

AN/SRC-30(XN-1) UHF SSB

Radio Set

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The AN/SRC-30(XN-1) is being developed to determine if UHF single sideband can improve UHF ship-to-ship communications. The new radio set will utilize existing equipment wherever possible to reduce development time and cost and to provide a high degree of commonality between HF and UHF systems.

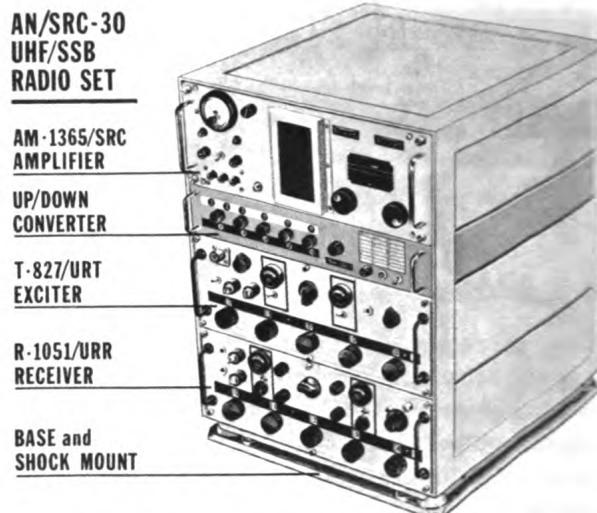
It will use the T-827/URT HF SSB exciter and R-1051/URR HF radio receiver (components of AN/WRC-1), the AM-1365/SRC 400 watt PEP UHF linear amplifier, and an up/down frequency converter. The up/down frequency converter will translate the output of the T-827/URT to drive the AM-1365/SRC UHF linear amplifier. The converter will also translate received UHF signals down to HF to permit reception with the R-1051/URR.

The AN/SRC-30(XN-1) will have CW, FSK, USB, LSB and ISB capability. It will also be capable of transmitting carrier plus one sideband (AM equivalent) to permit communication with existing AM equipment in high speed aircraft (where the doppler shift is excessive for SSB suppressed carrier).

The frequency of the AN/SRC-30(XN-1) will be controlled by a high stability internal standard. It can also be controlled by the ship's central frequency standard; the frequency stability will then be in the order of 1 part in 10^8 per 6 months.

A substantial improvement in signal-to-noise ratio in typical UHF military radio receivers is sacrificed because of excessive bandwidth. The bandwidth of the IF strip in the receiver portion of typical UHF radio sets (such as the AN/GRC-27 and AN/SRC-20) is in the order of 80 to 100 kilocycles. The noise is directly proportional to the receiver bandwidth. A receiver bandwidth of 3 kilocycles is entirely practical if high frequency stability and single sideband techniques are used. The IF bandwidth of the R-1051/URR is approximately 3 kilocycles.

By suppressing the carrier and transmitting only one sideband, existing UHF linear power amplifiers can be driven up to four times the sideband power



AN/SRC-30(XN-1) UHF SSB radio set now under development.

that is available when amplitude modulation is used (assuming the same degree of envelope distortion). Thus standard UHF linear power amplifiers, such as the AM-1365/SRC, can be used to provide an approximate 6 db increase in sideband power.

The noise figure of typical UHF military radio receivers is in the order of 12 to 20 db. Another substantial improvement in signal-to-noise ratio is sacrificed because of poor noise figure. The noise figure of the receiver portion of the AN/SRC-30 (XN-1) will be in the order of 6 to 8 db.

The AN/SRC-30(XN-1) will tune from 225 to 400 mc. in 100 cps tuning increments. The receiver portion will also be capable of continuous tuning between 100 cps tuning increments. Typical UHF military equipment now in use tunes in either 100 kc or 50 kc increments.

The AN/SRC-30(XN-1) is being developed by the U.S. Navy Underwater Sound Laboratory under sponsorship of the Bureau of Ships. After development is completed, a stringent operational evaluation is planned. If results are favorable, UHF SSB equipment can be made available to the Fleet within a short time. The majority of the components in the AN/SRC-30(XN-1) are already service-approved off-the-shelf items.

Commodore John Paul Jones, who hoisted the Navy's first flag, later served as Commanding Officer of *Alfred*, *Ranger*, and *Bon Homme Richard*.

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