

Analyze your TACAN and DME ground equipment

The R&S®EDST300 efficiently and precisely analyzes TACAN and DME ground stations, making it ideal for commissioning and regular maintenance.



Background

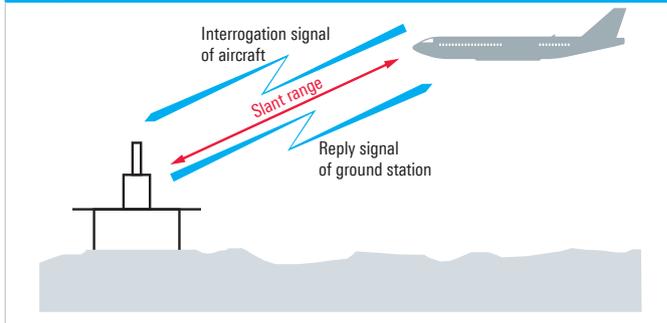
TACAN and DME installations are terrestrial systems that provide pulsed-based navigation signals in the frequency range from 962 MHz to 1213 MHz. Both systems are used by civil aircraft to determine the slant distance of an aircraft to the ground station. Military aircraft additionally use the bearing angle between the aircraft and the ground station that is offered by TACAN stations.

To determine the distance, the aircraft interrogator sends a double pulse. The ground station (transponder) replies to this request pulse after its internal main delay with an offset of 63 MHz. The aircraft receiver uses the round trip time of the double pulses to determine the distance (slant range) to the ground station.

Your task

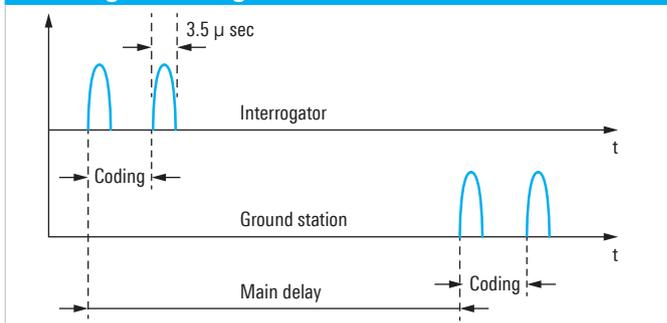
Terrestrial navigation systems such as ILS, TACAN and DME are subject to highest safety requirements. To ensure precise operation and worldwide compatibility, the International Civil Aviation Organization (ICAO) standardized critical parameters. Service providers regularly monitor,

Simplified illustration of a DME system



check, calibrate and certify TACAN and DME ground equipment to ensure conformance with the specification – essential for ensuring public safety and for military utilization. This calls for robust and reliable test equipment that meets all relevant requirements, from calibration to installation and regular maintenance.

DME signal timing

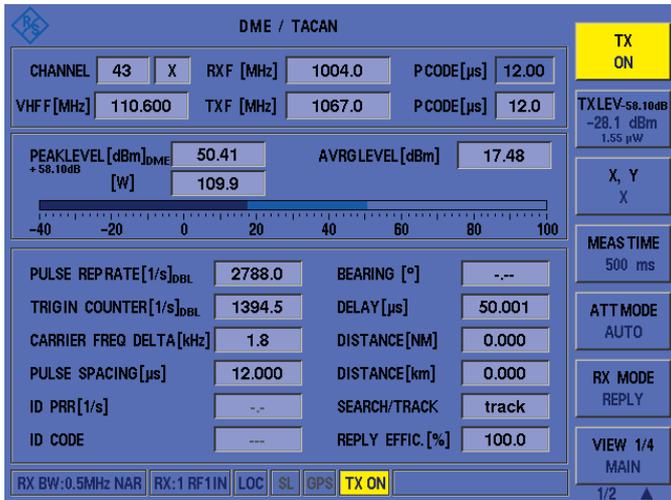


T&M solution

The R&S®EDST300 TACAN/DME station tester is a portable, battery-powered analyzer designed for commissioning, testing and servicing pulsed terrestrial navigation systems. It accurately and efficiently performs all specified TX/RX measurements in line with the relevant civil and military standards. Its wide dynamic range and compact design make the R&S®EDST300 ideal for both analyses on the RF output of the station and – in combination with the R&S®EDST-Z1 test antenna – measurements in the field.

Simply connect the R&S®EDST300 via a directional coupler or an attenuator to the DME or TACAN ground station. Select the DME channel frequency, set the external attenuation and switch on the integrated interrogator (R&S®EDST-B2 option) to immediately measure and display

the most relevant parameters, including on-channel peak and average power, transmitter frequency, pulse spacing (coding), pulse repetition rate, main delay, reply efficiency and ID code.

