

INTERFACE SPECIFICATION
FOR THE
COMBAT WEATHER SYSTEM
TO/FROM
SMALL TACTICAL TERMINAL

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1.0 SCOPE

Item Description

This interface specification defines the interface between the Small Tactical Terminal and the colocated Combat Weather System (CWS).

1.1.1 Small Tactical Terminal

The Small Tactical Terminal (STT) system is designed to provide multi-service tactical forces with a transportable meteorological data receiving and analysis capability, with direct data delivery to the field user without reliance on any land-line form of communication. It will provide mission planners and aircrews with real-time images and products of weather conditions in target areas. The STT will have two configurations: (1) a Basic system with the ability to receive the D-1ISP real time data smooth (RDS) signal, and (2) a Basic system with an enhancement kit that will allow the receipt of the real time data (RTD). The system will provide data and products to the AWDS and Combat Weather Systems when connected over an ethernet interface.

1.1.2 CWS Description

The CWS is part of a global environmental support system which provides for the collection, processing, display, and dissemination of environment data to support the Department of Defense (DoD). The CWS system provides the fusion of satellite derived data, conventional data, AOPs and weather instruments attached to the unit. It provides the user with high quality graphical and imagery displays. It is connected with the base communication LAN network.

2.0 APPLICABLE DOCUMENTS

2.1 Government Documents

The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

2.1.1 Specifications

OCR-AWDS-01-130 (AWDS) 1 December 1988	Automated Weather Distribution System System Specification
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2.1.2 Standards

MIL-STD-1777 August 12, 1983	Internet Protocol (IP)
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MIL-STD-I 778
August 12, 1983

Transport Control Protocol
(TCP)

2.1.3 Drawings

- none -

2.1.4 Other Publications

FCM-S2-I 990
May 1990

Standard Formats for Weather Data Exchange
Among Automated Weather Information Systems
(The Red Book)

2.2 Non-Government Documents

The following documents of the exact issue shown form a part of this specification to the extent specified herein . In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

2.2.1 Specifications

IEEE 802.3 Local Area Network CSMA/CD Access Method and Physical Layer Specification

TBD ANSI X-Windows (x-l 1, R5)

2.2.2 Other Publications

Part 800-3805-I 0 System and Network Administration
Sun Microsystems
Rev A, 27 March 1990

3.0 INTERFACE REQUIREMENTS

3.1 Physical

The Small Tactical Terminal shall provide an interface at the STT workstation. This interface shall be a 15 pin AUI connector. The maximum transmission distance of the AUI cable shall be 50 meters. See Figure 1.

3.2 Functional

The CWS interface with the Small Tactical Terminals transfers data one way. The Small Tactical Terminals will transmit data to the CWS, but does not receive any data from CWS. The Small Tactical Terminal shall allow remote log on and allow the terminal to be operated from the CWS system. Both systems shall operate in a SECRET system high mode while interconnected.

3.2. i Electronic

The electronic interface between the Small Tactical Terminal and the CWS shall comply with an IEEE 802.3 (Ethernet) interface.

3.2.2 Electrical

Not Applicable.

3.2.3 Hydraulic and Pneumatic

Not Applicable.

Software Functional Interface

The following sections describe the software functional interface between the Small Tactical Terminals and CWS. This software interface is an extension of the OCR-AWDS-01-130. The CWS interface with the Small Tactical Terminal transfers data one way. There are two categories of products which are transferred from the Small Tactical Terminals to the CWS workstation. These products are transferred over the interface in formats described in this section. The product types supported by the formats in this section are:

a) Uniform Gridded Data Fields Products.

b) Raster Scan Products.

3.2.4.1 Product Message Format

The product format to be transmitted to the CWS shall be in accordance with OCR-AWDS-01-130 Product Data Set Structure and Block Formats, Appendix 30. The product data set may contain multiple information blocks as required to define fully the product being transferred. The general structure is shown in Figure 2. These blocks are categorized as product definition, data description, and control blocks.

- a. Product Identification Block. This is a mandatory block used to convey the information needed to identify uniquely each product so that appropriate processing routines may be initiated within the CWS.
- b. Product Definition Block. This block contains information required to define the nature of the product being transferred.
- c. Data Description Block. This block contains all information required to describe the contents of the data block(s) that follow.
- d. Data Block. This block contains the product data in the format specified by the data description block.

- e. End of Product Block. This is a mandatory block used to signify the end of the product data set.

3.2.4.2 Uniform Gridded Data Field Products

Uniform Gridded Data Field (UGDF) products consist of single element sets corresponding to locations on a uniformly spaced grid. The only exception to this is geostrophic winds, which will be a multiple element set, sent under PID identifier first E character 9, with UWC and VWC mnemonics identified in the data description block (mode 3, submode 21).

Missing data within the grid shall be identified by all bits set to one in the data block for each missing grid point.

UGDF fields are shipped in the following sequence:

1. UGDF Product Identification Block (mode 1, submode 1)
2. Gridded Data Product Definition Block (mode 7, submode 20)
3. Unpacked UGDF Data Description Block (mode 3, submode 21)
4. Unpacked UGDF Data Block (mode 3, submode 1)
5. End of product block (mode 1, submode 2)

3.2.4.2.1 UGDF Product Identification Block

The product identification block shall be formatted as shown in Figure 3. The block elements are defined in FCM-S2-1990 Section 4.1, and consist of the following:

- a. Flag: (2-bits) set to 0 (octal).
- b. Length: (14-bits) set to 16 (octal). Indicating the number of byte pairs in the current block.
- c. Mode: (8-bits) set to 1 (octal).
- d. Submode: (8-bits) set to 1 (octal).
- e. Originator Identification: Set to the ICAO code designated in site set-up.
- f. Classification: set to a single ASCII character representing the security level of the Small Tactical Terminal:
 - "U", for Unclassified
 - "S" for Secret
 - "T" for Top Secret.
- g. Retention Time: Not used; set to binary zero.
- h. Product Identifier: The Product Identifier is represented by a ten character set, "FDTTAA(ii)EE". It is set as follows:

- (1) F - File Indicator: Set to ASCII "E" for the Small Tactical Terminal.
 - (2) D is set to ASCII: 'Y' for eighth mesh UGDF
 - (3) TT is set to ASCII: 'AN' for UGDF products.
 - (4) AA is set to ASCII per information in Table I. AA identifies the area coverage of the product.
 - (5) (ii)EE is set per Table II
- i. Product File Time: The Product File Time shall consist of a full century year (16 bit integer), month, day, hour, and minute (8 bit integers). It represents a means of further identifying products with identical Product Identifiers. This time shall be the date/time the product was generated for transmission to CWS.
 - j. Checksum: The Checksum is a two's complement 16 bit field containing the arithmetic sum of all the byte pairs with no end around carry. Adding all the byte pairs in a Mode/Submode that contains a Checksum field will produce a sum equal to zero.

