TELECOMMUNICATIONS SERVICES PROVIDED

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TELECOMMUNICATIONS SERVICES PROVIDED

INTRODUCTION

1. Services provided by Shore Stations may be split in two, depending on the sponsoring authority, CINCFLEET or CDCN. For each individual establishment, a document known as the Communications Requirement (CR) is published. This formal document lists all the services which the Station is complemented to provide, and lists the equipment supplied to meet those requirements. Some establishments suffer a further split and provide NATO services. When this is the case, the equipment is funded from NATO, and is often different to the Single Service counterparts (ie CRIMOND - National HF Tx - WBL and NATO - WBN). The engineering aspects of all services will be dealt with in the later chapters.

RN SERVICES

2. The United Kingdom Naval Communications Area Master Station (UKNAVCAMS) is situated at Whitehall and controls the majority of RN. Single Service Communications on behalf of CINCFLEET. The Reference for RN Comms is RNCP 1. Types of service provided are listed below.

Ship Broadcasts

3. This is the primary method of passing traffic from shore to ship. It may radiate on LF, HF or satellite (see later) or any combination of these. It may be keyed by CW or FST and may be secure or non-secure. Broadcasts are usually generated by some form of automatic message switch (Chapter 4) with manual back-up facilities.

4. CINCFLEET is the Broadcast Co-ordinating Authority (BCOA) for all RN Broadcasts. His responsibilities are listed in RNCP 1. All broadcasts are controlled through the Broadcast Control Authority (BCA) and Broadcast Control Stations (BCS), whose responsibilities are listed in RNCP 1.

5. All messages carry a serial number, messages being numbered sequentially from 001-999 (on MEP-controlled broadcasts the numbers are reset to 001 daily). Flash and Immediate messages are transmitted twice, Priority and Routine once only.

6. An MEP-controlled Traffic Check List is transmitted every 2 hours on all broadcasts. On scheduled broadcasts, a Traffic Check List is transmitted at the end of the schedule.

7. During periods of no traffic, check messages are transmitted every 2 minutes to maintain continuity.

Broadcast Designation and Multi-channelling

8. Each broadcast is given a 'designator' which consists of a group of letters and numerals describing the broadcast. These are listed in ACP 176E.

1st Letter	B	-	UK	A	- Australia
	C	-	Canada	X	- NATO
	U	-	USA		
1st Figure	1	-	Primary Ship Broadcast		
	2	-	Secondary Broadcast		
	3	-	Submarine Broadcast		
	4	-	Local Area Broadcast		
2nd Figure	1	-	FST		
	3	-	CW		
	4	-	Submarine Secondary CW		
	5	-	Submarine Secondary CW		
2nd Letter	A	-	UK	V	- Indian Ocean
	M	-	MED	Z	- World-wide
	F	-	Far East	B	- Australia
	L	-	Western Atlantic	T	- FOST Area
				G	- Gibraltar

for example: B11A, B31Z, B13A.

9. Broadcasts are multi-channelled for transmission. At present the channels in Fig 2.23 are allocated as follows at HF:

Channel 1 - B15A
Channel 2 - Link R(B)(A)
Channel 3 - B54A or in default B15A
Channel 4 - B41. Note: For ships not fitted with TTVF'B'/580

Future plans are to radiate an 8-channel Primary Group of Broadcast at HF.

10. The B41B and B14A facsimile Broadcast are dual-channelled as shown in Fig 3.1.

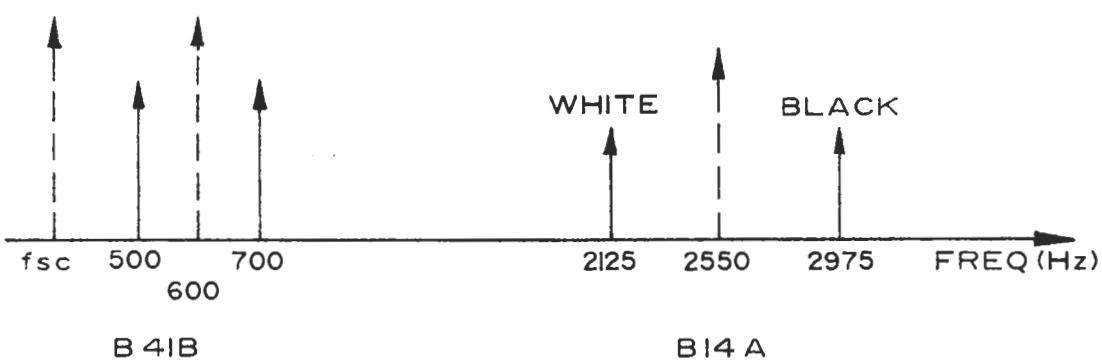

Figure 3.1

B14A is radiated on schedules, so during the night, when there is a large gap between schedules, a time switch automatically selects B11A keying for this broadcast.

HF Components

11. All broadcasts are transmitted on a number of HF channels (usually five) from a suite of HF transmitters keyed simultaneously. At present the B15A group is radiated from BODMIN and B14A/B41B from INSKIP. Fallback arrangements in the event of Commcen or Transmit Site failure are in RNCP 1.

LF Components

12. Most broadcasts are also radiated from one LF transmitter, though shortage of LF transmitters sometimes prevents this. The projected LF state is transmitted by CINCFLEET on the last working day of each month (RNCP 1 Paragraph 223). LF transmitters may be single or dual-channelled depending on the aerial bandwidth and Automatic VSWR tuning. LF transmitters have regular maintenance periods, which are listed in RNCP 1, though covering warning messages are usually sent on the Broadcast before close-down. This is dealt with in Chapter 6. The current UK LF transmitter state is transmitted on all components of the UK RSS CARB on the hour.

