III-V Microsystems Components for Positioning, Navigation and Timing in Extreme Harsh Environments

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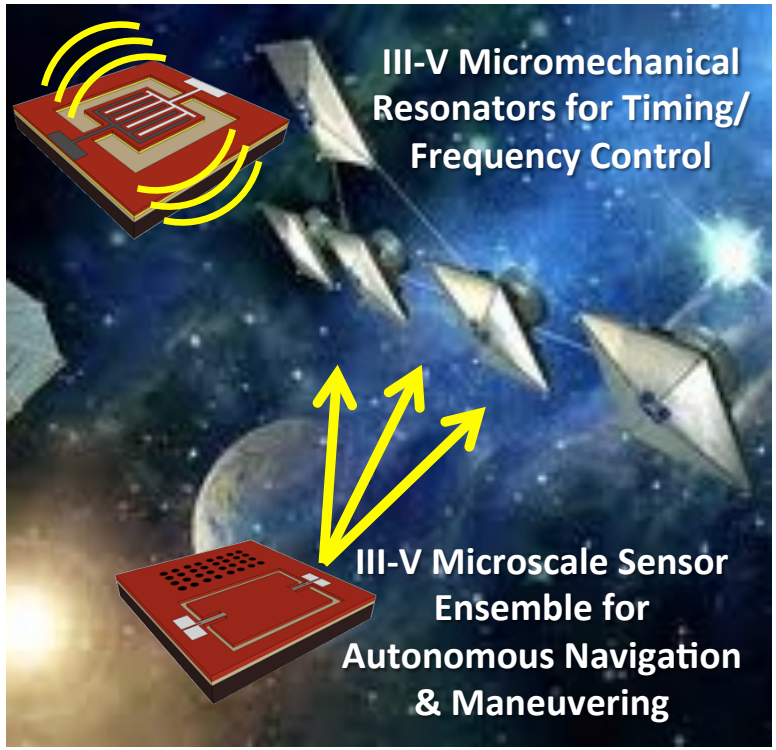
STRO-ECF Program
Technology Area 05 (TA05)

Summary of Proposed Research Activities (3-year effort):
- Design, fabrication and experimental characterization of III-V (wide bandgap) piezoelectric resonators with Q-enhancement and temperature compensation features.
- Design, fabrication and characterization of III-V sensors (e.g. sun and inertial sensors) for future spaceborne sensor ensembles.

Summary of Key Impacts to NASA's Roadmap:
- Miniaturized, radiation resistant, temperature compensated timekeeping and frequency control (deep space communication and navigation).
- Integrated microscale inertial and sun sensors for autonomous navigation and maneuvering enabling formation flying, docking and planetary landing.
- Advancements in the NASA's lightweight structures (TA12) priority through the use of extreme environment materials that are inherently thermally stable and radiation tolerant (less packaging requirements).



Background Image Courtesy of NASA

Project Resources: Faculty principal investigator, 2 graduate student researchers and Stanford Nanofabrication Facility (SNF) for device fabrication.