
- **Verification and Validation:** Correlation issues in V&V, model-based testing, flight validation of high-integrity manned/unmanned aerospace vehicle navigation and control in uncertain and GPS-denied environments.
- **Human/autonomy interaction:** teaming between humans and autonomous systems, effect of human-in-the-loop on operation of intelligent systems, methods for control/supervision of intelligent systems.

Technical Area Co-Chair (IS)
Rajnikant Sharma
Air Force Institute of Technology
rajnikant.sharma@us.af.mil

Technical Area Co-Chair (GNC)
Michael McFarland
Raytheon
mbmcfarland@yahoo.com

Modeling and Simulation for Autonomous Guidance, Navigation and Control (joint GNC/MST)

The GNC and MST Technical Committees invite papers in modeling and simulations topics in guidance, navigation and control. In particular, papers that address hardware-in-the-loop simulation for GNC algorithm verification, human-in-the-loop modeling and simulation for autonomous systems GNC are encouraged. Advancements in edge computing technologies and human machine interfacing for GNC of autonomous systems are also sought.

Note that submission to this joint track requires adherence to the GNC requirement of a full draft manuscript, which must include sufficient detail to allow informed evaluation by the assigned reviewers. Extended abstracts will be returned without review. Full draft manuscripts must not exceed a total length of 25 pages, formatted in accordance with the AIAA SciTech manuscript template.

Examples of specific topics for this area include the following:

- **Certification/assurance of GNC Flight Control Software:** Hardware in the loop simulations, use of the digital twin for GNC algorithm development and certification.
- **Modeling and Simulation for Autonomy:** Edge computing for autonomous GNC applications, human-machine interfacing for autonomy, human-in-the-loop modeling and simulation for autonomous GNC, agent-based modeling and simulation for autonomous systems GNC.
- **Simulation Techniques for V&V of GNC Algorithms**: High fidelity modeling and simulation for GNC algorithm testing and verification, testing of learning-based GNC software, hybrid simulation techniques for GNC V&V.

Technical Area Co-Chair (MST)
Nishanth Goli
Supernal
nishanth.goli@supernal.aero

Technical Area Co-Chair (GNC)
Kyle Zittle
Johns Hopkins University Applied Physics Laboratory
Kyle.Zittle@jhuapl.edu

Command and Control (C2) of Complex Autonomous GNC Systems (joint GNC/IC2S)

This joint track, co-hosted by the GNC and IC2S Technical Committees invites papers on command and control and guidance, navigation, and control methods for complex systems. In particular, papers are encouraged that address approaches for dealing with environmental and system complexity, volatility and uncertainty, for managing mixed manned and unmanned system elements, and for controlling/directing systems at multiple levels of aggregation simultaneously.

Note that submission to this joint track requires adherence to the GNC requirement of a full draft manuscript, which must include sufficient detail to allow informed evaluation by the assigned reviewers. Extended abstracts will be returned without review. Full draft manuscripts must not exceed a total length of 25 pages, formatted in accordance with the AIAA SciTech manuscript template.

Examples of specific topics for this area include, but are not limited to, the following:

- Alternate approaches for the collective C2 of manned, autonomous and hybrid human-machine controlled systems
- Self-organization and self-synchronization of collections of autonomous systems
- Distributed/emergent approaches to GNC in complex systems and environments
- C2 of complex, autonomous GNC systems in a cyber-contested environment
- Individual and collective situational awareness in complex autonomous (or hybrid) GNC systems
- Data- and AI-driven approaches for GNC sensemaking challenges for collective control

Technical Area Co-Chair (ICC)
Jimmie McEver
Johns Hopkins University Applied Physics Laboratory
jimmie.mcever@jhuapl.edu

Technical Area Co-Chair (GNC)
Ashwini Ratnoo
Indian Institute of Science
ratnoo@iisc.ac.in

Small Satellite Guidance, Navigation, and Control (joint GNC/SATS)

Papers are sought for a joint session on the design, construction, and operation of guidance, navigation and control subsystems for small satellite systems (SATS). Hardware topics of interest include design, demonstration, or integration of any GNC components such as reaction wheels, magnetorquers, inertial sensors, star trackers, sun/earth sensors, magnetometers, cameras and GNSS receivers. Software and algorithm topics of interest include autonomy, distributed decentralized and collaborative operations, attitude determination and control, autonomous or aided orbit determination and maneuver reconstruction, rendezvous and proximity operations, etc. Submissions are encouraged from academia, government, and industry.