Exercise Broadcasts

13. Communications during exercises are a special case, and are detailed in the Communications Annex to the Operation Order. They are a subject of negotiation between Exercise Planners and FSCE beforehand. Facilities will be provided as agreed and published to all stations concerned with start times etc well before the Exercise commences. These exercise communications usually involve satellite and other services as well. Should the required facilities not exist, they may be provided by DNST providing sufficient notice is given (ie new keying lines). A novel form of exercise broadcast is the shore re-radiation of a Task Group Tactical Broadcast via a satellite link.

Facsimile

14. The Fleet weather facsimile broadcast is known as B14A and is radiated from INSKIP, dual-channelled with the B41B as described earlier. The signal originates from the Fleet Weather Centre at NORTHWOOD as an FM audio signal. It is passed to INSKIP where it is converted to a suitable form for transmission (see Chapter 5). The broadcast is run in schedules, each schedule representing one picture. At night, after the last schedule the keystream is automatically changed to that of B11A.

Channel Availability and Receipt Broadcast (CARB)

15. This broadcast is part of the UK RSS system (Chapter 4). It is an off-line RATT Broadcast generated by the MAP used to radiate information on the frequencies available for ship-shore working, and to pass control and receipt messages.

16. In the automated 10-channel UK RSS system this is carried out by:

(1) Access Channel Designators; and

(2) Management Procedure by Condition Code indications.

Ship-Shore (HF)

17. The majority of Ship-Shore traffic is passed by a RATT Ship-Shore system, usually based on the UK. The civilian method (sometimes known as Series 'B') will be discussed later. A number of receivers, ashore are connected to omni-directional aerials, the frequencies being those advertised on the CARB. Usually 10 frequencies are available. A ship wishing to send a message raises a transmitter on the optimum frequency available and sends a test message (RNCP 1 Chapter 3). This message includes an indication of the ship's position with reference to the directional aerials available to the RSS receivers ashore. The MAP selects the best directional aerial to receiver and acknowledges the receipt of the test message by a condition code on the CARB. A second test message from the ship measures the quality of reception and MAP/MEP requests transmission of traffic.

18. The ship then passes its traffic, receiving receipts on the CARB until its traffic is cleared. The MAP then returns his receiver to an omni-directional aerial and resets the CARB.

19. In the event of a WHITEOUT BRAVO or MEPOUT, 10-channel UK RSS will be replaced by a 5-channel FALLBACK system based on the NSTN (MHS) at Pitreavie (RNCP 1 Fleet Addendum 3/90 refers).

20. Shore Stations without a CARB, or civilian stations operate a shore answering frequency. A ship calls up on this frequency to establish contact, and is given a working frequency to pass traffic. When operating with civilian stations, these are usually connected via telex or cable into the military network. The prime civilian station in the UK being PORTISHEAD radio.

Maritime Rear Link (HF)

21. The engineering practice, and connectivity of a Maritime Rear Link (MRL) will be discussed in later chapters. An HF MRL is a single-channel duplex traffic channel between a ship and a shore station, which is actuated for specific operational or exercise reasons, or to relieve the load on broadcasts and ship-shore services.

22. Being a single-channel circuit, an MRL traffic circuit has to be interrupted to send engineering messages. Propagation Difficulties often cause loss of communication during frequency changing and alternative means of communication are usually required. HF MRLs require constant monitoring and attention with intelligent liaison to achieve a high degree of availability. Once established reliably, MRLs are usually terminated in TARE ashore, (UK anchor) or at a manual operating bay abroad.

SUBMARINE COMMUNICATIONS

23. For all types of submarine communication the limitations on submarine transmission result in the shore/ship (Broadcast) becoming the essential link of submarine communication. For submerged reception the primary radio path for shore/ship has always been and will remain for the foreseeable future at VLF.

24. When all submarines operated independently and under both Command and Control from shore authorities the only submarine transmit requirement was for ship/shore to their shore Commander at HF. However the advent of integrated ASW operation has raised the requirement for direct communication and information exchange between submarines, surface vessels, aircraft and shore authorities. This has required a large increase in the communications capability of submarine and other units and authorities involved.

25. While the additional requirement is mainly applicable to submarines involved in integrated ASW operations, the techniques involved in providing additional radio paths (principally UHF SATCOM) and capacity are applicable to communications for all submarines.

26. To meet the Communication Requirement three basic systems are available:

(1) VLF/LF Broadcasts.

(2) UHF Satcom.

(3) HF Ship-Shore.

In all three systems there are basic UK National facilities available, but these may be extended by the use of NATO/other nations facilities.

27. UHF Satcom and HF Ship-Shore are dealt with elsewhere in these notes. Three special VLF/LF Submarine Broadcasts are provided:

(1) BSA - VLF Secure Broadcast for SSNs and SSKs.

(2) BSC - Two Transmitter LF Secure Broadcast for SSNs and SSKs.

(3) BSZ - VLF Continuous Secure Broadcast for SSBNs.

28. NATO broadcasts are available for UK National Control, when certain NATO transmitters would be employed. The transmitters listed below are available during peacetime conditions but of the three only ANTHORN is in regular use:

(1) VLF ANTHORN (UK) BSX.

(2) BLF TAVOLARA (IT) BST.

(3) VLF NOVIKEN (NO) BSN.

29. The authorities concerned with the co-ordination and control of UK Submarine Broadcasts are promulgated in RNCP 1, Chapter 6.

RN SATELLITE SERVICES

30. SCOT Satcom Services provide similar facilities to be those found at HF, and it is the intention that operating procedures should resemble those used at HF as closely as possible. Engineering procedures will be found in DCNP 4, JSP 321 and in Chapter 6 of these notes.

