DARPA

DARPATech

2002 Symposium

Transforming Fantasy

DARPA
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Transforming Fantasy

Navigation & Guidance

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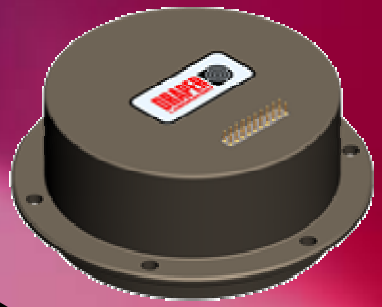
Navigation & Guidance

GPX

- High power GPS signals

MEMS INS

- Low cost inertial sensors

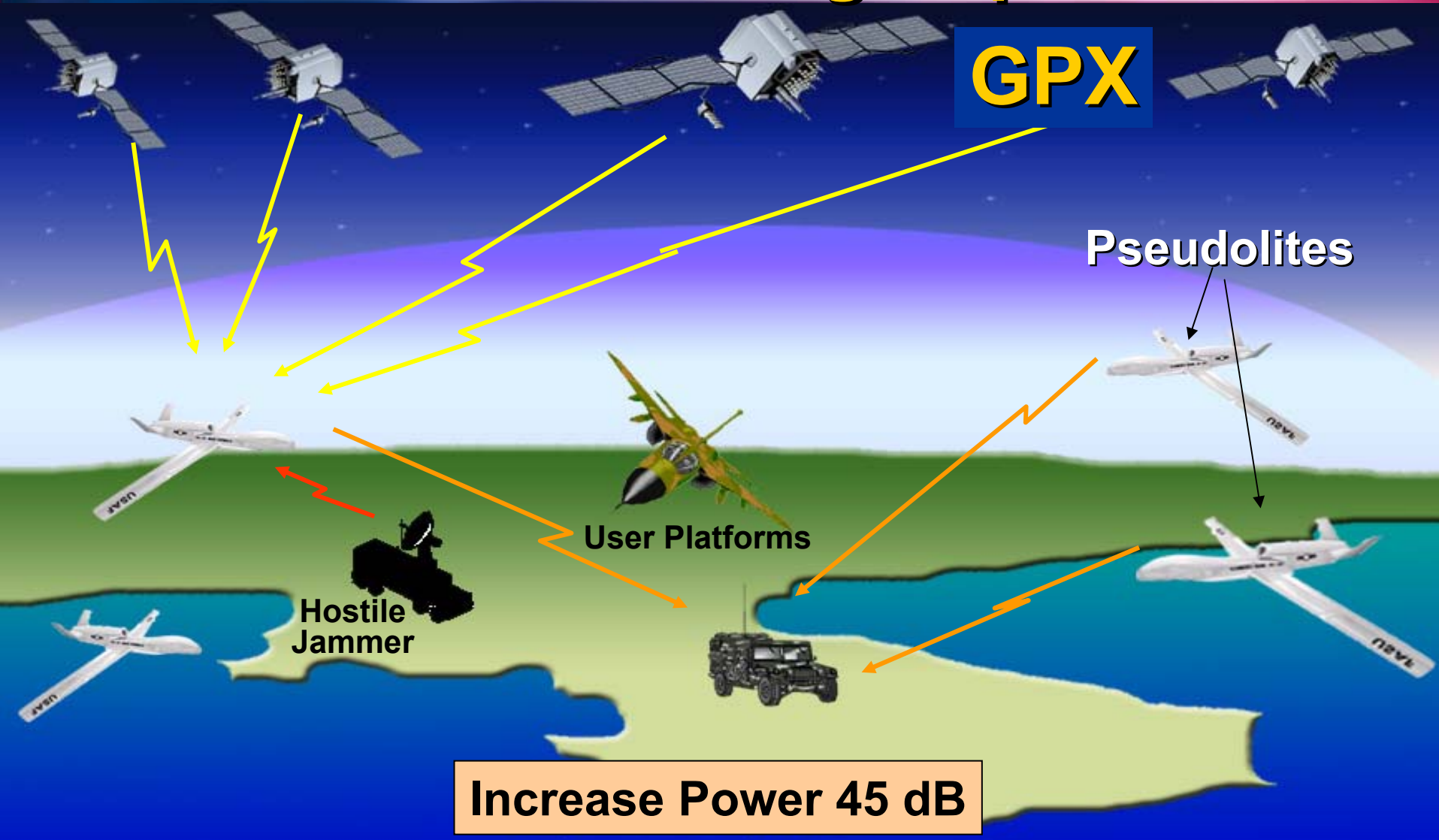


