NATO STANDARD

ATDLP-5.01

TACTICAL DATA EXCHANGE – LINK 1 (Point-To-Point)

Edition A Version 2

APRIL 2020

NORTH ATLANTIC TREATY ORGANIZATION

ALLIED TACTICAL DATA LINK PUBLICATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

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NATO LETTER OF PROMULGATION

14 April 2020

1. The enclosed Allied Tactical Data Link Publication ATDLP-5.01, Edition A, Version 2, TACTICAL DATA EXCHANGE – LINK 1 (POINT-TO-POINT), which has been approved by the nations in the CONSULTATION, COMMAND AND CONTROL BOARD (C3B), is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 5501.

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RECORD OF RESERVATIONS

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RECORD OF SPECIFIC RESERVATIONS

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APPENDIX 1 INTRODUCTION

1. Definition. Link 1 is a point-to-point digital data link utilizing binary coded serial transmission frame characteristics and standard message formats.

2. Scope. These standards are for use between air defence and aircraft control units of NATO, thus enabling exchange of tactical air defence and control information between appropriately equipped sites, computer-to-computer, and may be used within national systems.

3. Glossary. Terms which are pertinent to the interpretation of these standards are included and defined in Appendix 2 to Annex A.

4. Applicability. In general, ATDLP-5.01 applies to all systems which exchange air defence and aircraft control information using Link 1 standards. Specific differences exist between the standards in this ATDLP and those in NADGE, STRIDA, and other systems. Reference must be made to Appendix 4 of Annex C to understand the differences.

5. System Standards. The system standards contained in Appendix 3 of this Annex are in addition to and/or exceed the CCITT recommendations.

6. Error Rate. For information exchange, an average rate of not more than one transmission frame containing undetected errors in 2000 frames is the objective. This is the mean hourly rate not to be exceeded in more than ten hours in one month. The error detection code is specified for the purpose of detecting 99% of all transmission errors.

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APPENDIX 2 ACRONYMS, ABBREVIATIONS, DEFINITIONS, TERMS

1. AADGE.

Allied Air Defence Ground Environment.

2. A/C

Aircraft.

3. AEGIS

Airborne Early Warning Ground Integration Segment.

4. AEW

Airborne Early Warning.

5. Airborne Early Warning Target Area (ATA)

That area of concern to the AEW aircraft in which air defence information is forwarded from a ground air defence site to the AEW.

6. Alphanumeric

A contraction of alphabetic-numeric, the characters which include letters of the alphabet, numerals, and other symbols such as punctuation or mathematical symbols. For the purpose of this ATDLP, Alphanumerics will contain only letters and numerals.

7. Altitude

Altitude defined in AAP-6 as the vertical distance of a level, a point or an object considered as a point is measured radially outward from the earth as a positive quantity and is expressed in numbers of feet above mean sea level (MSL) (1013.2 hecto pascal (HP) barometric pressure).

8. Area of Operational Interest (AOI)

In air defence, an area in which automatic crosstelling of tracks of interest is provided to an adjacent site based on established criteria, such as identity and location (AAP-6).

9. ASIT

Adaptable Surface Interface Terminal (for IJMS) (US).

10. Attenuation

Decrease in intensity of signal, beam or wave as a result of absorption of energy and of scattering out of the patch of a detector, but not including the reduction due to geometric spreading, i.e., the inverse square of distance effect.

11. Azimuth

The angle subtended at the observer by two points on the horizon, or the angle between two vertical planes passing through the origin (e.g. the observer or a reference point) and containing objects of interest (e.g. platforms) or reference directions (e.g. true or magnetic north). Quantities may be expressed in positive values increasing in a clockwise direction; or in X, Y co-ordinates where south and west are negative. The reference position may be true north or magnetic north.

12. Binary Digit (BIT)

One of two digits in the representation of data in binary notation, i.e., 0 or 1, on or off, etc.

13. CCITT

Comité Consultatif International Télépone et Télégraphe. (International Telephone and Telegraph Consultative Committee), an international standardization body of the Postal Telephone and Telegraph departments and their equivalents.

14. Coverage

Coverage of a given air defence facility is the volume of air-space which is completely covered by own sensors. The coverage may have any size and this size may not be constant but may change depending on atmospheric conditions, radar performance, etc. One facility may have parts or all of its coverage in common with one or more other facilities.

15. CRIS

Coastal Radar Integration Segment.

16. Cross Telling

For the purpose of this ATDLP, cross telling is the transfer of information between automated air defence sites and systems.

17. Data

Element(s) of information.

18. Data Code

A method of encoding information in binary form suitable for automatic processing or digital transmission.

19. Data Link

A system of communications utilizing radio or land-line for the purpose of passing digitally coded information. AAP-6(I) A communication link whose terminals are suitable for transmission of data.

20. Data Mile (DM)

2,000 yards or 6,000 feet or 1,828.8 meters.

21. Data Storage Area (DSA)

The DSA is the maximum area within which an automated air defence facility is able to store tracks in its computers. The DSAs of adjacent air defence facilities must necessarily overlap one another.

22. Data Transfer Rate

The average number of bits, characters or blocks per time unit passing between corresponding equipments in a data transmission system. It is expressed in terms of bits, characters or blocks per second, minute or hour.

23. dbm

Decibels referred to one milliwatt.

24. Demodulation

A process wherein a wave resulting from previous modulation is employed to derive a wave having substantially the same characteristics as the modulating wave.

25. Digital Signal

A nominally discontinuous electrical signal that changes from one state to another in discrete steps. The electrical signal could change its amplitude or polarity; for instance, in response to outputs from computers.

26. Distortion

Delay - That distortion within a transmission system caused by the difference between the maximum and minimum transit time of frequencies within a specified band. (Also called time delay distortion and phase distortion).

27. ECM

Electronic Countermeasures.

28 EDC

Error Detection Code.

29 Error Detection

A code in which each data transmission conforms to specific rules of construction so that departures from this construction in the received data can be detected automatically.

30. Fall Time

Time required for a signal pulse to fall from a specified upper limit to a specified lower limit, usually ninety (90) per cent to ten (10) per cent of its original value.

31. Field

The bits in a data link message pertaining to a particular element of information. Fields normally consist of sequential bits, but may be split.

32. Flight Level

Surfaces of constant atmospheric pressure which are related to a specific pressure datum, 1013.2 mb (29.92 inches) and are separated by specific pressure intervals.

33. FNS

Full NATO AEGIS Site.

34. FQMP

Facteur de Qualité en Mémoire Principale (Track Quality Factor in System Track Store).

35. Identification (ID)

For the purposes of this ATDLP, identification is the designation of a track taken from the following list: Pending, Unknown, Interceptor, Friendly, Faker, Hostile, Kilo, X-Ray, Zombie.

36. Identification Amplification (ID AMP) / Identity Modifier (ID_MOD)

For the purposes of this ATDLP, the identification amplifier is the designation as defined by one of the following list: Jammer, Emergency.

37. IFF

Identification Friend or Foe.

38. (Reserved)

39. Local Track

A track maintained from automatically or manually locally generated data. Under special conditions a local track may use a portion of the track data received from another centre.

40. LSB

Least Significant Bit.

41. MACCS

Marine Air Command and Control System (US)

42. MANTA

MACCS/NADGE Tactical Application.

43. Message Frame

In Link 1, this is the unit of information for transmission and contains 128 transmission bits, whereby only 98 bits are used for the transfer of data.

44. Message Group

A sub-division of a message frame. For the purposes of this ATDLP, a message group consists of seven (7) information bits. The division of messages into groups is a hardware function for transmission purposes.

45. MODEM

Modulator/Demodulator.

46. Modulation

Variation in time of one or more quantized characteristics of an electromagnetic wave, alternating current or direct current according to the telegraph or data signals to be transmitted.

47 MRCS

Mobile Reporting and Control System (IT).

48. MSB

Most Significant Bit.

49. NADGE

NATO Air Defence Ground Environment.

50. NADGE MPR

NATO Air Defence Ground Environment Medium Power Radar.

51. NATO Track Number (NTN) (

A group of alphanumeric characters comprised of 15 bits and assigned to one track which uniquely identifies that track for its life in the system (prefix non-AA).

52. Non-NATO Track Number (non-NTN)

A conventional combination of alphanumeric characters comprised of 15 bits and used to indicate a specific track which has not yet been assigned a NATO track number (prefix AA).

53. NSS

(AEGIS) Non-Subscriber Site.

54. ONS

Original NADGE Site (not upgraded by AEGIS project).

55. Parity Bit

For the purposes of this ATDLP, a check bit that indicates whether the total number of binary ones in the appropriate message bits, excluding the parity bit, is odd.

56. Parity Check

For the purpose of this ATDLP, an odd parity check is used to test whether the number of ones (including the parity bit) in the appropriate message bits is odd.

57. POACCS

Portuguese Air Command and Control System.

58. PTT

Poste Telegraphe Telecommunications.

59. Remote Track

(See Track, Remote).

60. Rise Time

Time required for a signal pulse to rise from a specified lower limit to a specified upper limit, usually ten (10) per cent to ninety (90) per cent of its final value.

61. SIMCA

Sistema Integrado de Mando Control Aéreo (Air Command and Control Integrated System).

62. SAM

Surface-to-Air Missile.

63. Sensor

A technical means to extend man's natural senses; equipment which detects and indicates terrain configurations, presence of targets and other natural and man-made objects and activities by means of energy emission from or reflection by such targets or objects.

64 SIF

Selective Identification Feature.

65 SINS

Southern region Improved NADGE Sites.

66. SPADA

System for Point Air Defence (IT).

67. SSR

Secondary Surveillance Radar.

68. SSSB

Ship-Shore-Ship Buffer.

69. STRIDA

Système de Traitement et Représentation des Informations de Défense Aérienne.

70. Strobe

For the purposes of this ATDLP, a strobe is the radial indication of received electromagnetic energy.

71. TACS

Tactical Air Control System (US).

72. TADS

Tactical Air Defence System.

73. Track

For the purposes of this ATDLP, the aggregate of information procured, stored, communicated and displayed as the representation of an object of tactical significance.

74. Track, Remote

A track on which own sensor return may or may not be held but which is being reported by another unit/centre.

75. Track Continuity Area (TCA)

The TCA is a belt on either side of the common boundary of two (2) TPAs of adjacent centres or some other area so positioned to ensure continuity of tracking. All tracks within the TCA are automatically crosstold with the exception of:

Tracks being crosstold in the opposite direction.

Tracks whose crosstelling is inhibited either locally or by a request message.

Note: For a given centre, the TPA and the TCA(s) are completely within its DSA.

76. Track Data

Kinematic and auxiliary parameters coded in digital form as result of the track production process.

77. Track Production

A function of the air surveillance organization in which the active and passive radar inputs are correlated into coherent position reports, together with historical positions, identity, height, strength and direction of flight.

78. Track Production Area (TPA)

The TPA is a specific geographical area allocated to an air defence facility, within which this facility is responsible for track production and associated track data. The boundaries between TPAs are formed by a series of straight lines and the areas may be of any shape. There is no overlap between TPAs.

79. Track Quality

A numerical indication of tracking data reliability.

80. Two's Complement

For the purposes of this ATDLP, two's complement is a convention in which a negative value is represented by one (1) in the MSB position. It is the binary number which when added to the corresponding positive number yields a sum in which all bits of the component are 0s and the 1 is carried into the next higher bit position.

81. UCCS

United Kingdom Air Surveillance and Control System (UK ASACS) Command and Control System.

82. VISU

Display Subsystem of STRIDA (from visualisation).

83. Volume of Operational Interest (VOI)

That area of concern to the commander in which airborne early warning information is accepted by a ground air defence site in order to complement the situation display.

84. Weapon Engagement / Target Allocation Terminology Comparison

See following table.

		NADGE	UCCS	STRIDA	SIMCA	POACCS
Interceptor	available	eligible for local weapons program calculation (dressed)	not committed, free for operational use	free for commitment	Free for operational use	Free for operational use
	unavailable	not eligible for local weapon program calculations (not dressed)	committed, not free for operational use	not free for commitment	Not free for operational use and no int mission	Not free for operational use
	assigned	on operational mission	on operational mission	on mission	On int mission	On interception mission
	unassigned	not on operational mission	not on operational mission	not on mission	Not on int mission	Not on interception mission
	assigned available	on mission under local software control				
	unassigned available	not on mission, free for use				
	unassigned unavailable	not on mission, not free for use				
	mission completed			no longer on mission		
Non-Interceptor	engaged (by) or allocated (to)	Interceptor or SAM committed	Interceptor or SAM committed	Interceptor or SAM committed		
	unengaged (by) unallocated (to)	No air defence weapons committed	No air defence weapons committed	No air defence weapons committed		
	neutralized	exercise track not eligible for weapons commitment		exercise track not eligible for weapons commitment		

Table A2- 1 - Weapon Engagement/Target Allocation Definitions

APPENDIX 3 SYSTEM STANDARDS

Digital Signals

1. Message Frame...This is the unit of information for transmission. A message frame will contain 98 message bits divided into two messages (associated or not) each of which is divided into seven message groups of 7 bits each.

2. Transmission Frame. In order to transmit a message frame it is necessary to add certain bits. A transmission frame will consist of 128 transmission bits divided into 16 transmission groups of 8 bits each as depicted at Figure A-1. The transmission groups will be of three different types as follows:

a. Start Group. One start group begins each transmission frame. It contains 8 start bits; these are chosen to give a unique train of bits (eight "zeros") to identify the start of a next frame.

b. Data Group. Each transmission frame contains 14 data groups; each data group includes a single fixed bit ("one"), to ensure synchronism, and is followed by seven information bits.

c. Check Group. One check group completes the transmission frame. It contains a single fixed bit ("one") followed by 6 check bits followed by a final bit ("one") which completes the transmission frame.

3. Checking. The first of the six check bits will be used as an odd parity check on the first message bit position in the 14 message groups, the second check will cover the second message bit, and so on. The 6 bits available in the check group will enable only the first 6 message bits of each message group to be checked. The nature of the bit translation used (see paragraph 4 below), however, gives full protection for the 7^{th} bit of each group, provided the presence of the fixed mark bit in each group is also checked. Indeed, in differential FSK operation, errors in transmission occur in pairs: if one bit is incorrect, the following one is also incorrect. This means that whenever the 7^{th} bit of a data group is improperly transmitted, the following fixed mark bit will also be in error. Therefore, the mark logic will detect the error in the 7^{th} data bit without having to check the 7^{th} bit for parity.

4. Translation of Information. Within the digital equipment, a binary "one" in the message format will be translated into a differentially coded signal resulting in the binary "one" being indicated as a change in the binary state condition at the input to the modem. A binary "zero" will be indicated as no change in the state.

5. No Information Signal. When no information is to be transmitted the system will automatically assume an idling condition by transmitting a continuous series of binary ones translated into transitions as indicated at paragraph 4 above. Transmission of information will be resumed at any time by transmitting a start group. An idling period may occupy an integral number of bit positions.