3.2.4.2.2 UGDF Product Definition Block

The product definition block shall be formatted as shown in Figure 4. The block elements consist of the following:

- a. Flag: (2-bits) set to 0 (octal).
- b. Length: (14-bits) set to 30 (octal) representing the number of byte pairs in the current block.
- c. Mode: (8-bits) set to 7 (octal).
- d. Submode: (8-bits) set to 20 (octal).
- e. Projection Indicator (PI) Set: (8-bits) Set to the PI set defined in the Product List by the user.
- f. Grid Indicator (GI) Set: (8-bits) Set to 0. The GI set code is not used by CWS.
- g. Scale Factor (16-bits): Not used; set to binary zero.
- h. Coordinate Flag: (8-bits) Set to one (1) to indicate that the coordinate system used in the gridded product is the Air Force Global Weather Central (AFGWC) Satellite Global Data Base (SGDB) grid system. The grid point numbers (indices) sent in the product depend on the SGDB

grid mesh for the product The GI set code is not used by CWS.

- i. Units Code: (8-bits) set in accordance with Table III.
- j. Scale Exponent: (8-bits) Not used; set to binary zero.
- k. Multiplier Constant: (8-bits) Not used; set to binary zero.
- l. First Band Index Value (BI): (16-bits) Not used; set to binary zero.
- m. First Delta BI Values: (16-bits) Not used; set to binary zero.
- n. Number of Columns and Number of Rows: (16-bits each)

(1) Set Number of Columns equal to array size width (129 for regional eighth mesh) in the grid mesh.

(2) Set Number of Rows equal to array size length (129 for regional eighth mesh) in the grid mesh.

- o. Reference Coordinates: (16-bits each) The reference coordinates specify the first grid point for which data are transmitted, in SGDB coordinates for the grid mesh specified by the UGDF product request. These coordinates will be for the lower left corner of the product. (Eighth mesh I, J values)
- p. ISTART/JSTART: ISTART and JSTART shall be set to zero. These values are not used by CWS.
- q. Month, Day, Hour, and Minute: (8-bits each) Two sets are given. The first will contain the valid time of the most recent data (acquisition time) used to generate the product. The second set will be set to zero to indicate that the field is an analysis field.
- r. IPOLE/JPOLE:(16-bits each) For Polar Stereographic projections, the IPOLE/JPOLE fields define the horizontal and vertical SGDB eighth mesh grid indices, respectively, from the pole to the lower left corner of the product.

For Mercator projections, the IPOLE defines the East-West SGDB eighth mesh grid index from the Greenwich meridian to the meridian that passes through the lower left corner of the product, and the JPOLE defines the North-South SGDB index from the equator to the bottom of the product.

$IPOLE = (I_p - \text{REFERENCE I COORDINATE}),$ and

$JPOLE = (\text{REFERENCE J COORDINATE} - J_p),$

where :

1) for Polar Stereographic projections, I_p and J_p are the SGDB coordinates for the pole (North, South) in the SGDB grid mesh indices,

2) for Mercator projection, I_p and J_p are the SGDB coordinates of the intersection of the Greenwich meridian and the equator in the SGDB grid mesh indices.

For both Polar Stereographic and Mercator projections, the IPOLE/JPOLE grid distances are the number of SGDB grid mesh intervals for the product's mesh. Small Tactical Terminals will use eighth mesh grid intervals.

- s. RE/D: (16-bits) Not used; set to binary zero.
- t. Longitude X: (16-bits) Longitude X is the longitude of the meridian perpendicular to the base of the product and extending from the base of the product to the pole. Longitude X may be outside of the product boundaries. Valid Longitude X integers follow:

<u>Longitude X</u>	<u>Integer Value</u>
10E	10
100E	100
190E (170 W)	-170
280E (80 W)	-80

Longitude X will be set to zero for Mercator projections.

- u. Reference Code: (8-bits) Set to '2' (two), to indicate that the reference Coordinates for the product represent the lower left corner of the product in SGDB grid mesh indices.
- v. Scan Code: (8-bits) Set to '2' (two), to indicate that the order in which the data for the grid points appears in the data block(s) will be left to right, row by row, bottom up, with respect to the orientation of the product.
- w. Checksum: See 3.2.4.2.1 .j.

3.2.4.2.3 UGDF Data Description Block

The data description block shall be formatted as shown in Figure 5. The block elements consist of the following:

- a. Flag: (2-bits) set to 0 (octal).
- b. Length: (14-bits) set to the number of byte pairs in the current block.

- c. Mode: (8-bits) set to 3 (octal).
- d. Submode: (8-bits) set to 21 (octal).
- e. Elements Per Element Set: (8-bits) set to one (1) for all products except for geostrophic winds where it shall be set to two (2).
- f. Bytes Per Element Set: (8-bits) set to two (2) for all products except for geostrophic winds where it shall be set to four (4).
- g. Number of Element Sets: (16-bits) set to a value equal to the value of (Number of Rows) * (Number of Columns). For eighth mesh field, this will be 129 x 129.
- h. Element Mnemonic Characters: (8-bits each) set in accordance with Table IV. The mnemonic may not fill the four character mnemonic field; if not, the first character of the mnemonic will be in the first character field, and the unused fields will be set to ASCII 'space'.
- i. Start Byte of Element: (8-bits) set to four for the first element, and set to six for the second element of the geostrophic winds.
- j. Bytes Occupied Per Element: (8-bits) set to two (2).
- k. Unused: Not used; (8 -bits) set to binary zero.
- l. Units Code: (8-bits). Set in accordance with Table IV.
- m. Multiplier Mantissa: (8-bits) set in accordance with Table IV.
- n. Multiplier Characteristic: (8-bits) set in accordance with Table IV.
- o. Additive Constant: (16-bits) set in accordance with Table IV.
- p. Repeat h-o for second element of geostrophic winds.
- q. Checksum: See 3.2.4.2.1 .j.

3.2.4.2.4 UGDF Data Block

The data block shall be formatted as shown in Figure 6. The block elements are defined in FCM-S2-1990, Section 10.3.1 and consist of the following:

- a. Flag: (2-bits) set to 0 (octal).
- b. Length: (14-bits) set to the number of byte pairs in the current block.
- c. Mode: (8-bits) set to 3 (octal).

- d. Submode: (8-bits) set to 1 (octal).
- e. Elements: Contains the data values of each element set for the product being transmitted in sequence as defined in the scan code from the lower left hand corner.
- f. Checksum: See 3.2.4.2.1 .j.

3.2.4.2.5 UGDF End of Product Block

The end of product block shall be formatted as shown in Figure 7. The block elements are defined in FCM-S2-1990 Section 4.2, and consist of the following:

- a. Flag: (2-bits) set to 0 (octal).
- b. Length: (14-bits) set to 3 (integer).
- c. Mode: (8-bits) set to 1 (octal).
- d. Submode: (8-bits) set to 2 (octal).
- e. Checksum: (16-bits) set to 177373 (octal).

3.2.4.3 Raster Scan Products

The Raster Scan products are picture element (pixel) data making up imagery such as satellite pictures, graphic pictures, or facsimile type products. The Small Tactical Terminals shall extract the raster products from its projected bases, perform conversions (rotation, grayscale remapping, geometric extraction). The sequence of blocks shall be:

1. Product Identification Block (Mode 01 submode 01)
2. Satellite Product Definition Block (Mode 06 submode 20)
3. Pixel Product Definition Block (Mode 06 submode 30)
4. Define Datawidth Block (Mode 01 submode 05)
5. Raster Scan Data Block (Mode 06 submode 01)
6. End of Product Block (Mode 01 sub mode 02)

3.2.4.3.1 Raster Scan Product identification Block

The product identification block shall be formatted as shown in Figure 3. The block elements consist of the following:

- a. Flag: (2-bits) set to 0 (octal).
- b. Length: (14-bits) set to the number of byte pairs in the current block including the length and checksum.
- c. Mode: (8-bits) set to 1 (octal).

