

NATO UNCLASSIFIED

STANAG No. 1317

(Edition -2-)

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NORTH ATLANTIC TREATY ORGANIZATION

(NATO)

MILITARY AGENCY FOR STANDARDIZATION

(MAS)

STANDARDIZATION AGREEMENT

SUBJECT: NATO OCEANOGRAPHIC DATA EXCHANGE FORMAT (NODEF 1)

Promulgated on 30 November 1983

P.J. MITCHELL
Major-General, CAAR
Chairman, MAS

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RECORD OF AMENDMENTS

No.	Reference/date of amendment	Date entered	Signature
-3			

EXPLANATORY NOTES

AGREEMENT

1. This NATO Standardization Agreement (STANAG) is promulgated by the Chairman MAS under the authority vested in him by the NATO Military Committee.
2. No departure may be made from the agreement without consultation with the tasking authority. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.
3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

DEFINITIONS

4. Ratification is "The declaration by which a nation formally accepts the content of this Standardization Agreement".
5. Implementation is "The fulfilment by a nation of its obligations under this Standardization Agreement".
6. Reservation is "The stated qualification by a nation which ascribes that part of this Standardization Agreement which it cannot implement or can implement only with limitations".

RATIFICATION, IMPLEMENTATION AND RESERVATIONS

7. Page iii gives the details of ratification and implementation of this agreement. If no details are shown it signifies that the nation has not yet notified the tasking authority of its intentions. Page iv (and subsequent) gives details of reservations and proprietary rights that have been stated.

RATIFICATION AND IMPLEMENTATION DETAILS
STADE DE RATIFICATION ET DE MISE EN APPLICATION

N A T I O N	NATIONAL REFERENCE DE LA RATIFICATION NATIONALE	NATIONAL IMPLEMENTING DOCUMENT NATIONAL DE MISE EN APPLICATION	IMPLEMENTATION MISE		
			FORECAST DATE DATE PREVUE	ACTUAL DATE DATE REELLE	
			NAVY ARMY MER TERRE	AIR	NAVY ARMY MER TERRE AIR
BE	SP/OTAN ST.1317 830778 of/du 15.3.83		2.84		
CA	2441-1317 D Met Oc 3) of /du 11.4.83		NOT IMPLEMENTING NE MET PAS EN APPLICATION		
DA	M.204.67 5.1317 MAS NAVY 08449 of/du 13.4.83		12.84		
FR	Message 0266 NP-138 EMM/ OPS/AMO of/du 28.4.83				1.83
GE	BMVg Fu S IV I Az 03-51-30 of.du 11.5.83		7.83		
GR					
IT	S.M.M 3016689 of/du 21.4.83		11.83		
LU	ZSP/OTAN ST.1317 830778 of/du 15.3.83		NOT IMPLEMENTING NE MET PAS EN APPLICATION		
NL	MASIN/0482/83/NU/1317 of/du 14.4.83				6.83
NO	MAS-1104//83/B/SST/ORGI/OS/ AF/STANAG 1317 of/du 20.9.83				2.84
PO	MOD PORTUGAL RRN 037/DB of/du 20.5.83		10.85		
TU	TGS.GN.P.P:2307-245-83/ 1548 And D.MAS.S.(1317) 091350Z MAY/MAI 83				
UK	D/DNOR/F56/2/166 of/du 13.4.83		12.83		
US	NOT RATIFYING NE RATIFIE PAS				

NATO STANDARDIZATION AGREEMENT

(STANAG)

NATO OCEANOGRAPHIC DATA EXCHANGE FORMAT (NODEF 1)

- Annexes:
- A. Format explanation and description
 - B. Coding of Fields used in NODEF I
 - C. Notes for users

Related Documents: None

AIM

1. The aim of this agreement is to standardise the data format for exchanging processed oceanographic data on magnetic tape, in support of military purposes within the NATO nations.