6. Multiple Transmission Operation. Where it is necessary to use a number of circuits in parallel, provision shall be made for the message source to synchronize and stagger the start groups on the various circuits. This will permit interleaved operation of the data processing equipment.

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
								MARK	1	2	3	4	5	6	7
0	0	0	0	0	0	0	0		DATA GROUP 1						
START GROUP								FIRST MESSAGE							

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
MARK	8	9	10	11	12	13	14	MARK	15	16	17	18	19	20	21
	DATA GROUP 2								DATA GROUP 3						
FIRST MESSAGE (CONTINUED)															

33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
MARK	22	23	24	25	26	27	28	MARK	29	30	31	32	33	34	35
	DATA GROUP 4								DATA GROUP 5						
FIRST MESSAGE (CONTINUED)															

49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
MARK	36	37	38	39	40	41	42	MARK	43	44	45	46	47	48	49
	DATA GROUP 6								DATA GROUP 7						
FIRST MESSAGE (CONTINUED)															

65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
MARK	1	2	3	4	5	6	7	MARK	8	9	10	11	12	13	14
	DATA GROUP 8								DATA GROUP 9						
SECOND MESSAGE															

81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
MARK	15	16	17	18	19	20	21	MARK	22	23	24	25	26	27	28
	DATA GROUP 10								DATA GROUP 11						
SECOND MESSAGE (CONTINUED)															

97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
MARK	29	30	31	32	33	34	35	MARK	36	37	38	39	40	41	42
	DATA GROUP 12								DATA GROUP 13						
SECOND MESSAGE (CONTINUED)															

113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128
MARK	43	44	45	46	47	48	49	MARK							
	DATA GROUP 14								X	X	X	X	X	X	1
SECOND MESSAGE (CONTINUED)								CHECK GROUP							

Figure A3- 1 - Message Transmission Frame (With Frame and Information Bit Position Numbers Indicated)

BIT NUMBERS		
TX FRAME		MSG INFO BITS
1ST MSG	2ND MSG	
10	66	1
11	67	2
12	68	3
13	69	4
14	70	5
15	71	6
16	72	7
18	74	8
19	75	9
20	76	10
21	77	11
22	78	12
23	79	13
24	80	14
26	82	15
27	83	16
28	84	17
29	85	18
30	86	19
31	87	20
32	88	21
34	90	22
35	91	23
36	92	24
37	93	25
38	94	26
39	95	27
40	96	28
42	98	29
43	99	30
44	100	31
45	101	32
46	102	33
47	103	34
48	104	35
50	106	36
51	107	37
52	108	38
53	109	39
54	110	40
55	111	41
56	112	42
58	114	43
59	115	44
60	116	45
61	117	46
62	118	47
63	119	48
64	120	49

The missing Transmission (TX) Frame bit positions (1 to 128) are occupied by Start Group, fixed mark bits and Check

Figure A3-2 - Transmission Frame/Information Bit Conversion

7. Receiver Synchronization. A receiver shall be capable of achieving bit synchronization within 8 bit positions of an idling condition and shall maintain bit synchronism after the signal has been interrupted for up to 20 ms. If the information on the link is to be encrypted, the maximum time to achieve overall synchronization should not be more than one transmission frame at the receiving end of the link.

8. Transmission Speed Tolerances. In all cases the speed tolerance of the transmitted signal shall be + 1 in 10^4. Receivers shall be capable of accepting speed variations of $\pm$ 0.5%.

9. Modular-Demodulator

a. Transmission Mode. Frequency modulation (Frequency Shift Keying (FSK)) with a synchronous transmission mode will be used. Phase Modulation (Phase Shift Keying (PSK)) may be used by mutual agreement.

(1) New Standard. As a new standard, especially for the procurement of new communication systems, Phase Shift Keying (PSK) modulation according to CCITT-standards (e.g. V.22 bis, V.26, V.26 bis, V.27 ter, V.29, V.32, V.32 bis, V.33) with transmission speeds of 1200, 2400, 4800, 9600, ..., 64000 bits per second may be used.

(2) Each part of the communication equipment (common processors, modems, etc.) should be switchable for different transmission speeds of the a.m. spectrum, dependent on the state of technology of the equipment and the systems to interoperate with, as well as on the quality of the communication lines.

(3) New equipment using the new standard must, as long as the original standard is still in use by a system with which interoperability must be guaranteed, maintain also the original standard. Thus the burden to ensure interoperability lies always with the new system, never will a system still using the original standard be forced to change to the new standard.

(4) In any case, the use of any standard should be agreed upon between the management of all concerned systems at a very early stage of the procurement of new communication systems.

b. Transmission Speed. All systems shall be capable of operating at a basic speed of 1200 bits per second. An alternate speed of 600 bits per second, 1200 bits per second or a multiple thereof may be used by mutual agreement. The speed changes must be accomplished by a switch operation and must not require extensive readjustment of the equipment.

c. Impedance. Output and input impedances of the data transmission system on the line side will be standardized at a nominal 600 ohms, balanced and resistive at 800 Hz. The balance to earth must be at least 48 dB. There will be no ground connection on the line side.

d. Impedance Tolerance. It should be determined over the frequency band 300 to 3400 Hz, by:

$$\text{Return Loss} = 20 \log_{10} = \frac{Z + 600}{Z - 600\text{dB}} \text{ greater or equal to 15 db}$$

e. Receiver Input Level. The receiver should accept input levels from 0 to - 4.6 neper (N) (approximately 0 to - 40 dB). Where necessary, receivers shall be provided with a variable attenuator covering the range of zero to - 3N (approximately 25 dB) in 0.6N (approximately 5 dB) steps.

f. Output Attenuator. Data transmitters shall be provided with a separate variable output attenuator covering the range of 0 to 2.3 N conform to CCITT recommendations and be so arranged as to be accessible only by the service charged with implementing the long distance communication (wire or Hertzian) links.

10. Output/Input Filters

a. For leased point-to-point circuits, it is recommended that the transmitter employs an output filter to reject frequencies above 3400 Hz. The total transmitted power above this frequency should be at least 4.5 N (approximately 40 dB) below the steady state signal power. The receiver should employ a bandpass input filter. Use of both filters should not contribute significantly to the differential group delay of the system.

b. For switched network. To be specified later as the matter requires further studies based on relevant information to be supplied by the national authorities.

NOTE: In the event the modem is used on a switched telephone network, interference with telephone signalling systems must be avoided by more closely defining the limits of the output spectrum.

11. Interface

a. When a PTT provided CCITT standardized modem is used, the data processing terminal equipment should be compatible with the modem and the circuits should conform to the normalized CCITT interface standards on both sides of the modem (CCITT recommendations V1, V2 and V24 as contained in the current edition of the CCITT recommendations, Vol. VIII).

b. When national military authorities provide the modem, the modem functions may be integrated with the data processing input/output peripheral equipment. PTT approval is required only on the long distance line side of the modem when used on PTT point-to-point circuits

12. The receiver should be able to correctly demodulate a signal generated by a transmitter, after this signal has undergone distortion caused by its passage through a network having:

a. A maximum differential group delay	5 msec from 500 Hz to 2900 Hz
b. Additive noise measured by an instrument having a relatively long time-constant, e.g., a psophometer as recommended by CCITT used without filters	20 dB below signal level
c. A variation of overall loss in the short term (for a few seconds)	$\pm$ 0.6N (approximately $\pm$ 5 dB)
d. A variation of overall loss in the long term (over long periods including daily and seasonal variations)	$\pm$ 0.6N (approximately $\pm$ 5 dB)
e. The total variation of both short and long term will not exceed	$\pm$ 0.6N (approximately $\pm$ 5 dB)

NOTE: Tail circuits associated with the network must be engineered (equalizers, regenerators, repeaters, etc.) to ensure no degradation beyond the tolerance specified for the modem.

APPENDIX 4 MESSAGE STANDARDS

Messages

1. Message Frame. As previously defined at Appendix 3, paragraph 1.

2. Information Message. The 49 bit message is comprised of a 6 bit label (see para 21), and 43 information bits.

3. Test Message. Label 101110 (Information Bit Nos. 6, 5, 4, 3, 2, 1) identifies a test message. It is generated by repeating in each message group a pattern consisting of the six label bits and a value of zero in bit position 7.

4. BLANK Message. Label 000000 designates a BLANK message within which all other bits are set to zero. The only function of a BLANK message is to complete a message frame when no other message is available to do this.

Units, Conventions, etc.

5. Units of measurement generally will be based on binary sub-multiples of data miles, seconds and circles as follows:

Distance	1/8 data mile (750 feet)
Altitude	1/16 data mile (375 feet)
Speed	1/128 data mile per second
Azimuth	1/4096 of a circle

6. The positive Y and X coordinates (both for displacement and velocity) will correspond to True North and East respectively. Measurements will be made with respect to a system co-ordinate centre agreed between the transmitting site and the receiving site, provided authorization is given by proper national CM body. The transmitting site will transmit information referenced to the system co-ordinates centre of the specific Link 1 interface.

NOTE: Transformation is the process of converting the rectangular co-ordinates of a point in one plane of projection into the rectangular co-ordinates in another plane. The receiving site must perform the transformation from the received remote stereographic grid reference to the local stereographic grid reference.

7. Displacement will be measured in relation to a stereographic grid reference system. This means that objects are defined by projecting them gnomonically onto the assumed earth and projecting the points so derived stereographically onto a tangent plane. The transformation algorithm employed should not introduce an error greater than 1/8 data mile to the rectangular co-ordinates derived from the projection system.

8. Position normally is to be sent extrapolated to the instant of transmission.

9. Altitude is measured radially outward from the earth as a positive quantity above mean sea level.

10. Azimuth measurements will be recorded in the clockwise direction from TRUE NORTH.

11. Message Component. A bit, or combination of bits, occupying a particular bit position(s) within the data groups of a message frame will comprise a component. Each component will contain a specific item of numeric or non-numeric data in digitally encoded form.

12. If there is a non-zero message component indicating the presence of data, the coding "all zeros" will have a defined meaning (for instance, zero value).

13. Bits which are not part of a defined component are called "spare".

14. A code which is defined but not used for a component is called "not used" and a code free for future use is called "spare".

15. Link 1 facilities will recognize those agreed messages which are applicable to each particular data system.

16. Where applicable, the extreme limits of the code, positive and/or negative, will indicate that the encoded value is at or beyond the limits defined for the quantity.

17. All numerical values will be transmitted least significant value first, in straight binary code, with the least significant bit transmitted first. The table showing the contents of each message will also define the order of transmission for non-numerical data.

18. Negative Values. Negative numbers will be transmitted in "two's" complement form (see Appendix 2 to Annex A).

19. Bit Value. For numeric data, the effective value of each bit is defined once the message components have been specified. At transmission time, all bit positions in a message component must be occupied by zeroes and ones, or the component will not be transmitted.

20. Message Label. A unique combination of 6 bits will be used to identify the particular message being transmitted and is called the message label. The messages and associated labels are shown at Appendix 5 of Annex A. In case a message with any undefined label is received then this message is to be treated like a BLANK message (i.e. not processed).

21. Associated Message Indicator. The most significant bit of the 6 bit label basically is used to indicate message association, i.e., an S.5 message follows an S.4 with which it is associated. This information is conveyed as follows:

Information Bit Position	6	
	0	No associated message follows (e.g. S.4)
	1	Associated message follows (e.g. S.4+)

An associated message will always follow the message with which it is associated, in the same frame. (See Appendix 2 to Annex B).

22. Verbal Reference to Track Numbers. To simplify the track number for voice and written communications, an octal code expressed in two letters and three octal numbers will be used. The letters A, E, G, H, J, K, L and M will be used to denote the "origin" portion of the track number and the digits 0 through 7 form the numeric part.

23. Standard Messages

Messages fall into various functional groups:

a. Air surveillance

b. Strobe information

c. Management

d. Test

e. Frame filler

For more specific information on these functional groups and the related messages see Appendix 5 to Annex A

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APPENDIX 5 LINK 1 MESSAGE OVERVIEW

Label	Name	Title	Funct. Grp.
00	BLANK	BLANK MESSAGE	(e)
01	S.1	undefined	spare
02	S.2	undefined	spare
03	S.7	undefined	spare
04	S.10	undefined	spare
05	S.9	AREA CORNER POINT MESSAGE	(c)
06	S.11	undefined	spare
07	S.12	undefined	spare
10	S.23	undefined	spare
11	S.24	undefined	spare
12	S.25	undefined	spare
13	S.26	undefined	spare
14	S.27	undefined	spare
15	S.28	undefined	spare
16	S.29	undefined	spare
17	S.30	undefined	spare
20	S.31	undefined	spare
21	S.4	BASIC TRACK DATA MESSAGE	(a)
22	S.5	AMPLIFYING TRACK DATA MESSAGE	(a)
23	S.3	IFF/SIF MESSAGE	(a)
24	S.6	STROBE DATA MESSAGE	(b)
25	S.8	BASIC AEW TRACK DATA MESSAGE	(a)
26	S.13	undefined	spare
27	S.14	MANAGEMENT MESSAGE	(c)
30	S.15	MODE S AIRCRAFT ADDRESS MESSAGE	(a)
31	S.16	AIRCRAFT CALLSIGN MESSAGE PART 2	(a)
32	S.17	undefined	spare
33	S.18	undefined	spare
34	S.19	undefined	spare
35	S.20	undefined	spare
36	S.21	undefined	spare
37	S.22	undefined	spare
40	none	undefined	spare
41	none	undefined	spare
42	none	undefined	spare

Table A5- 1 - Link 1 Message Overview (Messages in order of octal label value)

Label	Name	Title	Funct. Grp.
43	none	undefined	spare
44	none	undefined	spare
45	S.9+	S.9 WITH ASSOCIATED MESSAGE FOLLOWING	(c)
46	none	undefined	spare
47	none	undefined	spare
50	none	undefined	spare
51	none	undefined	spare
52	none	undefined	spare
53	none	undefined	spare
54	none	undefined	spare
55	none	undefined	spare
56	S.0	TEST MESSAGE	(d)
57	none	undefined	spare
60	none	undefined	spare
61	S.4+	S.4 WITH ASSOCIATED MESSAGE FOLLOWING	(a)
62	none	undefined	spare
63	none	undefined	spare
64	none	undefined	spare
65	S.8+	S.8 WITH ASSOCIATED MESSAGE FOLLOWING	(a)
66	none	undefined	spare
67	none	undefined	spare
70	S.15+	S.15 WITH ASSOCIATED MESSAGE FOLLOWING	(a)
71	S.16+	AIRCRAFT CALLSIGN MESSAGE PART 1	(a)
72	none	undefined	spare
73	none	undefined	spare
74	none	undefined	spare
75	none	undefined	spare
76	none	undefined	spare
77	none	undefined	spare

Table A5- 1(cont) - Link 1 Message Overview (Messages in order of octal label value)

APPENDIX 6 HISTORICAL INFORMATION

LINK 1 SYSTEM STANDARDS

(Included for Historical Purposes and to Facilitate Development)

Reference Page A-3-1, paragraph 5

1. No Information Signal. When no information is to be transmitted the system will automatically assume an idling condition by transmitting a continuous series of test messages (S.0). Transmission of information will be resumed at any time by transmitting a start group. An idling period may consist of an even integral number of test messages.