New Initiatives

- Man-portable navigation
- Urban/indoor navigation
- Inertial navigation <1 deg/hr

Distribution Statement A. Approved for public release; distribution is unlimited.

Global Positioning Experiments



Increase Power 45 dB

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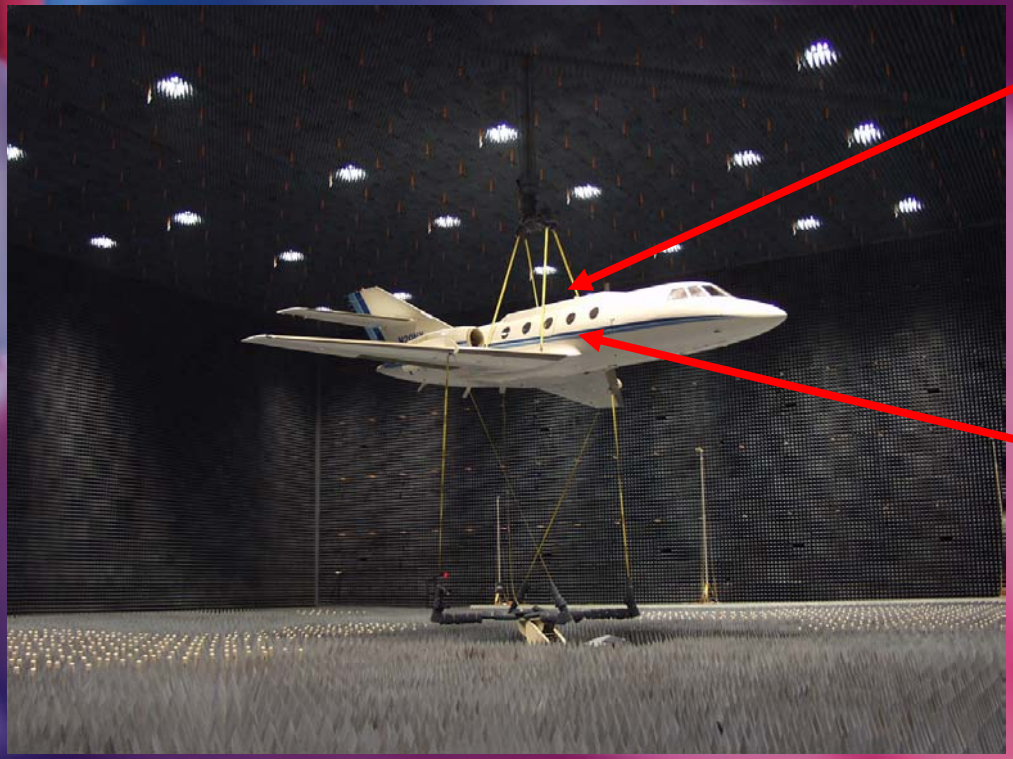
Digital Beamformer

