

RESILIENT NAVIGATION SYSTEM

Safe and secure navigation for UAV in GNSS denied environments



Honeywell

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Resilient Navigation System is a low size, weight and power navigation system that combines GNSS, INS, anti-jammer and alternative navigation technologies to provide **three layers of resilience for safe navigation.**



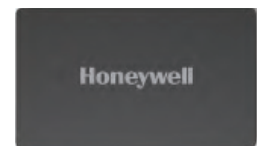
GPSdome 1

Ensures GPS availability during low power jamming conditions



Honeywell Compact Inertial Navigation System (HCINS)

Enables safe navigation for UAVs during intermittent GNSS disruptions



Honeywell Radar Velocity System (HRVS)

Enables safe navigation for UAVs during continuous GNSS disruptions

Safe and reliable navigation in challenging environments is essential for BVLOS* missions

Mission failure results in not just loss of the asset but the information on asset becomes a liability

Multi-Layer Resiliency

GNSS + anti-jammer + INS + Alternative Navigation

Enables **GNSS-Denied BVLOS* Missions**

Arducopter PX4

Integrated with commonly used UAV flight controls

Works in **Degraded Visual Environments**

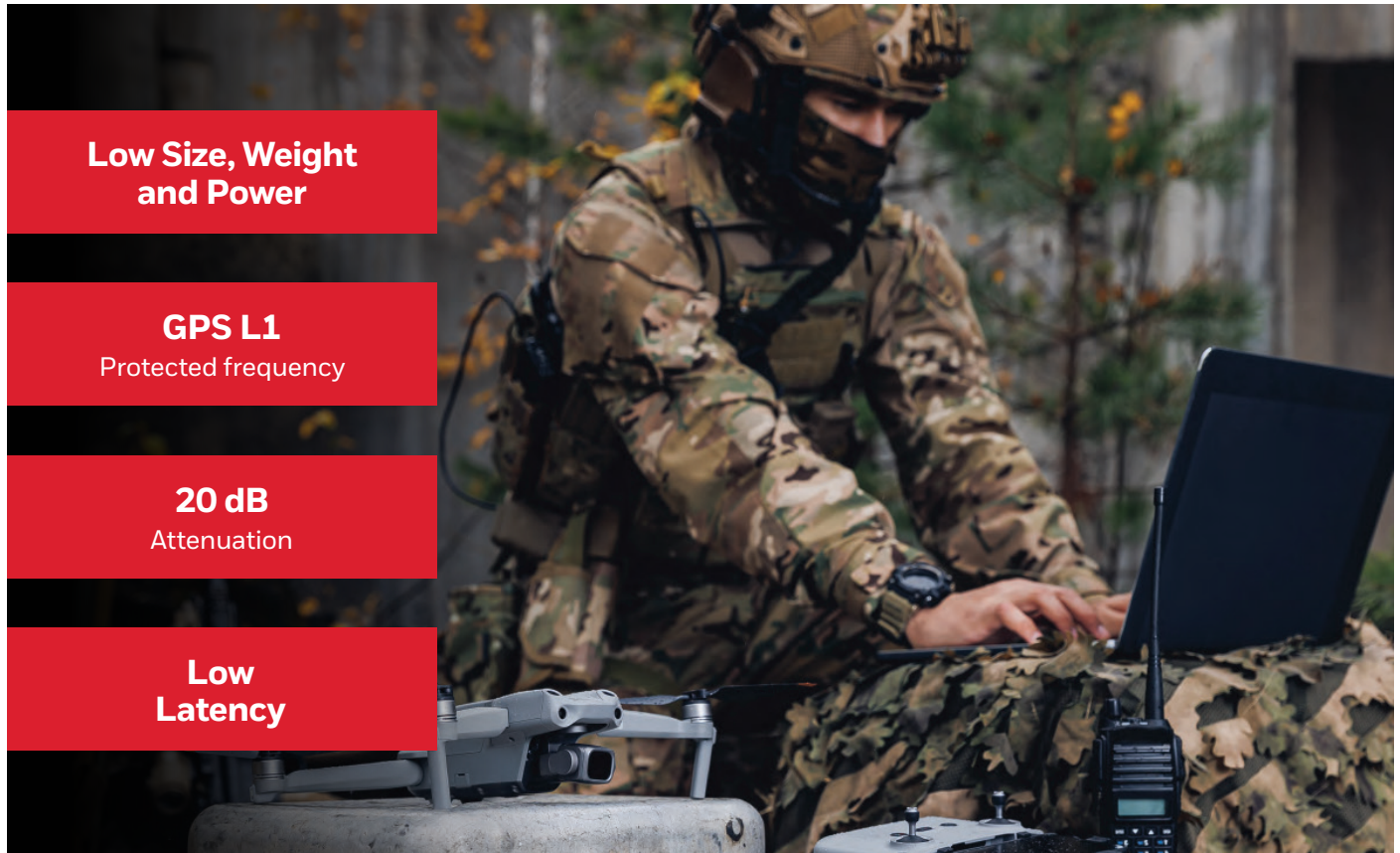
1-3 % Distance Traveled CEP
< 800 g Total system weight including accessories