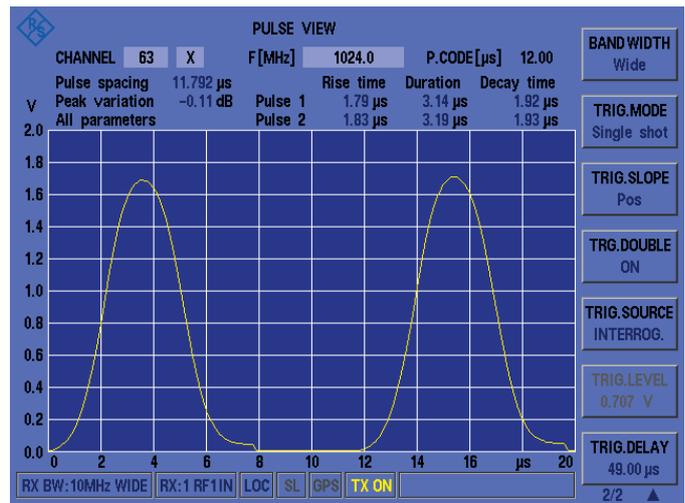


R&S®EDST300 DME/TACAN main view.

Varying the interrogator TX peak power leads to the reply delay variation with level parameter. To determine the sensitivity of the TACAN/DME ground equipment, the peak power is reduced until the reply efficiency drops to 70%. The R&S®EDST300 also supports convenient measurement of adjacent channel rejection and decoder rejection and performs the loading test with up to 6000 TX pulse pairs/s.

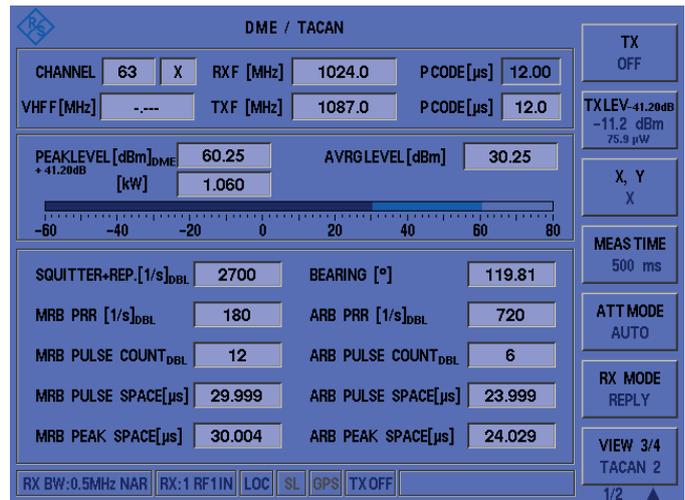
The pulse bandwidth measurement of the station under test is performed by tuning the RX frequency to ± 800 kHz and ± 2 MHz offsets. Thanks to the 500 kHz analysis bandwidth of the R&S®EDST300, the results can be directly compared with the on-channel peak power measurement to check the spectrum mask. In pulse view mode (R&S®EDST-K2 option), the pulse rise time, fall time and duration are automatically measured for the first and second pulse. This mode also measures the peak variation and supports droop measurements, for example on MRBs or ARBs of TACAN stations. The R&S®EDST300 also decodes the identifier and performs detailed measurements on the ID code timing, including ID period, dot and dash length, dot-dash and letter gaps and equalizer pulse time.

The R&S®EDST-K1 option adds dedicated TACAN analysis capabilities to the R&S®EDST300. This includes analysis of the main reference burst (MRB) and the auxiliary reference bursts (ARB) plus the determination of their pulse repetition rate, pulse count and pulse spacing.



R&S®EDST300 pulse view.

To measure TACAN signals in the field, connect the R&S®EDST-Z1 test antenna to the R&S®EDST300. Besides TACAN bearing, it measures the modulation depth and modulation frequency of the 15 Hz and 135 Hz AM signal components and determines the phase relationships.



R&S®EDST300 TACAN measurements.

Summary

The R&S®EDST300 is a flexible, compact and easy-to-use solution to carry out test cases in line with civil and military standards with a single instrument. Some measurements such as dead time, recovery time and echo suppression require a second signal source. With the R&S®SMBV100A vector signal generator, full test cases as required for DME and TACAN stations can be covered.

See also

www.rohde-schwarz.com/product/EDST300

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