



SILICON SENSING®

everything in motion

Product and Company Overview

September 2010

Silicon Sensing is a joint venture between Atlantic Inertial Systems and Sumitomo Precision Products.

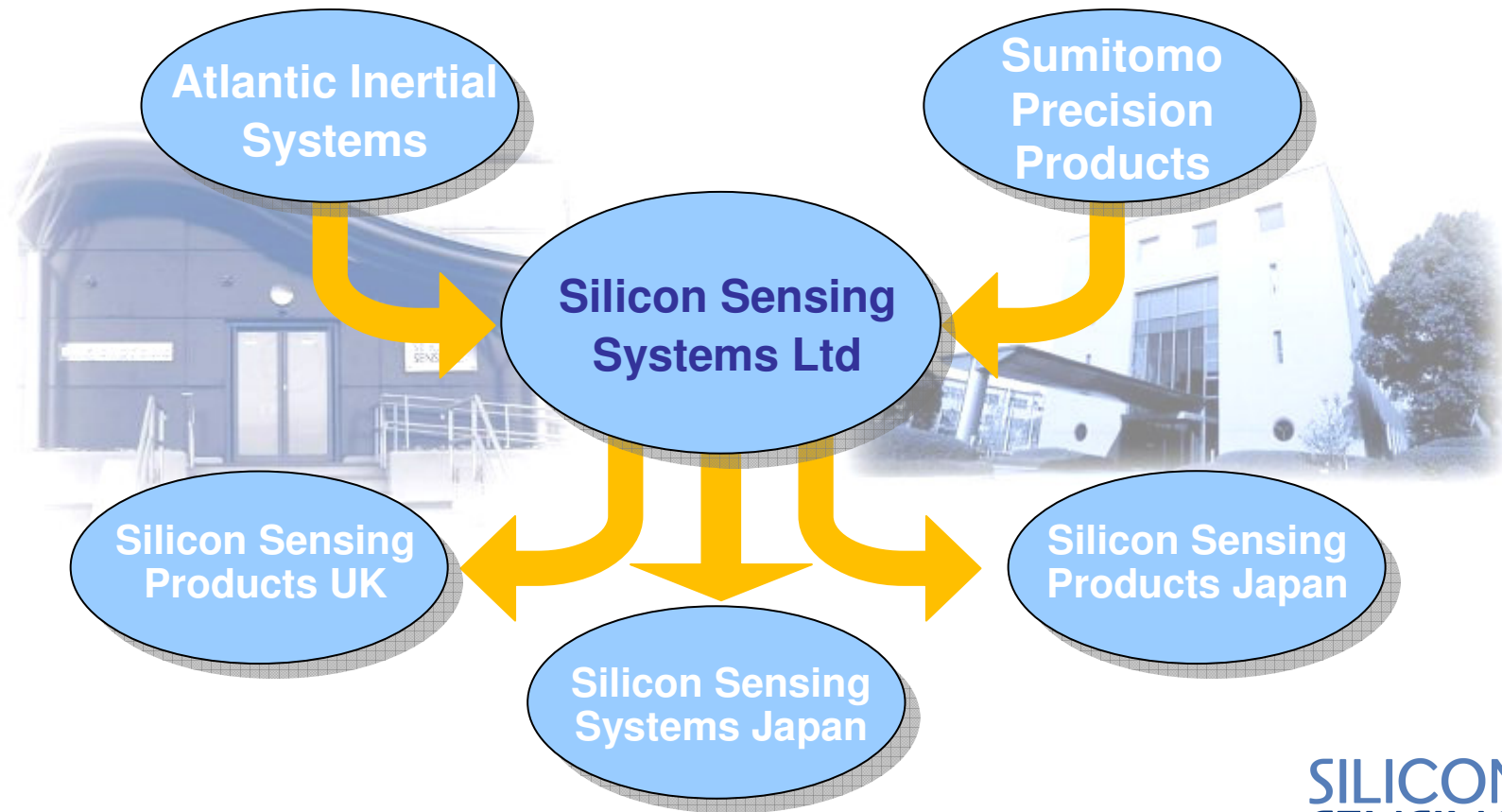
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Company Overview