No Dependency on maps or environment

*Beyond Visual Line of Sight

LAYER 1 GPSDOME 1

Industry's only non-ITAR GPS anti-jammer



Low Size, Weight
and Power

GPS L1
Protected frequency

20 dB
Attenuation

Low
Latency

GPSdome 1 is a small-sized, add-on device that provides protection against GPS jamming, ensuring continuity of autonomous navigation and operation during jamming conditions. No other solution that offers the same protection is as small, light, affordable or as easily installed as GPSdome 1.

FEATURES



- GPS anti-jammer
- Protected frequency: GPS L1 (C/A Code)
- Nominal 20dB attenuation of hostile signal
- Protection from 1 jamming signal



- IP67, -40°C to +85°C (enclosed)
- Minimal latency: 100ns ±15ns (constant)
- Compatible with most off-the-shelf active GNSS antennas



- Null steering technology in tiny form factor
- Dual use (non-ITAR) (ECCN: 7A005.b)



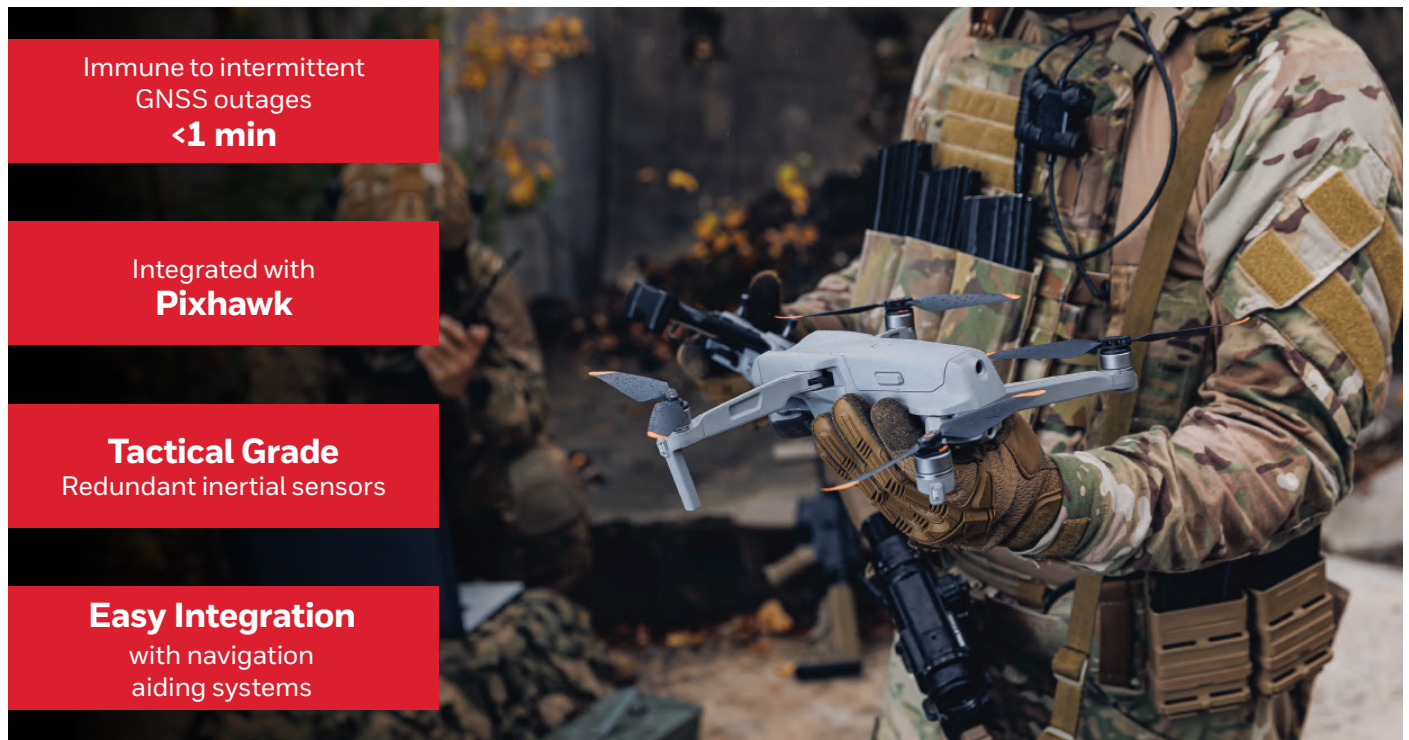
- Size: 74x47x25 mm (LxBxH)
- Weight: 150g
- Maximum power consumption: <1W



