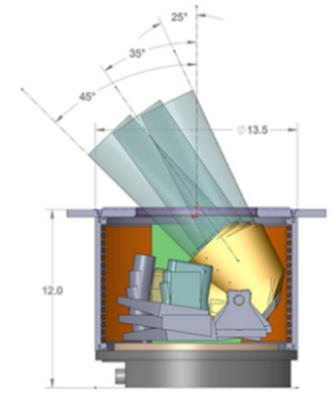


ALTERNATIVE NAVIGATION CELESTIAL AIDED NAVIGATION

Honeywell and Ball Aerospace have developed a Celestial Aided Navigation System which provides geolocation estimates to a host navigation system by using a star tracker to make precise angular measurements between stars and Resident Space Objects (RSOs).



Target applications/markets:

- GPS Denied/Disrupted Operations
- Long Range/High Altitude Missions
- Large Fixed Wing Aircraft, Larger UAV's, Fighters/Trainers, and Long-Range Missiles

Honeywell/Ball Aerospace advantages

- Honeywell advanced navigation software
- Proven Ball Aerospace optical design and image processing software
- Star tracker spatial calibration over pressure and temperature with 0.25 arc-second source knowledge
- High standard of manufacturability, reliability, and maintainability
- Supports platform/mission versatility

TECHNOLOGY BENEFITS

- Works over oceans/clouds
- Passive technology
- Day and night operations
- Reversionary stars-only mode
- Autonomous operation
- No physical infrastructure
- Resistant to jamming/spoofing
- Outputs celestial aided navigation data with predicted error uncertainties

CELESTIAL NAVIGATION PERFORMANCE

SPEC	STARS ONLY ¹	RSO AIDED ^{1,2,3}
Position	< 1.0 (nmi/hr, CEP)	< 25 (m, CEP)
Velocity	< 1.0 (m/s, 1 σ)	< 0.05 (m/s, 1 σ)
Heading	0.015 (deg, 1 σ)	0.01 (deg, 1 σ)
Pitch/Roll	0.01 (deg, 1 σ)	0.006 (deg, 1 σ)

¹Unique star observations available every 5 seconds

²Unique RSO observations available every 30 seconds

³RSO ephemerides known to within 30 m 1 σ in cross-track direction

SPECIFICATION

Operating Temperature Range	-40° C to +70° C	Weight/Size	<30lbs, 1 ft ³
Humidity	10% - 50% relative humidity	Inputs	UTC Time, RSO ephemerides, Altitude Reference; Host Transfer Alignment
Altitude	0 to 90,000 ft	Interfaces	Ethernet & PTP, or RS-422 & 1PPS
Vibrations	MIL-STD Fixed Wing A/C	Camera Field of View	3 deg ²
Supply Voltages	+28VDC		

For more information

Visit us at: <https://aerospace.honeywell.com/en/learn/products/sensors/alternative-navigation-systems> or

Ball Aerospace

ball.com/aerospace

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