

# RESILIENT UAV NAVIGATION SUITE

Safe and secure navigation for UAV in GNSS denied environments



Honeywell

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The Resilient UAV Navigation Suite 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.**



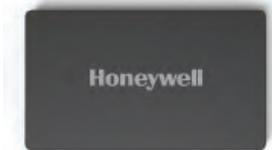
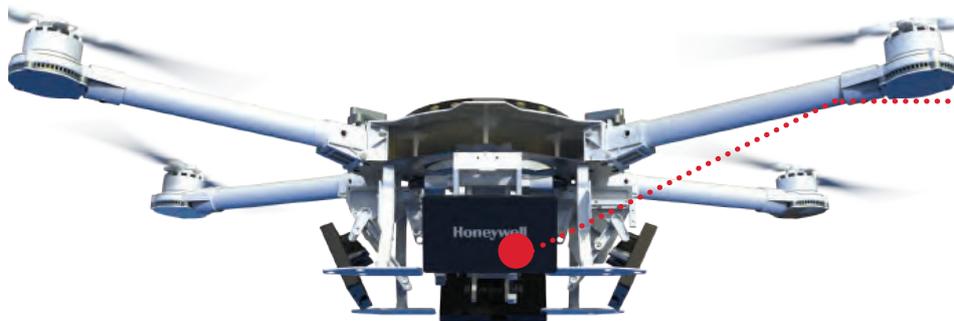
### GPSdome-SunStone

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**

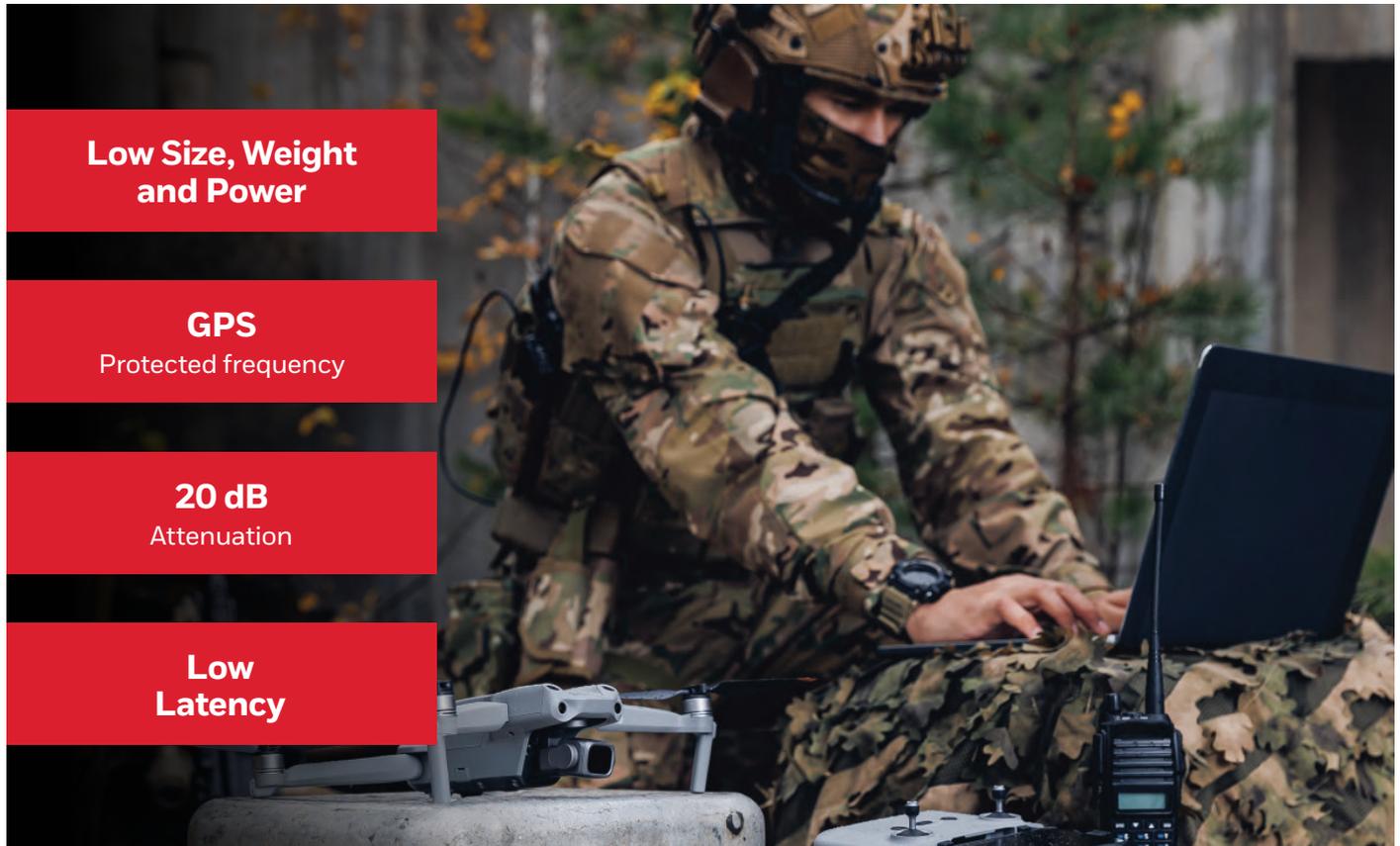
**1-3 %** Distance Traveled CEP  
**< 800 g** Total system weight including accessories

