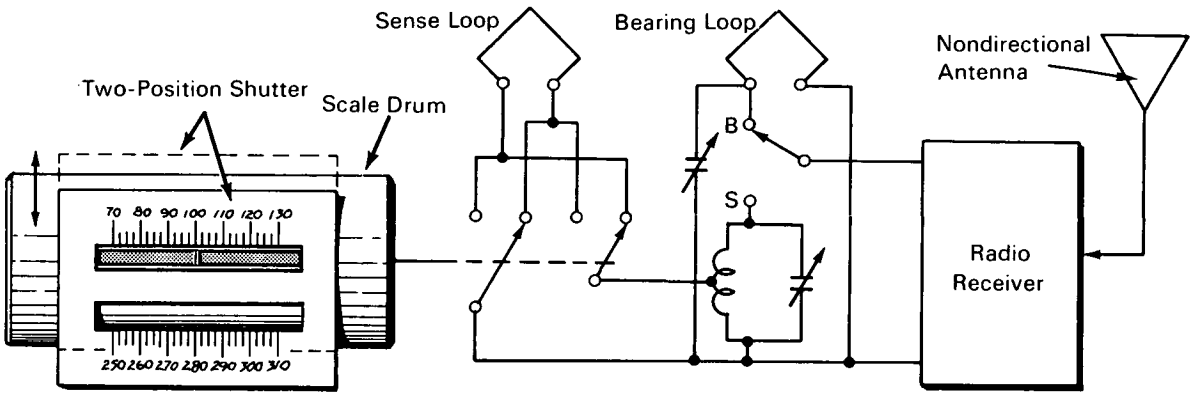
September 1970

Brief 70-10422

NASA TECH BRIEF

Improved Manual Radio Frequency Direction Finder



The standard procedure for taking a bearing on a radio signal is to rotate an antenna loop direction finder until the received signal intensity is minimal. The ordinary rotating loop direction finder indicates two bearings—180° apart—when the loop is rotated through one complete cycle. The conventional method of determining which is the true bearing introduces possible error due to misjudgement of the signal intensity and requires two complete rotations of the loop.

A new rf direction finder has been developed that requires only one rotation. The antenna loop direction finder, shown in the figure, consists of two separate loops mounted rigidly together at right angles to each other. The loops, one for bearing, the other for sensing, are rotated manually. The sensing loop, in conjunction with a nondirectional antenna, produces a signal with a directional pattern. The maximum signal portion of the pattern, which has a single null position, is used to determine the difference between the maximum and minimum signal intensities.

When the bearing loop is in an angular position for a null signal, the sense loop is in an angular position for either a minimum or maximum signal when combined with the nondirectional antenna signal. A switch reverses the connections of the sensing loop, to simulate a 180° rotation. The two positions of the switch produce a maximum and a minimum signal. The difference in the audio output of the radio receiver is readily apparent when the switch is changed from one position to the other. The manual reverse switch also selects the proper scale on a bearing indicator by actuating a two-position shutter.

The entire procedure can be summarized as follows: tune in station, rotate loop to obtain the minimum signal intensity, set mode select switch to "sense," and set the manual reverse switch to the maximum signal position. The proper bearing is obtained with only one rotation of the antenna loop.

Notes:

1. This innovation provides a means for visually determining antenna-to-signal source alignment in both of the antenna alignment modes and could be useful in commercial marine and aircraft navigation.

(continued overleaf)

2. Requests for further information may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B70-10422

Patent status:

No patent action is contemplated by NASA.

Source: T.L. Greenwood
Marshall Space Flight Center
(MFS-20507)