- d. Submode: (8-bits) set to 1 (octal).
- e. Originator Identification: (8-bits each char) set to ICAO code as defined at site set-up.
- f. Classification: (8-bits) set to a single ASCII character representing the security level of the Small Tactical Terminal:
 - “U”, for Unclassified
 - “S”, for Secret
 - “T”, for Top Secret.
- g. Retention Time: (8-bits) Not used; set to all zeros.
- h. Product identifier: (8-bits each) The Product identifier is represented by a ten character set, "FDTTAA(ii)EE". It is set as follows:
 - (1) F - File Indicator: Set to ASCII "E" for the Small Tactical Terminals.
 - (2) D is set to ASCII: 'S' for Satellite Products.
 - (3) TT is set to ASCII: 'TI' for Satellite Products,
 - (4) AA is set to ASCII per Table I: AA identifies the area coverage of the product.
 - (5) (ii)EE is set to four blanks (ASCII blank filled).
- i. Product File Time: (8-bits each) The Product File Time shall consist of a full century year (16 bit integer), month, day, hour, and minute (8 bit integers). It represents a means of further identifying products with identical Product Identifiers. This time shall be the date/time the product was generated.
- j. Checksum: See 3.2.4.2.1 .j.

3.2.4.3.2 Raster Scan Product Definition Blocks

The Definition Blocks listed in this section will be used to define the Raster Scan Product that is to be sent. A combination of several of these Definition Blocks may be needed to fully define the product.

3.2.4.3.2.1 Satellite Product Definition Block

This block is used to define all projected Raster Scan products that are in the form of imagery; i.e., satellite data as opposed to facsimile products. This data block shall be formatted as shown in Figure 8. The block elements consist of the following:

- a. Flag: (2-bits) set to 0 (octal).
- b. Length: (14-bits) set to the number of byte pairs in the current block including length and checksum in the current product identification block.
- c. Mode: (g-bits) set to 6 (octal).
- d. Submode: (g-bits) set to 20 (octal).
- e. Projection indicator Set: (8-bits each) The Small Tactical Terminal shall use the PI set code identified by the user in the product list.
- f. Grid Indicator (GI) Set: (g-bits) Not used by CWS; set to zero.
- g. Satellite Identification: (8-bits each) Two ASCII characters that identify the satellite from which the product was produced. The first character indicates the agency or country the satellite belongs to and the second dictates the satellite within the agency or country. If it is a merged data set, this field shall identify the most recent source of satellite information. These two characters may be sent in this definition block but they are not currently used by CWS. Currently defined identifications are:

FIRST CHARACTER:

A - U.S. Air Force
C - China
E - Europe
I - India
J - Japan
N - NOAA
R - Russia
S - NASA
V - U.S. Navy

SECOND CHARACTER: - None Currently Defined

- h. Longitude X: (16-bits) Longitude X is the longitude of the meridian perpendicular to the base of the product and extending from the base of the product to the pole. Longitude X may be outside of the product boundaries. Valid Longitude X integer values are:

<u>Longitude X</u>	<u>Integer Value</u>
10E	10
1 00E	100
190E (170W)	-170
280E (80W)	-80

- i. Resolution Code: (8-bits) This element specifies the resolution of the satellite data in the product in tenths of nautical miles, i.e., the resolution code must be multiplied by (.1) to obtain the actual value. The Small Tactical Terminals will use the nominal sampling distance for the PI set of a 1024 x 1024 image.
- j. Data Type: (8-bits) An integer code that specifies the type of satellite data contained in the product. The currently defined codes are:
 - 0 = visible (VIS)
 - 1 = Infrared (IR)
 - 6 = reserved for microwave
 - 7 = water vapor
- k. IMAX and JMAX: (16-bits each) The maximum horizontal (IMAX) and vertical (JMAX) size of the product in pixels. IMAX will be 1024 and JMAX will be 1024.
- l. Enhancement Data: (8-bits each) These elements are not used for CWS products. Set the following elements to zero filled:
 - (a) Enhance Max.
 - (b) Enhance Min.
 - (c) Enhance Id.
- m. Length: (8-bits) These elements is not used for CWS products; set to zero.
- n. I-Center: Not used; set to zero.
- o. J-Center: Not used; set to zero.
- p. Latitude: Not used; set to zero.
- q. Longitude: Not used; set to zero.
- r. Number of Characters: set to the number of characters contained in the product title that follows. A maximum of 72 characters will be used.
- s. Characters: The ASCII characters that make up the product title as defined by the user in the product definition.
 - First Field shall be Source of data: STT
 - Second Field - Region legend per Table I
 - Third Field - Satellite (POL, GEO)
 - Fourth Field - Five character field:

VIS	visible	0.4-1.1 μm	DMSP
		0.58-0.68 μm	NOAA, GOES,GMS

NIR	near infrared	0.7 -1.1 μ m	NOAA
WV	water vapor	6.5 μ m	GOES/METEOSAT
LC	low cloud	3.5-3.9 μ m	NOAA, GOES
IR	infra-red	10.3-1 2.5 μ m	DMSP, GMS, METEOSAT
		10.3-1 1.3 μ m	NOAA, GOES
		11.5-12.5 μ m	NOAA, GOES
SC	snow cloud	1.6-1.7 μ m	NOAA

Fifth Field - Valid Time (dd/hhmmZ) (dd = day of month) (Acquisition Time)

Sixth Field - Satellite ID (F-1 1, NOAA-1 0, etc) and ascending node time.

- t. Checksum: see paragraph 3.2.4.2.1 .j.

3.2.4.3.2.2 Pixel Product Definition Block

This block is used to define the orientation and projection of the product. The PI set code shall be the same as used in the satellite identification block. The format for the block is shown in Figure 9.

- a. Flag bit: Small Tactical Terminals shall set the two bits to zero.
- b. Length(i): Small Tactical Terminals shall set this to 5.
- c. Mode: Small Tactical Terminals shall set this to 006 (octal).
- d. Submode: Small Tactical Terminals shall set this to 030 (octal).
- e. PI Set: Must be the same as the identification used in the satellite identification block.
- f. Matrix Code: An octal code defining the dimensions of the pixel array being sent in the product. The Small Tactical Terminals shall use:

20 (octal) 1024 X 1024 X 8
- g. Scan Code: used to indicate the order in which the raster scan pixels are arranged in the data block. The scan code used by the Small Tactical Terminals shall be:

2 - Data are arranged in the data block such that pixels are defined row by row from the lower left corner.
- h. Pack Code: A code defining the algorithm used to pack the product. The Small Tactical Terminals shall use a code value of 2 octal and send a Datawidth/Fieldwidth block (Figure 17).