Satellite Broadcasts

31. With the exception of Facsimile and Minor War Vessels Broadcasts and local Broadcasts from Gibraltar and Portland, all area Broadcasts are transmitted on satellite channels controlled by MEP in the same way as HF Broadcasts. In addition, all nodes on the NSTN are capable of controlling satellite broadcasts.

Satellite Ship-Shore

32. Satellite Ship-Shore is similar in operation to HF Ship-Shore in that a number of channels are available and ships use them as convenient. All Satellite Ship-Shore channels are terminated in the MEP, and so all traffic handling ashore is automated, and automatically generated receipts are provided for each incoming message. All nodes in the NSTN have the software to run a number of Satellite Ship-Shore channels.

Ship-Shore Procedure

33. One of the functions of the SCOT engineering circuit is to receive the Channel Availability and Receipt Broadcast (CARB). Equipment at MECC (OAKHANGER) monitors the ship-shore channels and will transmit their availability every 10 minutes on the CARB. This is seen as a printout on the engineering T/P as A B C D E F, showing that all channels are available. Should this printout occur during engineering traffic, the engineering traffic is stored during the transmission and continues on its completion.

34. The user then selects which channel he has been allocated, or which one he chooses and commences transmission. This access is recognised by the MECC equipment and an amended CARB is immediately transmitted, ie AB DEF and as this circuit is common to all ship users, it can be seen that channel C is in use. It also shows the user that he has accessed the satellite and can send his traffic. On completion, the user ceases transmitting and the CARB will immediately be updated showing all channels available for access again.

35. The receipt broadcast automatically informs the user that each message has been received by the MEP at UKNAVCAMS. Ships using Ship-Shore use an indefinite callsign (G + any letter). The receipt on the engineering backroll taken the form of ZEV AAA, ie ZEV followed by the second letter of the indefinite callsign repeated three times. The user is then confident that he has cleared his message to the MEP.

36. A final check is generated every 30 minutes, when the MEP passes via TARE, a TOTE of all SCOT received signals confirming "final receipt", this being transmitted on all SCOT broadcasts.

Satellite Rear Links

37. These are awarded to ships in the same manner as HF MRLs. They are also duplex traffic circuits only this time employing all the facilities of a SCOT terminal, and always being anchored into the MEP (telegraph) or UKZE (Secure Speech).

UHF SATCOMS

38. UHF Satcom systems operate in the military UHF band (225-400 MHz) with down links in the range 240-260 MHz and up links in the range 295-320 MHz. The RN UHF Satcom system is provided by leasing channels in a US commercial UHF Satellite, GAPFILLER, though a UHF channel is planned for Skynet 4. Special arrangements can be made for use of the four US military satellites, USN FLT SATCOM.

39. The SGT of the RN UHF Satcom system is at Northwood, and comes under the control of UKSUBCAMS. The system provides a number of sub-systems:

(1) Submarine Satellite Information Exchange sub-system (SSIXS) which is designed to complement existing shore/ship and ship/shore communication for submarines. It allows for message traffic to be exchanged at high data rate (4800 Bauds) with shore communication centres.

(2) Narrow Band Secure Voice (NBSV), a 2400 Baud system utilising the full available UHF Satcom channel, allows real-time secure voice communication to take place via a half duplex relay between suitably equipped units.

(3) Low Data Rate (LDR) RATT - 75 Baud covered RATT system providing real-time half duplex communications for integrated ASW. Normally between FASWC Flagships and Towed Array units.

INMARSAT

40. The INMARSAT system is an international commercial satellite system fitted in all RFAs and selected HM Ships with specialised roles or tasks, eg MCMVs, OPVs, Survey Ships, Ice Patrol Ships.

41. The INMARSAT system operates a series of satellites to provide telephone, Telex, data and facsimile as well as distress and safety communications services to the shipping and offshore industry and is widely fitted in merchant vessels. The system may also provide emergency transportable communications when required. Secure speech facilities may be used if the appropriate speech security devices are connected to the telephone channel. This secure facility may be interconnected to SCOT/DSSS via UKZE.

42. The INMARSAT system is being developed to provide satellite communications to aircraft to include operational flight data and passenger telephone facilities.

43. The satellite system is connected via the ground station to the international Telex and telephone networks. Each ship allocated an INMARSAT terminal is allocated a principal UK Tape Relay Centre (TRC) to reduce the chance of two or more users attempting to access the same TRC simultaneously and causing interference and delays.

44. INMARSAT terminals are fitted to supplement normal service communications, not to replace them and ships will only sail on INMARSAT if no suitable service communication is available.

45. INMARSAT is expensive and should only be used if operationally necessary and no other means of communications exist. Use should be kept to a minimum, ships may be required to justify use made of the system. A full list of allowed conditions of use is given in RNCP 1 Chapter 5.

RN Local Services

46. With the exception of PORTLAND and FASLANE, local area communications use UHF only for harbour operations and administrative traffic, together with hand message and Secure Net Alongside (SNAC) facilities for ships.

47. The Dockyard Port Extended Range UHF service gives coverage of approximately 50 nm round Portsmouth, Plymouth and Rosyth. This service is designed to provide a secure voice facility with local termination only. Secure RATT facilities will be provided under a phased enhancement programme.

EMERGENCY COMMUNICATIONS

48. There are many requirements for certain communications to be set up in emergencies. They are usually documented locally, and every effort is made to foresee the requirements and allocate equipment and lines accordingly. The two major incidents which have communication plans set up and published in RNCP 1 Chapter 7 are:

(1) Communications in the event of submarine accident.

(2) Naval Nuclear Weapon Accident Communications. These special communications links are exercised at regular intervals.

Submarine Accident Communications

49. Communications nets used are:

(1) Area Broadcast - authority conducting operations use this for passing instructions and information to all ships taking part and for relaying information received from the search force.