- **Silicon Sensing Systems Ltd** is a 50/50 Joint Venture owned by Atlantic Inertial Systems and Sumitomo Precision Products:
 - **Atlantic Inertial Systems (AIS)** - formerly BAE SYSTEMS' Inertial Products group - brings 97 years of gyroscope design, Intellectual Property and innovation expertise. In December 2009, AIS became part of the Goodrich Corporation.
 - **Sumitomo Precision Products (SPP)** brings extensive MEMS manufacturing experience and Kaizen expertise. SPP owns Surface Technology Systems Inc, manufacturers of deep reactive-ion etchers essential for MEMS production.
- **Silicon Sensing Systems Ltd.**, is an established motion sensing supplier providing:
 - Superior performing and high stability products to customers
 - Solutions ranging from chip level angular rate sensors (gyros) through to complete Inertial/Dynamic Measurement Units (IMUs and DMUs).
 - High-reliability gyros and inertial systems in high volumes to automotive, industrial and commercial customers.

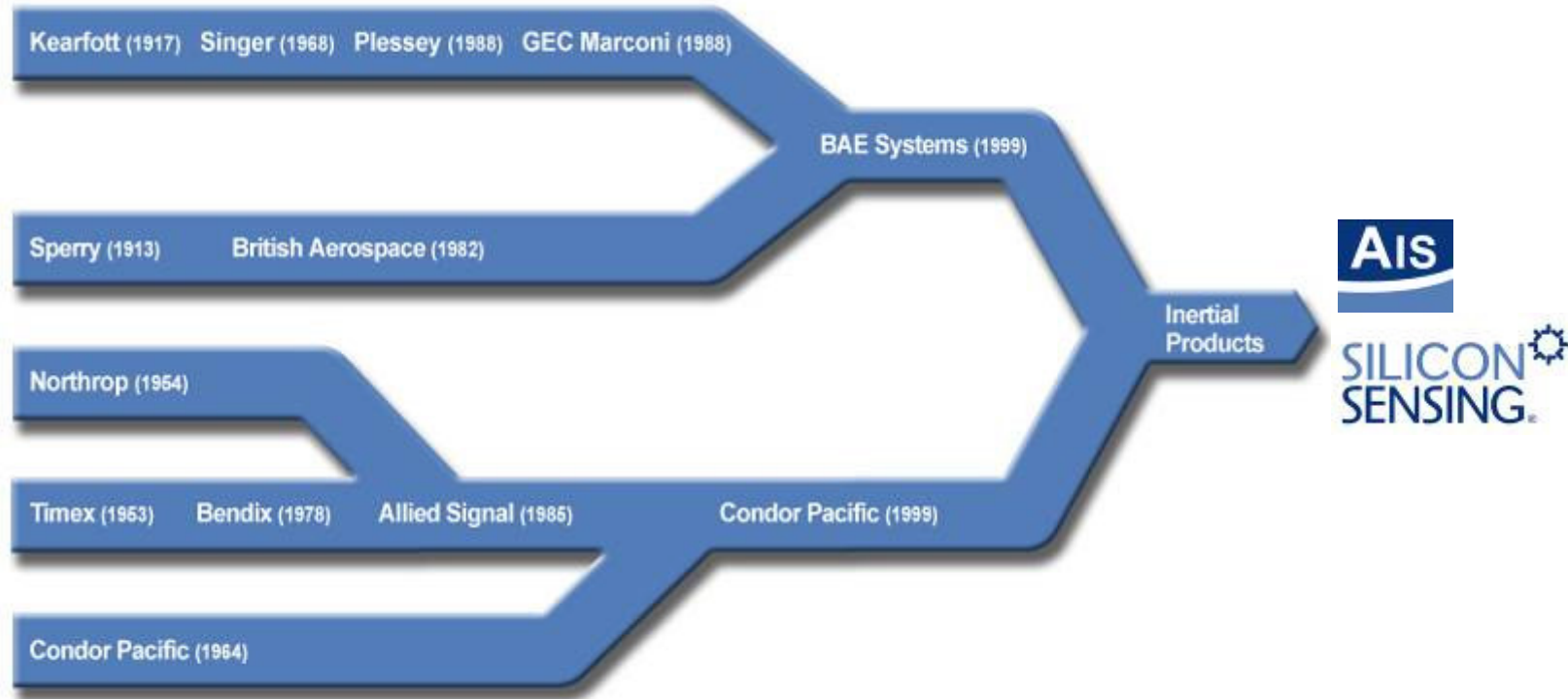
50/50 Joint Venture Company



Silicon Sensing is a joint venture between Atlantic Inertial Systems and Sumitomo Precision Products



