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Standard Adjustment Criteria For
Airborne Localizer And Glide Slope Receivers

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STANDARD ADJUSTMENT CRITERIA FOR
AIRBORNE LOCALIZER AND GLIDE
SLOPE RECEIVERS

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ERRATA

In Paragraph 4.2, Page 3, please change the words "Glide Slope Centering Signal" to read "Glide Slope Deviation Signal" and the words "Standard Localizer Centering Signal" to read "Standard Localizer Deviation Signal".

L. M. Sherer
Executive Secretary
FOREWORD

This report, prepared by RTCA Special Committee 98, was accepted by the Executive Committee of the Radio Technical Commission for Aeronautics under date of March 14, 1963. It thereby becomes an official Paper of RTCA and is distributed as such.

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STANDARD ADJUSTMENT CRITERIA
FOR AIRBORNE GLIDE SLOPE AND LOCALIZER RECEIVER

1.0 PURPOSE

This Paper sets forth recommended procedures for the adjustment of airborne Glide Slope and Localizer receivers in a manner which will assure that these equipments will perform their intended functions under all conditions normally encountered in routine aeronautical operations.

NOTE: Adjustment Procedures which provide equivalent results may be used in lieu of those recommended herein.

2.0 GENERAL REQUIREMENTS

2.1 Operation of Receiver

The receiver shall be operated in accordance with the manufacturer's instructions regarding alignment of circuits, primary power input voltage(s), loading of output circuits, warm-up time, and such other conditions as are essential to normal operation of the equipment.

2.2 Signal Generators

The signal generators used for the adjustment procedures shall be capable of accurately providing the Standard Test Signals specified in Section 3.0 of this Paper.

2.3 RF Input Voltage

The "rf input voltage" is defined as the "open circuit" voltage of the circuit connected to the receiver input. The rf input voltages specified herein define the input requirements to a receiver designed for use with transmission line having a characteristic impedance of 52 ohms. When a receiver designed for use with transmission line having other than 52 ohms characteristic impedance is adjusted, the required rf input voltages shall be computed according to the following equation:
\[ E_{in} = \sqrt{E_a^2 \times \frac{R}{52}} \]

WHERE:

- \( E_{in} \) is the computed required input voltage to the receiver. \( E_a \) is the input voltage specified herein.
- \( R \) is the characteristic impedance of the transmission line for which the receiver is designed.

3.0 STANDARD TEST SIGNALS

3.1 Standard Glide Slope/Localizer Test Signal

An rf carrier amplitude modulated simultaneously by sine wave audio signals of 90 cps ±0.3% and 150 cps ±0.3%, each of which is individually adjusted to provide 40% modulation of the carrier for Glide Slope, and 20% modulation of the carrier for Localizer. The 90 and 150 cps modulation signals shall be so phase locked that the positive-going zero of each third cycle of the 90 cps signal and of each fifth cycle of the 150 cps signal occur simultaneously.

3.2 Standard Glide Slope/Localizer Centering Signal

A Standard Test Signal in which the ratio of the 90 cps and 150 cps modulation signals is 0 db or in which the difference in depth of modulation (ddm) is less than .002 ddm.

NOTE: Difference in depth of modulation (ddm) is the percentage of modulation of the stronger signal minus the percentage of modulation of the weaker signal, divided by 100.

3.3 Standard Glide Slope/Localizer Deviation Signal

A Standard Test Signal in which the ratio of the 90 cps and 150 cps modulation signals is 2 db for Glide Slope and 4 db for Localizer, or in which the Difference in Depth of Modulation (ddm) of the modulation components is .092 ddm to 1.002 ddm.
NOTE: Where the percent modulation of the modulation signals is altered to provide a Standard Deviation Signal, the increase in percent modulation of the stronger signal shall be equal to the decrease in percent modulation of the weaker signal.

4.0 RECEIVER ADJUSTMENT

4.1 Deviation Indicator Centering

Apply to Glide Slope Receivers a 700 microvolt Standard Glide Slope Centering Signal and to Localizer Receivers a 1000 microvolt Standard Localizer Centering Signal and adjust the centering/balance control of the receiver to produce an on-course indication or zero indicator deflection.

4.2 Indicator Deflection Sensitivity

Apply to Glide Slope Receivers a 700 microvolt Standard Glide Slope Deviation Signal and to Localizer Receivers a 1000 microvolt Standard Localizer Deviation Signal and adjust the course sensitivity control of the receiver to produce Standard Deflection ±5% on the Deviation Indicator. The error should be balanced between the 90 cps and 150 cps sectors.

NOTE: In the case of receivers designed for use with ID-48 or equivalent indicators (1000Ω, 150-0-150 μA), Standard Deflection is 78 microamperes for Glide Slope and 90 microamperes for Localizer. In the case of receivers designed for use with other than ID-48 type indicators, Standard Deflection shall be 52% of center to that scale deflection obtained with a ddm of 0.175 for Glide Slope and 60% of center to that scale deflection obtained with a ddm of 0.155 for Localizer.

4.3 Course Softening (Glide Slope Only)

NOTE: The following adjustment is to be made only on receivers equipped with a Course Softening control.
Apply a Standard Glide Slope Deviation Signal of 14,000 microvolts and adjust the course softening control of the receiver to produce Standard Deflection ±5% on the Deviation Indicator.

4.4 Flag Alarm

NOTE: Flag Alarm performance, especially in varying environments, is a function of receiver design. Because of this, specific criteria for Flag Alarm adjustment cannot be defined herein. Adjustment should be such as to result in flag performance as specified below. (Consult the receiver manufacturer's recommended adjustment procedures for specific details.)

Alternately apply a Standard Glide Slope/Localizer Test Signal of a level equal to the rated receiver sensitivity and 20,000 microvolts, and adjust the alarm circuitry to produce that threshold value of current required to activate the alarm to its "out of sight" or "off" condition, plus a minimum of not less than 10% additional "safety factor" current. The adjustments made to meet this requirement shall provide the following additional alarm performance automatically without further readjustments:

The alarm shall be plainly visible or in the alarm condition
a. With the loss of either modulation signal from the rf signal.

b. With the complete loss of rf input signal.

c. When both modulation signals are decreased by 50% of standard value.

4.5 Performance Check

Upon completion of the adjustments required by paragraphs 4.1, 4.2, 4.3 and 4.4, check the receiver performance. If further adjustment is necessary due to interaction of controls or for other causes, repeat the adjustment procedures as necessary to attain compliance with the stated performance requirements.
MEMBERSHIP

Special Committee 98

Standard Adjustment Procedures
for Airborne ILS Glide Slope and Localizer Receivers

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