

Systems Development Stabilized Scan Mirror Assemblies

Features

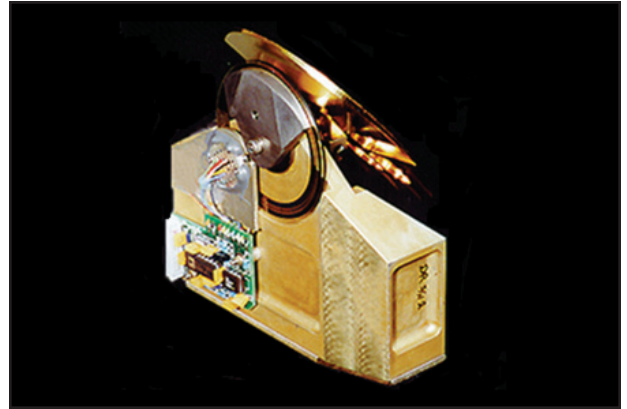
- Two independent Axes Optimized for Packaging Constraints
- High Resolution Optical Encoders
- Strap-down Gyro Design
- Digital Servo Control Electronics

The Systems Development Department has developed a two-axis, stabilized, scanning and pointing mirror assembly. Two independent single axis scanners are utilized to provide an active/passive imaging reconnaissance system for the Airborne Stand-off Minefield Detection System (ASTAMIDS).

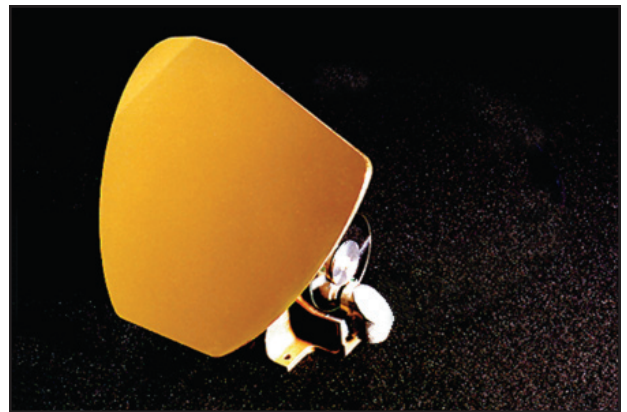
The two, single-axis stabilized mirror assemblies utilize strapdown rate sensors to derive body attitude information for a digital servo controller. Optical encoders provide high-resolution position (18 bit) feedback to the controller. High efficiency torque motors are used to drive the mirrors. The scan and stabilization functions are fully programmable via a VMEbus interface.

The mirror assembly provides a four-inch clear optical aperture with programmable scan patterns for both axes. Controller algorithms accommodate a three-axis inertial vector, calculating the appropriate coordinate transform to point and stabilize the line-of-sight.

On-gimbal electronics include gyro and encoder processing electronics as well as analog electronics to provide power to the torque motors. Off-gimbal electronics include a commercial VME based C-40 board for algorithm processing and a custom daughterboard for a high speed serial interface to the on-gimbal electronics.



Down Range Scanner



Cross Range Scanner

Typical Characteristics

CROSS RANGE SCANNER:

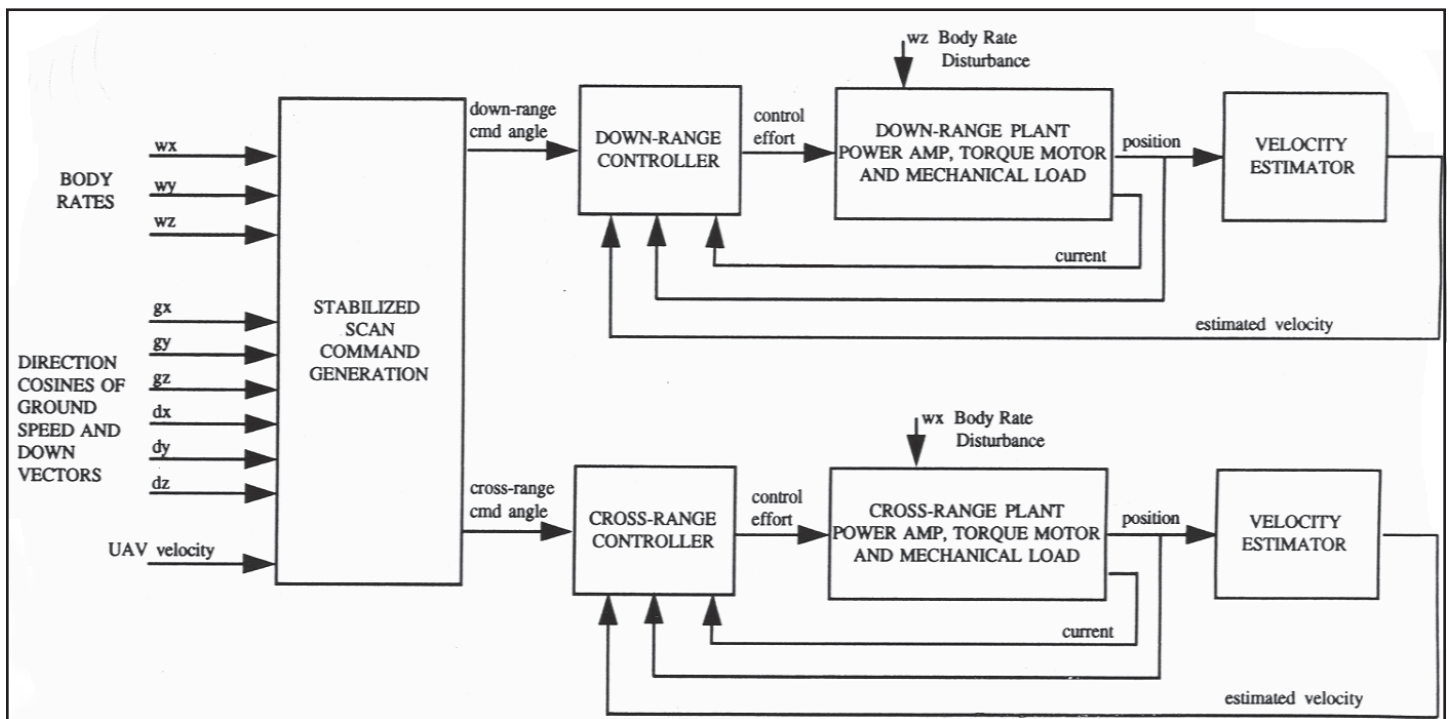
Cross Range Optical Look Angle: ± 40 deg
 Position Loop Bandwidth: > 100 Hz Type II Servo
 Platform Isolation: < 400 μ Rad RMS (Optical) with
 15 deg/sec pk-pk input (0.5 to 10 Hz)
 Scan Velocity Limit: 12.56 Rad/sec (Optical)
 Scan Acceleration Limit: 1100 Rad/sec² (Optical)
 Position Accuracy: 556 μ Rad Peak
 Position Resolution: 24 μ Rad

DOWN RANGE SCANNER:

Down Range Optical Look Angle: ± 22 deg
 Short Term Drift: 150 deg/hr
 Position Loop Bandwidth: > 100 Hz Type II Servo
 Platform Isolation: < 200 μ Rad RMS (Optical) with
 15 deg/sec pk-pk input (0.5 to 10 Hz)
 Scan Velocity Limit: 6.28 Rad/sec (Optical)
 Scan Acceleration Limit: 550 Rad/sec² (Optical)
 Position Accuracy: 556 μ Rad Peak
 Position Resolution: 24 μ Rad

COMBINED POWER:

Power: +35 VDC @ 0.6 A, stationary
 +35 VDC @ 10 A, full torque
 ± 15 VDC @ 1 A
 +5 VDC @ 1.2 A



Cross-Range and Down-Range Servo Systems

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