(2) Submarine Broadcast - submarine safety traffic will be run twice on receipt and again in the next routine, such traffic being identified by Sublook/Submiss/Subsunk/Smashex serial numbers in place of the normal numbers.

(3) Maritime Rear Link - an MRL is set up between the Conducting Authority and the Senior Officer Search Force. This takes priority over all other communications circuits. If a local MRL exists and is suitable, it is to be used, if not, UKNAVCAMS will allocate MRL 1/1A unless the SOSF is already on SCOT, when Satcoms are to be used.

Naval Nuclear Weapon Accident Communications

50. It is essential that the deployed AWE Team be provided with direct conference communications with AWE ALDERMASTON.

Ships should retain their primary traffic route and request an MRL from the appropriate Commcen as in Fig 3.2. The MRL Anchor Station will ensure connectivity to ALDERMASTON.

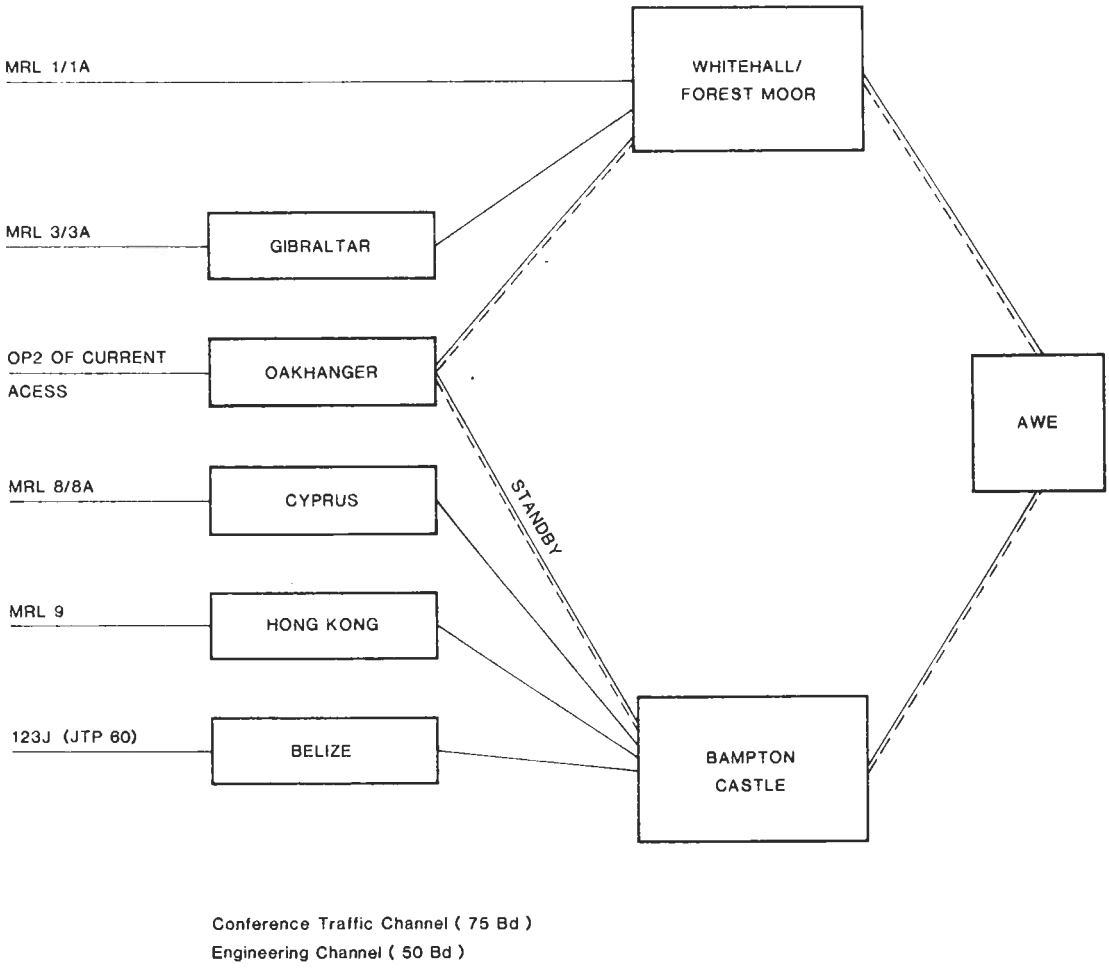

Figure 3.2 - MRL Anchor Stations

DCN SERVICES

51. DCN services are listed in DCNP 3 - Master Index of DCN Services (MIDS). In order to make identification easy, all DCN services are allocated an identity number consisting of the letters "DCN" followed by a four digit number. The network comprises services and circuits of a variety of functions, and each functional group has been allocated a block of 1000 numbers. Within each block the numbering pattern will have further significance. The services will be discussed block by block, some in much greater depth than others where the RN has a deeper involvement.

Inter-Threatre Services 0000-0999

52. Services within this group comprise fixed trunk services connecting theatres of operation, ie UK/GERMANY. They utilise all media of communications, HF, satellite, cable and troposcatter and may carry one or more telegraph or speech channels, employing both FDM and TDM techniques. Telegraph channels may or may not have EDC, and speech channels may or may not be secure. Non-secure speech channels employ LINCOMPEX and are connected for Service telephone networks, whilst secure voice channels are part of the DSSS, connecting major DSSS exchanges within UK and GERMANY, these services being dealt with more fully in block 1000-1999.

53. Also within this block, all service commencing with "08" are "Contingency Rear Links" (CRL). These services connect mobile units in the theatre of tactical operation with the DCN through designated anchor stations.

