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Nuclear Magnetic Resonance Gyroscope MICHAEL BULATOWICZ, PHILIP CLARK, ROBERT GRIFFITH, MICHAEL LARSEN, JAMES MIRIJANIAN, Northrop Grumman - Navigation Systems Division — The navigation grade micro Nuclear Magnetic Resonance Gyroscope (micro-NMRG) being developed by the Northrop Grumman Corporation is concluding the fourth and final phase of the DARPA Navigation Grade Integrated Micro Gyro (NGIMG) program. Traditional MEMS gyros utilize springs as an inherent part of the sensing mechanism, leading to bias and scale factor sensitivity to acceleration and vibration. As a result, they have not met performance expectations in real world environments and to date have been limited to tactical grade applications. The Nuclear Magnetic Resonance Gyroscope (NMRG) utilizes the fixed precession rate of a nuclear spin in a constant magnetic field as an inertial reference for determining rotation. The nuclear spin precession rate sensitivity to acceleration and vibration is negligible for most applications. Therefore, the application of new micro and batch fabrication methods to NMRG technology holds great promise for navigation grade performance in a low cost and compact gyro. This poster will describe the history, operational principles, and design basics of the NMRG including an overview of the NSD designs developed and demonstrated in the DARPA gyro development program. General performance results from phases 3 and 4 will also be presented.

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