Long Pedigree of Inertial Systems Capability



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Locations



Staffing: **USA: 500** **UK: 300** **Japan: 100**

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Accreditations



TS 16949:2002



ISO 9001:2000



ISO 17025

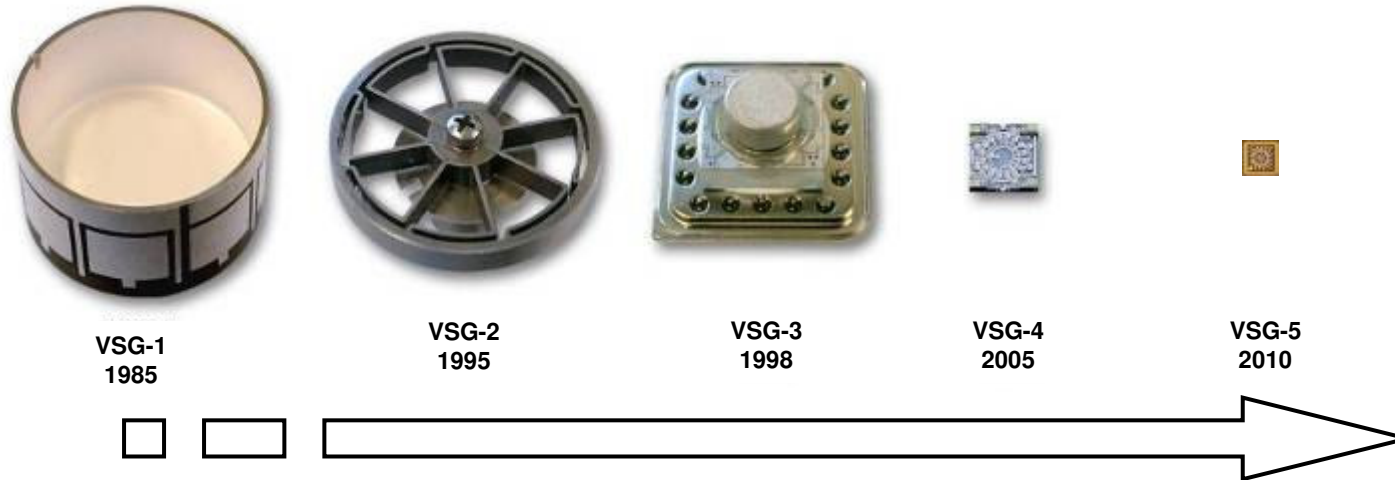


ISO 14001:2004



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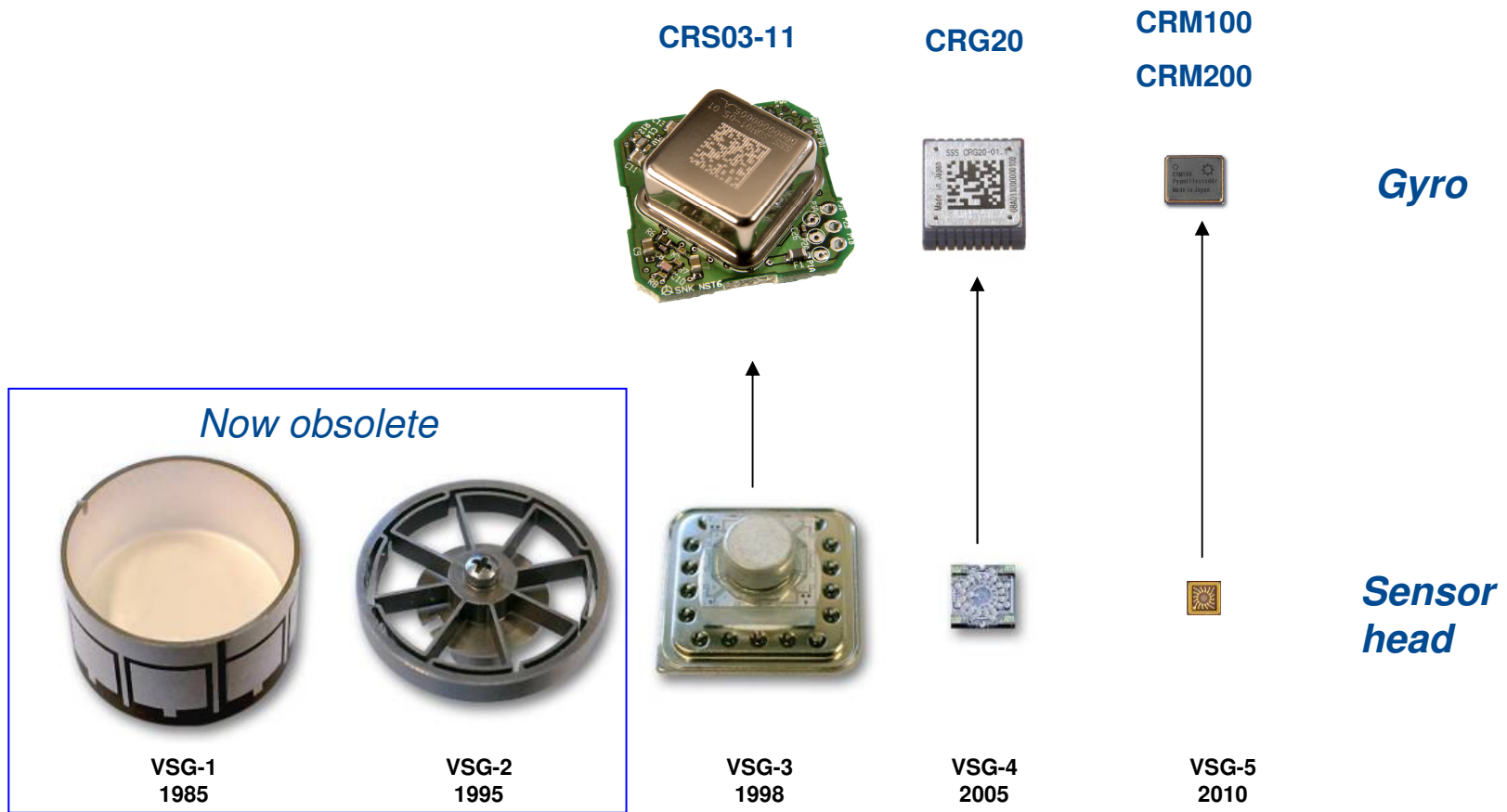
Vibrating Structure Gyro (VSG) Technology



- Silicon Sensing's gyroscopes are Vibrating Structure Gyroscopes, VSGs
- These VSGs use cylinder or ring structures and work on the Coriolis principle where forces are observed when a linear motion occurs in a rotating frame.
- The closed loop technology provides excellent scale factor and performance over wide rate and temperature ranges.
- The technology has a very rugged design and construction and delivers superior performance than its competitors using other structures (e.g tuning fork).