Reference Page A-3-4, paragraph 7

2. Receiver Synchronization. A receiver shall maintain bit synchronization after the signal has been interrupted for 20 msec. If the information on the link is to be enciphered, the maximum time to achieve overall synchronization should not be more than one transmission frame at the receiving end of the link.

Reference page A-3-5, paragraph 16

3. Proposed Addition of a Sub-Paragraph c.

a. Encryption Interface

(1) General. When a requirement exists for encryption of Link 1, the standards outlined herein will be used.

(2) D.C. Digital Transmission Interface. The following characteristics are applicable to signal, clock and control circuits for Link 1 digital, D.C., communications equipment. Specifically, the data terminal, the local side of the modem and both the loop and line side of cryptographic or cryptographics control equipment must be compatible with these characteristics.

(3) Transmitter Output Voltage. The open circuit transmitting voltage shall be positive and negative 6 $\pm$ 1 volts. Ripple shall be less than 0.5% under normal operating conditions. The balance between the mark and space voltages shall be within 10% of each other.

(4) Transmitter Source Impedance. The transmitting source impedance shall not exceed 100 ohms (50 ohms design objective) for currents whose magnitude is less than . The maximum short circuit current delivered to the interface shall not exceed 0.1 amperes

(5) Transmitter Wave Shape. The wave shape delivered to the interface shall have a rise time no faster than 5% of the duration of the unit interval. The wave shape shall be such that the rise* and fall* times shall be within 5% to 15% of the unit

interval at either 1200 or 600 bits per second. Transitions in both directions shall be reasonably equal within the limits specified above and be equally affected by shunt capacitance across the line. Properly shaped wave forms shall exhibit smooth exponential curves and contain no points of inflection prior to obtaining maximum amplitudes (see Figure A-3). The wave shaping is accomplished externally, interconnecting leads between transmit device and wave shaping unit shall not exceed 8 inches in length. The measurement shall be accomplished at the output terminals which shall be terminated in 47 to 68 kOhms resistive load for the purpose of the test.

(6) Receiver Input Impedance. The minimum input impedance of a single receiver device shall be 600 Ohms (DO**, 450 to 680 Ohms).

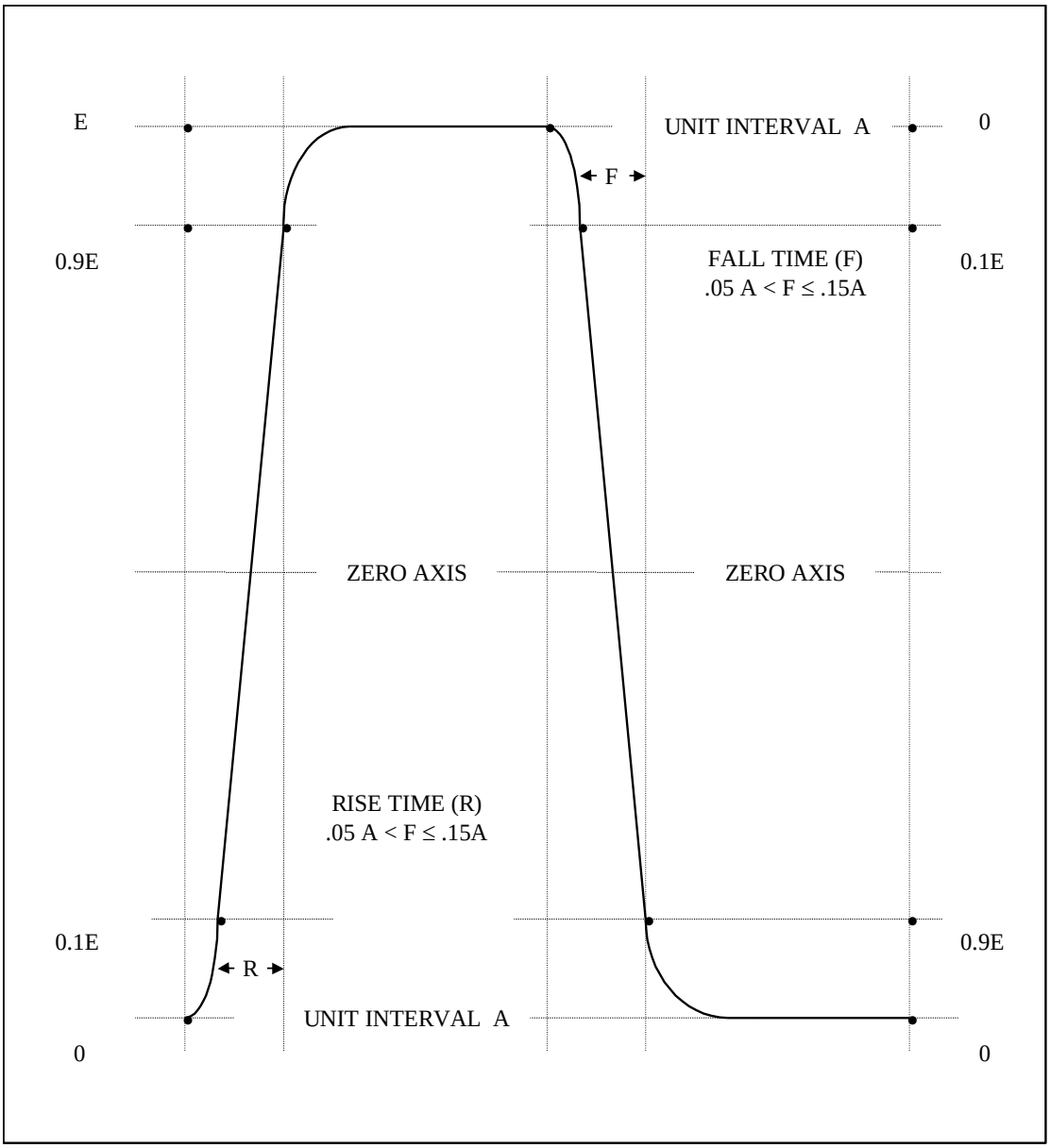
(7) Receiver Input Capacitance. The input capacitance of the receiver device shall not exceed 2500 picofarads.

(8) Receiver Sensitivity. Maximum operating current required (that current at which the device changes its state from mark to space or vice versa) shall be 10 milliamperes with a minimum input resistance of 600 Ohms. (DO**, 450 Ohms to 680 Ohms is 15.6 to 7.4 micro-amperes over a voltage range of 5 to 7 volts). Minimum input circuit sensitivity required shall be such that correct operation of the device shall be effected on current levels of these magnitudes. A marking current not in excess of 10 milliamperes (DO**, 15.6 to 7.4 milliamperes) shall cause the receiver device to correctly assume the mark (one) state, while a spacing current of the same magnitude shall cause the receiver device to correctly assume the spacing (zero) state. The balance between the mark and space current actually required shall be within 10% of each other.

(9) Signalling Sense. A positive voltage between line and signal ground shall be used to indicate a marking state; a negative voltage shall be used to indicate a spacing state.

* See Glossary, Appendix 2 to Annex A.

** Design Objective



Rise and Fall Times (0.1 to 0.9 of the peak-to-peak voltage, E) shall be approximately equal and shall exceed 5% but shall not exceed 15% of the unit interval, A, at either 1200 or 600 bits per second

Figure A6- 1 - Standard Wave Shape

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ANNEX B LINK 1 TRANSMISSION

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APPENDIX 1 MESSAGE/TRACK TRANSMISSION PROCEDURES

1. The following procedures are provided as a guide for Link 1 implementation. They must be used in conjunction with the terms defined at Appendix 2 of Annex A. Standardized transmission procedures and terms are necessary to ensure compatibility between two facilities or air defence systems using these message formats for the programming of telling functions.

2. Message Frame Content. A message frame will always contain two messages and will consist of any one of possible combinations listed in Appendix 2 to Annex B.

3. Message Association. An S.4 or S.8 message with the associated message bit set must be followed (in the same message frame) by either an S.3 or an S.5 message.
An S.15 message with the associated message bit set must be followed (in the same message frame) by an S.3 message.
An S.16 message with the associated message bit set must be followed (in the same message frame) by an S.16 message.
S.3, S.5 and S.16 messages will never be sent alone.

4. Link Transmission Cycle. Under normal circumstances (all tracks can be told during the cycle), the information on each track is updated at a fixed rate. This rate may either be the same as the radar antenna scan rate or 10 seconds. When there are more tracks to be told than can be accomplished in this fixed cycle, the cycle will be extended to ensure telling of all tracks whose transmission is mandatory (Priority I).

5. Test Message Transmission Cycle. The test message transmission cycle will be 10 seconds $\pm$ 1 second.. A message frame containing an S.0/S.0 Test Message Pair will be transmitted each cycle.

6. Message Precedence. Messages will be queued and transmitted in the following order of precedence.

First	S.0/S.0
Second	S.14 Management
Third	S.6
Fourth	S.14 Change ID, High Priority Tracks
Fifth	S.9/S.9, Low Priority Tracks

7. Transmission of Track Data.

a. Track Data Transmission Priorities. Track Data will be assigned one of the following priorities for telling:

(1) Priority I. (High priority tell). Mandatory telling during the next link transmission cycle. Assigned locally (in accordance with SOPs) to those messages concerning tracks manually or automatically (according to certain predetermined

criteria) selected for telling or tracks to be told as a result of receiving an S.14 message.

(2) Priority II. (Low Priority tell). Telling during the next link transmission cycle if time permits. Assigned to messages concerning all other tracks to be told.

b. Initial Transmission. When a track is first told the S.4/S.5 or S.8/S.5 message pair must be transmitted. The message pairs S.4/S.3, S.8/S.3 or S.15/S.3 (for systems implementing S.15 messages; see paragraph 9) must also be transmitted in the transmission frame immediately following. Systems implementing the S.16 messages must transmit an S.16+/S.16 pair in the transmission frame immediately following. Transmission of track messages will be initiated as a result of one of the following:

(1) in case of a track with NATO track number (NTN):

(a) Manual selection for crosstell (start tell action).

(b) Automatic qualification by nature of track (interceptor or emergency).

(c) Automatic qualification because track enters into or resides within a Track Continuation Area (TCA).

(d) Automatic qualification because track meets the criteria established by the receiving centre for its Area of Operational Interest (AOI) at the transmitting site, i.e. area residency, identification, target allocation status.

(e) Automatic qualification because track meets the criteria established by the transmitting centre for remote Volume of Operational Interest (VOI) or AEW Target Area (ATA), i.e. area residency, identification, target allocation status, altitude.

(f) Automatic qualification as consequence of a request received from a remote site

(2) in case of a track with non-NATO track number (representing a request for assignment of a NATO track number by the remote site for this track as result of a start tell action only and always using S.4 messages):

(a) An existing NTN is returned to the originator in case of correlation with an established NTN track.

(b) A new NTN will be assigned and returned to originator in case the track resides inside the TPA and, in addition, correlation with a non-NTN track or no correlation with an NTN track occurs.

(c) No NTN will be returned to the originator if no correlation with NTN tracks can be performed outside the TPA.

c. Information Updating. The following general rules apply when transmitting messages which contain updated information on tracks previously told

(1) Transmit S.4 or S.8 every transmission cycle under normal circumstances. In case of communications circuit saturation, the information updating cycle will exceed the link transmission cycle (Priority I) and delay transmission of some track updating messages (Priority II) for one or more link transmission cycles.

Therefore the sequence of transmission for priority II tracks will alternate in each information update cycle between tracks transmitted via S.4 versus those sent via S.8 in order to increase the likelihood of regular transmissions under load conditions.

(2) Transmit S.4/S.5 or S.8/S.5 in the following circumstances:

(a) On request (see messages S.14), or

(b) Subsequently, with a change of altitude or velocity or both beyond certain thresholds, or

(c) With a change in any other S.5 component(s), or

(d) After eight Link Transmission Cycles have elapsed since last S.5 transmission.

(3) Transmit S.4/S.3 or S.8/S.3, S.15 (see paragraph 9) in the following circumstances:

(a) On request (see message S.14), or

(b) At every change of IFF/SIF or Mode S Aircraft Address including cessation of electronic emergency signals.

(c) After eight Link Transmission Cycles have elapsed since last S.3 or S.15 transmission alternating with the transmission of S.5 [para 7.c(2)(d)] and displaced four transmission cycles.

(4) Transmit S.16+/S.16 in the following circumstances:

(a) On request (see message S.14), or

(b) At every change of the aircraft callsign.

(c) After eight Link Transmission Cycles have elapsed since last S.16+/S.16 transmission alternating with the transmission of S.5 [para 7.c(2)(d)] and displaced four transmission cycles.

d. Final Transmission

(1) When track telling is automatically initiated, the track will continue to be told until:

(a) It is automatically dropped in the sending centre (no information is provided to the receiving centre to indicate that telling has stopped), or

(b) It leaves the area where automatic transmission is require (no information is provided to the receiving centre to indicate that telling has stopped), or

(c) Telling is inhibited by a manual action in the sending centre. Any one of the following actions can inhibit the transmission of the track. (No information is provided to the receiving centre to indicate that telling has stopped):

1. Specifying STOP TELL by track number.

2. Specifying STOP TELL by category (e.g., identification, target allocation status, etc.).

3. Changing any of the governing criteria of the track so that it no longer qualifies for telling, or

(d) Telling is inhibited by receipt of an S.14 message resulting from a manual action taken in the receiving centre. Any one of the following actions can inhibit the transmission of the track. (No information is provided to the receiving centre to indicate that telling has stopped):

1. Specifying STOP TELL by track number.

2. Specifying STOP TELL by identification category (e.g., friendly, unknown, faker, etc.).

3. Specifying changing any component of the identification of the track so that it no longer qualifies for telling, or

(e) Telling is inhibited by receipt of an automatically generated S.14 message from the track receiving site informing the sending site that the track has become local (track acquisition achieved).

(2) When track telling is manually initiated, the track will continue to be told until (no information is provided to the receiving centre to indicate that telling has stopped):

(a) Dropped automatically by the sending centre, or

(b) The sending centre receives a request to stop telling, or

(c) The sending centre manually stops the telling of the track.

(3) Whether track telling is automatically or manually initiated, when the track is manually dropped an S.4/S.5 message pair "Track Dropping" is sent to all centres concerned. A centre which receives an S.4/S.5 "Track Dropping" message pair may retain or drop the track. If the receiving centre retains the track, it must not tell the track to the centre originating the S.4/S.5 message pair. If the receiving centre drops the track, it transmits the S.4/S.5 message pair to other centres concerned, but it must not send it to the centre originating the S.4/S.5.

8. Exchange of Management Information

a. S.14 management messages may be generated and sent automatically or manually (as consequence of operator actions).

(1) The S.14 messages serve different purposes as indicated by the Order code.

(a) Change track number of designated track

(b) Exchange data between designated tracks

(c) Change identity/identity modifier of designated track

(d) Start tell of designated track.

