

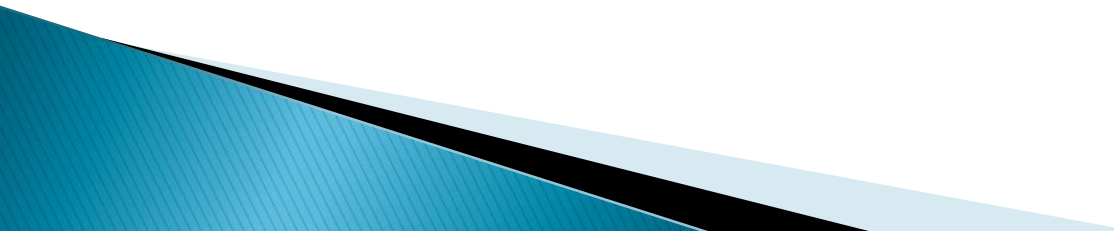
INTRODUCTION TO RADAR SYSTEMS

UNIT-III
Lecture-2

Conical Scan

- ▶ A logical extension of the simultaneous lobing technique described in the previous section is to rotate continuously an offset antenna beam rather than discontinuously step the beam between four discrete positions.
 - This is known as conical scanning.

Characteristics

- ▶ The angle between the axis of rotation and the axis of the antenna beam is called the squint angle.
 - ▶ The echo signal will be modulated at a frequency equal to the rotation frequency of the beam.
 - ▶ The amplitude of the echo-signal modulation will depend upon the shape of the antenna pattern, the squint angle, and the angle between the target line of sight and the rotation axis.
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Block diagram

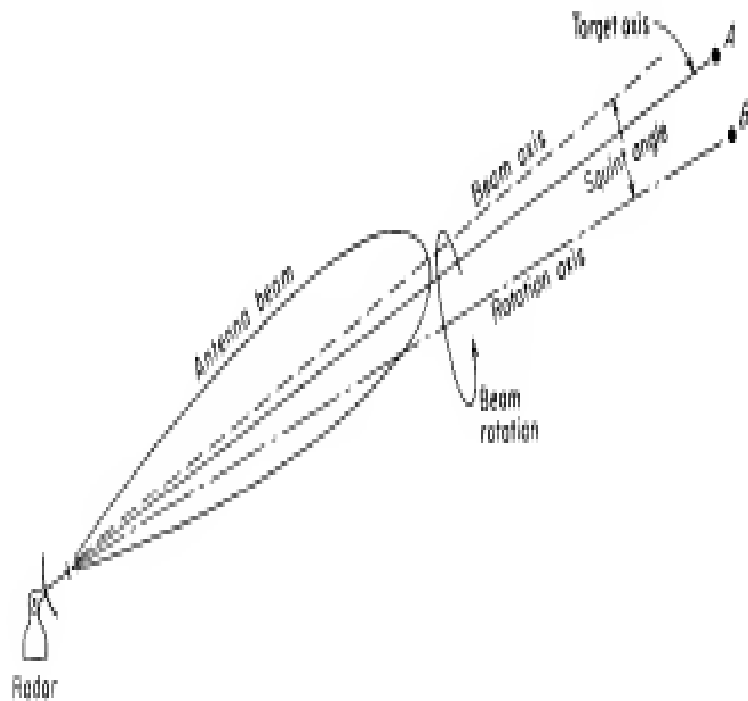


FIG. 5.2. Conical-scan tracking.