3.2.4.3.2.3 Define Datawidth Fieldwidth Block

This data block will be used to redefine number of bits per pixel, and the number of bits in the field containing that pixel, in the block for Raster Scan products. This data block shall be formatted as shown in Figure 10. The block elements consist of the following:

- a. Flag: (2-bits) set to 0 (octal).
- b. Length: (14-bits) set to the number of byte pairs in the current block.
- c. Mode: (8-bits) set to 1 (octal).
- d. Submode: (8-bits) set to 5 (octal).
- e. Fieldwidth: An integer number that defines the number of bits allocated to each data element in the specified mode/submode. The fieldwidth will be set to 8 for imagery.
- f. Datawidth: An integer number that defines the number of bits used by the actual data within the fieldwidth. The datawidth shall be set to 8.
- g. Affected Mode: This mode shall be set for mode 6.
- h. Affected Submode: The submode shall be set to 1.
- i. Checksum: See 3.2.4.2.1 .j.

3.2.4.3.3 Raster Scan Data Block

This data block shall be formatted as shown in Figure 11. The block elements consist of the following:

- a. Flag: (2-bits) set to 0 (octal).
- b. Length: (14-bits) set to the number of byte pairs in the current block. There shall be a maximum length of 2048 byte pairs per block.
- c. Mode: (8-bits) set to 6 (octal).
- d. Submode: (8-bits) set to 1 (octal).
- e. Starting Location (IROW and ICOL): (16-bits each) The row and column number, within the product, where the first pixel in the data block is located. For example, 0,0 specifies the first pixel is in the first row and first column, while 343,492 specifies that the first pixel is in the 344th row and the 493rd column. This location is referenced to the scan direction indicated by the scan code.

- f. Resolution: The number of pixels per scanline, set to 1024
- g. Pixel Data: The grayshade of each pixel in the scanline, with 0 indicating missing or no data, and grayshades 1 (black) -255 (white) represent the displayed image. Infrared and water vapor images shall be reversed for display of clouds as white.
- h. Checksum: See 3.2.4.2.1 .j

3.2.4.3.4 Raster Scan End of Product Block

The end of product block shall be formatted as shown in Figure 7. The block elements consist of the following:

- a. Flag: (2-bits) set to 0 (octal).
- b. Length: (14-bits) set to 3 (integer).
- c. Mode: (8-bits) set to 1 (octal).
- d. Submode: (8-bits) set to 2 (octal).
- e. Checksum: set to 177373 (octal).

3.2.5 Communication Protocol

The Communication Protocol used to transmit the Small Tactical Terminal products to CWS shall be Transport Control Protocol/Internet Protocol (TCP/IP) as defined in MIL-STD-1777 and MIL-STD-1778TCP/IP. The hardware level protocol shall be ethernet as defined by IEEE 802.3.

The small tactical terminal shall transfer the data to directory "/dmosp" on host processor using the Sun Network File System (NFSTM) protocol. The NFSTM protocol is defined in the System and Network Administration, Sun Microsystems, Part Number 800-3805-I 0. The small tactical terminal shall verify space availability for the product before shipment. The filenames shall be cws.msgnn (nn runs 1 0-99 and rolls over to 10).

CWS shall initiate the set-up of the system, acting as the server, and the STT shall act as the client. The STT shall transfer the PI set product to the remotely mounted mass storage device.

3.2.6 External User Support

The STT shall permit the CWS system user to use the X-window system version 11 revision 5 protocol to allow the satellite image resident on the STT to be displayed on the CWS terminal and to allow control of the STT. It is understood that CWS terminals may not be able to use all the STT display functions without

hardware upgrades, e.g., 24 bit plane displays. At a minimum, CWS shall be able to display an 8-bit plane image.

The STT shall allow the CWS user to initiate a remote login to the STT and to allow the CWS user to terminate a remote login session.

3.3 Environmental

Not Applicable.

3.4 Safety

Not Applicable.

4.0 QUALITY ASSURANCE PROVISIONS

The verification provisions for the requirements stated herein shall be contained in the specifications for the interfacing elements.

5.0 NOTES

6.0 ACRONYM/ABBREVIATION LIST

The acronyms listed below include all those used in this specification.

AFGWC	Air Force Global Weather Central
AFMC	Air Force Materiels Command
ASCII	American Standard Code for Information Interchange
AUI	Auxillary Unit Interface
AWDS	Automated Weather Distribution System
B	Blanking Flag
BI	First Band Index Value
CIDE	Communication Inter-face for Data Exchange
CSCI	Computer Software Configuration Item
CSMA/CD	Carrier-Sense Multiple Access with Collision Detection Protocol
DoD	Department of Defense
GI	Grid Indicator
ICAO	International Civil Aeronautical Organization
IEEE	Institute of Electrical and Electronic Engineers
IP	Internet Protocol
IR	Infrared
IRS	Interface Requirements Specification
IS	Interface Specification
LC	Low Cloud
NFSTM	Network File Systems
NIR	Near Infrared
NOTAM	Notice To Airmen
PI	Projection Indicator

PID	Product identifier
R	Reverse Video Flag
RDS	Real Time Data Smooth (from DMSP)
RTD	Real Time Data (from DMSP)
SGDB	Satellite Global Data Base
SC	Snow Cloud
SMC	Space and Missiles Systems Center
SSM/I	Special Sensor Microwave Imager
SSMIS	Special Sensor Microwave Imager Sounder
s s s	System Segment Specification
STT	Small Tactical Terminal
SWO	Staff Weather Officer
TCP	Transport Control Protocol
TCP/IP	Transport Control Protocol/Internet Protocol
UGDF	Uniform Gridded Data Field
VIS	Visible
WV	Water Vapor