(e) Stop tell of designated track

(f) Start tell of certain identity category tracks within AOI

(g) Stop tell of certain identity category tracks within AOI

(h) Send one S.4/S.3 or one S.15/S.3 (see paragraph 9) message pair for designated track

(i) Send one S.4/S.5 message pair for designated track

(j) Suppress designated raid tape target track

(k) Request to assign new track number to designated

(l) Send one S.16/S.16 message pair for designated track

(2) The S.14 messages are classified into different categories as indicated by their Type:

(a) Messages not requiring acknowledgement by the receiving site (type 0).

(b) Messages requiring acknowledgement by the receiving site (type 2).

(c) Messages acknowledging reception of a type 2 message (type 4).

(3) The frequency of transmission will be once per transmission cycle for a variable number of cycles depending on the return of the message.

(a) Messages of Type 0 or 4 will be sent once only.

(b) Manually generated and S.14 change identity messages will be sent until acknowledged.

(c) Relayed S.14 change identity messages will be sent until acknowledged, however not more than three times.

b. The S.9 message serves the purpose to establish or delete an area with four straight line boundaries at remote sites. The significance of this area is to be defined by operations upon utilization.

9. Exchange of Mode S Aircraft Address (S.15). To ensure compatibility with systems not processing S.15 messages, systems transmitting S.15 messages must be able to configure each point-to-point connection independently to enable/disable S.15 transmissions.

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APPENDIX 2 TRANSMISSION FRAME COMPOSITION

FRAME COMPOSITION		SECOND MESSAGE																
		BLANK	S.0	S.1	S.2	S.3	S.4	S.5	S.6	S.7	S.8	S.9	S.10	S.11	S.12	S.13	S.14	S.15
FIRST MESSAGE IN TRANSMISSION FRAME	BLANK	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.0	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.4	X	-	-	-	-	X	-	X	-	X	-	-	-	-	-	X	X
	S.4+	-	-	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-
	S.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.6	X	-	-	-	-	X	-	X	-	X	-	-	-	-	-	X	X
	S.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.8	X	-	-	-	-	X	-	X	-	X	-	-	-	-	-	X	X
	S.8+	-	-	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-
	S.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.9+	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
	S.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.14	X	-	-	-	-	X	-	X	-	X	-	-	-	-	-	X	X
	S.15	X	-	-	-	-	X	-	X	-	X	-	-	-	-	-	X	X
	S.15+	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-
	S.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.16+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table B2- 1 - Transmission Frame Composition

FRAME COMPOSITION		SECOND MESSAGE															
		S.16	S.17	S.18	S.19	S.20	S.21	S.22	S.23	S.24	S.25	S.26	S.27	S.28	S.29	S.30	S.31
FIRST MESSAGE IN TRANSMISSION FRAME	BLANK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.4+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.8+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.9+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.15+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.16+	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	S.31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table B2- 1(cont) - Transmission Frame Composition

ANNEX C LINK 1 MESSAGE FORMATS

Appendix 1	Message Contents
Appendix 2	Message Structure
Appendix 3	Message Field Definition
Appendix 4	Message Implementation
Appendix 5	Message Spare Bits

Note: Identical numbers are used for figures and main paragraphs in Appendices 1 through 4 in order to reference the same message.

INTENTIONALLY BLANK

APPENDIX 1 MESSAGE CONTENTS

MAIN CONTENT OF LINK 1 MESSAGES

1. Blank Message. Consists of all zeroes and is used to fill one transmission frame if there is only one single operational message left to be transmitted.

2. Test Message (S.0). Consists of a certain bit pattern which is used to verify and ensure proper and error-free Link 1 connection.

3. Reserved (S.1)

4. Reserved (S.2)

5. IFF/SIF Message (S.3). Contains SIF mode 1, 2 and 3/A codes, emergency information and the SIF request/reply code.

6. Basic Track Data Messages (S.4 and S.4+). Contain the 15-bit NATO-tracknumber, the cartesian co-ordinates of track position and the track data quality indicator.

7. Amplifying Track Data Message (S.5) Contains track altitude, track strength, track identity, X-velocity, Y-velocity, target allocation/weapon engagement status, traffic category, simulation and drop indicator.

8. Strobe Data Message (S.6) Contains strobe azimuth, strobe width, strobe type, strobe number, sensor type, strobe elevation information, originating site number, automatic/manual strobe indicator, simulation status and data age flag.

9. Reserved (S.7)

10. Basic AEW Track Data Messages (S.8 and S.8+) Contain the same data fields as the Basic Track Data Messages (S.4 and S.4+), see para 6.

11. Area Corner Point Messages (S.9 and S.9+) Contain the area number, corner number, cartesian corner co-ordinates, originating site code and drop indicator.

12. Reserved (S.10)

13. Reserved (S.11)

14. Reserved (S.12)

15. Reserved (S.13)

16. Management Message (S.14) Contains message type, order code, tracknumber “P”, tracknumber “Q”/amplifying data “A” field and originating site code.

17. Mode S Aircraft Address Messages (S.15 and S.15+). Contain the 15-bit NATO-tracknumber and the 24-bit aircraft-unique Mode S address.

18. Aircraft Callsign Messages (S.16 and S.16+). Contain the 15-bit NATO-tracknumber, the first/last four characters of the aircraft callsign and the source of the callsign.

19. Reserved (S.17)
20. Reserved (S.18)
21. Reserved (S.19)
22. Reserved (S.20)
23. Reserved (S.21)
24. Reserved (S.22)
25. Reserved (S.23)
26. Reserved (S.24)
27. Reserved (S.25)
28. Reserved (S.26)
29. Reserved (S.27)
30. Reserved (S.28)
31. Reserved (S.29)
32. Reserved (S.30)
33. Reserved (S.31)

APPENDIX 2 MESSAGE STRUCTURE

01	MESSAGE LABEL	SEE PARA 1.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
07	ZERO	SEE PARA. 1.2. APPENDIX 3 ANNEX C
08	ZERO	
09	ZERO	
10	ZERO	
11	ZERO	
12	ZERO	
13	ZERO	
14	ZERO	
15	ZERO	
16	ZERO	
17	ZERO	
18	ZERO	
19	ZERO	
20	ZERO	
21	ZERO	
22	ZERO	
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39	ZERO	
40	ZERO	
41	ZERO	
42	ZERO	
43	ZERO	
44	ZERO	
45	ZERO	
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47	ZERO	
48	ZERO	
49	ZERO	

Figure C2- 1 - Blank Message

01	MESSAGE LABEL	SEE PARA 2.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
07	TEST PATTERN	SEE PARA 2.2. APPENDIX 3 ANNEX C
08	TEST PATTERN	
09	TEST PATTERN	
10	TEST PATTERN	
11	TEST PATTERN	
12	TEST PATTERN	
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44	TEST PATTERN	
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47	TEST PATTERN	
48	TEST PATTERN	
49	TEST PATTERN	

Figure C2- 2 - S.0 Test Message

01	MESSAGE LABEL	SEE PARA 3.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 3 - S.1 (TBD)

01	MESSAGE LABEL	SEE PARA 4.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 4 - S.2 (TBD)

01	MESSAGE LABEL	SEE PARA 5.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
07	SPARE	SEE PARA 5.2 APPENDIX 3 ANNEX C
08	SPARE	
09	SIF MODE 3/A CODE	SEE PARA 5.3 APPENDIX 3 ANNEX C
10	SIF MODE 3/A CODE	
11	SIF MODE 3/A CODE	
12	SIF MODE 3/A CODE	
13	SIF MODE 3/A CODE	
14	SIF MODE 3/A CODE	
15	SIF MODE 3/A CODE	
16	SIF MODE 3/A CODE	
17	SIF MODE 3/A CODE	
18	SIF MODE 3/A CODE	
19	SIF MODE 3/A CODE	
20	SIF MODE 3/A CODE	
21	SIF REQUEST/REPLY INDICATOR	SEE PARA 5.4. APPENDIX 3 ANNEX C
22	SIF REQUEST/REPLY INDICATOR	
23	SIF REQUEST/REPLY INDICATOR	
24	EMERGENCY INDICATOR	SEE PARA 5.5.. APP. 3
25	SIF MODE PRESENCE INDICATOR	SEE PARA 5.6. APPENDIX 3 ANNEX C
26	SIF MODE PRESENCE INDICATOR	
27	SIF MODE PRESENCE INDICATOR	
28	EMERGENCY VALIDATION INDIC.	SEE PARA 5.7. APPENDIX 3
29	SPARE	SEE PARA 5.8. APPENDIX 3 ANNEX C
30	SPARE	
31	SIF MODE 1 CODE	SEE PARA 5.9. APPENDIX 3 ANNEX C
32	SIF MODE 1 CODE	
33	SIF MODE 1 CODE	
34	SIF MODE 1 CODE	
35	SIF MODE 1 CODE	
36	SPARE	SEE PARA 5.10. APPENDIX 3 ANNEX C
37	SPARE	
38	SIF MODE 2 CODE	SEE PARA 5.11. APPENDIX 3 ANNEX C
39	SIF MODE 2 CODE	
40	SIF MODE 2 CODE	
41	SIF MODE 2 CODE	
42	SIF MODE 2 CODE	
43	SIF MODE 2 CODE	
44	SIF MODE 2 CODE	
45	SIF MODE 2 CODE	
46	SIF MODE 2 CODE	
47	SIF MODE 2 CODE	
48	SIF MODE 2 CODE	
49	SIF MODE 2 CODE	

Figure C2- 5 - S.3 IFF/SIF Message

01	MESSAGE LABEL	SEE PARA 6.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
07	NATO TRACK NUMBER	SEE PARA 6.2. APPENDIX 3 ANNEX C
08	NATO TRACK NUMBER	
09	NATO TRACK NUMBER	
10	NATO TRACK NUMBER	
11	NATO TRACK NUMBER	
12	NATO TRACK NUMBER	
13	NATO TRACK NUMBER	
14	NATO TRACK NUMBER	
15	NATO TRACK NUMBER	
16	NATO TRACK NUMBER	
17	NATO TRACK NUMBER	
18	NATO TRACK NUMBER	
19	NATO TRACK NUMBER	
20	NATO TRACK NUMBER	
21	NATO TRACK NUMBER	
22	TRACK/DATA QUALITY	SEE PARA 6.3. APPENDIX 3 ANNEX C
23	TRACK/DATA QUALITY	
24	TRACK POSITION X-COMPONENT	SEE PARA 6.4. APPENDIX 3 ANNEX C
25	TRACK POSITION X-COMPONENT	
26	TRACK POSITION X-COMPONENT	
27	TRACK POSITION X-COMPONENT	
28	TRACK POSITION X-COMPONENT	
29	TRACK POSITION X-COMPONENT	
30	TRACK POSITION X-COMPONENT	
31	TRACK POSITION X-COMPONENT	
32	TRACK POSITION X-COMPONENT	
33	TRACK POSITION X-COMPONENT	
34	TRACK POSITION X-COMPONENT	
35	TRACK POSITION X-COMPONENT	
36	TRACK POSITION X-COMPONENT	
37	TRACK POSITION Y-COMPONENT	SEE PARA 6.5. APPENDIX 3 ANNEX C
38	TRACK POSITION Y-COMPONENT	
39	TRACK POSITION Y-COMPONENT	
40	TRACK POSITION Y-COMPONENT	
41	TRACK POSITION Y-COMPONENT	
42	TRACK POSITION Y-COMPONENT	
43	TRACK POSITION Y-COMPONENT	
44	TRACK POSITION Y-COMPONENT	
45	TRACK POSITION Y-COMPONENT	
46	TRACK POSITION Y-COMPONENT	
47	TRACK POSITION Y-COMPONENT	
48	TRACK POSITION Y-COMPONENT	
49	TRACK POSITION Y-COMPONENT	

Figure C2- 6 - S.4 and S.4+ Basic Track Data Message

01	MESSAGE LABEL	SEE PARA 7.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
07	TRACK ALTITUDE	SEE PARA 7.2. APPENDIX 3 ANNEX C
08	TRACK ALTITUDE	
09	TRACK ALTITUDE	
10	TRACK ALTITUDE	
11	TRACK ALTITUDE	
12	TRACK ALTITUDE	
13	TRACK ALTITUDE	
14	TRACK ALTITUDE	
15	TRACK ALTITUDE	
16	TRACK STRENGTH	SEE PARA 7.3. APPENDIX 3 ANNEX C
17	TRACK STRENGTH	
18	TRACK STRENGTH	
19	TRACK IDENTIFICATION	SEE PARA 7.3. APPENDIX 4 ANNEX C
20	TRACK IDENTIFICATION	
21	TRACK IDENTIFICATION	
22	TRACK IDENTIFICATION	
23	SPECIAL USE	SEE PARA 7.3. APPENDIX 4 ANNEX C
24	SPECIAL USE	
25	TRACK SIMULATION STATUS	SEE PARA 7.6. APPENDIX 3 ANNEX C
26	TRACK DROP INDICATOR	PARA 7.5. APPENDIX 4
27	AIR TRAFFIC CLASS	SEE PARA 7.8. APPENDIX 3 ANNEX C
28	AIR TRAFFIC CLASS	
29	TRACK VELOCITY X-COMPONENT	SEE PARA 7.9. APPENDIX 3 ANNEX C
30	TRACK VELOCITY X-COMPONENT	
31	TRACK VELOCITY X-COMPONENT	
32	TRACK VELOCITY X-COMPONENT	
33	TRACK VELOCITY X-COMPONENT	
34	TRACK VELOCITY X-COMPONENT	
35	TRACK VELOCITY X-COMPONENT	
36	TRACK VELOCITY X-COMPONENT	
37	TARGET ALLOCATION or	SEE PARA 7.10. APPENDIX 3 ANNEX C
38	WEAPON ASSIGNMENT STATUS	
39	SPECIAL USE	SEE PARA 7.3. APPENDIX 4 ANNEX C
40	SPECIAL USE	
41	SPECIAL USE	
42	TRACK VELOCITY Y-COMPONENT	SEE PARA 7.12. APPENDIX 3 ANNEX C
43	TRACK VELOCITY Y-COMPONENT	
44	TRACK VELOCITY Y-COMPONENT	
45	TRACK VELOCITY Y-COMPONENT	
46	TRACK VELOCITY Y-COMPONENT	
47	TRACK VELOCITY Y-COMPONENT	
48	TRACK VELOCITY Y-COMPONENT	
49	TRACK VELOCITY Y-COMPONENT	