**No Dependency** on maps or environment

\*Beyond Visual Line of Sight

# LAYER 1 GPSDOME-SUNSTONE

Industry's only non-ITAR GPS anti-jammer



**Low Size, Weight  
and Power**

**GPS**  
Protected frequency

**20 dB**  
Attenuation

**Low  
Latency**

**SunStone** 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 SunStone.

## 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

Weight: 150g

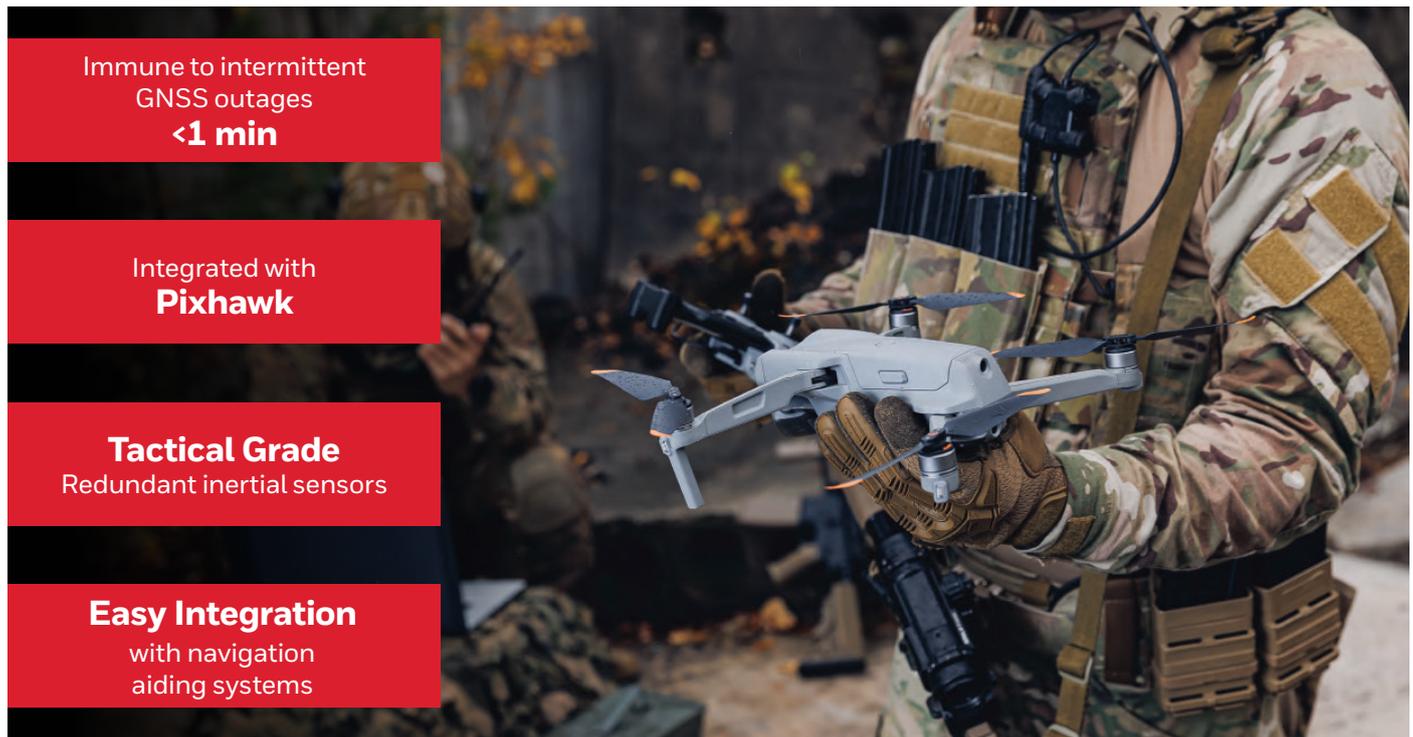