LAYER 2

HONEYWELL COMPACT INERTIAL NAVIGATION SYSTEM

Combined GNSS and inertial navigation system for UAVs



The Honeywell compact inertial navigation system (HCINS) for UAVs is a low size, weight and power (SWaP) inertial navigation system that is suitable for all types of UAVs. It enables safe navigation for UAVs during intermittent GNSS disruptions.

FEATURES



- Small inertial navigation system with dual GNSS receivers
- Tactical grade redundant inertial sensors
- Integrated with Pixhawk (Arducopter, PX4, and Mission Planner)
- Horizontal drift after 30s GNSS outage with no aiding ~ 5m



- SD card for data storage
- Navigation health monitor
- Ethernet interface



- Easy integration with aiding systems (radar, vision)
- Not export controlled (ECCN: 7A994)

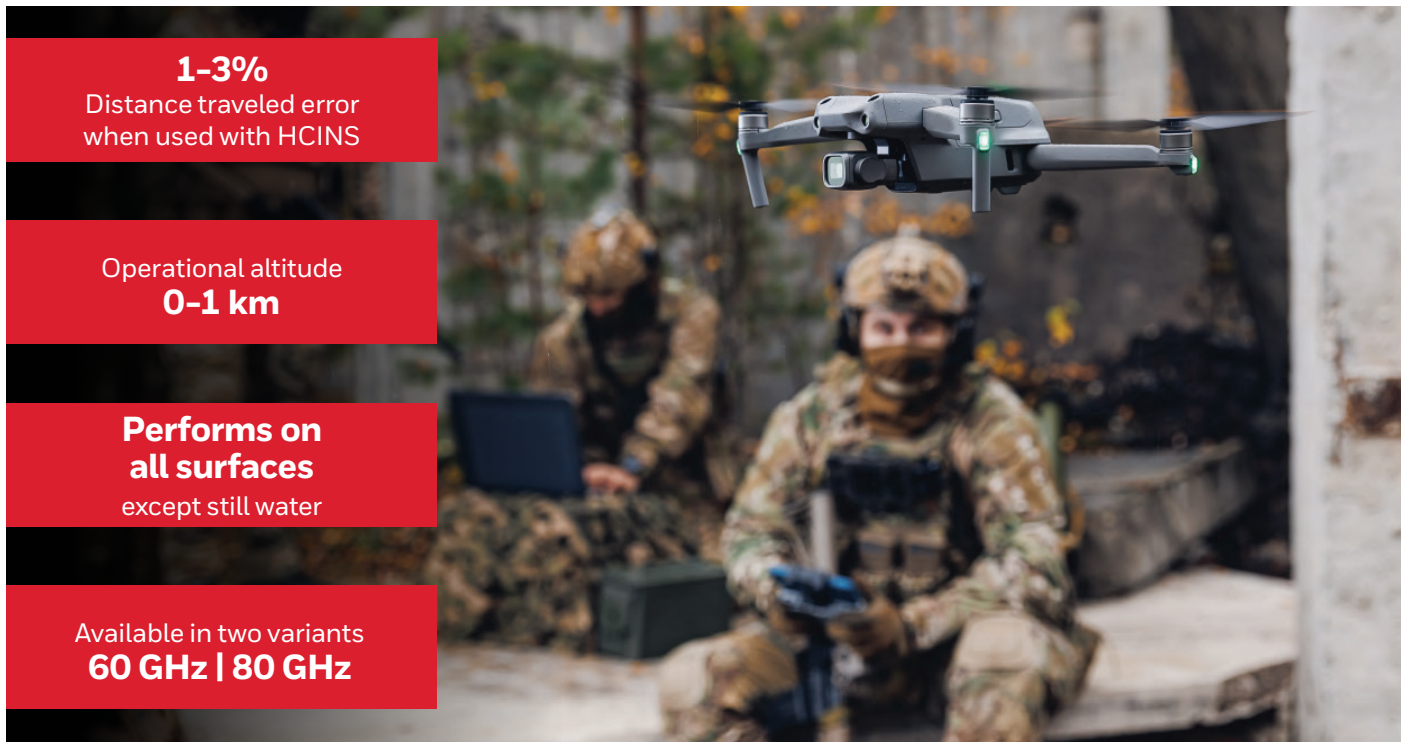


- Size: 104x60x28 mm (LxBxH)
- Weight: 140g
- Maximum power consumption: <3W



LAYER 3 HONEYWELL RADAR VELOCITY SYSTEM

Range and velocity without GNSS



1-3%

Distance traveled error
when used with HCINS

Operational altitude
0-1 km

**Performs on
all surfaces**
except still water

Available in two variants
60 GHz | 80 GHz

The Honeywell Radar Velocity System (HRVS) is a low size, weight and power (SWaP) millimeter radar-based navigation aiding system.