Figure C- 7 - S.5 Amplifying Track Data Message

01	MESSAGE LABEL	SEE PARA 8.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
07	STROBE ACQUISITION INDICATOR	SEE PARA 8.2. APPENDIX 3 ANNEX C
08	STROBE WIDTH CATEGORY	SEE PARA 8.3. APPENDIX 3 ANNEX C
09	STROBE WIDTH CATEGORY	
10	STROBE WIDTH CATEGORY	
11	STROBE TYPE	SEE PARA 8.4. APPENDIX 3 ANNEX C
12	STROBE TYPE	
13	STROBE SIMULATION STATUS	SEE PARA 8.3. APPENDIX 4
14	STROBE AZIMUTH	SEE PARA 8.6. APPENDIX 3 ANNEX C
15	STROBE AZIMUTH	
16	STROBE AZIMUTH	
17	STROBE AZIMUTH	
18	STROBE AZIMUTH	
19	STROBE AZIMUTH	
20	STROBE AZIMUTH	
21	STROBE AZIMUTH	
22	STROBE AZIMUTH	
23	STROBE AZIMUTH	
24	STROBE AZIMUTH	
25	STROBE AZIMUTH	
26	STROBE ORIGINATING SITE CODE	SEE PARA 8.7. APPENDIX 3 ANNEX C
27	STROBE ORIGINATING SITE CODE	
28	STROBE ORIGINATING SITE CODE	
29	STROBE ORIGINATING SITE CODE	
30	STROBE ORIGINATING SITE CODE	
31	STROBE ORIGINATING SITE CODE	
32	SENSOR TYPE	SEE PARA 8.8. APPENDIX 3 ANNEX C
33	SENSOR TYPE	
34	SENSOR TYPE	
35	STROBE NUMBER	SEE PARA 8.9. APPENDIX 3 ANNEX C
36	STROBE NUMBER	
37	STROBE NUMBER	
38	STROBE NUMBER	
39	STROBE NUMBER	
40	STROBE ELEVATION INFORMATION	SEE PARA 8.10. APPENDIX 3 ANNEX C
41	STROBE ELEVATION INFORMATION	
42	STROBE ELEVATION INFORMATION	
43	STROBE ELEVATION INFORMATION	
44	STROBE DATA AGE	SEE PARA 8.11. APPENDIX 3 ANNEX C
45	STROBE DATA AGE	
46	STROBE DATA AGE	
47	STROBE DATA AGE	
48	STROBE DATA AGE	
49	STROBE DATA AGE	

Figure C2- 8 - S.6 Strobe Data Message

01	MESSAGE LABEL	SEE PARA 9.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 9 - S.7 (TBD)

01	MESSAGE LABEL	SEE PARA 10.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
07	NATO TRACK NUMBER	SEE PARA 6.2. APPENDIX 3 ANNEX C
08	NATO TRACK NUMBER	
09	NATO TRACK NUMBER	
10	NATO TRACK NUMBER	
11	NATO TRACK NUMBER	
12	NATO TRACK NUMBER	
13	NATO TRACK NUMBER	
14	NATO TRACK NUMBER	
15	NATO TRACK NUMBER	
16	NATO TRACK NUMBER	
17	NATO TRACK NUMBER	
18	NATO TRACK NUMBER	
19	NATO TRACK NUMBER	
20	NATO TRACK NUMBER	
21	NATO TRACK NUMBER	
22	TRACK/DATA QUALITY	SEE PARA 6.3. APPENDIX 3 ANNEX C
23	TRACK/DATA QUALITY	
24	TRACK POSITION X-COMPONENT	SEE PARA 6.4. APPENDIX 3 ANNEX C
25	TRACK POSITION X-COMPONENT	
26	TRACK POSITION X-COMPONENT	
27	TRACK POSITION X-COMPONENT	
28	TRACK POSITION X-COMPONENT	
29	TRACK POSITION X-COMPONENT	
30	TRACK POSITION X-COMPONENT	
31	TRACK POSITION X-COMPONENT	
32	TRACK POSITION X-COMPONENT	
33	TRACK POSITION X-COMPONENT	
34	TRACK POSITION X-COMPONENT	
35	TRACK POSITION X-COMPONENT	
36	TRACK POSITION X-COMPONENT	
37	TRACK POSITION Y-COMPONENT	SEE PARA 6.5. APPENDIX 3 ANNEX C
38	TRACK POSITION Y-COMPONENT	
39	TRACK POSITION Y-COMPONENT	
40	TRACK POSITION Y-COMPONENT	
41	TRACK POSITION Y-COMPONENT	
42	TRACK POSITION Y-COMPONENT	
43	TRACK POSITION Y-COMPONENT	
44	TRACK POSITION Y-COMPONENT	
45	TRACK POSITION Y-COMPONENT	
46	TRACK POSITION Y-COMPONENT	
47	TRACK POSITION Y-COMPONENT	
48	TRACK POSITION Y-COMPONENT	
49	TRACK POSITION Y-COMPONENT	

Figure C2- 10 - s.8 AND s.8+ Basic AEW Track Data Message

01	MESSAGE LABEL	SEE PARA 11.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
07	AREA NUMBER CODE	SEE PARA 11.2. APPENDIX 3 ANNEX C
08	AREA NUMBER CODE	
09	SPARE	SEE PARA 11.3. APPENDIX 3 ANNEX C
10	SPARE	
11	AREA ORIGIN SITE	SEE PARA 11.4. APPENDIX 3 ANNEX C
12	AREA ORIGIN SITE	
13	AREA ORIGIN SITE	
14	AREA ORIGIN SITE	
15	AREA ORIGIN SITE	
16	AREA ORIGIN SITE	
17	AREA CORNER NUMBER	SEE PARA 11.5. APPENDIX 3 ANNEX C
18	AREA CORNER NUMBER	
19	AREA DROP INDICATOR	SEE PARA 11.6. APPENDIX 3 ANNEX C
20	SPARE	SEE PARA 11.7. APPENDIX 3 ANNEX C
21	SPARE	
22	SPARE	
23	SPARE	
24	AREA CORNER X-COMPONENT	SEE PARA 11.8. APPENDIX 3 ANNEX C
25	AREA CORNER X-COMPONENT	
26	AREA CORNER X-COMPONENT	
27	AREA CORNER X-COMPONENT	
28	AREA CORNER X-COMPONENT	
29	AREA CORNER X-COMPONENT	
30	AREA CORNER X-COMPONENT	
31	AREA CORNER X-COMPONENT	
32	AREA CORNER X-COMPONENT	
33	AREA CORNER X-COMPONENT	
34	AREA CORNER X-COMPONENT	
35	AREA CORNER X-COMPONENT	
36	AREA CORNER X-COMPONENT	
37	AREA CORNER Y-COMPONENT	SEE PARA 11.9. APPENDIX 3 ANNEX C
38	AREA CORNER Y-COMPONENT	
39	AREA CORNER Y-COMPONENT	
40	AREA CORNER Y-COMPONENT	
41	AREA CORNER Y-COMPONENT	
42	AREA CORNER Y-COMPONENT	
43	AREA CORNER Y-COMPONENT	
44	AREA CORNER Y-COMPONENT	
45	AREA CORNER Y-COMPONENT	
46	AREA CORNER Y-COMPONENT	
47	AREA CORNER Y-COMPONENT	
48	AREA CORNER Y-COMPONENT	
49	AREA CORNER Y-COMPONENT	

Figure C2- 11 - S.9 and S.9+ Area Corner Point Message

01	MESSAGE LABEL	SEE PARA 12.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 12 - S.10 (TBD)

01	MESSAGE LABEL	SEE PARA 13.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 13 - S.11 (TBD)

01	MESSAGE LABEL	SEE PARA 14.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2-14 - S.12 (TBD)

01	MESSAGE LABEL	SEE PARA 15.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 15 - S.13 (TBD)

01	MESSAGE LABEL	SEE PARA 16.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
07	ORDER ORIGINATING SITE CODE	SEE PARA 16.2. APPENDIX 3 ANNEX C
08	MESSAGE TYPE	SEE PARA 16.3. APPENDIX 3 ANNEX C
09	MESSAGE TYPE	
10	ORDER ORIGINATING SITE CODE	SEE PARA 16.2. APPENDIX 4 ANNEX C
11	ORDER ORIGINATING SITE CODE	
12	ORDER ORIGINATING SITE CODE	
13	ORDER ORIGINATING SITE CODE	
14	ORDER CODE	SEE PARA 16.4. APPENDIX 3 ANNEX C
15	ORDER CODE	
16	ORDER CODE	
17	ORDER CODE	
18	NATO TRACK NUMBER “P” FIELD	SEE PARA 16.5. APPENDIX 3 ANNEX C
19	NATO TRACK NUMBER “P” FIELD	
20	NATO TRACK NUMBER “P” FIELD	
21	NATO TRACK NUMBER “P” FIELD	
22	NATO TRACK NUMBER “P” FIELD	
23	NATO TRACK NUMBER “P” FIELD	
24	NATO TRACK NUMBER “P” FIELD	
25	NATO TRACK NUMBER “P” FIELD	
26	NATO TRACK NUMBER “P” FIELD	
27	NATO TRACK NUMBER “P” FIELD	
28	NATO TRACK NUMBER “P” FIELD	
29	NATO TRACK NUMBER “P” FIELD	
30	NATO TRACK NUMBER “P” FIELD	
31	NATO TRACK NUMBER “P” FIELD	
32	NATO TRACK NUMBER “P” FIELD	
33	ORDER ORIGINATING SITE CODE	SEE PARA 16.2. APPENDIX 4 ANNEX C
34	ORDER ORIGINATING SITE CODE	
35	NATO TRACK NUMBER “Q”/	SEE PARA 16.6. APPENDIX 3 ANNEX C
36	AMPLIFYING DATA “A” FIELD	
37	NATO TRACK NUMBER “Q”/	
38	AMPLIFYING DATA “A” FIELD	
39	NATO TRACK NUMBER “Q”/	
40	AMPLIFYING DATA “A” FIELD	
41	NATO TRACK NUMBER “Q”/	
42	AMPLIFYING DATA “A” FIELD	
43	NATO TRACK NUMBER “Q”/	
44	AMPLIFYING DATA “A” FIELD	
45	NATO TRACK NUMBER “Q”/	
46	AMPLIFYING DATA “A” FIELD	
47	NATO TRACK NUMBER “Q”/	
48	AMPLIFYING DATA “A” FIELD	
49	NATO TRACK NUMBER “Q”/ AMPL....	

Figure C2- 16 - S.14 Management Message

01	MESSAGE LABEL	SEE PARA 17.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
07	NATO TRACK NUMBER	SEE PARA 17.2. APPENDIX 3 ANNEX C
08	NATO TRACK NUMBER	
09	NATO TRACK NUMBER	
10	NATO TRACK NUMBER	
11	NATO TRACK NUMBER	
12	NATO TRACK NUMBER	
13	NATO TRACK NUMBER	
14	NATO TRACK NUMBER	
15	NATO TRACK NUMBER	
16	NATO TRACK NUMBER	
17	NATO TRACK NUMBER	
18	NATO TRACK NUMBER	
19	NATO TRACK NUMBER	
20	NATO TRACK NUMBER	
21	NATO TRACK NUMBER	
22	MODE S AIRCRAFT ADDRESS	SEE PARA 17.3. APPENDIX 3 ANNEX C
23	MODE S AIRCRAFT ADDRESS	
24	MODE S AIRCRAFT ADDRESS	
25	MODE S AIRCRAFT ADDRESS	
26	MODE S AIRCRAFT ADDRESS	
27	MODE S AIRCRAFT ADDRESS	
28	MODE S AIRCRAFT ADDRESS	
29	MODE S AIRCRAFT ADDRESS	
30	MODE S AIRCRAFT ADDRESS	
31	MODE S AIRCRAFT ADDRESS	
32	MODE S AIRCRAFT ADDRESS	
33	MODE S AIRCRAFT ADDRESS	
34	MODE S AIRCRAFT ADDRESS	
35	MODE S AIRCRAFT ADDRESS	
36	MODE S AIRCRAFT ADDRESS	
37	MODE S AIRCRAFT ADDRESS	
38	MODE S AIRCRAFT ADDRESS	
39	MODE S AIRCRAFT ADDRESS	
40	MODE S AIRCRAFT ADDRESS	
41	MODE S AIRCRAFT ADDRESS	
42	MODE S AIRCRAFT ADDRESS	
43	MODE S AIRCRAFT ADDRESS	
44	MODE S AIRCRAFT ADDRESS	
45	MODE S AIRCRAFT ADDRESS	
46	SPARE	
47	SPARE	
48	SPARE	
49	SPARE	

Figure C2- 17 - S.15 and S.15+ Mode S Aircraft Address Messages

01	MESSAGE LABEL	SEE PARA 18.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
07	NATO TRACK NUMBER/SPARE	SEE PARA 18.2. APPENDIX 3 ANNEX C
08	NATO TRACK NUMBER/SPARE	
09	NATO TRACK NUMBER/SPARE	
10	NATO TRACK NUMBER/SPARE	
11	NATO TRACK NUMBER/SPARE	
12	NATO TRACK NUMBER/SPARE	
13	NATO TRACK NUMBER/SPARE	
14	NATO TRACK NUMBER/SPARE	
15	NATO TRACK NUMBER/SPARE	
16	NATO TRACK NUMBER/SPARE	
17	NATO TRACK NUMBER/SPARE	
18	NATO TRACK NUMBER/SPARE	
19	NATO TRACK NUMBER/SPARE	
20	NATO TRACK NUMBER/SPARE	
21	NATO TRACK NUMBER/SPARE	
22	AIRCRAFT CALLSIGN	SEE PARA 18.3. AND 18.5. APPENDIX 3 ANNEX C
23	AIRCRAFT CALLSIGN	
24	AIRCRAFT CALLSIGN	
25	AIRCRAFT CALLSIGN	
26	AIRCRAFT CALLSIGN	
27	AIRCRAFT CALLSIGN	
28	AIRCRAFT CALLSIGN	
29	AIRCRAFT CALLSIGN	
30	AIRCRAFT CALLSIGN	
31	AIRCRAFT CALLSIGN	
32	AIRCRAFT CALLSIGN	
33	AIRCRAFT CALLSIGN	
34	AIRCRAFT CALLSIGN	
35	AIRCRAFT CALLSIGN	
36	AIRCRAFT CALLSIGN	
37	AIRCRAFT CALLSIGN	
38	AIRCRAFT CALLSIGN	
39	AIRCRAFT CALLSIGN	
40	AIRCRAFT CALLSIGN	
41	AIRCRAFT CALLSIGN	
42	AIRCRAFT CALLSIGN	
43	AIRCRAFT CALLSIGN	
44	AIRCRAFT CALLSIGN	
45	AIRCRAFT CALLSIGN	
46	AIRCRAFT CALLSIGN SOURCE/SPARE	SEE PARA 18.4. APPENDIX 3 ANNEX C
47	AIRCRAFT CALLSIGN SOURCE/SPARE	
48	SPARE	
49	SPARE	

Figure C2- 18 - S.16+, S.16 Aircraft Callsign Messages

01	MESSAGE LABEL	SEE PARA 19.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2-19 - S.17 (TBD)

01	MESSAGE LABEL	SEE PARA 20.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 20 - S.18 (TBD)

01	MESSAGE LABEL	SEE PARA 21.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 21 - S.19 (TBD)

01	MESSAGE LABEL	SEE PARA 22.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2-22 - S.20 (TBD)

01	MESSAGE LABEL	SEE PARA 23.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2-23 - S.21 (TBD)

01	MESSAGE LABEL	SEE PARA 24.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 24 - S.22 (TBD)

01	MESSAGE LABEL	SEE PARA 25.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2-25 - S.23 (TBD)

01	MESSAGE LABEL	SEE PARA 26.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 26 - S.24 (TBD)

01	MESSAGE LABEL	SEE PARA 27.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 27 - S.25 (TBD)

01	MESSAGE LABEL	SEE PARA 28.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 28 - S.26 (TBD)

01	MESSAGE LABEL	SEE PARA 29.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 29 - S.27 (TBD)

01	MESSAGE LABEL	SEE PARA 30.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 30 - S.28 (TBD)

01	MESSAGE LABEL	SEE PARA 31.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 31 - S.29 (TBD)

01	MESSAGE LABEL	SEE PARA 32.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 32 - S.30 (TBD)

01	MESSAGE LABEL	SEE PARA 33.1. APPENDIX 3 ANNEX C
02	MESSAGE LABEL	
03	MESSAGE LABEL	
04	MESSAGE LABEL	
05	MESSAGE LABEL	
06	MESSAGE LABEL	
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Figure C2- 33 - S.31 (TBD)

INTENTIONALLY BLANK

APPENDIX 3 MESSAGE FIELD DEFINITION

Common Implementation of Messages by Link 1 Users except where restricted as indicated in Appendix 4 to Annex C.

