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# E3R INERTIAL VELOCITY SENSOR

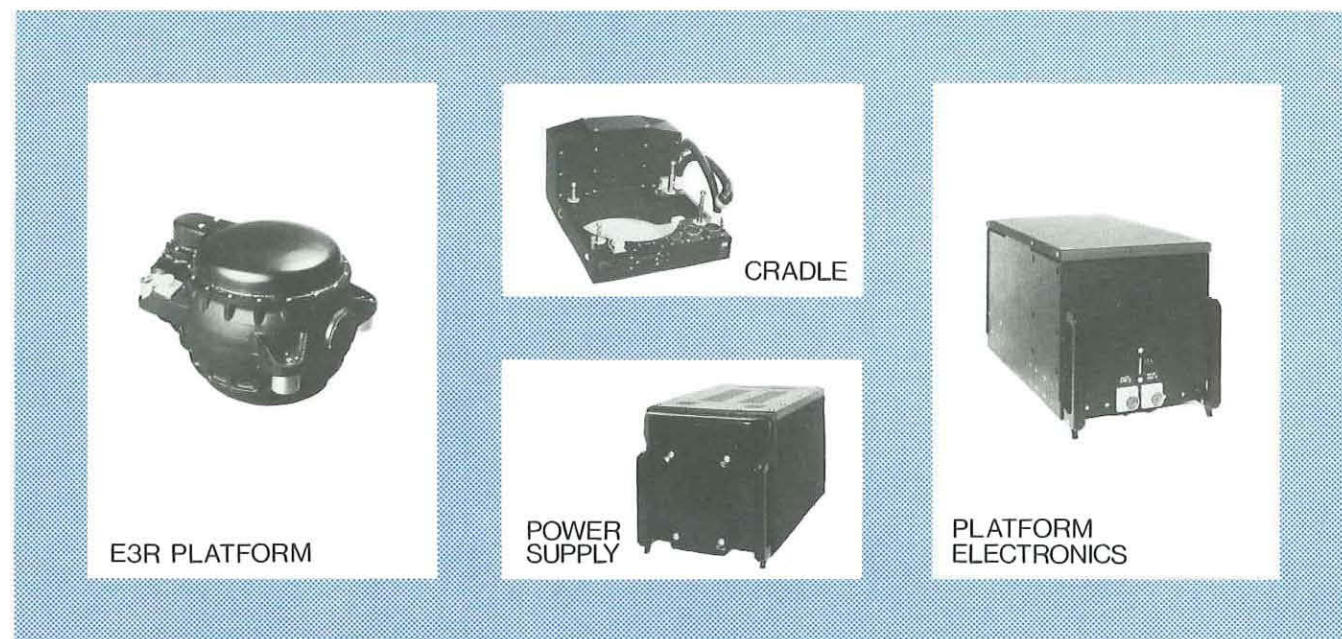


Inertial Navigation

Weapon Aiming

Stabilisation

# The E3R Inertial Velocity Sensor (IVS) consists of...



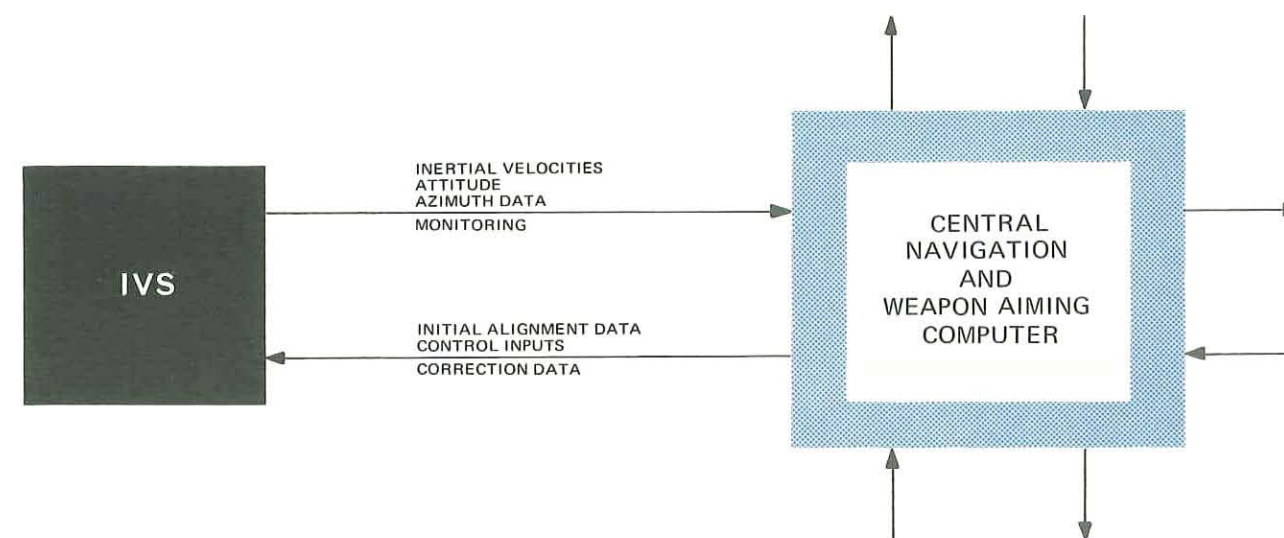
## ...and features

ROTATIONAL AVERAGING MECHANISATION FOR	Low Cost Precision Components High Accuracy Eliminating most 'soft' failures
DIGITAL COMPUTING THROUGHOUT FOR	Flexibility High Accuracy Simplified Interfaces High Reliability and Maintainability Extensive BITE capability
FREE AZIMUTH REFERENCE FOR	Worldwide operation capability Improved Azimuth drift performance

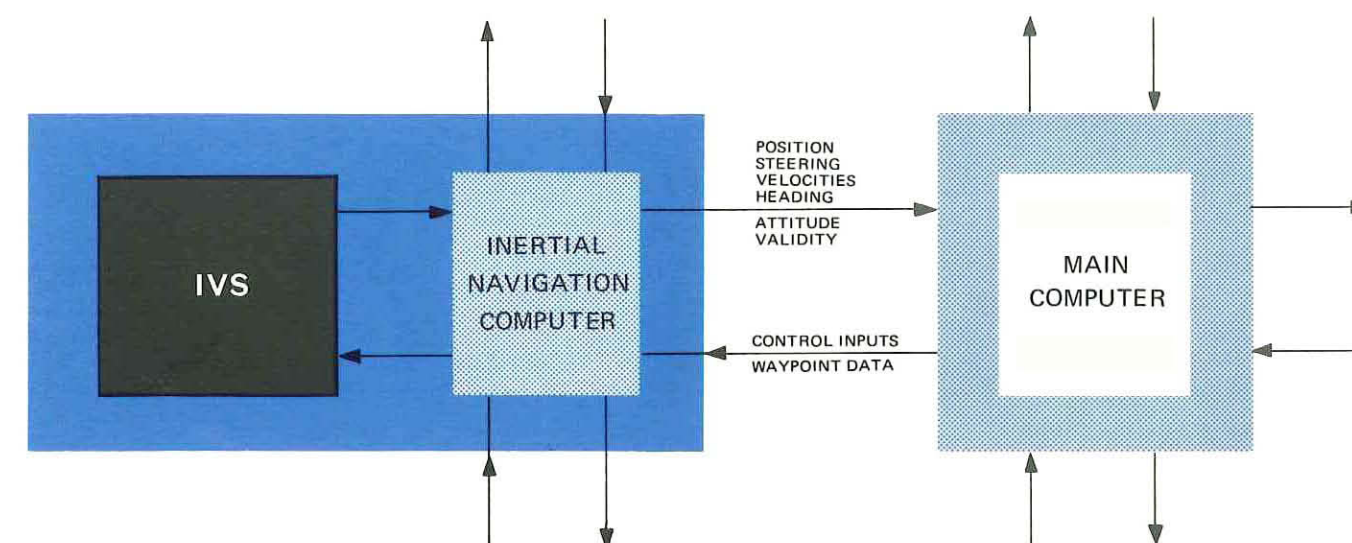
# The IVS concept...

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... offers a LOW COST INERTIAL NAVIGATION configuration within avionics systems featuring a CENTRAL COMPUTER:



Within avionics systems featuring DISTRIBUTED COMPUTERS the IVS can be used for INERTIAL NAVIGATION by the addition of an Elliott Microminiature digital navigation computer of the 900 series:



# The Units are...

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## The E3R Platform

This is a fully manoeuvrable, four gimballed platform which is the prime source of heading, attitude and acceleration information. It incorporates 3 single degrees of freedom gyros and 3 accelerometers in an 'inside out' gimbal configuration for increased accessibility. It is normally anti-vibration mounted in a cradle which also contains some of the electronics intimately connected with the platform operation.