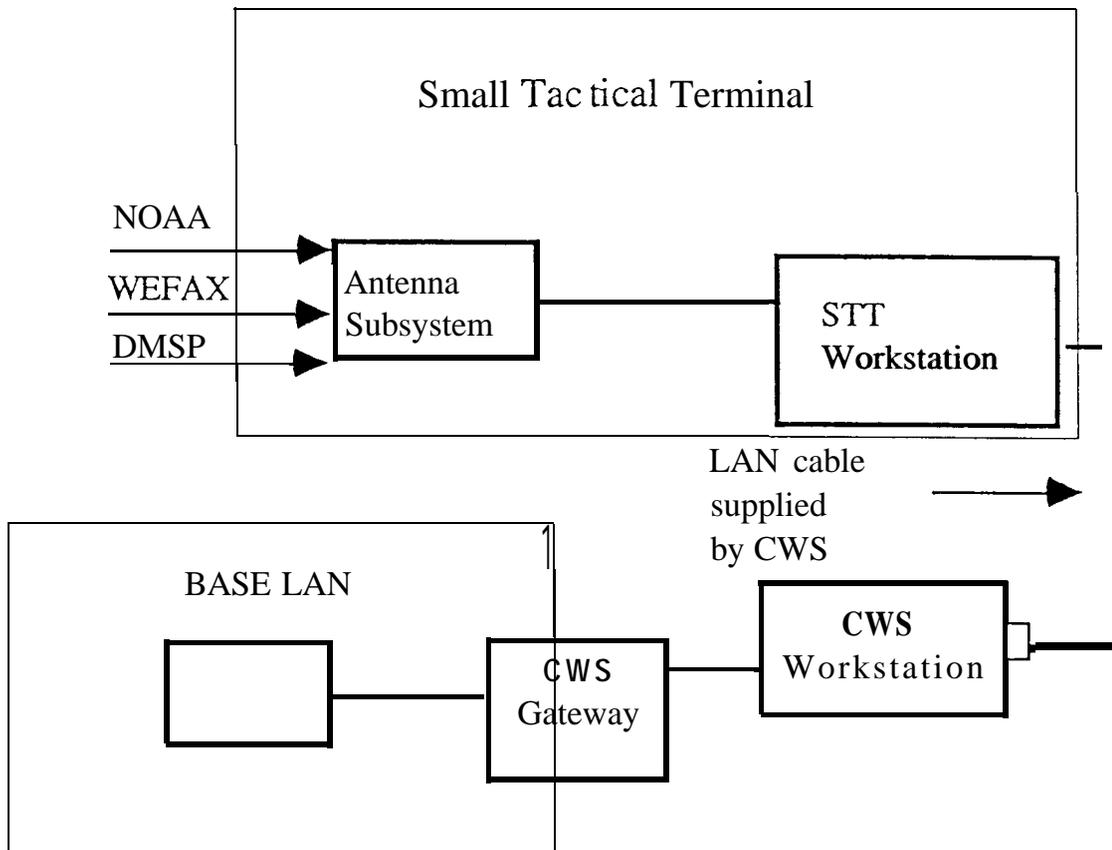


Figure 1. CWS - Small Tactical Terminal Interface

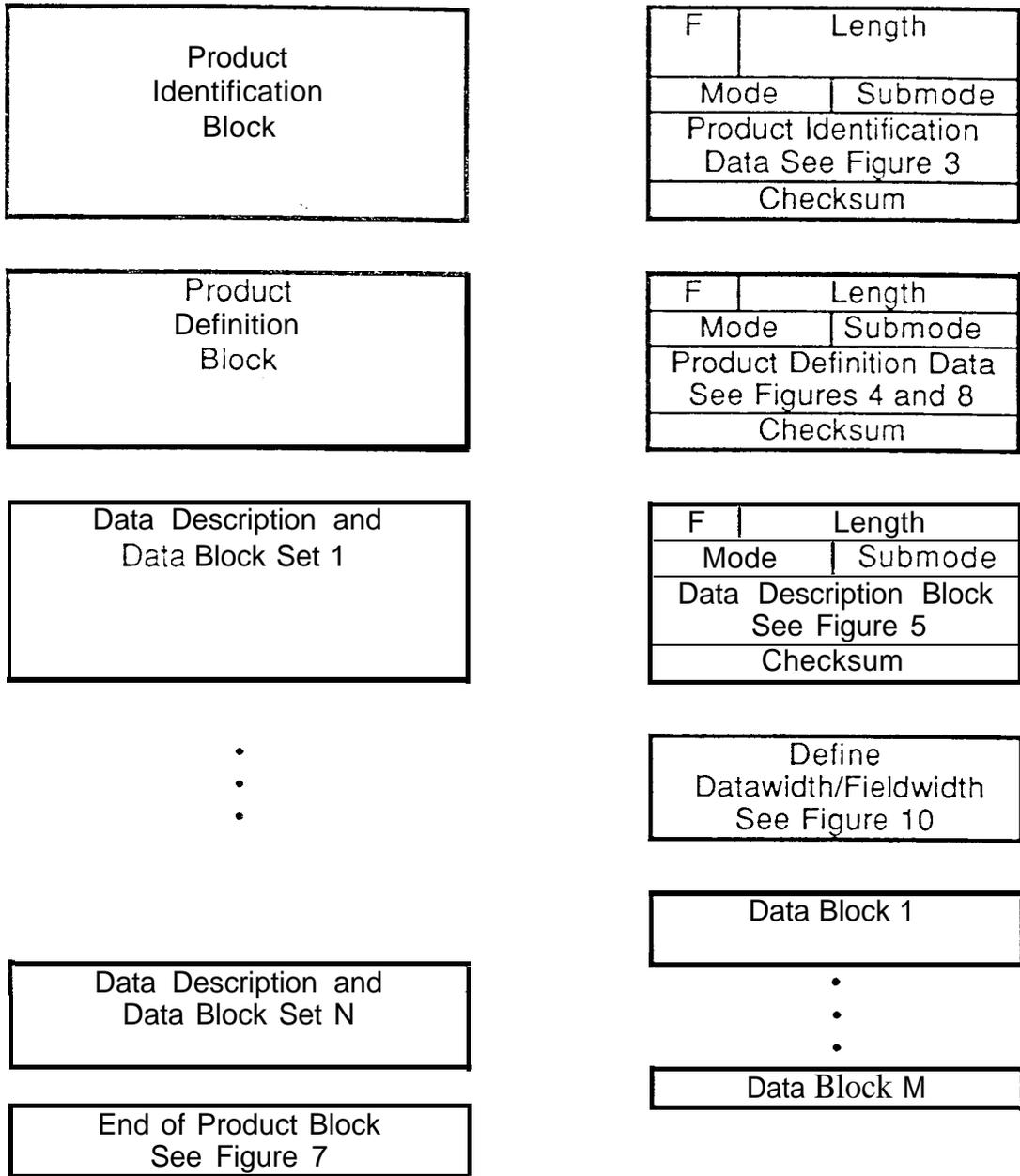


Figure 2. General Structure of Product Data Set

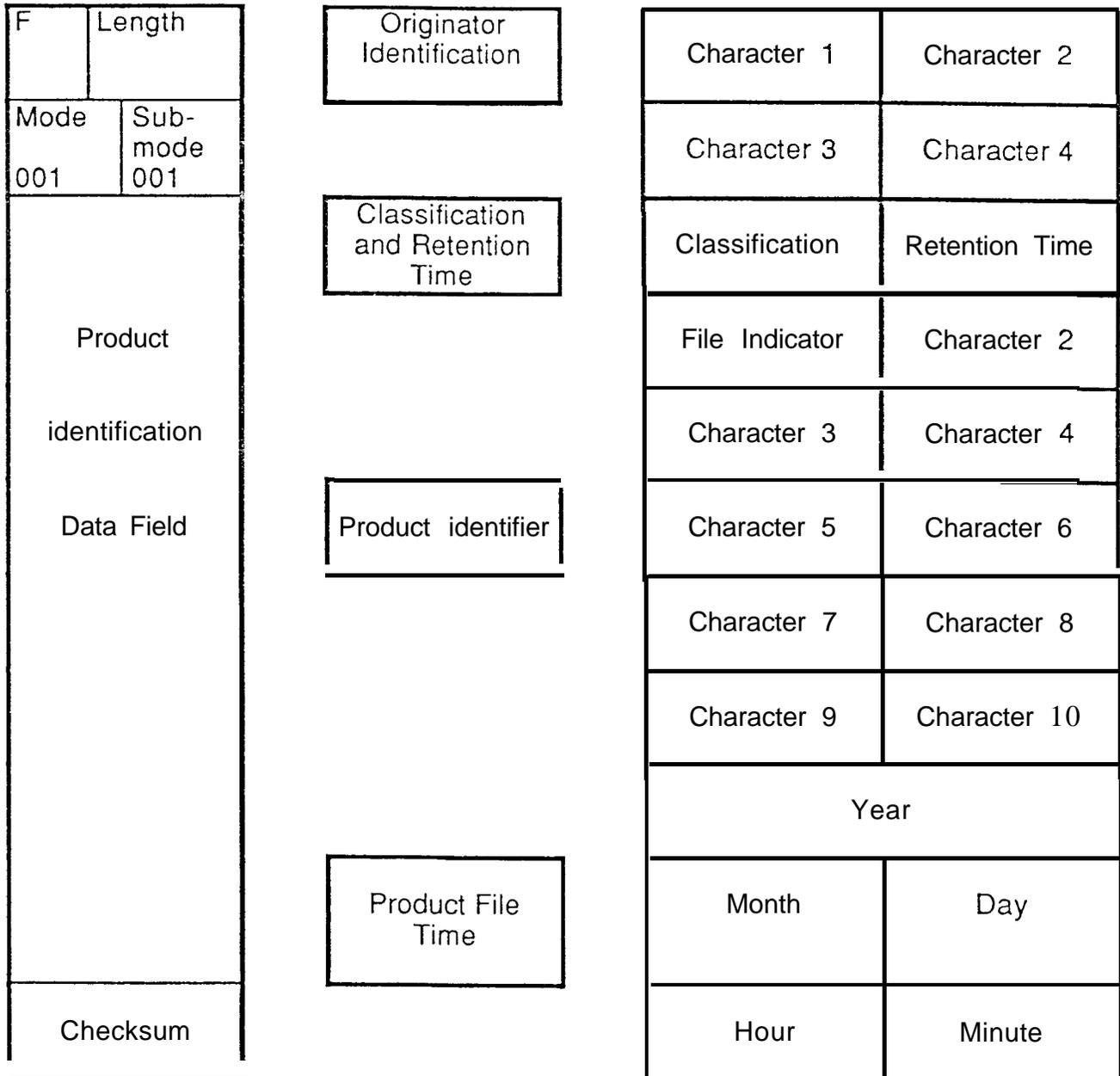


Figure 3. Product Identification Block Format (Mode 1, Submode 1)

F	Length(l)	
	007 (Mode)	020 (Submode)
	PI Set	GI Set
	Scale Factor	
	Coordinate Flag	Units Code
	Scale Exponent	Mult Constant
	First Band Index Value	
	First Delta BI in Field	
	Number of Columns	
	Number of Rows	
	Reference I Coordinate	
	Reference J Coordinate	
	Istart	
	Jstart	
	Month	Day
	Hour	Minute
	Month	Day
	Hour	Minute
	I Pole	
	J Pole	
	RE/D	
	Longitude X	
	Reference Code	Scan Code
	Checksum	

Figure 4. Gridded Data Product Definition Block

F	Length(i)	
003 (Mode)		021 (Submode)
Elements per Element Set		Bytes per Element Set
Number of Elements		
Mnemonic Character 1		Mnemonic Character 2
Mnemonic Character 3		Mnemonic Character 4
Start Byte of Element		Bytes Occupied per Element
Unused (zero filled)		Units Code
Multiplier Mantissa		Multiplier Characteristic
Additive Constant		
Mnemonic Character 1		Mnemonic Character 2
• • •		
Additive Constant		
Checksum		

Figure 5. Unpacked UGDF Data Description Block

F	Length(l)	
	003 (Mode)	001 (Submode)
	First Byte of Element 1	Second Byte of Element 1
	Bytes 3 through N-l Of Element Set 1	
		Last Byte of Element N
	First Byte of Element 1	Second Byte of Element 1
	Bytes 3 through N-l Of Element Set 2	
	• • •	
	First Byte of Element 1	Second Byte of Element 1
	Bytes 3 through N-l Of Element Set M	
		Last Byte of Element N
	Checksum	

F	Lenath(l)	
	003 (Mode)	001 (Submode)
	First Byte of Element M+1	Second Byte of Element M+1
	Bytes 3 through N-l Of Element Set M+1	
		Last Byte of Element N
	First Byte of Element 1	Second Byte of Element 1
	Bytes 3 through N-l Of Element Set M+2	
		Last Bvte of Element N
	• • •	
	First Byte of Element 1	Second Byte of Element 1
	Bytes 3 through N-l Of Element Set M+M	
		Last Byte of Element N
	Checksum	

Figure 6. Unpacked UGDF Data Block

F	Length(I)	
	001 (Mode)	002 (Submode)
Checksum		

Figure 7. End of Product Block