1. BLK Blank Message

1.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	0	0	0	0	Label value

1.2 Fixed Data Pattern (per Data Group)

07	06	05	04	03	02	01	Definition
14	13	12	11	10	09	08	
21	20	19	18	17	16	15	
28	27	26	25	24	23	22	
35	34	33	32	31	30	29	
42	41	40	39	38	37	36	
49	48	47	46	45	44	43	
0	0	0	0	0	0	0	Value

2. S.0 Test Message

2.1 Label (bits 01 to 06)

06	05	04	03	02	01	**Definition**
1	0	1	1	1	0	Label value

2.2 Fixed Data Pattern (per Data Group)

07	06	05	04	03	02	01	
14	13	12	11	10	09	08	
21	20	19	18	17	16	15	
28	27	26	25	24	23	22	**Definition**
35	34	33	32	31	30	29	
42	41	40	39	38	37	36	
49	48	47	46	45	44	43	
0	1	0	1	1	1	0	Value

3. S.1 (not defined)

3.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	0	0	0	1	Label value

3.2 Spare (bits 07 to 49)

4. S.2 (not defined)

4.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	0	0	1	0	Label value

4.2 Spare (bits 07 to 49)

5. S.3 IFF/SIF Message

5.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	0	0	1	1	Label value

5.2 Spare (bits 07 to 08)

5.3 SIF Mode 3/A Code (bits 09 to 20)

20	19	18	17	16	15	14	13	12	11	10	09	Definition
A_4	A_2	A_1	B_4	B_2	B_1	C_4	C_2	C_1	D_4	D_2	D_1	Pulse designator

Note: a. Bits are decoded only if SIF Mode 3/A Presence indicator is set.
b. In case "C" and "D" pulses are absent bits 09 through 14 are set to "zero".

5.4 SIF Request/Reply Indicator (bits 21 to 23)

23	22	21	Definition
0	0	0	no statement
0	0	1	not used
0	1	0	request to transmit IFF/SIF message
0	1	1	not used
1	0	0	reply to request for IFF/SIF message
1	0	1	not used
1	1	0	not used
1	1	1	not used

Note:For use refer to Appendix 4 to Annex C para 5.1

5.5 Emergency Indicator (bit 24)

24	Definition
0	Electronic emergency indication not present
1	Electronic emergency indication present

Note: For use refer to Appendix 4 to Annex C para 5.2.

5.6 SIF Mode Presence Indicator (bits 25 to 27)

27	26	25	Definition
0	0	0	No SIF Modes present
0	0	1	SIF Mode 1 present in bits 31 to 35
0	1	0	SIF Mode 2 present in bits 38 to 49
0	1	1	SIF Modes 1 and 2 present
1	0	0	SIF Mode 3/A present in bits 09 to 20
1	0	1	SIF Modes 1 and 3/A present
1	1	0	SIF Modes 2 and 3/A present
1	1	1	SIF Modes 1, 2 and 3/A present

5.7 Emergency Validation Indicator (bit 28)

28	Definition
0	Emergency status not confirmed
1	Emergency status confirmed

Note:For use refer to Appendix 4 to Annex C para 5.2.

5.8 Spare (bits 29 and 30)

5.9 SIF Mode 1 Code (bits 31 to 35)

35	34	33	32	31	Definition
A_4	A_2	A_1	B_2	B_1	Pulse designator

5.10 Spare (bits 36 and 37)

5.11 SIF Mode 2 Code (bits 38 to 49)

49	48	47	46	45	44	43	42	41	40	39	38	Definition
A_4	A_2	A_1	B_4	B_2	B_1	C_4	C_2	C_1	D_4	D_2	D_1	Pulse designator

6. S.4 and S.4+ Basic Track Data Messages

6.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	0	0	0	1	S.4 Label value
1	1	0	0	0	1	S.4+ Label value

6.2 NATO Track Number (bits 07 to 21)

21 20 19	18 17 16	15 14 13	12 11 10	09 08 07	Definition
L	L	D	D	D	Character

Char. Value	L(etter)	D(igit)
000	A	0
001	E	1
010	G	2
011	H	3
100	J	4
101	K	5
110	L	6
111	M	7

6.3 Track/Data Quality (bits 22 to 23)

23	22	Definition
0	0	high quality
0	1	medium quality
1	0	low quality
1	1	very low quality

Note:For use refer to Appendix 4 to Annex C para 6.1.

6.4 Track Position X-component (bits 24 to 36)

36	35	34	33	32	31	30	29	28	27	26	25	24	Definition
0													Sign bit, positive X (EAST)
1													Sign bit, negative X (WEST)
	1												MSB, 256 Data Miles
		1											128 Data Miles
			1										64 Data Miles
				1									32 Data Miles
					1								16 Data Miles
						1							8 Data Miles
							1						4 Data Miles
								1					2 Data Miles
									1				1 Data Mile
										1			0.5 Data Miles
											1		0.25 Data Miles
												1	LSB, 0.125 Data Miles

Note: If sign bit is negative then the absolute value is coded in two's complement.

6.5 Track Position Y-component (bits 37 to 49)

49	48	47	46	45	44	43	42	41	40	39	38	37	Definition
0													Sign bit, positive X (NORTH)
1													Sign bit, negative X (SOUTH)
	1												MSB, 256 Data Miles
		1											128 Data Miles
			1										64 Data Miles
				1									32 Data Miles
					1								16 Data Miles
						1							8 Data Miles
							1						4 Data Miles
								1					2 Data Miles
									1				1 Data Mile
										1			0.5 Data Miles
											1		0.25 Data Miles
												1	LSB, 0.125 Data Miles

Note:If sign bit is negative then the absolute value is coded in two's complement

7. S.5 Amplifying Track Data Message

7.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	0	0	1	0	Label value

7.2 Track Altitude (bits 07 to 15)

15	14	13	12	11	10	09	08	07	Definition
1	1	1	1	1	1	1	1	1	31.9375 DM or 191.625 KFt
1									16 DM or 96 KFt
	1								8 DM or 48 KFt
		1							4 DM or 24 KFt
			1						2 DM or 12 KFt
				1					1 DM or 6 KFt
					1				0.5 DM or 3 KFt
						1			0.25 DM or 1500 Ft
							1		0.125 DM or 750 Ft
								1	0.0625 DM or 375 Ft and below
0	0	0	0	0	0	0	0	0	no statement

Note: For use refer to Appendix 4 to Annex C para 7.1.

7.3 Track Strength/Flight Size (bits 16 to 18)

18	17	16	Definition
0	0	0	no statement
0	0	1	not used
0	1	0	one aircraft
0	1	1	two aircraft
1	0	0	three aircraft
1	0	1	four to seven aircraft
1	1	0	eight to twelve aircraft
1	1	1	more than twelve aircraft

Note: For use refer to Appendix 4 to Annex C para 7.2.

7.4 Track Identification (bits 19 to 22)

Note:For use refer to Appendix 4 to Annex C para 7.3.

7.5 Special Use (bits 23 and 24)

Note:For use refer to Appendix 4 to Annex C para 7.4.

7.6 Track Simulation Status 9bit 25)

25	Definition
0	LIVE track
1	Simulated track

7.7 Track Drop Indicator (bit 26)

Note:For use refer to Appendix 4 to Annex C para 7.5.

7.8 Air Traffic Class Indicator (bits 27 and 28)

28	27	Definition
0	0	no classification/no statement
0	1	operational air traffic
1	0	general air traffic
1	1	spare

Note:Not implemented as defined, refer to Appendix 4 to Annex C para 7.6.

7.9 Track Velocity X-Component (bits 29 to 36)

36	35	34	33	32	31	30	29	Definition
0								Sign bit, positive X value (EASTWARD)
1								Sign bit, negative X value (WESTWARD)
	1							MSB, 0.5 DM/sec or 1800 DM/hr
		1						0.25 DM/sec or 900 DM/hr
			1					0.125 DM/sec or 450 DM/hr
				1				0.0625 DM/sec or 225 DM/hr
					1			0.03125 DM/sec or 112.5 DM/hr
						1		0..015625 Dm/sec or 56.25 DM/hr
							1	LSB, 0.0078125 DM/sec or 28.125 DM/hr

Note:If sign bit is set negative then absolute value is coded in two’s complement form.

7.10 Target Allocation/Weapon Assignment Status (bits 37 and 38)

38	37	Definition
0	0	not allocated
0	1	allocated to interceptor
1	0	allocated to surface-to-air missile
1	1	Faker neutralized

Note: For use refer to Appendix 4 to Annex C para 7.7.

7.11 Special Use (bits 39 to 41)

Note: For use refer to Appendix 4 to Annex C para 7.4.

7.12 Track Velocity Y-Component (bits 42 to 49)

49	48	47	46	45	44	43	42	Definition
0								Sign bit, positive Y value (NORTHWARD)
1								Sign bit, negative Y value (SOUTHWARD)
	1							MSB, 0.5 DM/sec or 1800 DM/hr
		1						0.25 DM/sec or 900 DM/hr
			1					0.125 DM/sec or 450 DM/hr
				1				0.0625 DM/sec or 225 DM/hr
					1			0.03125 DM/sec or 112.5 DM/hr
						1		0..015625 Dm/sec or 56.25 DM/hr
							1	LSB, 0.0078125 DM/sec or 28.125 DM/hr

Note:If sign bits set negative then absolute value is coded in two's complement form.

8. S.6 Strobe Data Message

8.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	0	1	0	0	Label value

8.2 Strobe Acquisition Indicator (bit 07)

07	Definition
0	Strobe was acquired automatically
1	Strobe was acquired manually

8.3 Strobe Width Category (bits 08 to 10)

10	09	08	Definition		
			lower limit	upper limit	approx. range
0	0	0	no statement	no statement	no statement
0	0	1	above 0°	below180°/256	less than 0.7°
0	1	0	180°/256	below180°/128	0.7° to 1.4°
0	1	1	180°/128	below 180°/64	1.4° to 2.8°
1	0	0	180°/64	below 180°/32	2.8° to 5.6°
1	0	1	180°/32	below 180°/16	5.6° to 11.3°
1	1	0	180°/16	below 180°/8	11.3° to 22.5°
1	1	1	180°/8	none	22.5° and above

Note:Not implemented as defined, refer to Appendix 4 to Annex C para 8.1.

8.4 Strobe Type (bits 11 and 12)

12	11	Definition
0	0	strobe represents centre of jammed sector
0	1	strobe represents start of jammed sector
1	0	strobe represents end of jammed sector
1	1	delete strobe

Note:Not implemented as defined, refer to Appendix 4 to Annex C para 8.2.

8.5 Strobe Simulation Status (bit 13)

Note: For implementation refer to Appendix 4 to Annex c para 8.3.

8.6 Strobe Azimuth (bits 14 to 25)

25	24	23	22	21	20	19	18	17	16	15	14	Definition
1												MSB, 180°
	1											180°/2 or 90°
		1										180°/4 or 45°
			1									180°/8 or 22.5°
				1								180°/16 or 11.25°
					1							180°/32 or 5.625°
						1						180°/64 or 2.8125°
							1					180°/128 or 1.40625°
								1				180°/256 or 0.703125°
									1			180°/512 or 0.3515625°
										1		180°/1024 or 0.17578125°
											1	LSB, 180°/2048 or 0.087890125°

Note: Strobe Azimuth value is referenced to TRUE NORTH.

8.7 Strobe Originating Site Code (bits 26 to 31)

31	30	29	28	27	26	Definition
0	0	0	0	0	0	no statement
0	0	0	0	0	1	site no 1
0	0	0	0	1	0	site no 2
.	.	.	.	.		…
1	1	1	1	1	0	site no 62
1	1	1	1	1	1	site no 63

Note: Not implemented as defined, refer to Appendix 4 to Annex C para 8.4.

8.8 Sensor Type (bits 32 to 34)

34	33	32	Definition
0	0	0	no statement
0	0	1	NADGE MPR
0	1	0	spare
.	.	.	…
1	1	1	spare

Note: Not implemented as defined, refer to Appendix 4 to Annex C para 8.5.

8.9 Strobe Number (bits 35 to 39)

39	38	37	36	35	Definition
0	0	0	0	0	no number asssigned
X	X	X	X	X	1 to 31

Note: Not implemented as defined, refer to Appendix 4 to Annex C para 8.6

8.10 Strobe Elevation Information (bits 40 to 43)

43	42	41	40	Definition
0	0	0	0	no statement or 2D-radar source
0	0	0	1	3D-radar beam no. 1
.	.	.	.	through
1	1	0	0	3D-radar beam no. 12
1	1	0	1	
1	1	1	0	not used
1	1	1	1	

8.11 Strobe Data Age (bits 44 to 49)

49	48	47	46	45	44	Definition
0	0	0	0	0	0	0 seconds
0	0	0	0	0	1	1 second
.	.	.	.	.	.	
1	1	1	1	1	1	63 seconds

Note: Not implemented as defined, refer to Appendix 4 to Annex C para 8.7

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9. S.7 (not defined)

9.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	0	0	1	1	Label value

9.2 Spare (bits 07 to 49)

10. S.8 and S.8+ Basic AEW Track Data Messages

10.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	0	1	0	1	S.8 label value
1	1	0	1	0	1	S.8+ label value

10.2 NATO Track Number (bits 07 to 21)

See Appendix 3 to Annex C para 6.2.

10.3 Track/Data Quality (bits 22 and 23)

See Appendix 3 to Annex C para 6.3.

10.4 Track Position X-Component (bits 24 to 36)

See Appendix 3 to Annex C para 6.4.

10.5 Track Position Y - Component (bits 37 to 49)

See Appendix 3 to Annex C para 6.5.

