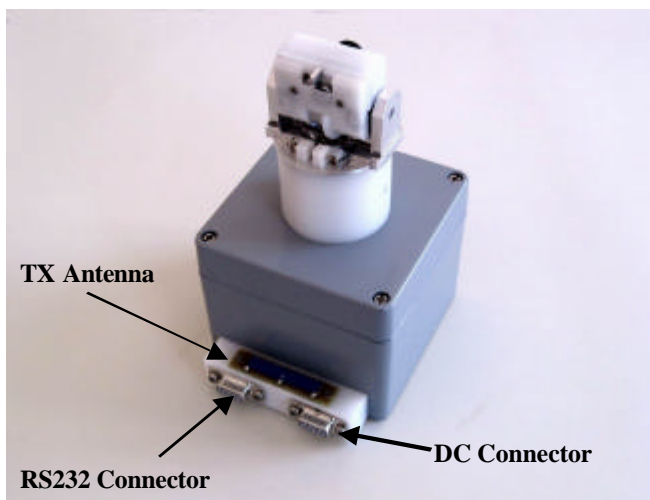
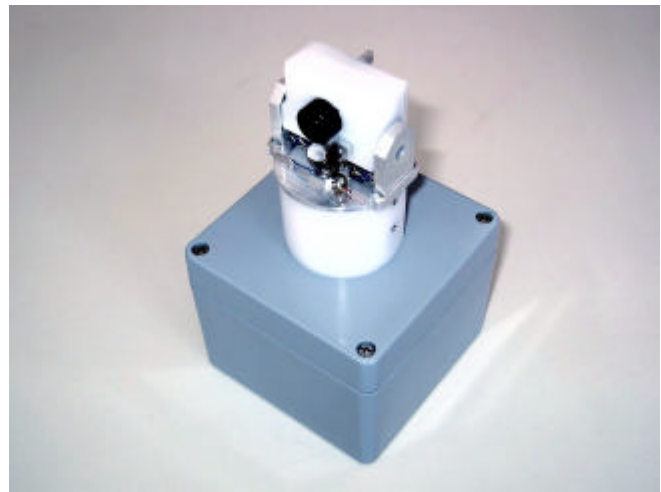


## Fully Steerable Wireless Micro-Camera

The product is a COTS (Commercial Off-The-Shelf) micro-camera working in visible field with possible adaptation in the infrared. The data transmission versus a remote Data Management Centre (DMC) is "wireless". The micro camera is mounted on a remotely controlled micro-platform with azimuth and elevation orientation capability. Possible applications are remote monitoring in space. Main characteristics are: light weight, very low power consumption.



The Micro-camera can be installed either inside a spacecraft or platform for non-contacting telemetry applications (e.g.: taking pictures of moving objects or mechanisms or the temperature map of a heat dissipation plate) or outside the platform to take pictures or films of the deployment of appendages, the separation of satellite from the carrier; rockets intra-stage separations; and other key mission events.

To cope with the worst-case distances possibly existing between the camera and the data point-of-retrieval (e.g. the cabin or a data encoder inside a spacecraft) the micro-camera can be provided with:

- a low data rate wireless bi-directional link operating in the UHF ISM bands (433 MHz) for sending commands to the camera and receiving information on the camera status;
- a high data rate wireless link operating in the ISM S-band (around 2400 MHz) to send live video data (single shots or continuous data streams) to the data point-of-collection.

Both wireless links can be obviously replaced by wired links if preferred by the mission/application.

The system consists of a Remote Sensor Head wirelessly linked to a Central Unit.