AGREEMENT

2. Participating nations agree to adopt the NATO Oceanographic Data Exchange Format described in Annexes A-C when exchanging processed oceanographic data for military purposes.

GENERAL

3. Physical oceanographic data is collected, processed and digitised by Nations and held in data banks on a variety of computers and in various formats. NODEF-1 is not intended to supplant individual data centre storage formats but is to be used for exchange purposes only. The use of NODEF-1 will reduce the NATO exchange problem for each data centre to a requirement for only two conversion programs - one to convert from the exchange format to its own format (when receiving data) and the other to do the converse when supplying data.

IMPLEMENTATION OF THE AGREEMENT.

4. This STANAG is implemented when Nations have issued the necessary instructions to bring its provisions into effect to appropriate national Agencies.

FORMAT EXPLANATION AND DESCRIPTION

1 An observation will consist of multiple card image records of various types. A description of the various record types follows. The remainder of this annex contains details of the record formats.

<u>Record type</u>	Name	Details
0	Source	Originator's observation identification number, date, time, position, type of observation, details of processing methods.
1	Meteorology	Meteorological conditions prevailing at the time of the observation.
2	Comments	Any other information not catered for in the format.
	Bathythermograph	Depth/temperature values, usually from BT instruments.
4	Velocimeter	Depth/sound velocity values taken by velocimeters.
5	Serial (observed level)	Depth/temperature/salinity/conductivity/sound velocity values at an observed depth - usually water bottle or STD/CTD type data.
6	Serial (interpolated level)	Depth/temperature/salinity/conductivity/sound velocity values interpolated from observed level data.

2. All record types except type 0 are optional although an observation must contain at least one record of type 3, 4, 5 or 6. Any record type except types 0 and I may be used a number of times in each observation. (see Annex C).

3. An observation may not contain type 3 or 4 records if it contains type 5 or 6 and vice versa

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4. Record type 6 should only be provided as an alternative to record type 5 when observed level data has been lost during processing, since the recipient of the data may prefer to use a particular method of interpolation not used by the donor.

5. When an observation requires a total of more than 999 records of one type (eg high quality STD data) (Record type 5), a continuation observation is to be used.

6. Block size. Records should be blocked into not more than 512 words (2048 characters) per block.

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4A&e1 A_r Spe C_c to40 cod-+.o ,L L\$ wA-t.o C kt. L1 VU f;

RECORD TYPE O - SOURCE

<u>Field Name</u>	<u>Number of Characters</u>	<u>Significant Character</u>	<u>Comments</u>
Date: Year ✓	2	1	last 2 characters of year
Month	2	3	01 to 12
Day	2	5	01 to 31
Time: Hour ✓	2	7	GMT
Minute	2	9	
Latitude: Degrees ✓	2	11	00 to 90
Minutes	2	13	00 to 59
Tenths	1	15	0 to 9
Longitude: Degree J	3	16	000 to 180
Minutes	2	19	00 to 59
Tenths	1	21	0 to 9
Quadrant	1	22	WMO code 3333
Ten-degree Square		23	Canadian or Marsden (Marsden numbers to be prefixed by M)
One-degree Square	2	27	Canadian or Marsden
Position: Determination	1	29	fixing method - see Annex B
Accuracy	1	30	accuracy of position - see Annex B
Depth of deepest measurement			in 'vnhh m*.trPc
Seabed depth <i>BATH</i>	<i>5</i>		in whole metres
Oceanographic instrument	<i>2</i>		See Annex B
Method: Digitisation <i>sig</i>	1		see Annex B
Interpolation <i>Text record</i>	1		see Annex B
Number of depth levels	4		including those in ny continuation observation.