“Evolution not Revolution”

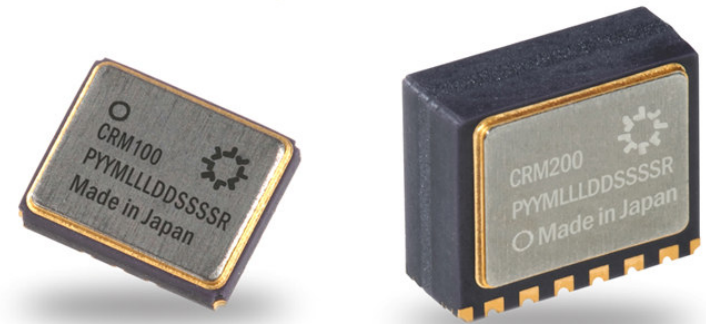
25 Years of VSG Technology



PinPoint® Overview

- **Current Applications**
 - Automotive
 - Model helicopters
 - Pointing measurement & control
 - Power tools and gesture measurement
 - Personal navigation devices and GPS aiding
- **Key Features**
 - Single-axis analogue and digital rate sensor
 - In-plane and orthogonal sensing options, CRM100
 - Class-leading bias and noise over temperature
 - Proven and robust VSG5 silicon vibrating ring
 - 3V supply and low power consumption (4.5mA)
 - Selectable rate ranges of 75°/s, 150°/s, 300°/s and 900°/s
 - User adjustable bandwidths to 150 Hz
 - Internal temperature available over SPI for external compensation
 - Wide temperature range -40 to +105 deg.C
 - CRM100 footprint; 5.70mm x 4.78mm x 1.18mm
 - CRM200 footprint; 6.30mm x 5.50mm x 2.63mm
- **Notes:**
 - RoHS compliant
 - Hermetically sealed SMD package for temperature and humidity resistance