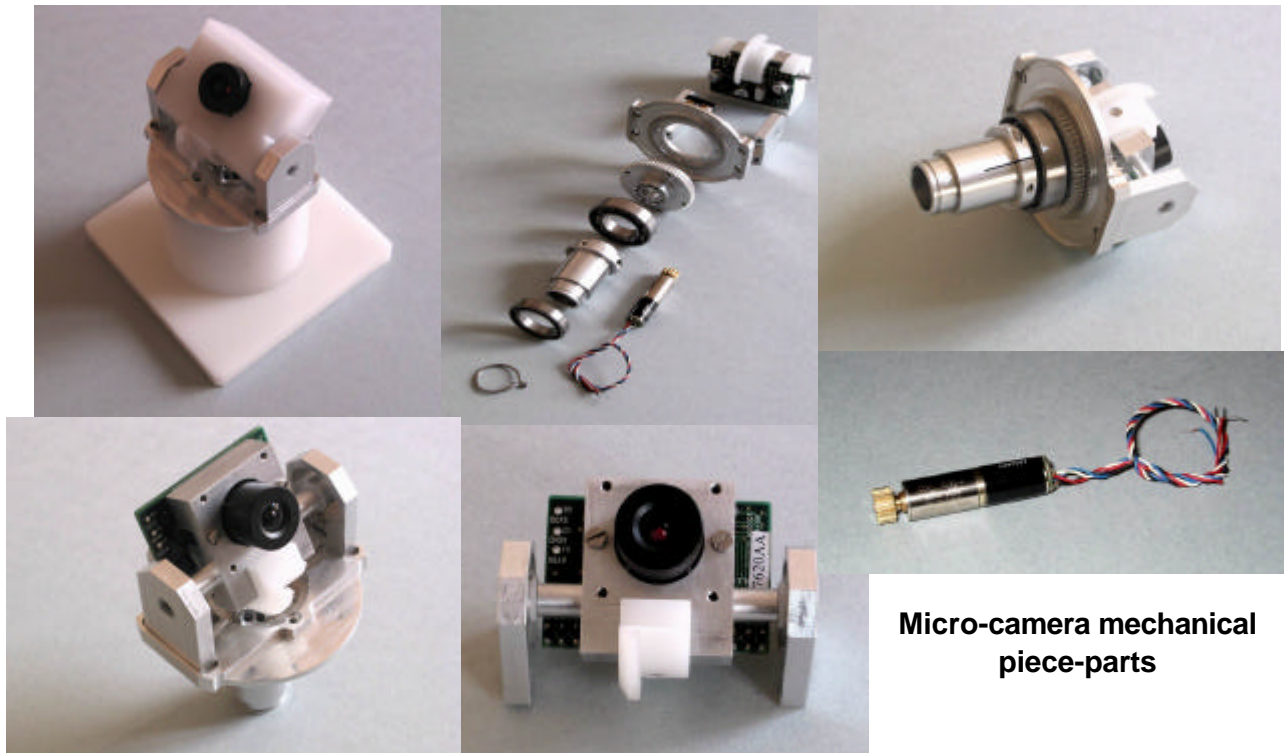
The Remote Sensor Head includes:

- A fully re-pointable commercial micro-camera, which can operate in the visible or infrared bands depending on the User requirements, mounted on an elevation-over-azimuth micro-pedestal.
- Miniaturized 433 MHz receiver and transmitter capable of up to 19 Kbps datarate, which are used to implement a two way narrow-band radio-link with the Central Unit.

- An advanced version of the Remote Sensor Head can also carry a miniaturized S-band transmitter having an instantaneous bandwidth of nearly 4 MHz. This option is implemented on those applications requiring a real-time transfer of the data acquired by the micro-camera.

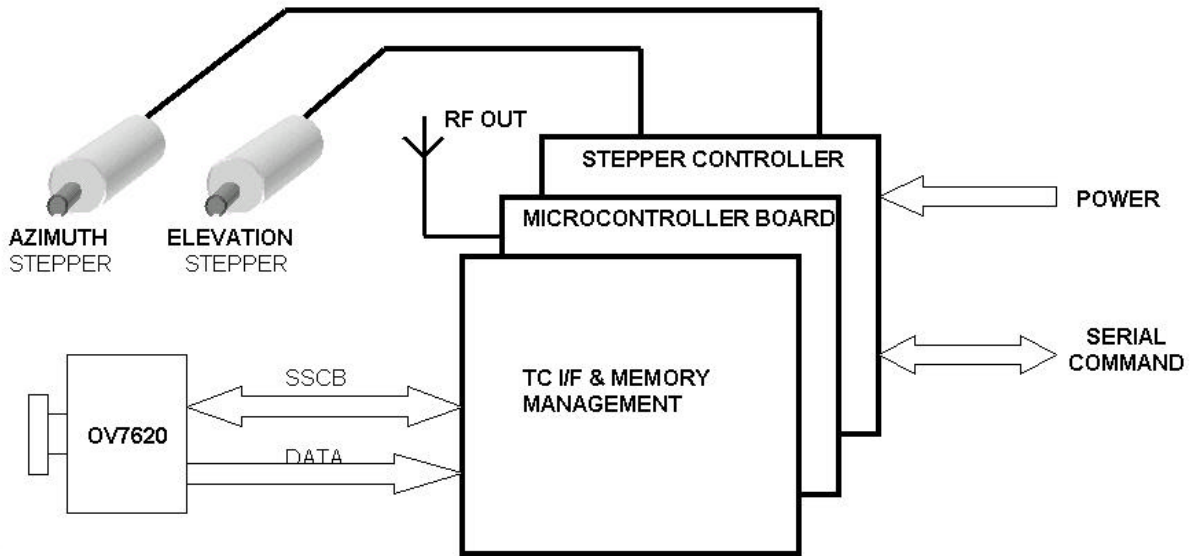
In addition the micro-camera is mounted on a two axis pedestal, each axis being controlled by a micro-stepper motor and a gear.

A remotely settable IC-based pedestal electronic drive, which includes a logic handling the encoder readouts from the pedestal, will manage the commanded pointing and other signals originated by, or destined to, the two-axis pedestal.