Technical Area Co-Chair (GNC)
Michael McFarland
Raytheon
michael.b.mcfarland@rtx.com

Technical Area Co-Chair (SATS)
Jonathan Sauder
NASA Jet Propulsion Laboratory
jonathan.sauder@jpl.nasa.gov

Uncertainty Quantification in GNC (joint NDA/GNC)

This joint track, co-hosted by the NDA and GNC Technical Committees invites papers on uncertainty quantification for guidance, navigation and control methods for aerospace vehicles. Aerospace vehicles operate in an uncertain environment; hence, they experience random forces, making their dynamics uncertain. The model parameters, initial and boundary conditions are known precisely. Furthermore, structures and actuators have uncertain properties compared to the tested ones. Therefore, it is of utmost importance to account for these uncertainties in the operation of these vehicles to achieve targeted maneuvers.

Examples of specific topics for this area include, but are not limited to, the following:

- Accurate and efficient propagation of uncertainty through dynamical models.
- Quantifying the effect of model or data uncertainty on future predictions of the model.
- Different mechanisms to represent the uncertainty in models
- Quantifying the effect of model state uncertainty on accuracy of the GNC system
- Optimal-control or decision-making strategies while accounting for uncertain outputs of the model

Technical Area Co-Chair (NDA)
Sameer B. Bulani
University of Alabama
sameer.mulani@ua.edu

Technical Area Co-Chair (GNC)
Puneet Singla
The Pennsylvania State University
psingla@psu.edu

GNC Graduate Student Paper Competition

The GNC Technical Committee will host a Graduate Student Paper Competition at SciTech 2026. In addition to appropriate recognition, all finalists in the GNC Graduate Student Paper Competition will receive a monetary award of $500 and complimentary registration. The overall winner will receive an additional $1,000 award.

For this competition, full draft manuscript papers are sought from graduate students on GNC technical research topics, from which up to six finalists will be selected by a panel of judges for inclusion in a special GNC Graduate Student Paper Competition session. Author eligibility and manuscript submission requirements are described below.

Eligibility Requirements

- A student must be the first or sole author, enrolled at an institution of higher learning.
- Upon selection as a finalist the student must provide to the Competition Chairs a 'Statement of Contributions' that delineates the specific technical contributions of each co-author. Furthermore, the student must assert that they have provided the preponderant share of input to both the technical and written dimensions of the paper and must also include the signatures of all co-authors.
- The student author must be a member of AIAA to become a finalist in the competition.
- The student author must be a full-time graduate student in good academic standing at his or her university/institution at the time of submission.
- Full draft manuscript not exceeding a total length of 25 pages.
- The student author is not the overall winner of the preceding year's competition.
- Only one paper submission per primary author.

Submission Requirements

- Graduate Student Paper Competition submissions must adhere to the overall Forum Abstract Submission Requirements.
- Students must select the "Student Paper Competition" presentation type during the electronic submission process. Do not submit the abstract more than once. Only submissions with "Student Paper Competition" presentation type indicated will be eligible for the competition.
- All submissions must be made by the Forum abstract submission deadline.

Finalists will be required to make two presentations at the Forum: once in the appropriate regular technical session and once in a separate GNC Graduate Student Paper Competition session. Note that authors will receive an accept/reject notification first for the regular SciTech forum review process and later for the graduate student paper competition. The second notification will be from the GNC Technical Committee. A paper can be (1) accepted for both the regular SciTech forum and competition, (2) accepted to the SciTech forum, but not the competition, or (3) not accepted to either.

Graduate Student Paper Chair
Spilios Theodoulis
Delft University of Technology
S.Theodoulis@tudelft.nl

Graduate Student Paper Co-Chair
Dipanjan Saha
Northeastern University
dipanjan2812@gmail.com