



## $\mu$ IMU-I Micro Inertial Measurement Unit

*Minimizing a highly successful system with no compromises*



Northrop Grumman LITEF (NG LITEF) is a world leading company with over 45 years of experience in Inertial Systems Technology. With its new generation MEMS (Micro Electro Mechanical Systems) technology sensors, NG LITEF continues to design high accuracy Inertial Measurement Units (IMUs) to meet current and future requirements.

MEMS sensor design at NG LITEF started in the early nineties with the B-290, a full silicon accelerometer. This accelerometer has been qualified in systems for attitude heading reference, stabilization and guidance. In 2001 NG LITEF launched the development of the  $\mu$ CORS (Micro Coriolis Rate Sensor) applying the DRIE MEMS technology.

NG LITEF's extensive experience with its IMUs, based on Fiber Optic Gyros and the MEMS Accelerometer Triad B-290, was the basis of the MEMS IMU design, resulting in the following advantages for the user:

- Integrated, sealed and self contained unit (3 MEMS rate sensors, 3 MEMS linear accelerometers, electronics, power supply and housing)
- Standard digital interfaces
- Output of fully compensated data (e.g. temperature and misalignment)
- Extensive Built-in-Test features
- Small size, low weight, low power consumption
- Low Life Cycle cost

### Typical Applications:

- Attitude Heading Reference Systems
- Flight control and guidance systems, e.g. for UAVs
- Stabilization of antennas, cameras and other instruments on moving platforms
- Precision farming

# μIMU-I

## Micro Inertial Measurement Unit

### TECHNICAL DATA

|   | μIMU-I-SP                                    | μIMU-I-HP     |
|---|--|---------------|
| <b>Rate Sensor Parameters</b>           |  |               |
| • Measurement Range                     | ±1000 °/s                                    |               |
| • Bias In Run Stability (1σ) (*)        | ≤ 6 °/h                                      | ≤ 3 °/h       |
| • Bias Repeatability (residual, RMS)    | ≤ 10 °/h                                     | ≤ 4 °/h       |
| • Angular Random Walk                   | ≤ 0.3 °/√h                                   | ≤ 0.15 °/√h   |
| • Scale Factor Error (RMS)              | ≤ 1400 ppm                                   | ≤ 1000 ppm    |
| • Axis Misalignment (RMS)               | ≤ 0.5 mrad                                   |               |
| <b>Linear Acceleration Parameters</b>   |  |               |
| • Measurement Range                     | ±30 g  |               |
| • Bias Repeatability (residual, RMS)    | ≤ 3 mg                                       | ≤ 1.5 mg      |
| • Velocity Random Walk                  | ≤ 0.25 mg/√Hz                                | ≤ 0.07 mg/√Hz |
| • Scale Factor Error (RMS)              | ≤ 1500 ppm                                   | ≤ 1000 ppm    |
| • Axis Misalignment (RMS)               | ≤ 0.5 mrad                                   |               |
| <b>System Parameters</b>                |  |               |
| • Mass                                  | 0.68 kg, 1.5 lb                              |               |
| • Dimensions                            | Ø 85 mm x H 60 mm, Ø 3.35 inch x H 2.36 inch |               |
| • Volume                                | 340 cm <sup>3</sup> , 20.7 inch <sup>3</sup> |               |
| • Supply Voltage                        | +5 VDC                                       |               |
| • Power Consumption                     | < 8 W  |               |
| • Interface                             | RS 422, HDLC                                 |               |
| • Data Rate                             | 50 to 1024 Hz                                |               |
| • Built in Test (BIT)                   | Power up BIT, Continuous BIT                 |               |
| • Acoustic noise level                  | 140 dB                                       |               |
| • Random vibration level [10...2000 Hz] |  |               |
| - operational                           | 8.7 g <sub>RMS</sub>                         |               |
| - survival                              | 11.7 g <sub>RMS</sub>                        |               |
| • Shock                                 |  |               |
| - operational                           | 40 g / 11 ms / 3 axes                        |               |
| • Temperature                           |  |               |
| - operating                             | - 45 °C to +70 °C                            |               |
| - storage                               | - 55 °C to +71 °C                            |               |

(\*) Implying Allan Variance under constant temperature conditions and cluster time 24 h.

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