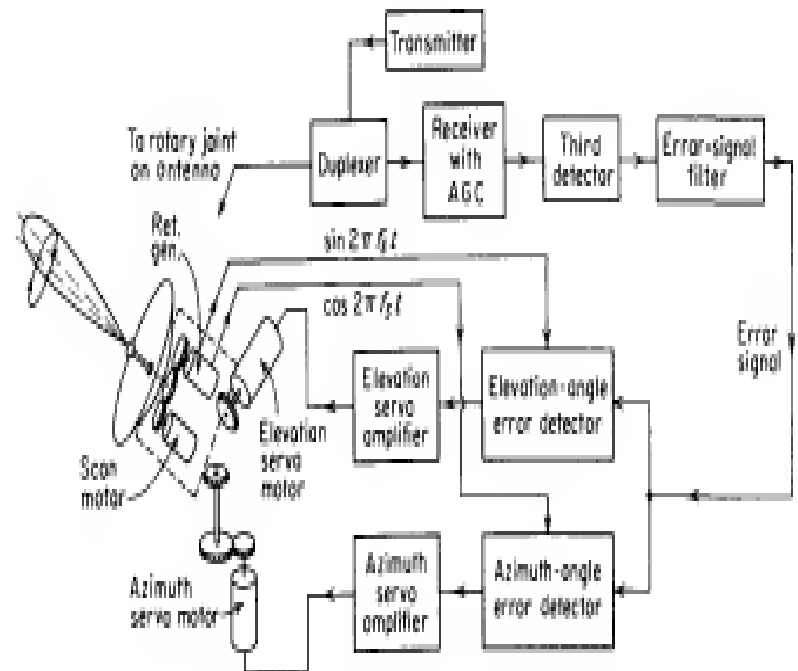
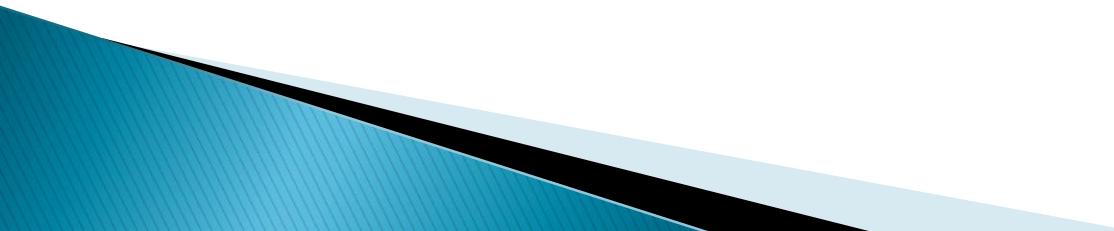
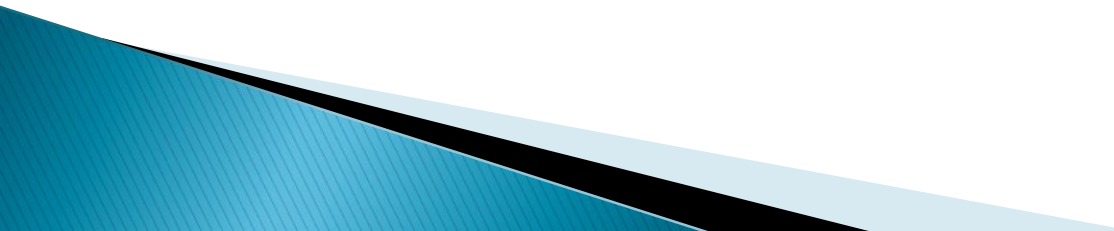


FIG. 5.3. Block diagram of conical-scan tracking radar.

Description

- ▶ The phase of the modulation depends on the direction of the angle between the target and the rotation axis.
 - ▶ The conical-scan modulation is extracted from the echo signal and applied to a servo-control system which continually positions the antenna on target.
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Contd.

- ▶ When the antenna is on target, the line of sight to the target and the rotation axis coincide, and the conical-scan modulation is zero.
 - ▶ A block diagram of the angle-tracking portion of a typical conical-scan tracking radar.
 - ▶ The antenna is mounted so that it can be positioned in both Conical-scan tracking.
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Contd.

- ▶ The antenna beam is offset by tilting either the feed or the reflector with respect to one another.
- ▶ One of the simplest conical-scan antennas is a parabola with an offset rear feed rotated about the axis of the reflector.

Contd.

- ▶ If the feed maintains the plane of polarization fixed as it rotates, it is called a nutating feed.
 - ▶ A rotating feed such as is used in the SCR-584 rotates a dipole and thus rotates polarization. The latter type of feed requires a rotary joint. The nutating feed requires a flexible joint.
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