<u>Field Name</u>	<u>Number of Characters</u>	<u>Significant Character</u>	<u>Comments</u>
Number of records	3	49	total number of records of type 1,2,3,4,5 or 6 excluding continuation observations
Classification (Data Use Code)	1	52	see Annex B
Spare	7	53	
Continuation observation * indicator	1	60	normally set to 0 but incrementing by I for each continuation observation
Identification: Country	2	61	IOC code)
Platform	6	63	National code)
Cruise*	4	69	Originator's code)Record Terminator
Serial Number*	4	73.	Originator's code)
Record type	1	77	always 0)
Sequence*	3	78	always 001)

*See Annex C

RECORD TYPE I - METEOROLOGY

<u>Field Name</u>	<u>Number of Characters</u>	<u>Significant Character</u>	<u>Comments</u>
Present weather	1	1	See Annex B
Cloud amount	1	2	WMO code 2700
Cloud type	1	3	WMO code 0500
Atmospheric pressure	5		In tenths of millibars, eg 1001.5 millibars coded as 10015
Air temperature: dry bulb	4	9	In tenths of degree Celsius including minus sign where required, eg - 05.2°C coded as - 052
dew point	4	13	
Wind direction	2	17	WMO code 0877
Wind speed	2	19	
Wind speed units		21	Insert i for knot insert for m sec
Sea surface reference temperature	3	22	In tenths of degree Celsius, eg =T9°C coded as - 99
Instrument for SSRT	1	25	See Annex B
Ice	1	26	See Annex B
Wave period	2	27	In seconds
Wave height	2	29	In half metres <u>a&2 5 m</u> coded as .5
Sea state	1	31	WMO code 3700
Swell period	2	32	In seconds
Swell directions		34	WMO code <u>083.</u>
Swell height	2	36	In <u>half metres</u> eg 2.5 m coded as <u>5</u>
Spare	23	38	
Identification: Country	2	61	IOC code)
Platform	6	63	SOe+1-- ,Ka-v-6-)Record National Terminator code)
Identification: Cruise		69	Originator's) code)Record
Serial No		73	Originator's Terminator code)

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Field Name	Number of Characters	Significant Character	Comments
Record type	1	77	Always I)
Sequence		78	Always 001)

RECORD TYPE 2 - COMMENTS

Field Name	Number of Characters	Significant Character	Comments
Text	Up to 60	I	Alpha-numeric
Identification:			
Country	2	61	IOC code)
Platform	6	63	national code)
Cruise*	4	69	originator's)Record code)Terminator
Serial No	* 4	73	originator's) code)
Record type		77	always 2)
Sequence*	3	78	incrementing) from 001 for) each continuation record within the same observation

RECORD TYPE 3 - BATHYTHERMOGRAPH

Field Name	Number of Characters	Significant Character	Comments
Depth	4	1, 8, 15...	in metres
Temperature	3	5, 12, 19...	in tenths of degrees Celsius eg 14.1 °C coded as 141 -1. 1 °C; rndPd as -1 1
Depth/Temperature values are repeated up to 8 times per record			
Quality Code	2	57	See Annex B
*See Annex C			

Field Name	Number of Characters	Significant Character	Comments
Spare	2	59	
Identification:			
Country	2	61	IOC code)
Platform	6	63	national code)
Cruise*	4	69	originator's) code)
Serial No*	4	73	originator's)Record code)Terminator
Record type	1	77	always 3)
Sequence*	3	78	incrementing) from 001 for) each continuation record 'within the same observation.

RECORD TYPE 4 - VELOCIMETER

Field Name	Number of Characters	Significant Character	Comments
Depth	4	1, 10, 19...	in metres
Sound velocity	5	5, 14, 23...	in tenths of metres/second, eg 1485. J, metres/sec coded as 14851
Depth/SV values are repeated up to 6 times per record			
Quality code	3	55	See Annex B
Spare	3	58	
Identification:			
Country	2	61	IOC code)
Platform	6	63	national code)
Cruise*		69	originator's) code)
Serial No*	4	73	originator's)Record code)Terminator
Record type	1	77	always 4)
Sequence*	3	78	incrementing) from 001 for each continuation record within the same observation

*See Annex C

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RECORD TYPES 5 AND 6 - SERIAL DATA AT OBSERVED AND INTERPOLATED LEVELS

One record for each depth, records sorted into increasing depth within record type.