Maximum power consumption: <1W



Commercially available

# 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

Weight: 140g

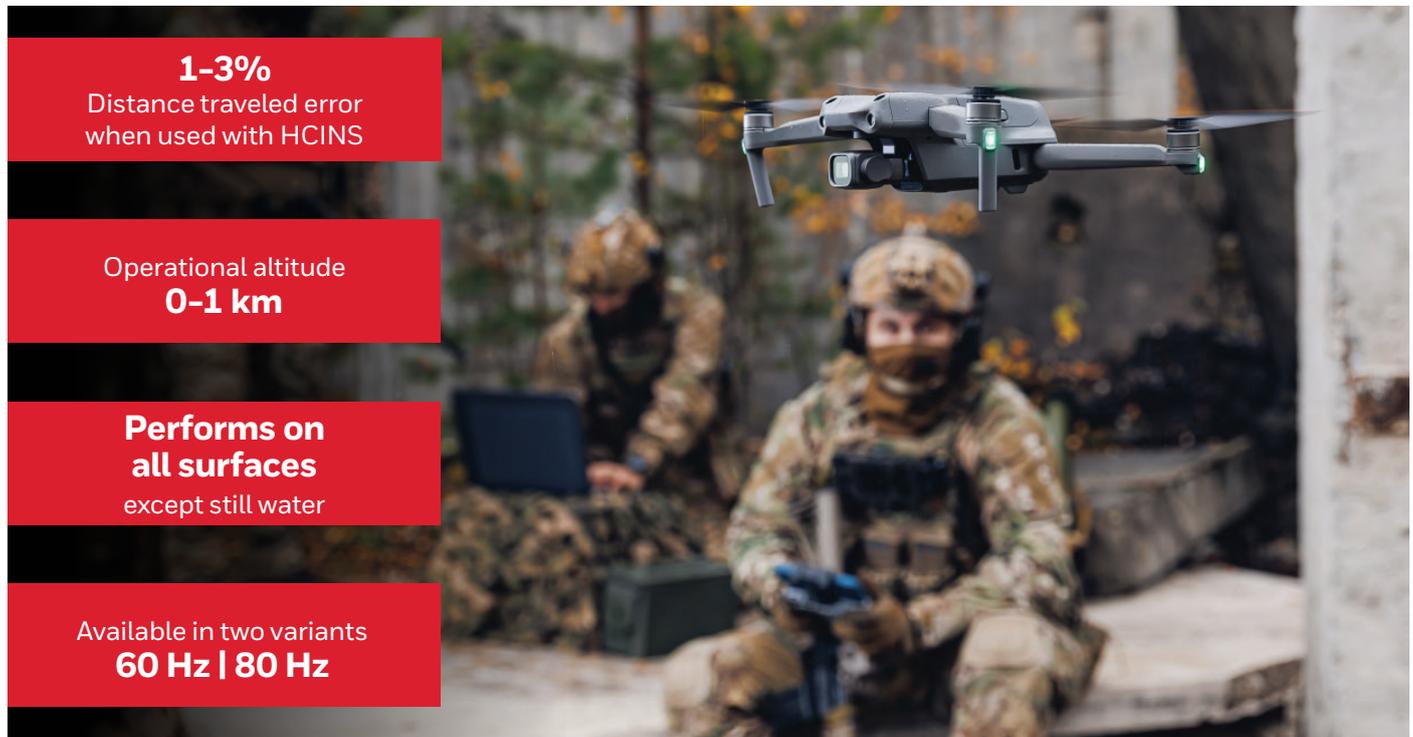
Maximum power consumption: <3W



Available in Q2 2023

# 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 Hz | 80 Hz**

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
- Only 1 radar for surface 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