FEATURES



- 3D velocity aiding system
- 4 radars and 1 interconnection board for UAV applications
- CEP error of 1-3% distance traveled when integrated with HCINS
- Two variants - 60GHz and 80GHz
- Altitude < 400m (60GHz), <1000m (80GHz) at speed <20m/s



- Indefinite precise hover
- Works over all surfaces (except still water)
- Impervious to environmental conditions



- Not export controlled (ECCN: 6A998.a)
- Needs FCC waiver for US

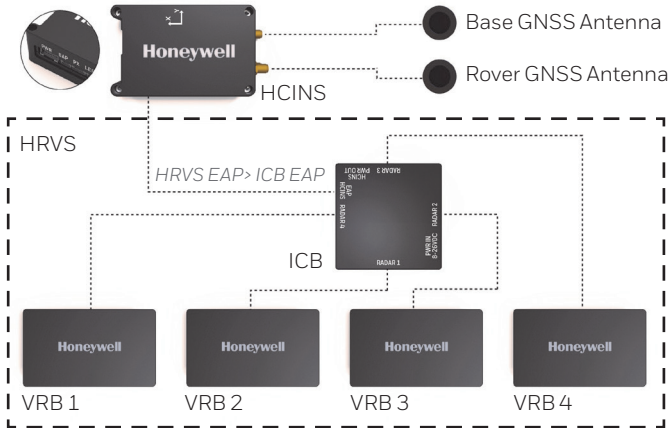


- Size: 113x65x31 mm (LxBxH)
- Weight: 63g (1 Radar), 290g (4Radars and 1 ICB)
- Maximum power consumption: <2W per Radar

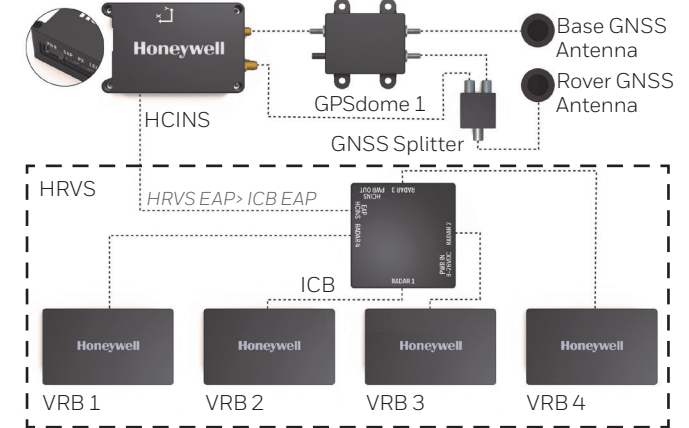


INTERCONNECTIONS DIAGRAM

WITHOUT GPSDOME 1



WITH GPSDOME 1



RESILIENT NAVIGATION SYSTEM

PART NUMBER	QUANTITY	DESCRIPTION
68013252-1	01	GPSdome1
88003175	01	HCINS Packaging Content (HCINS + Cables + Damping Platform + SD Card)
88003168	01	Honeywell Compact Inertial Navigation System (HCINS) 2.4
88003160	01	Power Cable for HCINS
88003161-001	01	Ethernet Cable for HCINS
88003162	01	External Aiding Port (EAP) Cable for HCINS
88003163	01	Pixhawk Cable for HCINS
53700092-2	01	SD card - inserted in HCINS
88004275 88004276 88004277-001/002/003/004	01	Damping Platform for HCINS
88003444	01	HRVS packaging content (4xVRB + ICB + 15cm flat cables)
88003442	04	Velocity Radar Board (VRB) 3.3
88003436	01	Interconnection Board (ICB)
88003432	04	VRB-ICB Cable flat 15 cm cable

OPTIONAL

PART NUMBER	QUANTITY	DESCRIPTION
88003445	04	VRB-ICB Cable rounded 25 cm cable
88003445-001/002/003/004	04	VRB-ICB Cable rounded 35 cm / 40 cm / 50 cm / 100 cm cable
53700060 - 2	02	GNSS Antenna Maxtena M7h
53700144-1	01	GPS Splitter