<u>Field Name</u>	<u>NumberOf</u> <u>Characters'</u>	<u>Significant</u> <u>Character</u>		<u>Comments</u>
Depth	1	1		in tenths of metres, eg 20.5 m coded as 00205
Depth quality		1	6	See Annex B
Temperature		4	7	in hundredths of degrees Celsius eg 25.25°C coded as 2525
Temperature quality		1	11	accuracy of temperature measurement - see Annex B
Salinity		5	12	in parts per thousand to 3 decimal places eg 35.307% coded as 35307
Salinity quality		1	17	accuracy of salinity measurement - see Annex B
Salinity indicator		1	18	see Annex B
Conductivity		5	19	in mmho per cm to 3 decimal places eg 40.255 mmho/cm coded as 40255
Conductivity quality		1	24	accuracy of conductivity measurement - see Annex B
Sound velocity		5	25	in tenths of metres/second
Sound velocity quality		1	30	accuracy of sound velocity measurement - see Annex B
Sound velocity indicator		1	31	see Annex B
~arP		29	32	
Identification:	Country	2	61	IOC code)
	Platform	6	63	national code)
	Cruise	4	69	originator's)
	Serial No	4	73	code) Record
				originator's) Terminator
				code)

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<u>Field Name</u>	<u>Number of Characters</u>	<u>Significant Character</u>	<u>Comments</u>
Record type	1	77	5 for observed) 6 for inter-) polated level)
Sequence*	3	78	Incrementing) from 001 for) each continu-) ation record)Record within the)Terminator same obser-) vation for) each record) type)

*See Annex C

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ANNEX B TO
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CODING OF FIELDS FOR USE IN NODEF-1

Position - determination

<u>Code</u>	<u>Meaning</u>
0	unspecified
1	celestial
2	satellite
3	inertial
4	long range)
5	medium range) radio fixing
6	short range)
7	radar/visual fixing from land
8	radar/visual/radio fixing from land

Position - accuracy

<u>Code</u>	<u>Accuracy (Nautical miles)</u>
0	unspecified
1	< 0.1
2	0.1 -0.5
3	0.5- 1
4	1-5
5	5- 10
6	> 10

Instrument

<u>Code</u>	<u>Instrument</u>
00	unspecified
	mechanical bathythermograph (MBT)
11	helicopter bathythermograph (HBT)
20	expendable bathythermograph (XBT),;
21	XBT types T-4 & T-6 (460 metres) ¹
22	XBT type T-7 (760 metres)
23	XBT type T-5 (1830 metres)
24	XBT type T-9 (Helicopter)
25	XBT type T-10 (200 metres)
26	XBT type T-1 1 (460 metres long paper)

Instrument

<u>Code</u>	<u>Instrument</u>
29	airborne bathythermographic (AXBt) -
30	water bottles
40	STD probe
45	STDV probe
50	SV probe
52	XSV
55	S/M velocimeter
60	CTD
(ot 65	X C f ' G2 C. fo ~c>bc)t. rta r~1G CTDV A2c~3~~
70	Thermistor chain

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Present Weather

Code	<u>Meaning</u>
0	Clear (no cloud at any level)
1	Partly cloudy (scattered or broken)
2	Continuous layers of cloud(s)
3	Sandstorm, duststorm, or blowing snow
4	Fog, thick dust or haze
5	Drizzle
6	Rain
7	Snow, or rain and snow mixed
8	Shower(s)
9	Thunderstorm(s)

Method-digitisation

Code	<u>Meaning</u>
0	unspecified
1	manually digitised at inflection points
2	NODC standard levels /
3	IAPSO standard levels
4	automatically digitised at inflection points
5	observed levels only (eg Nansen data)
6	constant intervals (eg every 5 metres)
7	other predetermined levels
	Inflection points-from digitally recorded data