- Full scale jamming tests in chamber
- Pseudolite protected by 40-55 dB



7 Element Antenna

Digital Beamformer

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GPX Testing

1999 2000 2001 2002 2003

Navigation Accuracy

Burn Through Jamming

Beamformer Antijam

Full Pseudolite System

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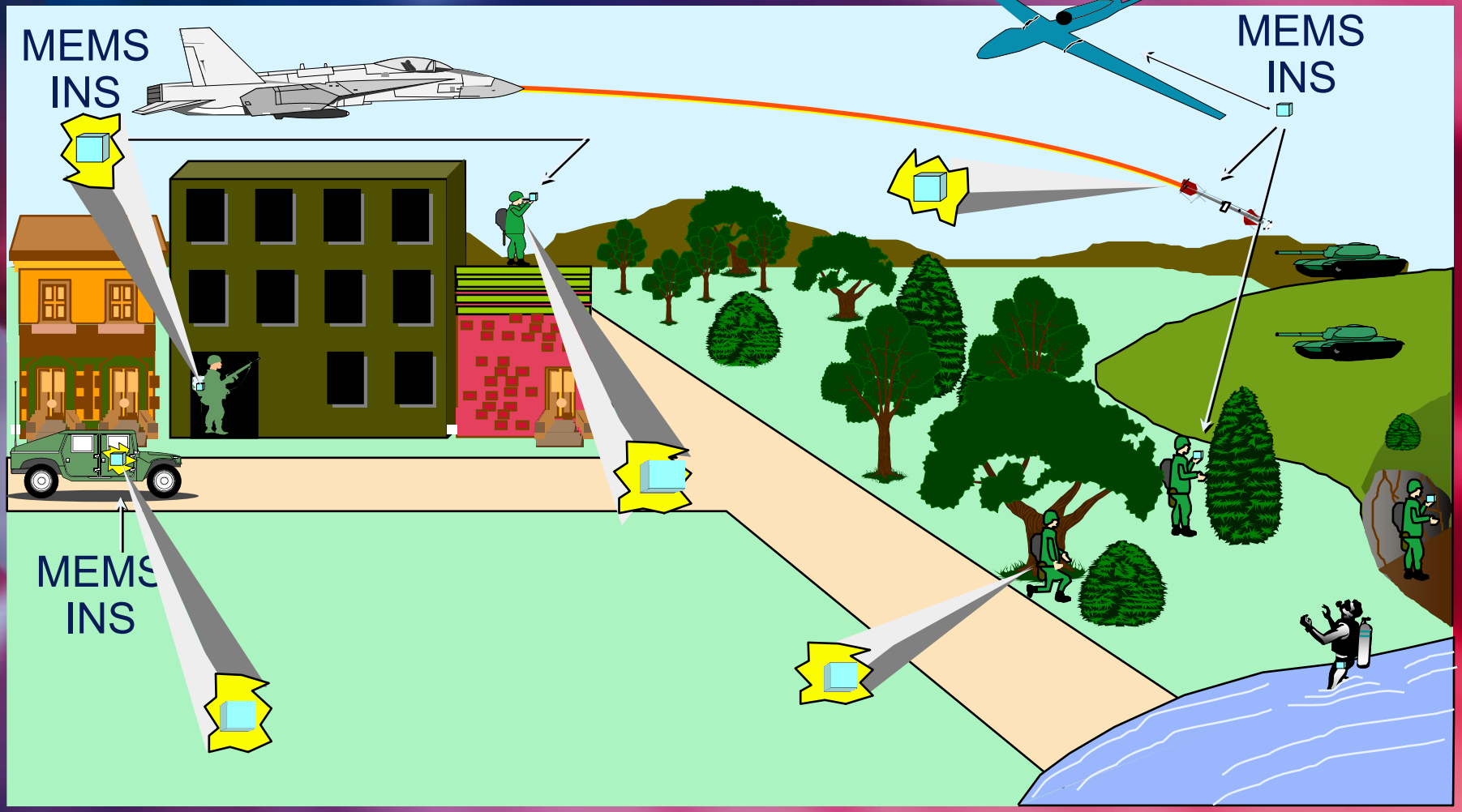
MEMS INS