54. Within the DCN certain conventions govern the numbering and allocation of channels within multi-channel circuits.

10 MHz Convention

55. When using non-synthesised equipment, if the carrier is above 10 MHz, the USB is radiated on an SSB transmission and is the primary sideband in an ISB transmission. When the carrier is below 10 MHz the LSB is radiated in an SSB transmission and is the primary sideband on the ISB transmission. In any situation the primary sideband is known as the ALFA and the other the BRAVO sideband.

56. This convention is occasionally met during CRL operations. Exceptionally to combat interference sideband inversion on SSB, or reversal on ISB may be ordered.

Priorities

57. Channels are allocated to users by CDCN on the basis of a list of user priorities which has been laid down by the Defence Signal Board. These priorities feature in DCNP 3 against their respective channels and indicate the order in which channels should be shed in the event of poor propagation conditions. The engineering channel is not given a priority code and is always the last channel to be shed.

Reporting Suffixes

58. As will be seen in Chapter 7, certain daily reports require to be revised on the availability of DCN channels. To aid description of the channels on a multi-channel circuit a reporting suffix is added to the DCN number when referring to the channel, ie:

A - Primary CU Channel or OP1 for RN Ships
B - Second CU Channel or OP2 for RN Ships
C - Third CU Channel
D-Z (except K, L, M) - Channel connecting overseas theatre to UK relay centre. Letter derived from terminal station TI.
K - Secure Speech
L - Insecure Speech
M - Data

These reporting suffixes should not be confused with channel identities.

Channel Identification

59. When synthesised transmitters are used, the USB is radiated on an SSB transmission and is the primary sideband on ISB, designated as 'HOTEL'. The lower sideband if transmitted is designated 'LIMA'. If FDM is used the suffix 'UNIFORM' is added and if TDM is used the suffix 'TANGO' is added, ie:

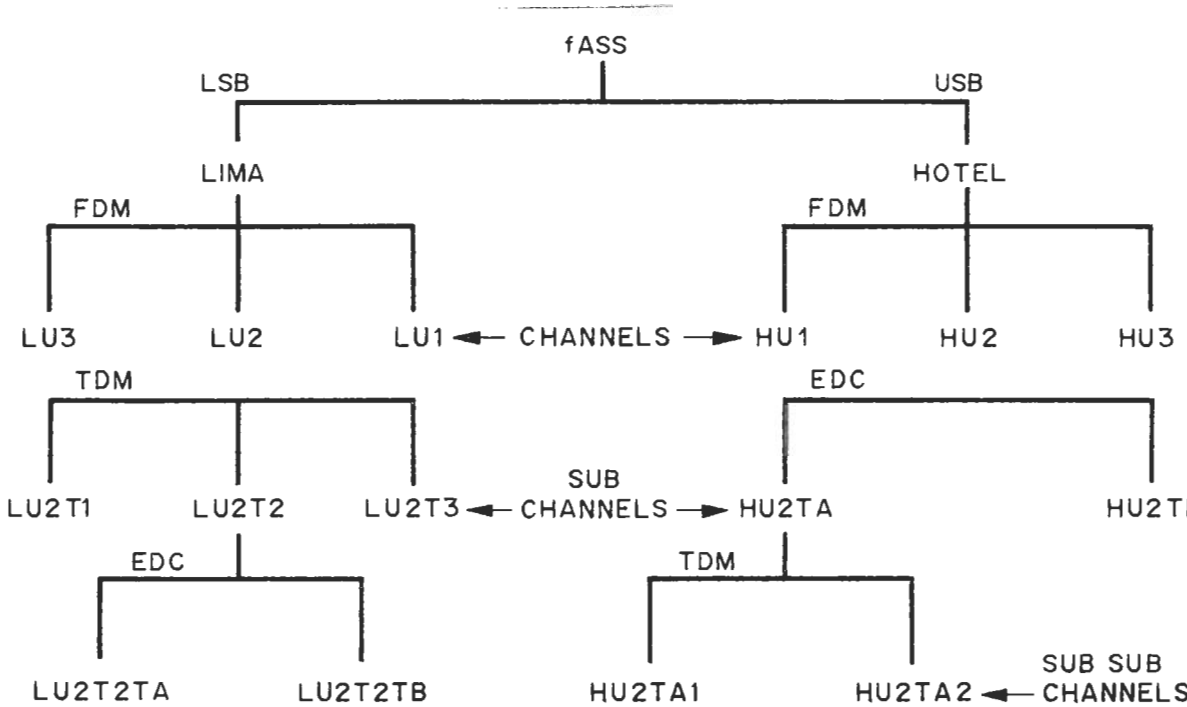

Figure 3.3

60. TDM sub-channels with EDC are denoted by the suffix 'ALFA' and 'BRAVO'. Sub-sub-channels are denoted by the additions of numerical suffixes.