Method --interpolation

Code	<u>Meaning</u>
0	Unknown
1	linear for inflection point data
2	Lagrangian for observed level data

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Classification (Data Use Code)

Code	<u>Meaning</u>
1	DNP and IGOSS data
2	data published in open literature
3	unclassified unpublished data
4	unclassified data with release caveat
5	unclassified commercial data with release caveat or with release dates
6	NATO RESTRICTED
7	NATO CONFIDENTIAL
	NATO SECRET

*Matches table
6.F3
ore*

Ice Code	<u>Meaning</u>
	tia~

No ice	
Ice in vicinity but not identified as to type or amount	
Few bergs (10 or less)	
Many bergs (more than 10)	
Very open or open pack ice (6/10 coverage or less)	<u>more than</u> 1 nautical mile from tFie observation
Close or very close pack ice (more than 6/10 coverage)	
Very open or open pack ice (6/10 coverage or less)	than 1 nautical mile from t e observation
Close or very close pack ice (more than 6/10 coverage)	
Observation within heavy concentration of pack ice, polar pack ice, fast ice, etc (observation made from ice island, drifting pack ice, beset vessel, fast ice, etc)	
No observation of ice made.	

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Sound velocity indicator

Code	<u>Meaning</u>
0	computed by unspecified equation
1	observed by sound velocity meter
2	computed by Wilson's 2nd equation
3	computed by Leroy's equation
4	computed by US Naval Research Laboratory II formula
5	computed by Ross equation (Saclantcen 1978)
6	computed by Del Grosso equation

Salinity indicator (Method of derivation)

Code	<u>Meaning</u>
0	computed by unspecified equation
1	International Oceanographic Tables 1966 (UNESCO)
2	titration Practical Salinity Scale 1978

Instrument for SSRT

Code	<u>Meaning</u>
0	unspecified bucket thermometer
2	injection thermometer
3	reversing thermometer thermograph
5	injection thermistor

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Quality (Record Type 3) - 2 digit code

D1 Code

- 0 Unspecified
- 1 Profile has a normal form
- 2 Form of profile is "abnormal" but plausible

D2

- Unspecified
- Profile free from all blemishes
- 2 Slight defects present, which do not change the form of the profile
- 3 only the first part of the profile is usable

Quality (Record Type 4) - 3 digit code

D1 Code

- 0 Not known
- 1 Origin is. above or below horizontal line Om
- 2 Origin is positionally correct, ie located at Om or at some other desired depth, eg 20 m
- 3 Origin is in doubt

D2

- 1 submarine descending during observation
- 2 submarine ascending during observation
- 3 direction of movement not indicated on the record

D3

- 0 Not known
- 1 Profile has a normal form
- form of profile is "abnormal" but basically plausible

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Quality (Records Types 5 and 6)

Code	Depth epth	Temperature	Salinity	Sound Velocity_	Conductivity
0	undetermined	undetermined	undetermined	undetermined	undetermined
1	< 0.1	< 0.01	< 0.001	< 0.1	< 0.005
2	0.1-0.5	0.01-0.02	0.001-0.003	0.1-0.2	0.005-0.015
3	0.5-1.0	0.02-0.05	0.003-0.01	0.2-0.3	0.015-0.05
	1-5	0.05-0.1	0.01-0.03	0.3-0.5	0.05-0.15
5	5-10	0.1-0.2	0.03-0.1	0.5-1	0.15-0.5
6	10-50	0.2-0.5	0.1-0.5	1-2	0.5-2.5
7	> 50	> 0.5	> 0.5	>2	> 2.5
8		interpolated	interpolated	interpolated	interpolated
9	questionable	questionable	questionable	questionable	questionable

Cloud Cover - WMO Code 2700

Cloud Type - WMO Code 0500

Code Amount of Sky Cover in Eighths

Code

0	Cloudless
1	A trace, up to one-eighth
2	One-quarter
3	Three-eighths
4	One-half
5	Five-eighths
6	Three-quarters
7	Seven-eighths or overcast with openings
8	Completely overcast
9	Sky obscured by fog or other phenomenon