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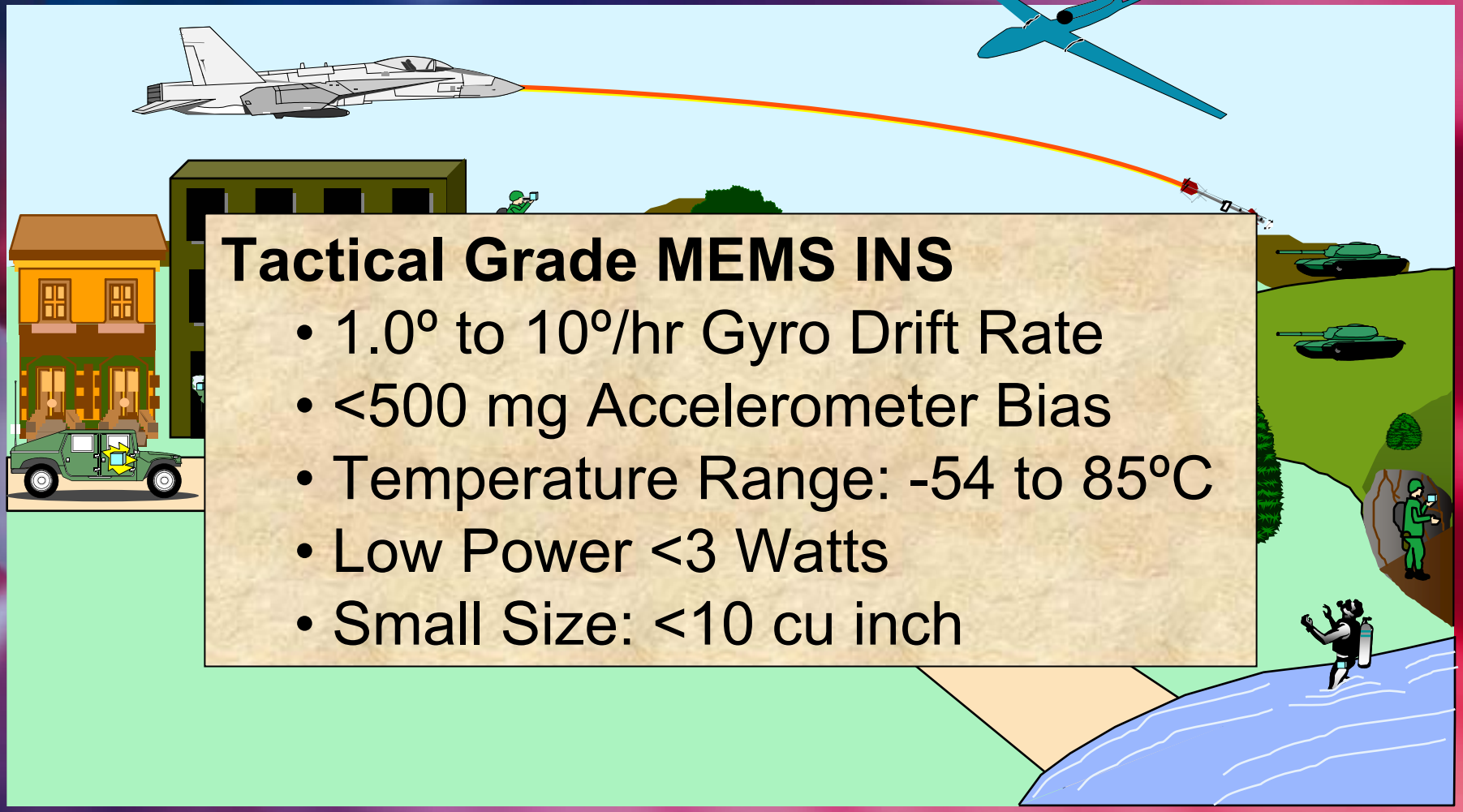
MEMS INS



Tactical Grade MEMS INS

- 1.0º to 10º/hr Gyro Drift Rate
- <500 mg Accelerometer Bias
- Temperature Range: -54 to 85ºC
- Low Power <3 Watts
- Small Size: <10 cu inch