PINPOINT®



SILICON SENSING®

DMU02 Overview

- **Current Applications**
 - Robotics
 - Autonomous vehicle guidance, navigation and control
 - GPS aided navigation and attitude sensing
 - Vehicle dynamic testing & motorsport applications
 - Platform stabilisation & control
 - Biomechanics
- **Key Features**
 - 6 Degree of Freedom (6 DoF) Dynamic Measurement Unit
 - 3 Axes of angular rate measurement to +/- 300 deg/s
 - 3 Axes of linear acceleration measurement to +/- 6g
 - 4 Wire industrial standard Serial Protocol Interface, SPI
 - Recommended high message rate of 1 KHz
 - Temperature range -40 to +85 deg.C
 - Internal temperature available on SPI output
 - Angular rate bandwidth to > 45 Hz
 - Linear acceleration bandwidth to > 350 Hz.
 - Footprint, 26mm x 26 mm x 26mm (excluding connector)
- **Notes:**
 - RoHS compliant



CRS09 Overview

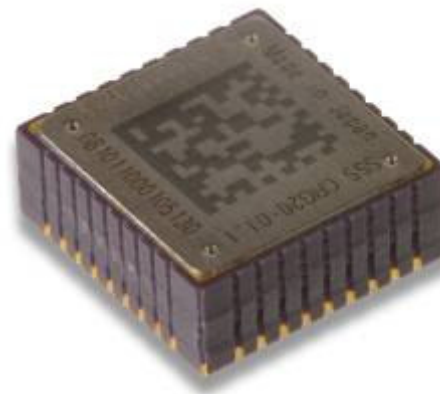
- **Current Applications**
 - General replacement for FOG gyroscopes
 - Precision platform stabilisation & control
 - High performance commercial avionics and IMUs
 - North finding and direction/pointing applications
 - GPS aided navigation and compassing
- **Key Features**
 - Single-axis precision analogue rate sensor
 - Ultra low noise and high stability over temperature and time
 - New high performance dual loop head
 - Rate ranges of +/-100 deg/s and +/-200 deg/s
 - Bandwidth typically 55 Hz
 - Options for lower bias over temperature available
 - Internal temperature sensor and ring frequency output for external compensation and performance enhancement
 - Can be externally compensated over temperature using factory test data or new data
 - Wide temperature range -40 to +85 deg C
 - Footprint; 63mm x 63 mm x 19mm
- **Notes:**
 - RoHS compliant



CRG20 Overview

- **Current Applications**

- Commercial avionics
- Automotive
- Robotics & autonomous vehicle control (including UAVs)
- GPS aided navigation and compassing
- Platform stabilisation & control
- Model helicopters
- Industrial tools and equipment



- **Key Features**

- Single-axis analogue and digital rate sensor
- 4 Wire industrial standard Serial Protocol Interface, SPI
- Digital rate range options of +/-300 deg/s and +/-800 deg/s
- Analogue rate range options of +/-75 deg/s, +/-300 deg/s and +/-800 deg/s
- Bandwidth options include 40Hz , 75Hz and 90 Hz available
- Factory calibrated for bias and scale factor over temperature
- Comprehensive Built in Test (BIT)
- Internal temperature available on SPI output
- Wide temperature range -40 to +125 deg.C
- Footprint, 9mm x 9.5 mm x 3.44mm

- **Notes:**

- RoHS compliant
- Hermetically sealed SMD package for temperature and humidity resistance