11. S.9 and S.9+ Area Corner Point Messages

11.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	0	1	0	1	S.9 label value
1	0	0	1	0	1	S.9+ label value

11.2 Area Number Code (bits 07 and 08)

08	07	Definition
0	0	First area of originating site
0	1	Second area of originating site
1	0	Third area of originating site
1	1	Fourth area of originating site

11.3 Spare (bits 09 and 10)

11.4 Area Origin Site (bits 11 to 16)

16 15 14	13 12 11	Definition
L	L	originating site track number prefix

Char value			L(etter)
0	0	0	A
0	0	1	E
0	1	0	G
0	1	1	H
1	0	0	J
1	0	1	K
1	1	0	L
1	1	1	M

11.5 Area Corner Number (bits 17 and 18)

18	17	Definition
0	0	Point 1, start of first line, end of fourth line
0	1	Point 2, start of second line, end of first line
1	0	Point 3, start of third line, end of second line
1	1	Point 4, start of fourth line, end of third line

11.6 Area Drop Indicator (bit 19)

19	Definition
0	No statement
1	Drop order for associated area

11.7 Spare (bits 20 to 23)

11.8 Area Corner X-Component (bits 24 to 36)

See Appendix 3 to Annex C para 6.4.

11.9 Area Corner Y-Component (bits 37 to 49)

See Appendix 3 to Annex C para 6.5.

12. S.10 (not defined)

12.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	0	1	0	0	Label value

12.2 Spare (bits 07 to 49)

13. S.11 (not defined)

13.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	0	1	1	0	Label value

13.2 Spare (bits 07 to 49)

14. S.12 (not defined)

14.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	0	1	1	1	Label value

14.2 Spare (bits 07 to 49)

15. S.13 (not defined)

15.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	0	1	1	0	Label value

15.2 Spare (bits 07 to 49)

16. S.14 Management Message

16.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	0	1	1	1	Label value

16.2 Order Originating Site Code (bits 10 to 13 and 33 to 34 and 07)

07	34	33	13	12	11	10	Definition
0	0	0	0	0	0	0	No Statement
0	0	0	0	0	0	1	Site Code 1
0	0	0	0	0	1	0	Site Code 2
.	.	.	.	.	.	.	
1	1	1	1	1	1	0	Site Code 126
1	1	1	1	1	1	1	Site Code 127

Note: For use refer to Appendix 4 to Annex C para 16.2.

16.3 Message Type (bits 08 to 09)

09	08	Definition
0	0	Acknowledgement not required
0	1	Acknowledge receipt
1	0	Receipt acknowledged
1	1	not used

Note: For use refer to Appendix 4 to Annex C para 16.1

16.4 Order Code (bits 14 to 17)

17	16	15	14	Definition	"P"	"Q"	"A"
0	0	0	0	No statement	N	N	N
0	0	0	1	Change NTN in "P" to NTN in "Q"	Y	Y	N
0	0	1	0	Exchange basic data between NTN in "P" and in "Q"	Y	Y	N
0	0	1	1	Change ID of NTN in "P" according to amplifying data	Y	N	Y
0	1	0	0	Start telling NTN in "P"	Y	N	N
0	1	0	1	Stop telling NTN in "P"	Y	N	N
0	1	1	0	Start telling all tracks in AOI with ID contained in amplifying data "A"	N	N	Y
0	1	1	1	Request one S.4/S.3 or S.15/S.3 message pair for NTN in "P". See Note 1	Y	N	N
1	0	0	0	Stop telling all tracks in AOI with ID contained in amplifying data "A"	N	N	Y
1	0	0	1	Suppress raid tape target with RTD contained in "P"	Y	N	N
1	0	1	0	Request one S.4/S.5 message pair for NTN in "P"	Y	N	N
1	0	1	1	Request one S.16+/S.16 message pair for NTN in "P"	Y	N	N
1	1	0	0	Request to assign new NTN to NTN to NTN in "P"	Y	N	N
1	1	0	1	Spare	-	-	-
1	1	1	0	Spare	-	-	-
1	1	1	1	Spare	-	-	-

Note 1: Where point-to-point connection is not configured for S.15 transmissions: S.4/S.3.
Where point-to-point connection is configured for S.15 transmissions: S.15/S.3.

16.5 NATO Track Number "P" Field (bits 18 to 32)

See Appendix 3 to Annex C para 6.2.

16.6 NATO Track Number "Q"/Amplifying Data "A" Field (bits 35 to 49)

The nature of this variable data field is determined by the order code. See Appendix 3 to Annex C para 16.4.

16.6.1 NATO Track Number "Q" Field (bits 35 to 49)

See Appendix 3 to Annex C para 6.2.

16.6.2 Amplifying Data "A" Field (bits 35 to 49)

49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	Definition
											X	X	X	X	Track ID code
									X	X					Weapon Engagement or Target Allocation Status
X	X	X	X	X	X	X	X	X							Spare

Note: a. For Track Identification code refer to Appendix 4 to Annex C para 7.2.

b. For Weapon Engagement/Target Allocation Status refer to Appendix 3 Annex C para 7.10.

17. S.15 Mode S Aircraft Address Message

17.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	1	0	0	0	S.15 Label value
1	1	1	0	0	0	S.15+ Label value

17.2 NATO Track Number (bits 07 to 21)

See Appendix 3 to Annex C para 6.2.

17.3 Mode S Aircraft Address (bits 22 to 45)

33	32	31	30	29	28	27	26	25	24	23	22	Definition
bit-11	10	9	8	7	6	5	4	3	2	1	0	Bits 0 – 11 of a/c address
45	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**Definition**
bit-23	22	21	20	19	18	17	16	15	14	13	12	Bits 12 – 23 of a/c address

17.4 Spare (bits 46 to 49)

18. S.16 Aircraft Callsign Message

18.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	1	0	0	1	S.16 Label value
1	1	1	0	0	1	S.16+ Label value

18.2 NATO Track Number (bits 07 to 21)

See Appendix 3 to Annex C para 6.2.

18.3 Aircraft Callsign (S.16+, Char 0 to 3, bits 22 to 45)

33	32	31	30	29	28	27	26	25	24	23	22	Definition
Char 1						Char 0						L/D
45	44	43	42	41	40	39	38	37	36	35	34	Definition
Char 3						Char 2						L/D

18.4 Aircraft Callsign Source (S.16+, bits 46 to 47)

47	46	Definition
0	0	No Statement
0	1	Mode S (Aircraft ID)
1	0	Flight Plan Correlation
1	1	Operator Input

Note: Table 18.4 is for information only and does not indicate any priority given

18.5 Aircraft Callsign (S.16, Char 4 to 7, bits 22 to 45)

33	32	31	30	29	28	27	26	25	24	23	22	Definition
Char 5						Char 4						L/D
45	44	43	42	41	40	39	38	37	36	35	34	Definition
Char 7						Char 6						L/D

Characters are coded in a subset of International Alphabet 5 as follows:

Char. Value	L(etter)	Char. Value	D(igit)
000000	No Statement	100001	undefined
000001	A	100010	undefined
000010	B	100011	undefined
000011	C	100100	undefined
000100	D	100101	undefined
000101	E	100110	undefined
000110	F	100111	undefined
000111	G	101000	undefined
001000	H	101001	undefined
001001	I	101010	undefined
001010	J	101011	undefined
001011	K	101100	undefined
001100	L	101101	undefined
001101	M	101110	undefined
001110	N	101111	undefined
001111	O	110000	0
010000	P	110001	1
010001	Q	110010	2
010010	R	110011	3
010011	S	110100	4
010100	T	110101	5
010101	U	110110	6
010110	V	110111	7
010111	W	111000	8
011000	X	111001	9
011001	Y	111010	undefined
011010	Z	111011	undefined
011011	undefined	111100	undefined
011100	undefined	111101	undefined
011101	undefined	111110	undefined
011110	undefined	111111	undefined
011111	undefined		
100000	BLANK		

18.6 Spare bits

18.6.1 S.16+

Bits 48 and 49

18.6.2 S.16

Bits 07 to 21 and 46 to 49

19. S.17 (not defined)

19.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	1	0	1	0	Label value

19.2 Spare (bits 07 to 49)

20. S.18 (not defined)

20.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	1	0	1	1	Label value

20.2 Spare (bits 07 to 49)

21. S.19 (not defined)

21.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	1	1	0	0	Label value

21.2 Spare (bits 07 to 49)

22. S.20 (not defined)

22.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	1	1	0	1	Label value

22.2 Spare (bits 07 to 49)

23. S.21 (not defined)

23.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	1	1	1	0	Label value

23.2 Spare (bits 07 to 49)

24. S.22 (not defined)

24.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	1	1	1	1	Label value

24.2 Spare (bits 07 to 49)

25. S.23 (not defined)

25.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	1	0	0	0	Label value

25.2 Spare (bits 07 to 49)

26. S.24 (not defined)

26.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	1	0	0	1	Label value

26.2 Spare (bits 07 to 49)

27. S.25 (not defined)

27.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	1	0	1	0	Label value

27.2 Spare (bits 07 to 49)

28. S.26 (not defined)

28.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	1	0	1	1	Label value

28.2 Spare (bits 07 to 49)

29. S.27 (not defined)

29.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	1	1	0	0	Label value

29.2 Spare (bits 07 to 49)

30. S.28 (not defined)

30.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	1	1	0	1	Label value

30.2 Spare (bits 07 to 49)

31. S.29 (not defined)

31.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	1	1	1	0	Label value

31.2 Spare (bits 07 to 49)

32. S.30 (not defined)

32.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	0	1	1	1	1	Label value

32.2 Spare (bits 07 to 49)

33. S.31 (not defined)

33.1 Label (bits 01 to 06)

06	05	04	03	02	01	Definition
0	1	0	0	0	0	Label value

33.2 Spare (bits 07 to 49)

APPENDIX 4 MESSAGE IMPLEMENTATION

LINK 1 MESSAGE NON-COMMON BITFIELDS (IMPLEMENTATION)

1. BLK - Blank Message. Implemented as per Appendix 2 and 3 to Annex C in all systems.

2. S.0 - Test Message. Implemented as per Appendix 2 and 3 to Annex C in all systems.

3. Reserved (S.1)

4. Reserved (S.2)

5. S.3 - IFF/SIF Message. Implemented as per Appendix 2 and 3 to Annex C with the following restrictions.

5.1 SIF Request/Reply indicator (bits 21 to 23)

23	22	21	STRIDA	NADGE	UCCS	POACCS
0	0	0	1. Auto Transmission a. Initial Telling b. Change of SIF c. Confirmation of detected emergency 2. Manual Transmission a. Local order to send SIF b. Manual reply to a S.3 request	Not transmitted If received processed like code 100 below	Not transmitted If received processed like code 100 below	
0	1	0	Manual request to transmit S.3	Not transmitted If received causes S.3 tell flag to be set	Not transmitted if received will not be processed	
1	0	0	Automatic reply to a S.3 request	SIF reply	SIF reply	
X	X	X	not used	not used	not used	not used

5.2 Emergency indicator (bit 24 and 28)

28	24	NADGE/UCCS/STRIDA	SIMCA	POACCS
0	0	no statement	Not emergency or confirm emergency alert off	Only bit 28 is processed as follows: If bit 28 = 0 ⇒ no emergency If bit 28 = 1 ⇒ emergency
0	1	illegal	Electronic emergency	
1	0	confirm emergency alert off	Confirm emergency on and not electronic emergency	
1	1	confirm emergency alert on	Confirm emergency alert on	

Note: Emergency confirmation and/or termination in NADGE and STRIDA is set by local switch action and received remote S.3 message, also upon received CLA message in STRIDA.

6. S.4 and S.4+ - Basic Track Data Message Implemented in all systems as per Appendix 2 and 3 to Annex C with the following restrictions:

6.1 Track/Data Quality (bits 22 and 23)

23	22	NADGE/UCCS/SIMCA/POACCS	STRIDA
0	0	TQ 7 or 6	not used
0	1	TQ 5 or 4	Local Track all types FQMP 6 or 7
1	0	TQ 3 or 2	a. Local track type 41, 42, 43 FQMP 0 to 5 b. Remote track FQMP 0 to 4
1	1	TQ 1 or 0	a. Local track type 40 FQMP 0 to 4 b. Remote track FQMP 5 to 7

6.1.1 NADGE (TQ) and STRIDA (FQMP) Quality Definition

Value	Time elapsed since last position update
7	less than one radar scan
6	one or more but less than two radar scans
5	two or more but less than three radar scans
4	three or more but less than four radar scans
3	four or more but less than five radar scans
2	five or more but less than six radar scans
1	six or more but less than seven radar scans
0	seven or more radar scans

Note: The length of a radar scan depends on the type of radar used and therefore varies for different sites between 10 and 15 seconds

6.1.2 STRIDA Track Type Definition. Depending on the number of radar returns which are used to form one plot the resulting tracks are classified in different categories.

Track type and associated criteria in STRIDA						
min. number of pulse/plot	4	4	4	4	3	2
plot/scan ratio	7/7	6/7	5/7	4/7	3/7	2/7
type of track initiated	40	41	42	43	30	20
adequate plot update causes	–	40	40	40	40	30
missed plot results in track type	41	42	43	–	–	–

7. Amplifying Track Data Message Implemented as per Appendix 2 and 3 to Annex C in all systems with the following restrictions:

7.1 Track Altitude (bits 07-15) implemented in UCCS as per Appendix 2 and 3 to Annex C with the following restrictions:

15	14	13	12	11	10	09	08	07	UCCS Receipt	UCCS Transmission
1	1	1	1	1	1	1	1	1	99900 Ft	Not used
				to						
1	0	0	0	0	1	0	1	1		
1	0	0	0	0	1	0	1	0	99750 Ft	99750 Ft and above
0	0	0	0	0	0	0	0	1	100 - 500 Ft	

Note: UCCS track altitude upper limit is 99900 Ft

7.2 Strength/Flight Size (bits 16-18)

18	17	16	NADGE/STRIDA/UCCS/POACCS	SIMCA
0	0	0	no statement	no statement
0	0	1	not used	not used
0	1	0	strength one	strength one
0	1	1	strength two	strength two
1	0	0	strength three	strength three
1	0	1	strength four to seven	strength four
1	1	0	strength eight to twelve	(1)
1	1	1	strength many	strength many

(1) Strength many in reception. In transmission this code is not used

7.3 Track Basic Identification (bits 19 to 22)

22	21	20	19	STRIDA (5)	NADGE/UCCS	SIMCA	POACCS
0	0	0	0	PENDING	PENDING	PENDING	PENDING
0	0	0	1	UNKNOWN	spare	spare	reject
0	0	1	0	FAKER alloc. to interceptor	UNKNOWN	UNKNOWN	UNKNOWN
0	0	1	1	FAKER neutralized	reserved (1)	unused	reject
0	1	0	0	INTERCEPTOR	INTERCEPTOR	INTERCEPTOR	INTERCEPTOR
0	1	0	1	INTERCEPTOR not available	KILO	KILO	KILO
0	1	1	0	FRIENDLY	FRIENDLY	FRIENDLY	FRIENDLY
0	1	1	1	ZOMBIE	reserved (2)	unused	reject
1	0	0	0	HOSTILE alloc. to interceptor	FAKER	FAKER	FAKER
1	0	0	1	FAKER	FAKER JAMMER	unused	FAKER JAMMER
1	0	1	0	HOSTILE	HOSTILE	HOSTILE	HOSTILE
1	0	1	1	HOSTILE alloc. to SAM	HOSTILE JAMMER	unused	HOSTILE JAMMER
1	1	0	0	X-RAY	X-RAY	X-RAY	X-RAY
1	1	0	1	JAMMER (4)	reserved (3)	unused	reject
1	1	1	0	FAKER alloc. to SAM	ZOMBIE	ZOMBIE	ZOMBIE
1	1	1	1	KILO	spare	spare	reject