### Rotational Averaging

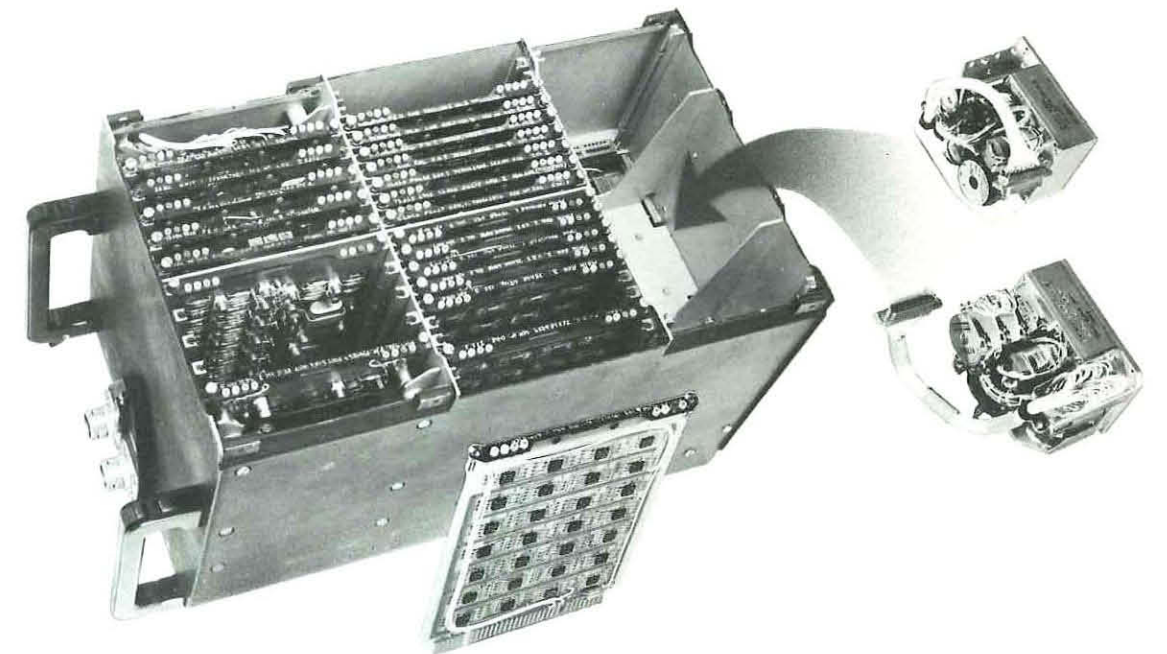
In the E3R platform, the vertical gyros and the horizontal accelerometers are rotated at a constant spatial rate about the azimuth axis. This averages out errors generated in the system by biases which are constant in the rotating axis frame.

With a normal high grade non-rotated inertial system of comparable performance, gyros having long term drift rates better than 0.01 %/hr. and accelerometers with high bias stability with time and temperature must be used.

The rotational averaging in the E3R system enables relatively cheap gyros and accelerometers to be used, for example the gyro drift of 0.1%/hr. is effectively reduced to less than 0.01%/hr. It also attenuates the effect of soft failures due to changes in performance of the precision components and extends the periods between routine calibrations.

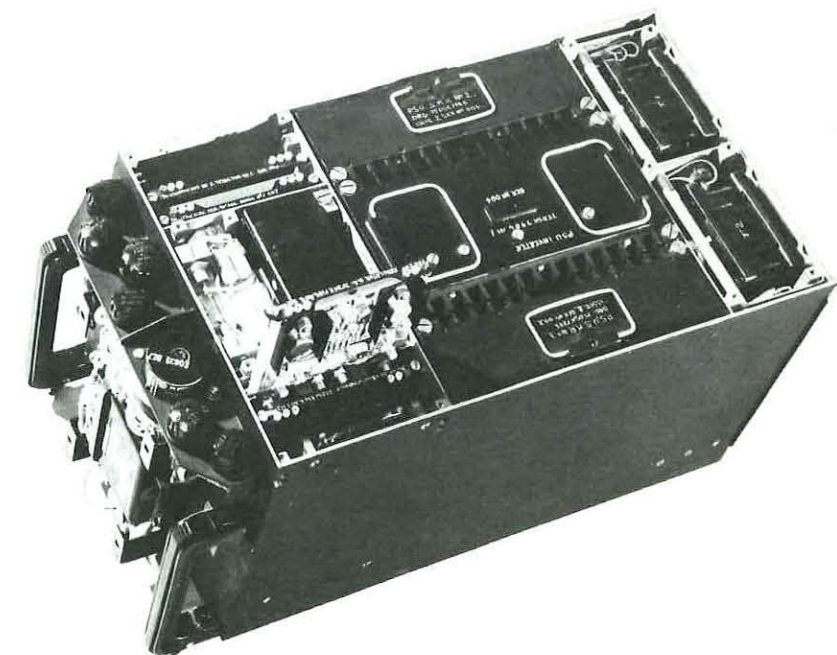
## The Platform Electronics Unit

This unit processes the data from the platform to produce outputs of inertial velocity and attitude information. It generates the signals to complete the Schuler feedback loops to the platform. Also contained within the unit are control, automatic sequencing and BITE circuitry for the IVS.