0	Cirrus
1	Cirrocumulus
2	Cirrostratus
3	Alto cumulus
4	Altostratus
5	Nimbostratus
6	Stratocumulus
7	Stratus
8	Cumulus
9	Cumulonimbus
/	Cloud not visible

No measurement made

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Quadrant - WMO Code 3333

Code	Latitude	Longitude
1	North	East
3	South	East
5	South	West
	North	West

Sea State - WMO Code 3700

Code		Height in Metres
0	Calm (glassy)	0
1	Calm (rippled)	0 - 0.1
2	Smooth (Wavelets)	0.1- 0.5
3	Slight	0.5-1.25
4	Moderate	1.25-2.5
5	Rough	2.5-4
6	Very rough	4 - 6
7	High	6 - 9
8	Very high	9 - 14
9	Phenomenal	Over 14

Direction (wind and swell) - WMO Code 9877

True direction, in tens of degrees from which wind or swell is coming.

Code		Code		Code		Code	
00	Calm	10	95° - 104°	20	195° - 204°	30	295 ⁰ - 304°
01	05° - 14°	11	105 ⁰ - 114°	21	205 ⁰ - 214°	31	305 ⁰ - 314°
02	15° - 24°	12	115° - 124°	22	215° - 224°	32	315° -324 ⁰
03	25° - 34	13	125° - 134°	23	225° - 234°	33	325° - 334°
04	35° - 44°	14	135° - 144°	24	235° - 244°	34	335° - 344°
05	45° - 54°	15	145° - 154°	25	245° - 254°	35	345° - 354°
06	55° - 64°	16	155° - 164°	26	255° - 264°	36	355° - U4°
07	65° -74 ⁰	17	165° - 174°	27	265° - 274°	99	Variable
08	75° - 84°	18	175° - 184°	28	275° - 284°		
09	85 ⁰ - 94°	19	185° - 194°	29	285° - 294°		

100 Country Codes (NATO Nations)

- 06 Germany
- 11 Belgium
- 8 Canada
- 26 Denmark
- 29 Spain
- 31 U.S.A.
- 35 France
- 36 Greece
- 46 Ireland
- 48 Italy
- 58 Norway
- 64 Netherlands
- 68 Portugal
- 74 U.K.
- 89 Turkey

Luxembourg is unspecified.

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ANNEX C TO
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NOTES FOR USERS

1. It is necessary to distinguish between continuation records and continuation observations.
 - a. Continuation Records. Usually the data levels from one observation cannot be contained in a single record of the appropriate type. Subsequent records of the same type are called continuation records and follow precisely the same format as the first record of that type. The maximum number of continuation records of any one type is 999, and will be indicated in character 78-80 of each record type. Record types 0 and I cannot have continuation records.
 - b. Continuation Observations. When an observation requires more than 999 data records to contain it, a continuation observation will be used. A continuation observation will start with a repeat of record type 0, with the continuation observation indicator (character 60) incremented by 1, followed by the required number of records of types 3, 4, 5 or 6 as appropriate.
2. End of File Marks. The end of file mark (EOF) should only be used at the end of a file containing all observations of one type, eg at the end of a file of BT observations.
3. Cruise and Serial Numbers. When cruise numbers are not recorded the year number should be inserted instead.

The serial number taken together with the cruise/year number, ship and country codes, should provide a unique reference number for any observation within a file.

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4. Tape Characteristics. In data exchanges the following tape characteristics need to be agreed between the donor and the recipient.

- a. Recording mode - PE or NRZI
- b. No of tracks - 7 or 9
- c. Parity - odd or even
- d. Packing density - 556, 800 or 1600 bpi
- e. Inter-block gap size
- f. Tape codes - BCD, EBCDIC, ASCII or others