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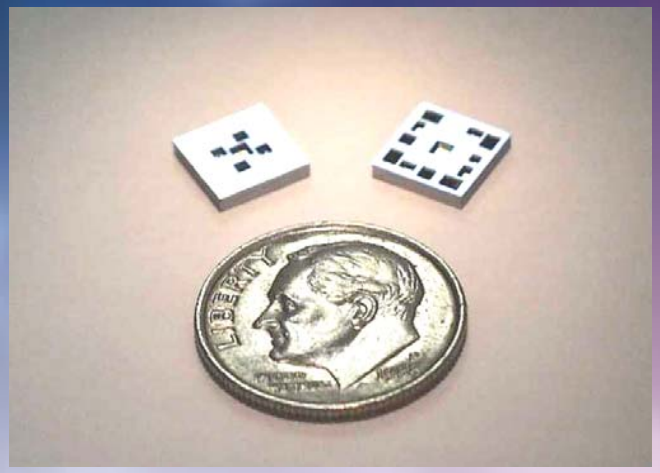
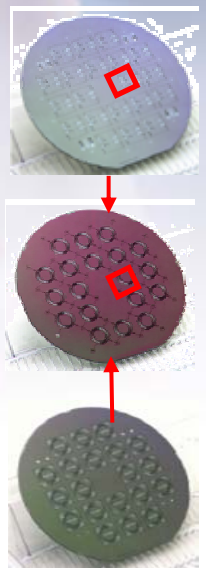
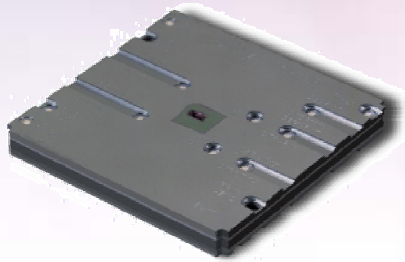
MEMS Gyroscope



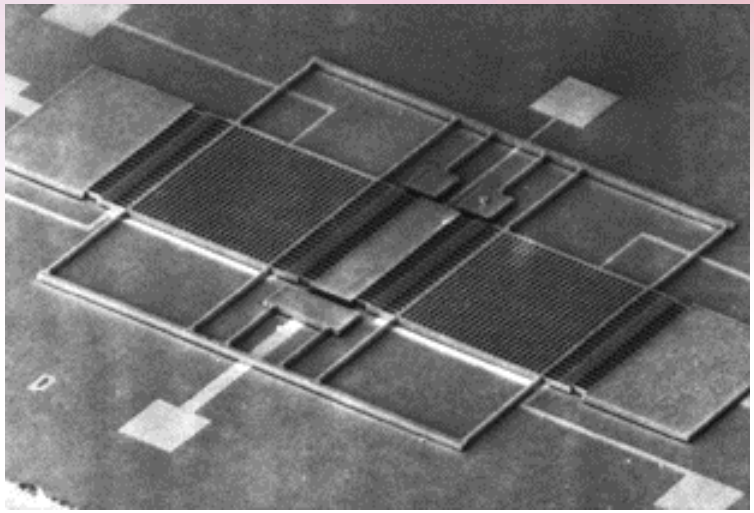
KEARFOTT-
Micromachined Vibrating Beam Multisensor





LITTON - Silicon Gyro

DRAPER - Tuning Fork Gyro



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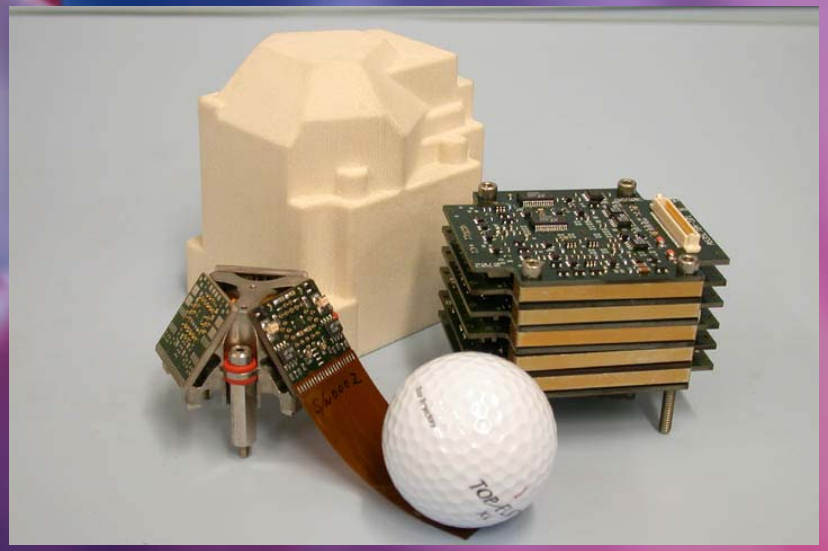
MEMS-based Inertial Measurement Units