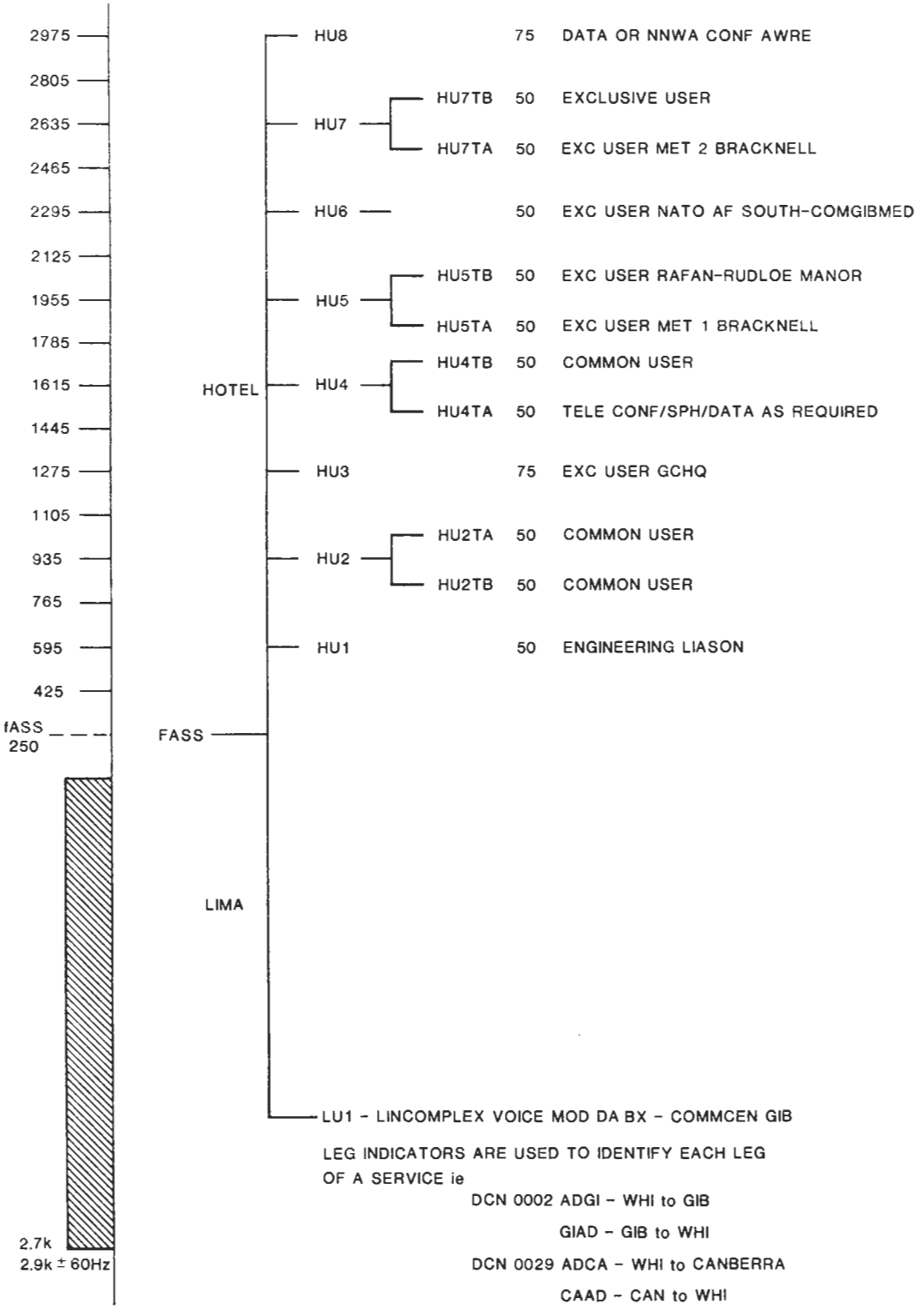

Figure 3.4 - Composition of Typical DCN HF Trunk Signal

Facilities Available on Inter-Theatre Trunks

61. Analysis of the channels which make up a typical inter-theatre HF ISB fixed trunk service reveals all of the facilities available on these services. Practical services may employ any combination of these depending on the media employed. DCNP 3 gives full details of every service.

Common User Channels

62. Common User (CU) channels carry administrative and operational traffic between the CU Central Message Switched Networks (UK and GERMANY) and other theatres. UK termination is invariably a message switch (computer) whilst Distant termination may be a computer or a Manual Tape Relay Centre (MTRC). Consequently signal loading is usually high and of very mixed content. Should signal traffic fall off, it is common practice to lose one channel of a multi-channel CU system. Many CU overseas channels are single-channel cable circuit, presenting their own peculiar engineering problem as dealt with in Chapter 7.

Exclusive User Channels

63. These are not part of CU system but are dedicated to the exclusive use of a particular military or government organisation. Such channels are usually extended from the Master System Control Point (MSCP) directly to the user who will provide his own terminal and encryption equipment. This system also presents its own special engineering problems.

Conference and Special Handling Channels (DCNP 6)

64. The CU telegraph network is crypto protected to carry traffic up to and including SECRET. Traffic of a higher classification and traffic bearing caveats cannot be passed on the CU network and requires special handling. Another limitation of the CU system is that its inherent delay precludes cohesive conference or discussions.

65. The facilities required to meet the needs of SPH traffic and conference are similar in that:

(1) The security required is different to that for CU traffic, ie higher protection standards are necessary.

(2) The amount of SPH and conference traffic is fairly low.

(3) Although the number of users is much less than that for the CU system, each user may need to communicate with any other user.

These similarities lead to a common SPH/Conference system. Channels within the DCN are dedicated to SPH/Conference but have no permanently fitted terminations. Each channel may be connected at each end, to one of a number of locations equipped specifically to handle SPH/Conference traffic and only when a requirement is stated by the users is an end to end channel established.

66. Each user to user link is identified as a numbered patch. Users requiring the establishment of a patch will request it by its patch number. Since the channels dedicated to SPH/Conference are limited and each forms part of the route of several DCN patches, system engineers may receive more than one request for use of a channel at the same time. A system of priorities is therefore used. Details of the identification and routeing of DCN patches, the procedure for setting up the patches, and the priorities system are given in DCNP 6.

DCN Patches

67. The tandem connection of two or more channels is sometimes necessary:

(1) To connect two points not connected by a direct service.

(2) To supplement an existing service either because of deterioration of that service or ad hoc patches affected to meet unusual traffic demands.

Insecure Speech

68. Insecure speech links are provided on a limited number of links. All routes are between UK and other theatres and the services terminate at the main theatre PBX (Mod PBX in UK) and are therefore accessible to any military telephone user. These systems may not be cross-connected to civil systems.

69. The DCN bearer media used for insecure speech include landline, radio relay, troposcatter and HF. Insecure speech is not carried on Satellite bearers. When HF radio is used, LINCOMPEX equipment is employed and the bandwidth occupies 3 kHz.