Note:

(1) by SHAPE reserved for UNKNOWN JAMMER

(2) by SHAPE reserved for FRIENDLY JAMMER

(3) by SHAPE reserved for X-RAY JAMMER

(4) identity JAMMER includes HOSTILE and FAKER JAMMER which are distinguished by ID amplification C1 (para 7.4.2)

(5) STRIDA converts ID before transmission to other system

7.4 Special Use (bits 23 to 24 and 39 to 41)

	41	40	39	24	23	use
NADGE/UCCS				X	X	mass raid size description see para 7.4.1.
	X	X	X			altitude staleness see para 7.4.3
STRIDA			X			altitude staleness see para 7.4.3
	X	X		X	X	ID amplification see para 7.4.2.
SIMCA			X			altitude staleness see para 7.4.3
	X	X		X	X	not used
POACCS			X			Altitude Staleness see para 7.4.3.
	X	X		X	X	not used

7.4.1 Mass Raid size description

24	23	NADGE/UCCS	STRIDA/SIMCA/POACCS
0	0	no statement	not applicable
0	1	16 X 16 DM or less	
1	0	32 X 32 DM or less	
1	1	64 X 64 DM or less	

7.4.2 ID Amplification (intra-STRIDA only)

41	40	24	23	Definition
0	0	1	1	H national special interest track flag
0	1	0	0	J Reserved
0	1	1	0	L flightplan indicator
0	1	1	1	M Exercise
X	X	X	X	other codes not used

7.4.3 Altitude Staleness Indicator

41	40	39	NADGE/UCCS	STRIDA	SIMCA	POACCS
0	0	0	T ≤ N sec since update	not applicable	not applicable	
0	0	1	T ≤ 2N sec since update			
0	1	0	T ≤ 3N sec since update			
0	1	1	T > 3N sec since update			
1	0	0	T ≤ N sec since last trial			
1	0	1	T ≤ 2N sec since last trial			
1	1	0	T ≤ 3N sec since last trial			
1	1	1	T > 3N sec since last trial			
–	–	0	not applicable	T > 30 sec since update or unknown height	unknown height	T > 20 sec since update
–	–	1	not applicable	T ≤ 30 sec since update	valid height	T < 20 sec since update

Note: N is a site adaptable parameter.

7.5 Track Drop Indicator (bit 26)

26	STRIDA	NADGE/UCCS/SIMCA	POACCS
0	no statement	no statement	no statement
1	Drop track (order)	Track is dropped (info)	Drop track (order)

7.6 Air Traffic class

28	27	NADGE/UCCS/STRIDA	SIMCA	POACCS
0	0	not used, always transmitted	no statement	not used, always transmitted as zeroes. If ≠ 0 msg rejected.
0	1	as zeroes, not processed	general	
1	0	upon reception	operational	
1	1		other	

7.7 Target Allocation/Weapon Engagement Status (bits 37 and 38)

38	37	NADGE	UCCS	STRIDA	SIMCA	POACCS
FOR INTERCEPTOR IDENTITY ENGAGEMENT STATUS						
0	0	unassigned, available	available	unassigned	available	unassigned
0	1	assigned	assigned	assigned	assigned	assigned
1	0	allocated to SAM*	not used	not used	not used	No statement
1	1	unavailable	unavailable	not used	unavailable	Mission completed
FOR NON-INTERCEPTOR IDENTITY TARGET ALLOCATION STATUS						
0	0	unallocated	unallocated	unallocated	unallocated	unallocated
0	1	allocated to INTERCEPTOR	allocated to INTERCEPTOR	allocated to INTERCEPTOR	allocated to INTERCEPTOR	allocated to INTERCEPTOR
1	0	allocated to SAM	allocated to SAM	allocated to SAM	allocated to SAM	allocated to SAM
1	1	FAKER neutralized	not used	FAKER neutralized	Not used	FAKER neutralized

Notes:

1. The terms used are defined in Annex A Appendix 2 "Weapon Engagement/Target Allocation Terminology Comparison".

* = Not used operationally.

8. Strobe Data Message Implemented as per Appendix 2 and 3 to Annex C in all systems with the following restrictions:

Note: UCCS does not transmit S.6 Messages. Upon receipt of an S.6 Message, UCCS interprets the field as implemented by the message originator defined in paragraphs 8.1 to 8.7 below.

8.1 Strobe Width Category (bits 08 to 10)

10	09	08	NADGE
0	0	0	below 0.703º
0	0	1	0.703º to 1.406º
0	1	0	1.406º to 2.813º
0	1	1	2.813º to 5.625º
1	0	0	5.625º to 11.25º
1	0	1	11.25º to 22.50º
1	1	0	22.50º to 33.75º
1	1	1	above 33.75º

8.2 Strobe Type (bits 11 and 12)

12	11	NADGE
0	0	Strobe represents centre of jammed sector
0	1	Not applicable
1	0	
1	1	

8.3 Strobe Simulation Status (bit 13)

13	NADGE
0	Live strobe
1	Simulated strobe

8.4 Strobe Originating Site Code (bits 26 to 31).

For site codes see ADatP-31

8.5 Sensor Type (bits 32 to 34)

34	33	32	NADGE
0	0	0	Not applicable
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

8.6 Strobe Number (bits 35 to 39) used to identify a particular strobe from amongst those sent from a single origin source.

39	38	37	36	35	NADGE
0	0	0	0	0	no statement
0	0	0	0	1	update for strobe no. 1
0	0	0	1	0	update for strobe no. 2
0	0	0	1	1	update for strobe no. 3
0	0	1	0	0	update for strobe no. 4
0	0	1	0	1	update for strobe no. 5
0	0	1	1	0	update for strobe no. 6
0	0	1	1	1	not used
.	.	.	.	.	
1	0	0	0	0	
1	0	0	0	1	new strobe no. 1
1	0	0	1	0	new strobe no. 2
1	0	0	1	1	new strobe no. 3
1	0	1	0	0	new strobe no. 4
1	0	1	0	1	new strobe no. 5
1	0	1	1	0	new strobe no. 6
1	0	1	1	1	not used
.	.	.	.	.	
1	1	1	1	1	

8.7 Strobe Data Age (bits 44 to 49)

49	48	47	46	45	44	NADGE
0	0	0	0	0	0	0 seconds
.	.	.	.	.	.	To
0	0	1	0	0	1	9 seconds
0	0	1	0	1	0	10 seconds
0	0	1	0	1	1	11 seconds
.	.	.	.	.	.	To
0	1	1	1	1	1	31 seconds
1	0	0	0	0	0	Not used
.	.	.	.	.	.	
1	1	1	1	1	1	

9. Reserved (S.7).

10. S.8 and S.8+ - Basic AEW Track Data Message. Implemented as per Appendix 2 and 3 to Annex C in all AEGIS sites only. Message format is identical to S.4 except for the message label.

11. S.9 and S.9+ - Area Corner Point Message. Implemented as per Appendix 2 and 3 to Annex C in STRIDA sites only.

12. Reserved (S.10)

13. Reserved (S.11)

14. Reserved (S.12)

15. Reserved (S.13)

16. S.14 - Reporting Management Message. Implemented as per Appendix 2 and 3 to Annex C in all systems with the following restrictions.

16.1 Message Type (bits 08 to 09)

09	08	NADGE/SIMCA	STRIDA
0	0	Automatically generated and transmitted, upon reception no acknowledge required.	Automatically and manually generated and transmitted, upon reception no acknowledge required.
0	1	Manually (automatically in SIMCA) generated and transmitted. Upon reception automatic acknowledge generated.	Received only, upon reception automatic acknowledge generated.
1	0	Automatically generated upon reception of type 01, upon reception stops retransmission of type 01.	Automatically generated upon reception of type 01, not received.

Note:Type 10 message is “echo” of type 01 message where just the type code is changed.

16.2 Order Originating Site Code (bits 10 to 13 and 33 to 34 and 07).

NADGE are capable of using either the old (5 bit) codes or the new (7 bit) codes; US and UK systems currently use the 5 bit code. For NADGE a protective coding is done, to ensure backwards compatibility. Changing from the old codes to the new codes requires co-ordination between directly interfacing systems. For site codes see ADatP-31.

17. S.15 and S.15+ Mode S Aircraft Address Message. Optional implementation; implemented as per Appendix 2 and 3 to Annex C in systems that implement the S.15.

18. S.16 and S.16+ Aircraft Callsign Message. Optional implementation; implemented as per Appendix 2 and 3 to Annex C in systems that implement the S.16.

19. Reserved (S.17).

20. Reserved (S.18).

21. Reserved (S.19).
22. Reserved (S.20).
23. Reserved (S.21).
24. Reserved (S.22).
25. Reserved (S.23).
26. Reserved (S.24).
27. Reserved (S.25).
28. Reserved (S.26).
29. Reserved (S.27).
30. Reserved (S.28).
31. Reserved (S.29).
32. Reserved (S.30).
33. Reserved (S.31).

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APPENDIX 5 MESSAGE SPARE BITS

MSG	LBL	SPARE BITS	TOTAL
BLNK	00	n/a	0
S.0	56	n/a	0
S.1	01	07 to 49	43
S.2	02	07 to 49	43
S.3	23	07, 08, 29, 30, 36, 37	6
S.4	21	n/a	0
S.4+	61	n/a	0
S.5	22	n/a	0
S.6	24	n/a	0
S.7	03	07 to 49	43
S.8	25	n/a	0
S.8+	65	n/a	0
S.9	05	09, 10, 20, 21, 22, 23	6
S.9+	45	09, 10, 20, 21, 22, 23	6
S.10	04	07 to 49	43
S.11	06	07 to 49	43
S.12	07	07 to 49	43
S.13	26	07 to 49	43
S.14	27	n/a	0
S.15	30	46 to 49	4
S.15+	70	46 to 49	4
S.16	31	07 to 21, 46 to 49	19
S.16+	71	48 to 49	2
S.17	32	07 to 49	43
S.18	33	07 to 49	43
S.19	34	07 to 49	43
S.20	35	07 to 49	43
S.21	36	07 to 49	43
S.22	37	07 to 49	43
S.23	10	07 to 49	43
S.24	11	07 to 49	43
S.25	12	07 to 49	43
S.26	13	07 to 49	43
S.27	14	07 to 49	43
S.28	15	07 to 49	43
S.29	16	07 to 49	43
S.30	17	07 to 49	43
S.31	20	07 to 49	43

Table C5- 1 - Spare Capacity

MSG	LBL.	SPARE BITS	TOTAL
n/a	40	07 to 49	43
n/a	41	07 to 49	43
n/a	42	07 to 49	43
n/a	43	07 to 49	43
n/a	44	07 to 49	43
n/a	46	07 to 49	43
n/a	47	07 to 49	43
n/a	50	07 to 49	43
n/a	51	07 to 49	43
n/a	52	07 to 49	43
n/a	53	07 to 49	43
n/a	54	07 to 49	43
n/a	55	07 to 49	43
n/a	57	07 to 49	43
n/a	60	07 to 49	43
n/a	62	07 to 49	43
n/a	63	07 to 49	43
n/a	64	07 to 49	43
n/a	66	07 to 49	43
n/a	67	07 to 49	43
n/a	70	07 to 49	43
n/a	71	07 to 49	43
n/a	72	07 to 49	43
n/a	73	07 to 49	43
n/a	74	07 to 49	43
n/a	75	07 to 49	43
n/a	76	07 to 49	43
n/a	77	07 to 49	43

Table C5- 1(cont) - Spare Capacity

ANNEX D MINIMUM IMPLEMENTATION

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ANNEX E BIT FIELD CATALOGUE

No.	Name	Bits	Message	Ref. No.
1	Message Label	6	all	
2	SIF Mode 3/A Code	12	S.3	
3	SIF Request/Reply Indicator	3	S.3	
4	Emergency Indicator	1	S.3	
5	SIF Mode Presence Indicator	3	S.3	
6	Emergency Validation Indicator	1	S.3	
7	SIF Mode 1 Code	5	S.3	
8	SIF Mode 2 Code	12	S.3	
9	NATO Track Number	15	S.4, S.8, S.15, S.16	46, 47
10	Track/Data Quality	2	S.4, S.8	
11	Track Position X-Component	13	S.4, S.8	40
12	Track Position Y-Component	13	S.4, S.8	41
13	Track Altitude	9	S.5	
14	Track Strength/Flight Size	3	S.5	
15	Track Basic Identification	4	S.5	
16	Track Identity Amplification (STRIDA only)	4	S.5	
17	Mass Raid Size Description (NADGE/UCCS only)	2	S.5	
18	Track Altitude Staleness (NADGE/UCCS only)	3	S.5	
19	Track Altitude Staleness (STRIDA/SIMCA/POACCS only)	1	S.5	
20	Track Simulation Status	1	S.5	
21	Track Drop Indicator	1	S.5	
22	Air Traffic Class Indicator (STRIDA/SIMCA only)	2	S.5	
23	Track Velocity X-Component	8	S.5	
24	Track Velocity Y-Component	8	S.5	
25	Target Allocation/Weapon Assignment Status	2	S.5	
26	Strobe Acquisition Indicator	1	S.6	
27	Strobe Width Category	3	S.6	
28	Strobe Type	2	S.6	
29	Strobe Simulation Status (NADGE only)	1	S.6	
30	Strobe Azimuth	12	S.6	
31	Strobe Originating Site Code	6	S.6	
32	Sensor Type	3	S.6	
33	Strobe Number	5	S.6	
34	Strobe Elevation Information	4	S.6	
35	Strobe Data Age	6	S.6	
36	Area Number Code	2	S.9	
37	Area Origin Site	6	S.9	
38	Area Corner Number	2	S.9	
39	Area Drop Indicator	1	S.9	
40	Area Corner X-Component	13	S.9	11
41	Area Corner Y-Component	13	S.9	12
42	Message Type	2	S.14	
43	Order Originating Site Code (NADGE/UCCS only)	5	S.14	
44	Order Originating Site Code (STRIDA/POACCS only)	6	S.14	
45	Order Code	4	S.14	

Table E- 1 - Message Bit Fields

No.	Name	Bits	Message	Ref. No.
46	NATO Track Number “P” Field	15	S.14	9, 47
47	NATO Track Number “Q” Field	15	S.14	9, 46
48	Amplifying Data “A” Field	6	S.14	
49	Mode S Aircraft Address	24	S.15	
50	Aircraft Callsign (Characters 0-3)	24	S.16+	
51	Aircraft Callsign (Characters 4-7)	24	S.16	
52	Aircraft Callsign Source	2	S.16+	

Table E- 1(cont) - Message Bit Fields

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