



MICRO-MINIATURE STRAIN GAGE UNIT **MICROSGU™**

CURRENTLY INSTALLED IN THE ENGINE
COMPARTMENT OF ALL NASA SHUTTLES

INVOCON, INC.

TECHNOLOGY PROFILE March 2003

The Wireless Strain Gage Solution

The Micro-Miniature Strain Gage Unit (MicroSGU) system is a wireless data acquisition network for dynamic strain sensing and recording applications. The system includes MicroSGU Remote Units, a MicroSGU Receiver Unit, and the Graphical User Interface (GUI).

The **MicroSGU Remote Unit** (pictured at right) is a small battery-powered, autonomous, wireless device designed for trigger initiated acquisition and recording of strain data. Each unit can be wirelessly programmed to sleep in a low power consumption mode until a selected time. Then the remote unit will enter into a circular buffered data trigger mode: sampling at 250 Hz and using programmable trigger threshold levels. Upon detection of a data trigger, 13 minutes of data from each channel is synchronously sampled and recorded at 250 Hz. Finally, upon completion of the programmed event sequence, the unit will re-enter the low power consumption mode to wait for a wireless data download command from the user. Download and event setup commands are issued through the **MicroSGU GUI** running on a PC. The **MicroSGU Receiver Unit** connects to the PC via a standard RS-232 serial port.



The MicroSGU system was designed for NASA and successfully flown on the Shuttle since 2001 to detect strain of components during launch. Other applications where the triggered initiation capability may be appropriate are railroads, bridges, industrial equipment, and other structures or components that experience random stresses.

Specifications

DATA ACQUISITION RATE	250 Hz
EXTERNAL SENSORS	Capable of exciting and synchronously sampling two external strain gages. Optional full-bridge completion configuration; 2.5V excitation; 16-bit A/D; factory programmable gain and 2 nd -order Butterworth filter parameters.
INTERNAL TEMPERATURE	10-bit A/D with quarter degree C resolution.
POWER	Battery powered; 2.8-4.0V input range.
OPERATING TEMPERATURE RANGE	-35°C to +85°C (Reduce battery life by 50% when continuous operation at -35°C.)
BATTERY LIFE	60 cumulative hours of active data acquisition or trigger mode.
MEMORY	In every acquisition event, 13 minutes of data from each channel is stored in non-volatile memory.
PACKAGING	Snap enclosure (pictured) with replaceable internal battery—5.6cm x 4.1cm x 2.8cm Ruggedized housing in current development.
OTHER SENSORS	MicroSGU Remote Units are capable of sampling and recording data from any sensor with an active resistive element.

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System specifications subject to change without notice.
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