F	Length(I)	
	006 (Mode)	020 (Submode)
	PI Set	GI set
Satellite Identification		
Longitude X		
	Resolution Code	Data Type
I Max		
J Max		
	Enhance Max	Enhance Min
	Enhance ID	Length (MM)
	I Center	J Center
Latitude		
Longitude		
	No. of Char	Character 1
	Character 2	Character 3
	Character N-1	Character N
Checksum		

Figure 8. Satellite Product Definition Block

F	Length(I)	
	006	030
	PI-set	Matrix Code
	Scan Code	Pack Code
Checksum		

Figure 9. Pixel Product Definition Block

F	Length (l)	
	001 (Mode)	005 (Submode)
	Fieldwidth	Datawidth
	Mode	Submode
Checksum		

Figure 10. Define Datawidth/Fieldwidth Block

F	Length (l)	
	006 (Mode)	001 (Submode)
Starting Row (IROW)		
Starting Column (ICOL)		
Resolution		
Pixel Data		
Checksum		

Figure 11. Raster Scan Data Block

Table I. Coverage Area Identifiers for Tactic I Products

PI Set Code	Geographical Designation	Geographical Designator	Long X	ILL, JLL	Region Legends
20	Regional Window Europe	EN	100E	53,25	EUROPE
21	Regional Window S.W. Asia	AW	100E	53,29	S.W.ASIA
22	Regional Window S.E. Asia	MO	100E	37,9	S.E. ASIA
23	Regional Window N.W. Asia	OH	100E	37,25	N.W. ASIA
24	Regional Window S. Africa	ZA	170W	41,33	S.AFRICA
25	Regional Window S. America	AG	100E	33,25	S. AMER
26	Regional Window E. Africa	EA	MER	1,21	E.AFRICA
27	Regional Window Indian Ocean	IO	MER	17,21	INDIAN O
28	Regional Window S.E. Asia	NG	MER	33,21	S.E. ASIA
29	Regional Window Caribbean	DO	MER	76,21	CARIB
31	Regional Window Caribbean	CA	MER	69,19	CARIB CARRIB
32	Regional Window Tropical Hawaiian Islands	TR	MER	47,19	TROP HAWAII
33	Regional Window Marianas	MY	MER	31,19	MARIANAS
34	Regional Window S.E. Asia	ID	MER	25,19	S.E. ASIA
35	Regional Window W. Indian Ocean	MV	MER	10,22	W. INDIAN OCEAN
36	Regional Window Australia	AW	MER	29,28	AUSTRALIA
37	Regional Window W. Africa	AO	MER	2,20	W. AFRICA
38	Regional Window S. America	CH	100E	31,27	S. AMER
39	Regional Window Russia	RA	100E	46,17	RUSSIA
40	Regional Window CONUS	u s	80W	21,55	CONUS
41	Regional Window East US	UE	80W	25,57	E. US
42	Regional Window West US	UW	80W	17,57	w. U.S. W. US

Table I. Coverage Area identifiers for Tactical Products (continued)