Draper Laboratory



Kearfott Guidance & Navigation

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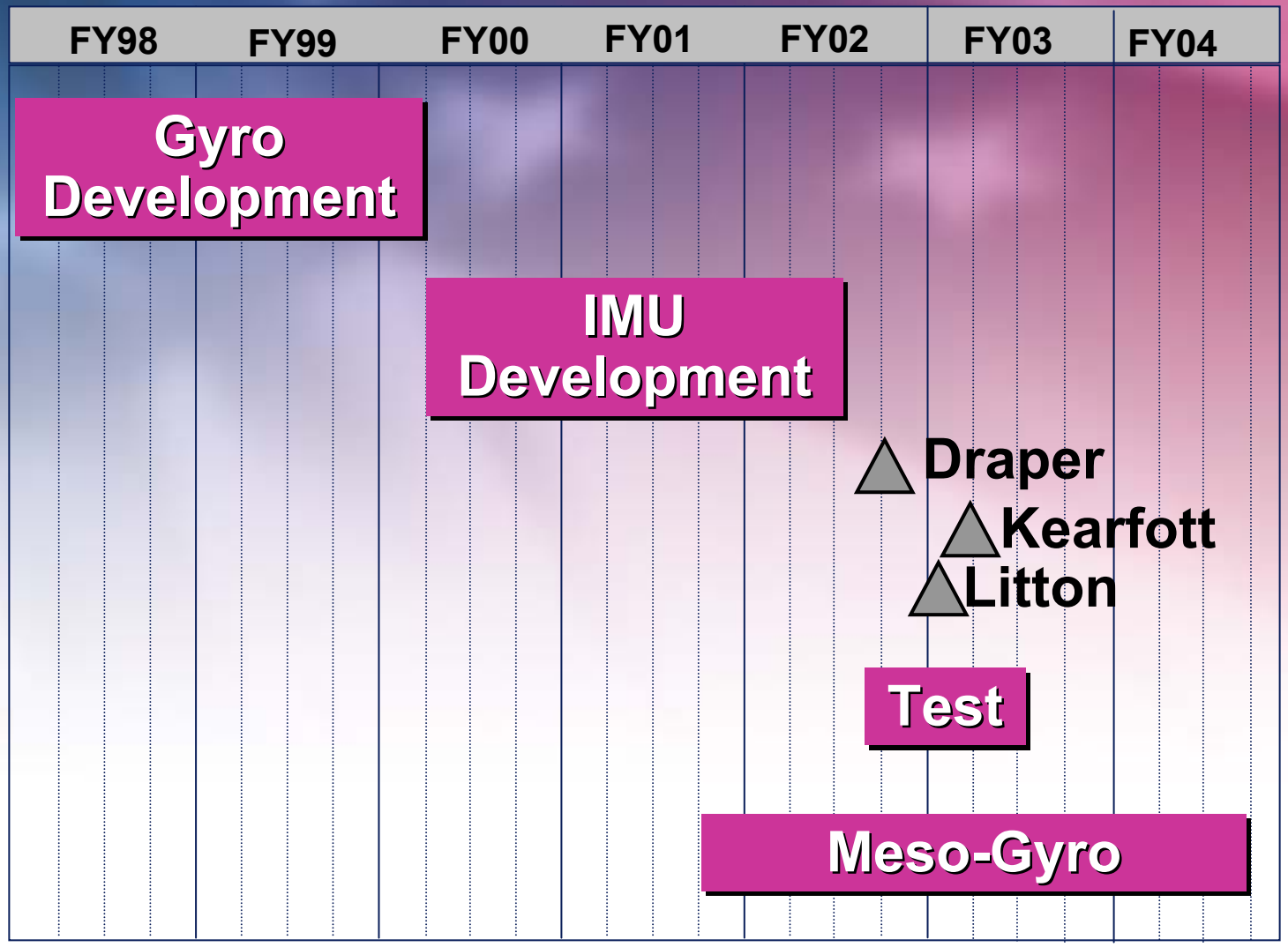
MEMS-INS Schedule