Contingency Rear Links (CRL)

70. Rear Links are services provided between forces operating in a tactical role in the field and fixed defence communications. To this end certain DCN and other stations have the resources to anchor HF or Satcom Rear Link services which once established become an extension of the communications system of which the anchor station is a part. CRLs are all numbered, commencing "DCN 08" followed by two digits which define the anchor station and the mode of emission. Designated anchor stations have equipment earmarked for CRLs and designated links are provided. Details of mobile equipment will be found in JSP 321 whilst the conduct of CRLs is laid down in DCNP 7.

71. When logistic support is limited, either initially or for the duration of an exercise/operation, the mobile force may have to rely on a single-channel simplex morse rear link. Such an Initial Contact Link (ICL) employs compact equipment which is low powered but can be deployed rapidly with minimum air lift costs. The ICL may subsequently be replaced by a higher grade link, though in times of poor propagation conditions a higher grade service may have to be abandoned and morse contact re-established.

72. CRLs and ICLs present engineering problems very similar to MRLs and these are discussed in Chapter 7.

Secure Speech Services 1000-1999

73. The second block of DCN service numbers is allocated to the Defence Secure Speech System, to which DCNP 8 is a subscriber directory.

74. The Defence Secure Speech System (DSSS) provides protection for voice communication up to and including TOP SECRET, between military subscribers both at home and overseas. The DSSS interfaces with the PICKWICK system (for MOD subscribers) which serves both military and government subscribers. For transmission over the DSSS circuits speech is passed through a Vocoder which digitalises the analogue input into a 2400 bit per second data stream. This is then encrypted and fed to a line modem which converts it to a form suitable for transmission over landline. An HF modem is used if the speech is to be carried over an HF circuit. The reverse process is carried out at the receive terminal where the Vocoder produces synthetic speech.

75. The system is based on a number of zone exchanges, one in each main theatre of operations, the main one being the UK zone exchange (UKZE) at MOD. All theatre zone exchanges are linked by DCN circuits to UKZE and subscribers are connected to their theatre zone exchange either directly or through subsidiary automatic or manual exchanges. Subscribers to the same exchange may be connected to each other through their own exchange or to a subscriber in another theatre through the UKZE.

76. SCOT fitted ships with secure speech facility are connected into the DSSS through SGT OAKHANGER.

77. The number block 1000-1999 refers to individual subscriber services. Inter exchange services (UK) are carried on DCN services commencing with "02", whilst overseas connection employ normal DCN services.

Intra UK/Germany Telegraph Circuits 2000-2999

78 The CU sub-system in the UK consists of a number of inter-connected Automatic Major Relay Stations connected to Manual Major Relay, Minor Relay and directly to tributaries. A similar system is operated in Germany, but is not considered here. The main message switches are all inter-connected so each has a route to all of the others. The system interfaces with other message networks, ie Telex, TASS, NATO, US Military etc, though these interfaces are not necessarily automatic. Each inter-connection has a DCN circuit number within the block 2000-2999. (ie COLLINGWOOD to FORT SOUTHWICK in DCN 2325.) Annex A gives an example of how a signal would pass through the CU sub-system en route from COLLINGWOOD to a ship.

79. All of the CU channels on the Inter-theatre legs of the DCN are anchored at one or other of the Automatic Message switches shown in Fig 3.4. The significance of numbers within the block is shown in DCNP 3. Traffic quality and engineering is based on the receive philosophy, ie stations are responsible for their receive legs.

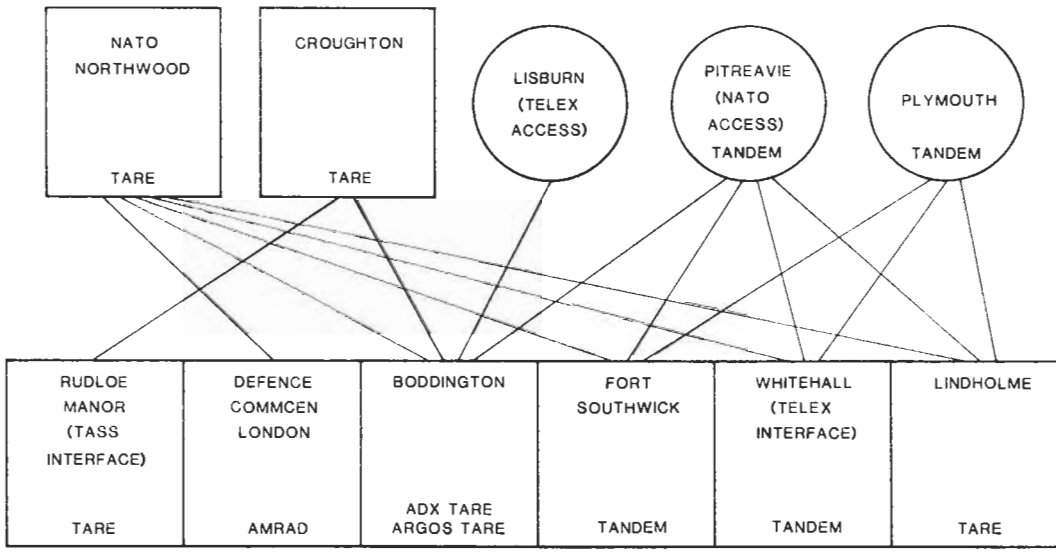

Figure 3.5 - Major Relay Stations in the UK Common User Sub-System

Maritime Satellite Services FM: 9000-9999 CDMA: 8000-8999

80. RN Ships at sea employ DCN Satellite Services for communications to shore. Since ships are essentially mobile and the number of satellite accesses is not unlimited, a versatile circuit pattern capable of accommodating a number of ships connected to alternative ground terminals via different satellites is required.