PI Set Code	Geographical Designation	Geographical Designator	Long X	I,LL,J,LL	Region Legends
43	Regional Window North US	UN	80W	17,49	N. U.S. N. US
44	Regional Window Canada	CN	80W	25,49	CANADA
45	Regional Window Europe	EU	10E	52,39	EUROPE
46	Regional Window East Asia	JN	100E	33,12	E. ASIA
47	Regional Window Alaska	AQ	170W	18,27	ALASKA
48	Regional Window Hawaii	PA	170W	7,31	HAWAII
49	Regional Window Azores	AZ	10E	49,50	AZORES
50	Regional Window Antarctica	AA	100E	25,41	ANTARCTICA
51	Regional Window Mideast	ME	10E	58,29	MIDEAST
52	Regional Window S. Africa	AP	170W	43,34	S. AFRICA
53	Regional Window New Zealand	NZ	10E	27,45	NEW ZEAL
54	Regional Window Central Atlantic	AI	MER	81,20	CEN ATL
55	Regional Window East Pacifica	MX	MER	59,20	EAST PAC
60	Tropical Cont Ocean-Indian Ocean	IO	MER	9,27	IND OCEAN TROP/IN 0
61	Tropical Cont Ocean-West Pacific	PW	MER	31,27	W. PAC TROP/W PA TROP W PAC
62	Tropical Cont Ocean-East Pacific	PZ	MER	53,27	E. PAC TROP/E PA TROP E PAC
63	Tropical Cont Ocean-W. Hemisphere	SA	MER	63,27	TROP WH TROP/W HE S. AM
64	Tropical Cont Ocean-Atlantic	ST	MER	73,27	TROP ATLC TROP/ATLA TROP WH

Table I. Coverage Area Identifiers for Tactical Products (continued)

PI Set Code	Geographical Designation	Geographical Designator	Long X	LL, JLL	Region Legends
65	Tropical Cont Ocean-Africa	AF	MER	90,27	TROP AFRICA TROP OF AF
66	Tropical Cont Ocean-S. America	BO	MER	67,37	S. AMER
67	Tropical Cont Ocean-Hawaii	PS	MER	43,27	HAWAII
68	Tropical Cont Ocean-Indonesia	MS	MER	19,27	INDONESIA
69	Tropical Cont Ocean-Central Africa	AM	MER	91,27	CEN AFR
70	Subwindow US (N.W.)	UM	80W	21,47	NW US
71	Subwindow US(West)	UA	80W	19,50	U.S.WEST
72	Subwindow US(Mountain)	UC	80W	22,50	U.S. MTN MTN US
73	Subwindow US(S.W)	UX	80W	22,53	U.S.S.W.
74	Subwindow US(N. Central)	UD	80W	25,50	N CNT US
75	Subwindow US (S. Central)	UL	80W	25,53	S CNT US
76	Subwindow US (East)	UO	80W	28,52	E. CONUS E US
77	Subwindow US (N.E.)	UP	80W	31,51	N.E. CONUS
78	Subwindow US (S.E.)	UF	80W	28,55	S.E. CONUS
79	Subwindow US (N.E. Pacific)	UB	80W	18,45	N.E. PACIFIC
80	Subwindow Western Europe	UK	10E	48,38	W. EUR
81	Subwindow Iceland	IL	10E	44,40	ICELAND
82	Subwindow Spain	SP	10E	51,40	SPAIN
83	Subwindow Italy	Y	10E	51,36	ITALY
84	Subwindow Turkey	TU	10E	51,31	TURKEY
85	Subwindow Russia	RS	10E	45,32	RUSSIA
86	Subwindow Afgan/Iran	AH	10E	48,23	IRAN

Table I. Coverage Area Identifiers for Tactical Products (continued)

PI Set Code	Geographical Designation	Geographical Designator	Long X	ILL, JLL	Region Legends
87	Subwindow Syria/Iraq	SY	10E	51,29	SYRIA
88	Subwindow Saudi Arabia	SD	10E	54,24	SAUDI
89	Subwindow Egypt	EG	10E	57,30	EGYPT
90	Subwindow Alaska	AK	170W	22,31	ALASKA
91	Subwindow Alaska (Arctic Ocean)	AC	170W	26,27	ARTIC OC
92	Subwindow Alaska (N.W. Canada)	AY	170W	26,35	N.W.CAN
93	Subwindow Alaska (Gulf of Alaska)	GA	170W	18,35	G.OF ALAS
94	Subwindow Alaska (Bering Sea)	LU	170W	18,27	BERING
95	Subwindow Ethiopia	ET	10E	61,23	ETHIOPIA
100	Subwindow Hawaii	HW	170W	7,34	HAWAII
101	Subwindow Hawaii (N.W.)	HF	170W	16,31	N.W. HAWAII
102	Subwindow Hawaii (N.E.)	HG	170W	16,39	N.E. HAWAII
103	Subwindow Hawaii (E)	HH	170W	7,39	E. HAWAII
104	Subwindow Hawaii (W)	HI	170W	7,31	W. HAWAII
110	Subwindow Korea	KO	100E	30,15	KOREA
111	Subwindow Japan	JP	100E	27,17	JAPAN
112	Subwindow Okinawa	EC	100E	28,12	OKINAWA
113	Subwindow Asia (Eastern USSR)	MK	100E	33,20	E. USSR
114	Subwindow Asia (N.W. Pacific)	JH	100E	25,20	N.W.PAC
115	Subwindow Asia (W. Central Pacific)	JK	100E	25,12	W CEN PAC
116	Subwindow Asia (China)	CI	100E	33,12	CHINA
120	Subwindow Lajes	LJ	10E	47,46	LAJES
121	Subwindow Lajes (N.W. Atlantic)	NF	10E	41,50	N.W. ATL
122	Subwindow Lajes (Iceland/Greenland)	GL	10E	41,42	ICELAND
123	Subwindow Lajes N.E. Atlantic	PO	10E	49,42	N.E. ATL
124	Subwindow Lajes (N. Central Atlantic)	AX	10E	49,50	N. CEN ATL
130	Subwindow Panama	PM	MER	72,14	PANAMA

Table I. Coverage Area Identifiers for Tactical Products (continued)

PI Set Code	Geographical Designation	Geographical Designator	Long X	ILL,JLL	Region Legends
131	Subwindow Gulf of Mexico	GX	MER	70,12	GULF MEX
132	Subwindow Tropical Hawaii	HT	MER	51,13	HAWAII
133	Subwindow Guam	GM	MER	35,14	GUAM
134	Subwindow South China Sea	SS	MER	27,14	S CHINA S
135	Subwindow Philippine Sea	PH	MFR	32,11	PHIL SEA
136	Subwindow S. Hemisphere	FK	170W	32,16	S. Hemi
137	Subwindow S.Hemisphere		10E	40,24	S. Hemi
138	Subwindow S. Hemisphere		80W	40,16	S. Hemi
139	Subwindow S. Hemisphere		100E	32,24	S. Hemi
0	Non PI Set Image				

