THE DRAWINGS CONTAINED IN THIS SUPPLEMENT HAVE BEEN DONE IN AUTOCAD.

Supplement No. 1

SIGNALLING CHARACTERISTICS AND TIMING OF THE MARISAT TELEX SERVICE

(*Source:* COMSAT)

1 Introduction

In response to Recommendation U.4, this Supplement describes the characteristics and time sequences of the international telex service operated over the MARISAT maritime satellite communication system.

2 Ship terminal originated telex call

Figure 1 shows the signalling sequence for a telex call originated from a ship terminal in the MARISAT system. Figure 2 illustrates the telex signalling and timing sequence. The following is a general description of the sequence of events in establishing a telex call from a ship terminal to a gateway switch.

2.1 To initiate a call, the ship terminal sends a telex request message in the *out—of—band* request channel. The coast earth station receiving the valid request message will send back an *out—of—band* assignment message instructing the ship terminal equipment to tune to the assigned channel.

2.2 On the receipt of a valid *out—of—band* assignment message from the coast earth station, the ship terminal can then access its assigned channel. The terminal will normally achieve carrier and bit timing synchronization within 0.58 seconds after receipt of the assignment message. This time includes assignment message decoding, carrier recovery and clock recovery. Transmission will normally start upon frame synchronization, which occurs in less than 5.25 seconds. Therefore, the normal ship terminal response time will be less than 5.8 seconds as seen at the ship or 6.6 seconds as seen at the coast earth station. The time that the assignment message remains active in the coast earth station is in addition to this 6.6 seconds, allowing enough time for the ship terminal to start transmitting.

2.3 The coast earth station, which is continually transmitting a spacing signal, makes the transition space to mark indicating call confirmation within one character (150 milliseconds not counting framing delays) after the assignement message is formatted. In cases of heavy traffic, the assignment message may be delayed in queue until after the transition has occurred, i.e., it is possible for the space to mark transition to be received by the ship terminal before the assignment message.

2.4 The initial ship terminal transmission is in the spacing state. When a mark is received from the coast earth station, the terminal changes its transmission from space to mark. In the case when the space to mark transition on the coast earth station to ship terminal link reaches the terminal before the assignement message, the terminal inserts no more than two space characters in the initial burst.

2.5 Once the coast earth station has received the terminal's space to mark transition, it sends a WRU (figure case D) to the ship terminal. The coast earth station must receive a 20 character answerback within 7 seconds from the end of the WRU character sequence or it will clear the call. In addition, the coast earth station sends a *request not acceptable* assignment message (out—of—band) back to the terminal. The coast earth station does not check if the answerback code corresponds to the ship terminal's destination code (ID).

2.6 The received answerback is stored by the coast earth station. Call processing is now started between the coast earth station and the gateway switch. The coast earth station presents a mark to the gateway switch and the gateway responds with a *call confirmation* within 1 second. Within 3 seconds after the *call confirmation*, the gateway returns a *call connect*. The coast earth station then connects the gateway switch to the ship terminal. The gateway then sends its header (if any) and a WRU to the ship terminal. After transmission of these signals, the coast earth station disconnects the circuit and sends the ship's answerback in storage to the gateway switch within 850 milliseconds. The ship terminal will send an answerback in response to the WRU from the gateway switch. However, this second answerback is blocked by the coast earth station. The coast earth station will connect the circuit after the 19th character of the ship's answerback is received, and the ship terminal can then send selection digits to the gateway switch.

2.7 After this second connection, the coast earth station does not respond to any data on the line until it detects clearing.

2.8 The gateway switch, upon receipt of the selection sequence from the ship terminal, proceeds to process the call to the desired terrestrial subscriber. As the MARISAT system interfaces with various gateway switches, the signalling sequences proceed according to the protocol between the particular gateway switch and the terrestrial network.

Note — The signalling sequences shown between the gateway switch and terrestrial network in Figure 1 illustrates one method of signalling which can be employed.