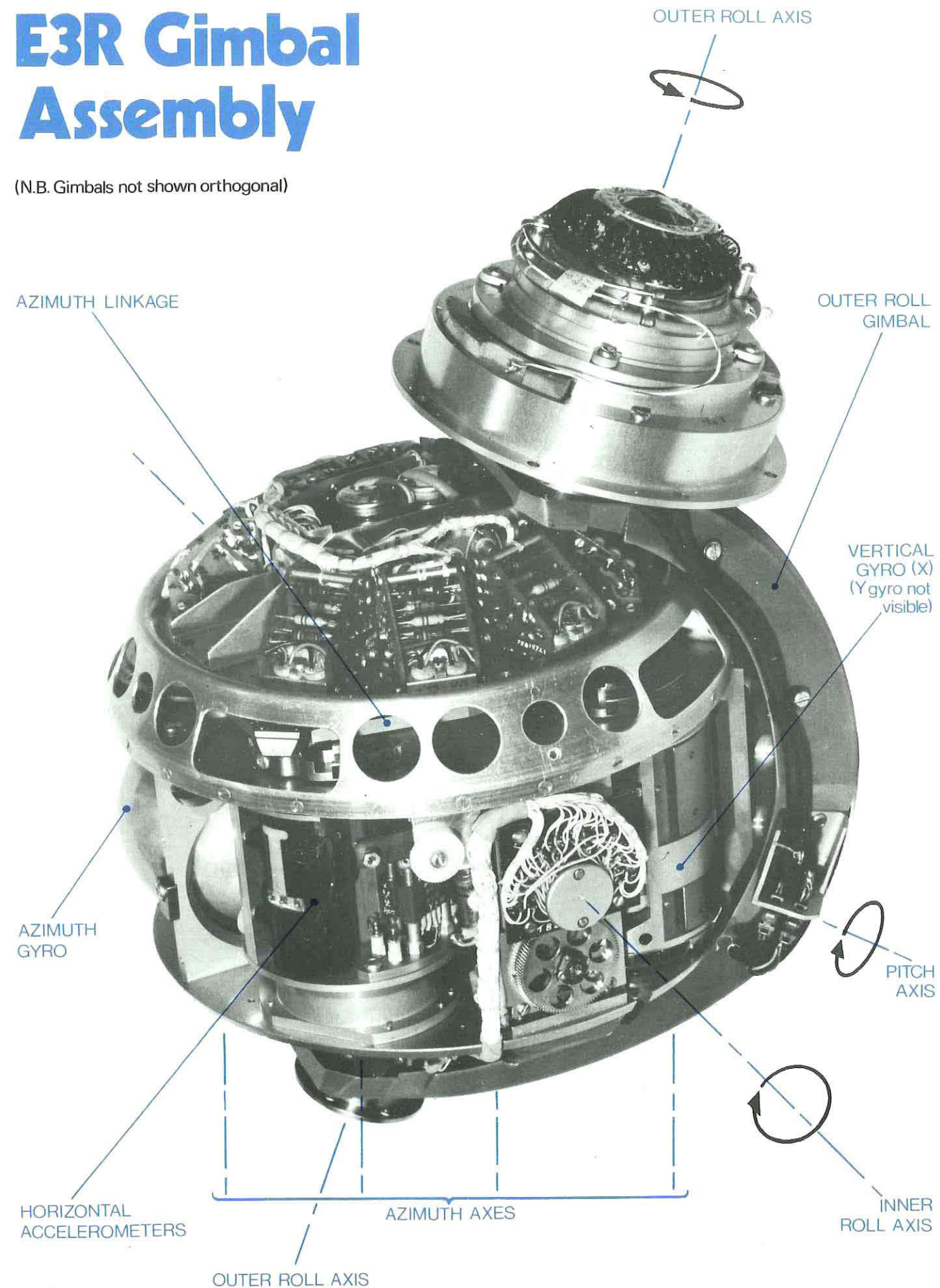
## The Power Supply Unit

This unit generates the stabilised supplies for the IVS from the aircraft 28V. d.c. supply, and heater supplies from the 200V. 400 Hz supply.



# E3R Gimbal Assembly

(N.B. Gimbals not shown orthogonal)



## Characteristics

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Unit	Platform and Cradle	Platform Electronics Unit	Power Supply Unit
Size (cm.)	33.8W x 39.7L x 26.5H	¾ ATR (Short) 19.1W x 32.0L x 19.4H	¾ ATR (Short)
Weight (Kg.)	23.6	9.5	15.4
Power	+ 28V d.c. 200V 400 Hz.	650W (Max.) 1KVA (Max. at Switch on for Heating)	
Accuracy	EQUIVALENT POSITION ERROR < 2nm/hr. C.E.P. ATTITUDE READOUT ERROR < 0.1°		
Inputs	CONTROL SIGNALS INITIAL ALIGNMENT DATA CORRECTION DATA		
Outputs	INERTIAL VELOCITIES ATTITUDE AND AZIMUTH DATA VALIDITY SIGNALS		

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