DMU01 Overview

- **Current Applications**
 - Vehicle dynamic testing and motorsport tuning
 - Vehicle stability control
 - Telemetry systems
 - Instrumentation & measurements
 - Crane stability control
- **Key Features**
 - 6 Degree of Freedom (6 DoF) Dynamic Measurement Unit
 - 3 Axes of angular rate measurement to +/- 250 deg/s
 - 3 Axes of linear acceleration measurement to +/- 8g
 - Controller Area Network bus, CANbus 2B.
 - High bit rate at 1MHz, high message rate at 1 KHz
 - Internal compensation for bias, scale factor and misalignment, over the temperature range -20 to +60 deg.C
 - Angular rate bandwidth to > 45 Hz
 - Linear acceleration bandwidth to > 100 Hz.
 - Footprint, 98mm x 96 mm x 37mm (excluding. connector)
- **Notes:**
 - Not RoHS compliant



SiRRS01 Overview

- **Current Applications**
 - Unmanned vehicle guidance, navigation & control
 - Telemetry systems
 - Platform stabilisation
 - Satellite pointing
 - Military applications (guidance & control)
- **Key Features**
 - Single-axis analogue rate sensor
 - Non ratiometric
 - Temperature output for external modeling/compensation
 - Comprehensive Built in Test (BIT)
 - Rate ranges include 110, 50, 200, 300 and 1500 deg/s
 - Bandwidth >50Hz
 - Temperature range $-40\text{ }^{\circ}\text{C}$ to $+75\text{ }^{\circ}\text{C}$
 - Rugged hermetic case for harsh environments & long life
 - High shock and vibration resilience
 - Footprint, 32mm x 32 mm x 21mm
- **Notes:**
 - Not RoHS compliant



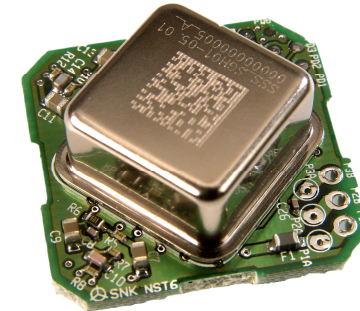
CRS05 Overview

- **Current applications**
 - Commercial avionics
 - Automotive
 - Truck stability control
 - Platform stabilisation
- **Key features**
 - Single-axis analogue rate sensor
 - Ratio metric
 - Rate Ranges include 50, 200 and 75 deg/s
 - Bandwidth 80Hz, 30 Hz and 40 Hz
 - Wide temperature range $-40\text{ }^{\circ}\text{C}$ to $+100\text{ }^{\circ}\text{C}$
 - Open PCB for customer integration
 - Compact footprint, 45mm x 19 mm x 13.9mm
 - PPAP issued January 2005
- **Notes:**
 - Low cost
 - Not RoHS compliant



CRS03/CRS07 (Unpackaged) Overviews

- **Current applications**
 - Model helicopter
- **Key Features**
 - Single-axis analogue rate sensor
 - Ratio metric
 - High rate range of 573 deg/s
 - >55Hz bandwidth
 - Temperature range $-20\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$
 - Compact footprint, 27mm x 27 mm x 13.1mm
- **Notes:**
 - Low cost
 - RoHS compliant



CRS03/CRS07 (Packaged) Overviews

- **Current applications**
 - Antenna stabilisation
 - Automotive after-market
 - Precision agriculture
 - eg - Autosteer & boom stability control
 - GPS compasses & gyro-compasses
- **Key Features**
 - Single-axis analogue rate sensor
 - Ratio metric
 - Rate ranges include 80, 100 and 200 deg/s
 - 10Hz bandwidth
 - Temperature range $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$
 - Metalised housing
 - Pigtail & connector lead or pinned output options
 - Compact footprint, 29mm x 29 mm x 18mm
- **Notes:**
 - Low cost
 - RoHS compliant



Products from Atlantic Inertial Systems

- **Current Applications**
 - Various military applications
 - UAVs and ROVs
 - Navigation & GPS Aiding
 - Rail surveying
 - Platform location
- **Key Features**
 - Full 6 degree of freedom IMUs
 - Rate ranges up to 14,000 deg/s possible
 - Modular architecture for customisation
 - Linear acceleration range of up to 30g
 - Configurable bandwidths
 - Various serial interface options (RS485, PC, ASRAAM, SDLC)
 - Compact footprints
 - IMU02 - 69mm diameter x 31.4mm
- **Notes:**
 - In production
 - Rugged for harsh environments



SiIMU02

SiIMU04



SiNAV02

(MEMS
INS/GPS)

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