3 Telex call originated by a coast earth station

3.1 Figures 3 and 4 illustrate the telex signalling and timing sequences for a telex call originated in a terrestrial network to a ship terminal via the MARISAT system. As the signalling sequences between the terrestrial networks and each gateway switch are not identical, that portion of the signalling sequences in Figure 3 are for illustrative purposes only and no attempt is made to describe all the possible sequences.

3.2 The following paragraphs provide a description of the sequence of events which occurs between a gateway switch and a ship terminal for a telex call originated by a coast earth station.

3.2.1 Upon receit of the selection digits from the terrestrial network, the gateway switch starts the signalling sequence by sending a *call request* signal on an idle circuit to the coast earth station. Upon receipt, the coast earth station returns both a *call confirmation* and *proceed—to—select* signal within the proper intervals as shown in Figure 4. The gateway switch can then proceed to send the selection digits to the coast earth station.

3.2.2 The coast earth station checks the validity of the selection digits and if correct, sends an *out—of—band* assignment message to the ship terminal requested. When the assignment message has been transmitted, the signalling proceeds in the same manner as a call from a ship terminal to a coast earth station described in § 2. Once the ship has accessed its assigned channel, the coast earth station sends a WRU to the ship terminal. The terminal responds with its answerback which is stored by the coast earth station.

3.2.3 When the answerback is stored, the coast earth station sends a *call connect* signal to the gateway switch. The gateway then sends a WRU and its header toward the coast earth station. These signals are blocked at the coast earth station and prevented from going to the ship terminal. The coast earth station responds to the gateway's WRU with the ship terminal answerback it had previously stored. The coast earth station then interconnects the circuit between the gateway switch and the ship terminal. From this point, the coast earth station is essentially transparent to all data on the line until it detects a *clearing* signal.

4 Telex clearing sequence

4.1 The coast earth station recognizes a *clearing* signal as a spacing condition of 400 to 1000 milliseconds from either the gateway switch or a ship terminal. After recognition of the *clearing* signal, the coast earth station will disconnect the circuit and send a *clear confirmation* signal in both directions.

4.2 Release of the satellite circuit section is under the control of the coast earth station. The ship terminal does not stop transmission of its RF carrier until;

a) it has returned a *clear confirmation* signal following the receipt of a *clearing* signal from the coast earth station; or

b) a *clear confirmation* signal is received from the coast earth station. In either case, the ship terminal maintains a spacing signal for a maximum of 3.09 seconds before transmission is terminated.

4.3 For 6 seconds after the successful receipt of the *clearing* and *clear confirmation* signals over a circuit section between the coast earth station and a gateway switch, the coast earth station will not process any calls on that circuit section. The ship terminal is also considered busy during this 6—second interval. This 6—second guard time is necessary to allow for proper clearing of the ship terminal over the satellite circuit section. If another telex call is received for that ship terminal during the 6—second guard time, the coast earth station will send back an **OCC** service signal.

Figure 1/suppl. 1 - CCITT 48390

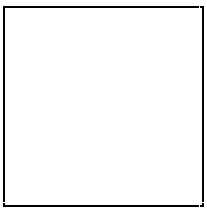

Figure 2/suppl. 1 - CCITT 48400

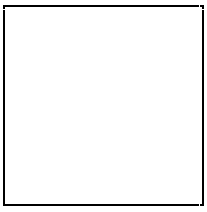

Figure 3/suppl. 1 - CCITT 48410

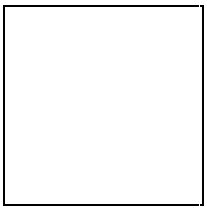
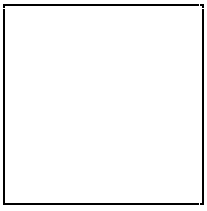
Figure 4/suppl. 1 - CCITT 48420