81. The block 8000-8999 is reserved for CDMA access, almost universally now in use. Decoding of the second, third and fourth digits plus suffix via DCNP 3 Section 1 allows the circuit to be defined. ie DCN 8104A defines a ship accessing OAKHANGER via the Indian Ocean DSCS Satellite on Ship-Shore, Channel OP1.

ANNEX A TO
CHAPTER 3 OF DP 83/2721

ROUTEING EXAMPLE OF SIGNAL FROM COLLINGWOOD TO SHIP READING B21G

1. A typical example of the route taken by a signal through the DCN and Single Service RN networks is shown at Fig A.1. The example is a signal generated in HMS COLLINGWOOD addressed to a ship in the Mediterranean reading the Gibraltar Area Secure Broadcast B21G.

2. The message arrives at COLLINGWOOD MCO on a message form signed by the Releasing Officer. In the MCO it will be entered directly into the FORT SOUTHWICK TANDEM using a VDU connected to the computer by a crypto protected high speed landline (DCN 2325).

3. The address is read automatically by the TANDEM and routed to WHITEHALL TARE over the DCN 2301 landline after encryption. Over this leg it will be mixed with other administrative traffic being shuffled between the UK TAREs.

4. WHITEHALL TANDEM reads the signal address in plain language and routes it to the DCN 0002 service to GIBRALTAR on the Common User Channel.

5. On reception and decryption the address is read automatically by the TANDEM at the RN COMMCEN GIBRALTAR and a tape produced for the TAPE READER controlling the B21G broadcast. The ship addressee will read this message from the broadcasts, turns it back to page copy and distributes internally by SIC.

6. Once routed on B21G the message leaves the DCN and becomes part of the RN Single Service Communications Network.

7. Chapter 4 of these notes will use this example again to illustrate the preparation of Signals, Routeing Indication and Transmission Identities.

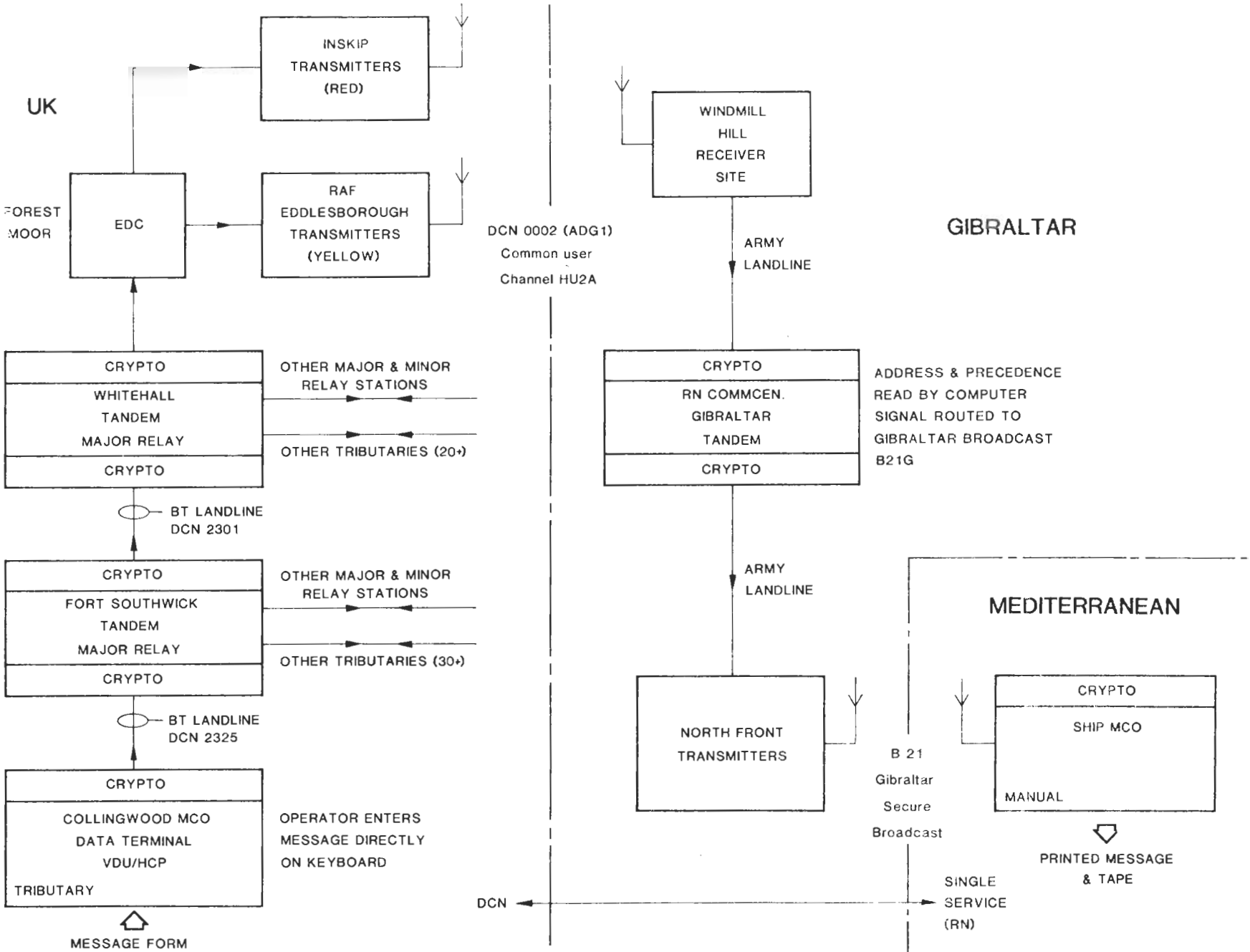

Figure 3A.1 Signal Routing Example