

### Micropropulsion for Small Spacecraft (Progress in Astronautics and Aeronautics)

By M. Micci, A. Ketsdever



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Micropropulsion is an enabling technology for microspacecraft operations by making missions possible which otherwise could not be performed. For example, the formation and maintenance of platoons of microspacecraft will require a manoeuvering capability to counter orbital perturbations. Microspacecraft missions involving large spacecraft resupply, repair or surveillance will also require manoeuverability. The mission requirements for microspacecraft will be varied and in some cases a large range of capability might be required on the same spacecraft. Micropropulsion systems must be extremely versatile to address these requirements. It is clear that there is a need for micropropulsion systems from high thrust chemical engines to high specific impulse electric thrusters to fulfill specific missions just as for larger spacecraft. It is becoming increasingly evident that microspacecraft will require efficient propulsion systems to enable many of the missions currently being investigated. The systems constraints on mass, power, maximum voltage and volume with which microspacecraft will have to contend pose several challenges to the propulsion system designer. Micropropulsion concepts that address these limitations in unique and beneficial ways, should be of interest to the microscpacecraft community. Written by leading experts in the field, this new book shows the state-of-the-art in micropropulsion concepts and activities at the early stages in the development of this new and exciting research area.

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#### **Editorial Review**

#### About the Author

Dr. Michael M. Micci is a professor of Aerospace Engineering at Pennsylvania State University. His research areas include solid propellant, liquid propellant, and electric rocket propulsion. He received his B.S. and M.S. degrees in aeronautical and astronautical engineering from the University of Illinois at Urbana-Champaign and his Ph.D. in mechancial and aerospace engineering from Princeton University.

Dr. Andrew D. Ketsdever received a Ph.D. in aerospace engineering from the University of Southern California (USC). He is a member of the engineering research staff at the Air Force Research Laboratory's Propulsion Directorate as well as an adjunct professor in the Department of Aerospace and Mechanical Engineering at USC. Current research interests include micropropulsion systems, gas-surface interactions, spacecraft-thruster interactions, microelectromechanical device flow characterization, microscale heat transfer, and small scale plasma generation.

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