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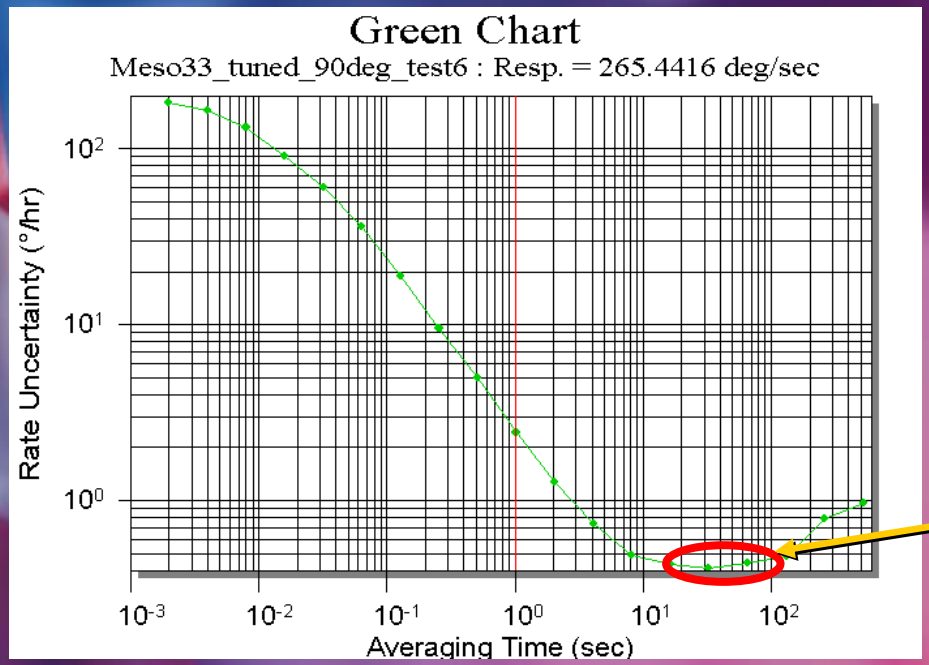
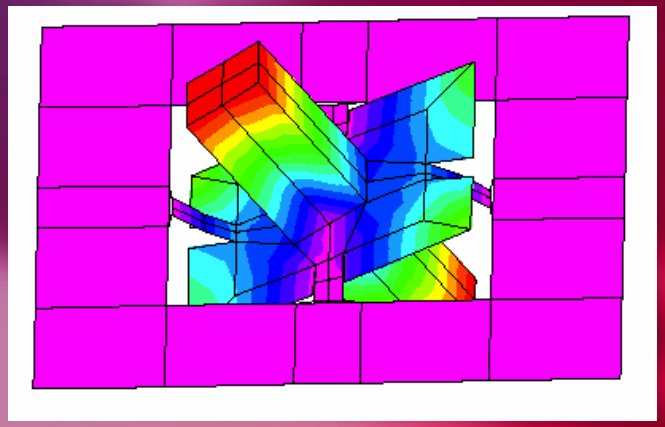
Meso-Gyroscope

- Meso-scale gyroscope offers more accuracy at slight increase of size and cost





0.4 deg/hr

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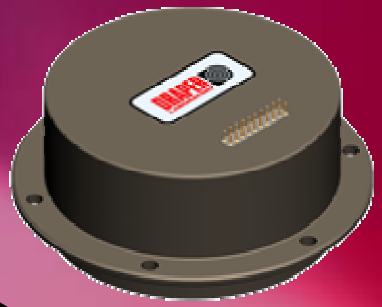

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