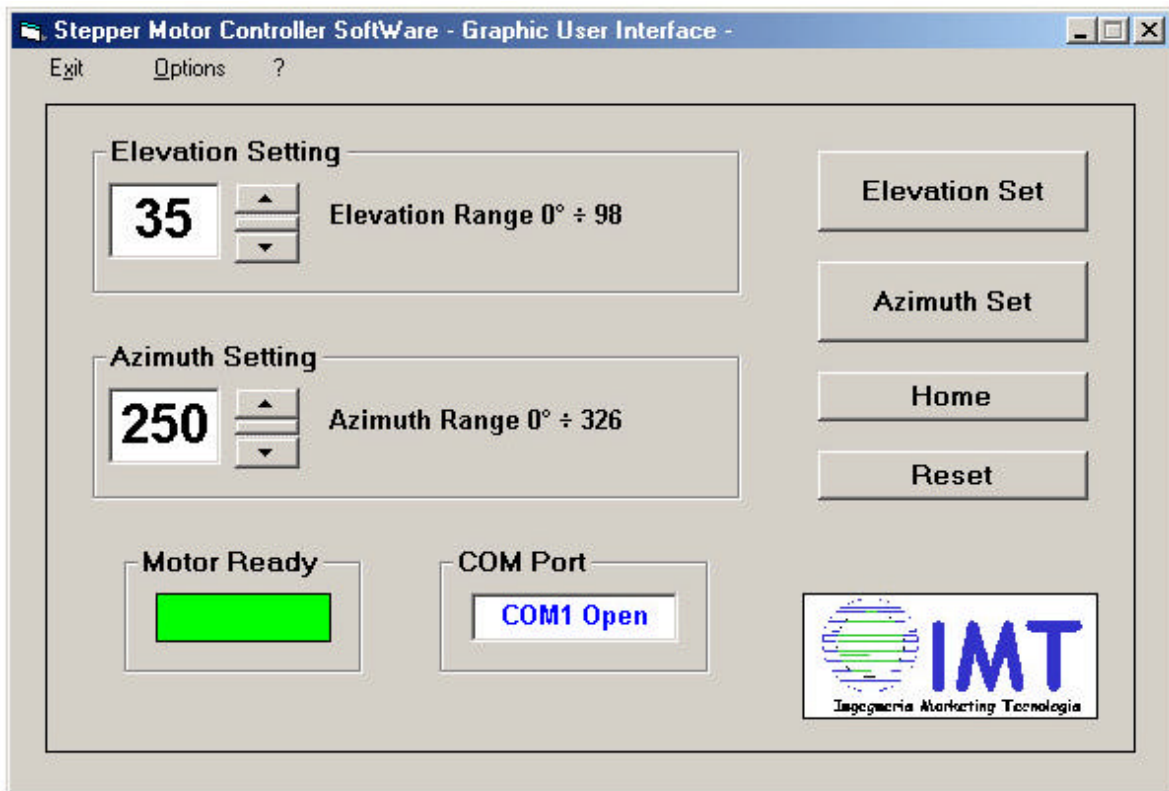


The Central Unit includes:

- A 433 MHz transmitter and receiver capable of up to 19 kbps datarate. The transceiver serves to implement a two-way narrow-band radio-link with the Remote Sensor Head. The transmitter sends telecommands for controlling the Remote Sensor Head operation; the receiver handles the housekeeping telemetry signals relayed by the micro-camera or else can be used to receive the low-speed video read-out from the temporary S.S. memory.
- An advanced version of the Central Unit can carry a miniaturized S-band receiver having an instantaneous bandwidth of nearly four MHz. This option is implemented on those applications requiring a real-time transfer of the data acquired by the micro-camera.
- A data processing facility where the digital videos received via the wideband channel(s) are pre-compressed to cope with the maximum telemetry datarate in the spacecraft platform to ground data-link.



Micro-camera electrical architectural design



Central Unit User Graphics Interface



**Image Acquisition User Interface**

A complete demonstration unit is available for customer verification. A flight unit development would need about 20 weeks for delivery.

### **Micro-camera Specification**

#### **ELECTRICAL**

Power Supply: + 5V

Power consumption - During Stepper motor moving: 480 mA (@ +5.0V)

Image acquisition and transmission: 260 mA (@ +5.0V)

2 Connectors (DB9): 1 for Power supply + 1 for TLC (in the case of 1 way transmission only)

#### **IMAGE TRANSFER**

Up to 30 images/sec depending on transmission datarate capability

#### **MECHANICAL (for the Flight unit)**

Dimensions: 70 mm \* 70 mm \* 130 mm

Weight: about 0.5 Kg

#### **STREERING CAPABILITY**

- 45 to +90 degrees of elevation

-160 to +160 degrees of azimuth

#### **ENVIRONMENTAL**

Temperature: -20°C ÷ +60°C (Qualification)

Vibration: 21 g max - sinusoidal – 20 ÷ 60 Hz (Qualification) 12 g rms - random (Qualification)

#### **LIFE**

5 years for LEO applications (< 1000Km)

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