Weight: 63g (1 Radar), 290g (4Radars and 1 ICB)

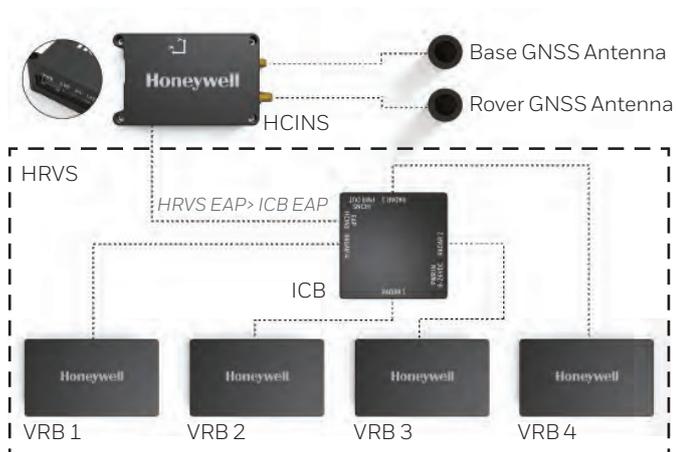
Maximum power consumption: <2W per Radar



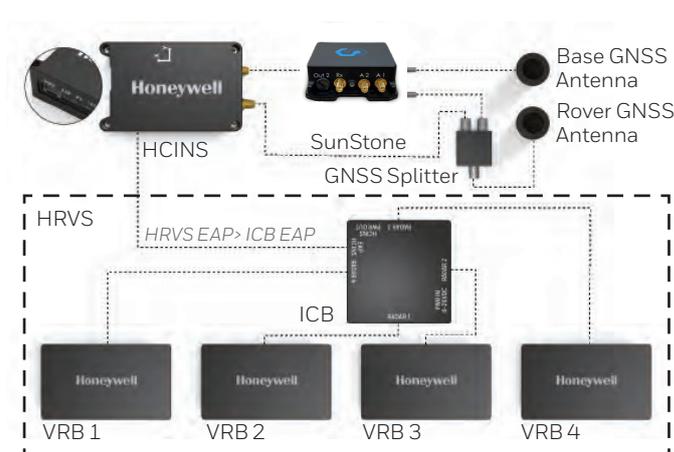
Available in Q2 2023

# INTERCONNECTIONS DIAGRAM

## WITHOUT SUNSTONE



## WITH SUNSTONE



# RESILIENT UAV NAVIGATION SUITE

| PART NUMBER                      | QUANTITY | DESCRIPTION                                              |
|----------------------------------|----------|----------------------------------------------------------|
| 68013252-1                       | 01       | SunStone                                                 |
| 88003168                         | 01       | Honeywell Compact Inertial Navigation System (HCINS) 2.4 |
| 88004275<br>88004276<br>88004277 | 01       | Damping Platform for HCINS                               |
| 53700092-2                       | 01       | SD card - inserted in HCINS                              |
| 88003160                         | 01       | Power Cable for HCINS                                    |
| 88003161 - 1                     | 01       | Ethernet Cable for HCINS                                 |
| 88003162                         | 01       | External Aiding Port (EAP) Cable for HCINS               |
| 88003163                         | 01       | Pixhawk Cable for HCINS                                  |
| 88003442                         | 04       | Velocity Radar Board (VRB) 3.3                           |
| 88003436                         | 01       | Interconnection Board (ICB)                              |
| 88003432                         | 04       | VRB-ICB Cable flat 15 cm cable                           |
| 88003445                         | 04       | VRB-ICB Cable rounded 25 cm cable (Optional)             |
| 88003445-001                     | 04       | VRB-ICB Cable rounded 35 cm cable (Optional)             |
| 88003445-002                     | 04       | VRB-ICB Cable rounded 40 cm cable (Optional)             |
| 88003445-003                     | 04       | VRB-ICB Cable rounded 50 cm cable (Optional)             |
| 88003445-004                     | 04       | VRB-ICB Cable rounded 100 cm cable (Optional)            |
| 53700060 - 2                     | 02       | GNSS Antenna (Optional)                                  |
| 53700144-1                       | 01       | GNSS Splitter (Optional)                                 |