Table II. Indicators for Tactical Products

CODE VALUE	1ST I BASE TIME (NOTE 2)	2ND I LEVEL	1ST E PARAMETER	2ND E FORECAST HOURS
0	00Z	1000 mb	Lightning	0
1	03Z	100 mb	Potential Temperature	3
2	06Z	200 mb	Dew Pt Temperature	6
3	09Z	300 mb	Ceiling	9
4	12Z	400 mb	Visibility	12
5	15Z	500 mb	icing Parameters	15
6	18Z	600 mb	Humidity Parameters	18
7	21Z	700 mb	Rain accumulation	21
8	00Z	850 mb	Cloud Parameters	30
9	03Z	N/A	Multiple Parameters	36
A	06Z	250 mb	Total Cloud Amount	24
B	09Z	150 mb	Cloud Base	48
C	12Z	50 mb	Cloud Top	72
D	15Z	Tropopause	D-Value	4 Days
E	18Z	70 mb	Equivalent Potential Temperature	5 Days
F	21Z	30 mb	Stream Function	6 Days
G	00Z	20 mb	Geopotential Height	7 Days
H	03Z	10 mb	High Cloud Amount	8 Days
I	06Z	Low	Divergence	9 Days
J	09Z	Middle	Vorticity	10 Days
K	12Z	High	Streamlines	60 Hours
L	15Z	925 mb	Low Cloud Amount	1 Hour

Table II. Indicators for Tactical Products (Continued)

CODE VALUE	1ST I BASE TIME	2ND I LEVEL	1ST E PARAMETER	2ND E FORECAST HOURS
M	18Z	950 mb	Middle Cloud Amount	2 Hours
N	21Z	990 mb	Dewpoint Depression	4 Hours
O	00Z	Above Bndry Layer	Omega	5 Hours
P	03Z	Sea Surface	Pressure	7 Hours
Q	06Z	Soil	Quantitative Precipitation Forecast	8 Hours
R	09Z	1600 m AGL	Boundary Layer Dewpoint Depression	10 Hours
S	12Z	surface	S W E A T	11 Hours
T	15Z	Multi-Level Thunderstorms	Temperature	
U	18Z	Multi-Level Clouds and Weather	U-Component of Wind	
V	21Z	Multi-Level Turbulence	V-Component of Wind	
W	01Z	Multi-Level Winds and Jet	Precipitable Water	
X	02Z	Multi-Level Surface Features	Primary Present Weather	
Y	04Z	Multi-Level Weather	Secondary Present Weather	
Z	05Z	Multi-Level Unspecified	Tertiary Present Weather	
a	07Z	Thickness (1000-850)	Altimeter Setting	

Table II. Indicators for Tactical Products (Continued)

CODE VALUE	1ST I BASE TIME	2ND I LEVEL	1ST E PARAMETER	2ND E FORECAST HOURS
b	08Z	Thickness (1000-700)	Barometric Pressure Tendency	
c	10Z	Thickness (1000-500)	Thickness (see note 1)	
d	11Z	Thickness (850-700)	Aerosol Type	
e	13Z	Thickness (850-500)	Boundary Layer Parameters	
f	14Z	Thickness (700-500)	NEXRAD Parameters	
g	16Z	Thickness (500-300)	(IR) Parameters	
h	17Z	Thickness (300-200)	wind speed	
i	19Z	7 mb	soil moisture	
j	20Z	5 mb	Ice Age	
k	22Z	2 mb	Ice Edge/ Concentration	
l	23Z	1 mb	Age	
m	JAN	0.4 m b	Contrail	
n	FEB	0.1 mb	Turbulence Parameters	
o	MAR	0.03 mb	Precipitation Parameters	
p	APR	level 1	wind parameters	
q	MAY	level 2	snow cover	
r	JUNE	level 3	rain rate	
s	JULY	level 4	snow parameters	
t	AUG	level 5	Thunderstorm Parameters	
u	SEPT	50M AGL	sea parameters	

Table II. Indicators for Tactical Products (Continued)

CODE VALUE	1ST I BASE TIME	2ND I LEVEL	1ST E PARAMETER	2ND E FORECAST HOURS
v	OCT	150M AGL	volcanic ash fall out parameters	
w	NOV	300M AGL	brightness temperature	
x	DEC	600M AGL	reserved	
y		900M AGL	reserved	
z		1200M AGL-	reserved	

SMALL TACTICAL TERMINALS CWS REQUIREMENT
CWS REQUIREMENT NOT USED BY SMALL TACTICAL TERMINAL
P3I REQUIREMENT FOR SMALL TACTICAL TERMINAL TO CWS

note 1 = thickness levels are defined between the i mandatory levels (1000, 850, 700, 500, 400, 300, 250, 200, 150, 100, 70, 50, 30, 20, 10 mb levels) (e.g. if product lists second i code value 0, 1 000- 850 mb thickness is sent.)

note 2 = Base Time is the acquisition time (or creation time if acquisition time is not appropriate).

Table III. Tactical UGDF Product Mnemonics and Units Code

Weather Element	Mne-monic	First E	UNITS	UNITS CODE	RANGE OF VALUES
Age	AG	l	hours	61	N/A
Brightness Temperature	TPB	w	°C	2	-200 to 50
Ceiling	CIG	3	FT	12	0 to 50000
Cloud Amount	CA	8	%	24	0 to 100
Cloud Base	CDB	B	M	3	0 to 25000
Cloud Top	CDT	C	M	3	0 to 25000
Cloud Type	CT	8	N/A	23	1 to 10
Cloud Water	CLW	6	KG/M**2	26	0 to 12.5
Dew Point Depression	DPD	N	°C	2	0 to 50
Geopotential Heights	GPH	G	M	3	0 to 50000
Geostrophic Winds	UWC VWC	9	M/S	4	-200 to +200
Ice Age	IAG	j	N/A	23	Null, First, MY
Ice Concentration	ICE	k	%	24	0 to 100
Ice Edge	ICD	k	N/A	23	0 or 1
Liquid Water	LWC	6	KG/M**2	26	0 to 12.5
Rain Rate	RR	r	mm/hr	76	0 to 61
Relative Humidity	RH	6	%	24	0 to 100
Snow Depth	SNO	s	cm	10	0 to 2000
Snow Water	SNW	s	cm	10	0 to 50
Soil Moisture	SIM	i	%	24	0 to 100
Specific Humidity	SH	6	G/KG	75	0 to 50
Temperature	TMP	T	°C	2	-120 to 50
Temperature of Dew Point	DPT	2	°C	2	-100 to 50
Thickness	THK	c	M	3	100 to 5000
Total Cloud Amount	CTA	A	%	24	0 to 100
Total Water	THW	6	G/KG	75	0 to 50
Wind Speed	SPD	h	M/S	4	0 to 200

Note: The Age (time) shall be specified in minutes since OOOZ, e.g. if data is valid at 05052, the time shall be coded as 305.

Table IV. Tactical UGDF Products Mathematical Parameters

Mnemonic	Units/Code	Multiplier Mantissa	Multiplier Character	Additive Constant
CA	24	1	0	0
CDB	3	1	2	0
CDT	3	1	2	0
CIG	12	2	2	0
CLW	26	1	0	0
CTA	24	1	0	0
DPD	23	1	0	0
DPT	2	1	1	173
GPH	3	2	2	0
IAG	23	N/A	N/A	N/A
ICD	23	1	0	0
ICE	24	1	0	0
LWC	26	5	-2	0
RH	24	1	0	0
RR	76	1	0	0
SH	75	1	0	0
SIM	24	1	0	0
SNO	10	1	1	0
SNW	10	1	0	0
SPD	4	1	0	0
THK	3	2	1	100
THW	75	1	0	0
TIM	61	1	0	0
TMP	2	1	0	150
TPB	2	2	0	0
u w c	4	2	0	200
VWC	4	2	0	200