Space target characterization, control, and assessment in orbital games and on-orbit servicing

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With the advancement of space technology and the increasing autonomy of space missions, orbital games and on-orbit servicing involve increasingly complex spacecraft dynamics, target behaviors, and interactions among multiple spacecraft. Limited observations, uncertain target maneuvers, structural flexibility, and communication and resource constraints pose challenges to spacecraft state estimation, control, design, and mission planning. In this context, research from the perspectives of observation, control, and structural design provides a foundation for space target characterization, motion regulation, and mission effectiveness assessment.

Multisensor observations support the identification of target motion, physical properties, and maneuvering intentions, while control and decision-making methods enable autonomous operations and coordinated interactions. Spacecraft structural design and formation configuration further influence sensing capability, control performance, and mission feasibility. Meanwhile, increasingly demanding space missions call for distributed estimation and control, autonomous task allocation, and integrated mission planning and assessment. Understanding the relationships among sensing, dynamics, structure, decision-making, and mission performance is therefore essential to supporting safe and reliable spacecraft operations.

This special session welcomes theoretical, methodological, and application-oriented contributions concerning spacecraft and multi-spacecraft systems. Topics of interest include, but are not limited to:

- ⁎Space target detection, identification, and physical and behavioral characterization;
- ⁎Spacecraft state estimation, autonomous navigation, and multisensor information fusion;
- ⁎Spacecraft orbit attitude control and spacecraft swarm coordination;
- ⁎Orbital dynamic games, docking, and on-orbit servicing;
- ⁎Spacecraft structural design, flexible dynamics and integrated control;
- ⁎Mission planning, effectiveness assessment, performance evaluation, and spacecraft system reliability;
- ⁎Purely theoretical methods capable of supporting the above research.

For more information on the special session, please contact Dr. Liwei Hao through email: **1332136625@qq.com**