N87-10525

# 9.2.2 MST DATA EXCHANGE TRHOUGH THE NCAR INCOHERENT-SCATTER RADAR DATA BASE

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One means of making MST data more easily accessible for scientific research by the general scientific community is through a centralized data base. Such a data base can be designed to readily provide information on data availability and quality, and to provide copies of data from any radar in a common format to the user.

The ionospheric incoherent-scatter radar community has established a centralized data base at NCAR that may serve not only as a model for a possible MST data base, but also as a catalyst for getting an MST data base started. Some key elements of the NCAR data base are:

Data are processed to yield geophysical parameters (e.g., velocities instead of Doppler shifts) by the radar organizations before being sent to NCAR;
Emphasis is on data for which measurement and analysis techniques have become well-understood and relatively routine;
All radar organizations use a common format for sending data;
NCAR catalogues the data and prepares summary information files;
NCAR provides data copies to users upon request;
NCAR assists users when possible with documentation and software, and helps place users in contact with appropriate persons at radar organizations for further information;
Users are required to offer co-authorship on publications to data providers;
Costs are largely borne by each respective institution with minimum transfers of funds. (NSF-supported radars are supposed to have funds included in their contracts to cover costs of participation in the data base).

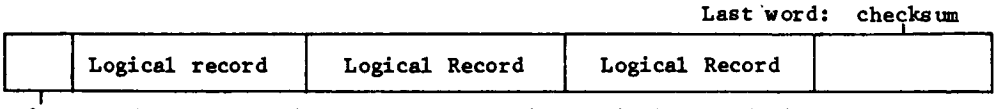
The NCAR data base can include MST data in this same framework with relatively little extra effort. We are willing to handle MST data on a limited basis in order to permit assessment of community interest and in order to provide some experience with a centralized data base for MST data. If sufficient interest develops, NSF support could be sought for a full-scale MST data base, either at NCAR or elsewhere. Data from the Poker Flat radar are already under consideration for inclusion in the NCAR data base.

One important requirement is a common data format. The format currently used for incoherent-scatter data is quite flexible, and in fact was designed with the thought in mind of having it usable for data from other types of instruments. A brief description of this format is appended. The MST community may find this format acceptable, or may wish to design a more specialized format.

NCAR's data base tape format

All words are 16-bit, 2's complement integers.

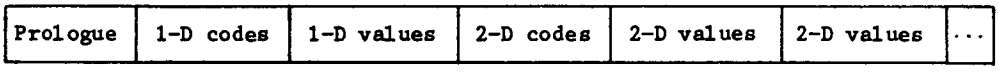
Physical Record




First word: total number of words in this physical record, including this word and checksum.

Each physical record contains an integral number of logical records.

Logical Record (Data Record)




| | | Length |
|---|---|---|
| Or: | Prologue | LPROL |
| | 1-D codes | JPAR |
| | 1-D values | JPAR |
| | 2-D codes | MPAR |
| NROW rows | 2-D values | MPAR |
| | 2-D values | MPAR |
| | . | . |
| | . | . |
| | . | . |

PROLOGUE

| WORD NUMBER | NAME | DESCRIPTION |
|---|---|---|
| 1 | LTOT | Number of 16-bit words in this record, including this one |
| 2 | KREC | Kind of record (1002 for data record in this format) |
| 3 | KINST | Instrument code |
| 4 | KINDAT | Kind-of-data code, pointing to documentation on analysis procedure used |
| 5 | IBYR | Beginning year for data in this record |
| 6 | IBDT | Beginning month/day (MMDD) |
| 7 | IBHM | Beginning hour/min (HHMM) |
| 8 | IBCS | Beginning centisecond |
| 9 | IEYR | Ending year |
| 10 | IEDT | Ending date |
| 11 | IEHM | Ending hour/min |
| 12 | IECS | Ending centisecond |
| 13 | LPROL | Length of this prologue (at least 16) |
| 14 | JPAR | Number of single-valued parameters (0 permissible) |
| 15 | MPAR | Number of multiple-valued parameters (0 permissible) |
| 16 | NROW | Number of entries for each multiple-valued parameters (0 permissible) |

## SAMPLE PARAMETER CODES

| Code | Description | Designator | | Units |
|---|---|---|---|---|
| 10 | YEAR (UNIVERSAL TIME) | YEAR | 1. | UT |
| 20 | MONTH/DAY (UNIVERSAL TIME) | MMDD | 1. | UT |
| 21 | DAY NUMBER OF YEAR (UNIVERSAL TIME) | DAY # | 1. | UT |
| 30 | HOUR/MIN (UNIVERSAL TIME) | HHMM | 1. | UT |
| 34 | TIME PAST 0000 UT | HR > 0000UT | 1.E-03 | HOUR |
| 60 | INTEGRATION TIME FOR THESE DATA | INTEGRATN T | 1. | S |
| 70 | SAMPLING INTERVAL (TIME BETWEEN SAMPLS) | SAMPL NTRVL | 1. | S |
| 110 | ALTITUDE (HEIGHT) | ALTITUDE | 1. | KM |
| 111 | ADDITIONAL INCREMENT TO ALTITUDE | ADDITNL HT | 1.E-01 | M |
| 115 | ALTITUDE AVERAGING INTERVAL | AVGNG DEL H | 1. | KM |
| 116 | ADDITIONAL INCREMENT TO HT AVGNG INTRVL | ADDITNL D H | 1.E-01 | M |
| 120 | RANGE | RANGE | 1. | KM |
| 121 | ADDITIONAL INCREMENT TO RANGE | ADDITNL RNG | 1.E-01 | M |
| 125 | WIDTH OF RANGE GATE | RANGE GATE | 1. | KM |
| 126 | ADDITIONAL INCREMENT TO RNGE GATE WIDTH | ADDITNL R G | 1.E-01 | M |
| 130 | MEAN AZIMUTH ANGLE (0 = GEOG N, 90 = EAST) | AZ ANGLE | 1.E-02 | DEG |
| 140 | ELEVATION ANGLE (0 = HORIZONTAL, 90 = VERT) | EL ANGLE | 1.E-02 | DEG |
| 402 | PULSE LENGTH | PULSE LEN | 1.E-06 | SEC |
| 412 | LOG10 SIGNAL TO NOISE RATIO | LG10(SNR) | 1.E-03 | |
| 486 | PEAK POWER | PEAK POWER | 1. | KW |
| 490 | TRANSMITTED FREQUENCY | XMITTED FRQ | 1.E+05 | HZ |
| 492 | RECEIVED DOPPLER FREQUENCY OFFSET | R DPLR OFST | 1. | HZ |
| 494 | RECEIVER BANDWIDTH | RCVR BANDWD | 1. | KHZ |
| 496 | RECEIVER DELAY TIME | RCVR DLAY T | 1.E-06 | SEC |
| 830 | LOG10 (NUTRL ATM MASS DENSITY IN KG/M3) | LG10(M DEN) | 1.E-03 | |
| 910 | NEUTRAL ATMOSPHER LOG10(PRESSURE IN PA) | LG10(PRES) | 1.E-03 | |
| 920 | PRESSURE SCALE HEIGHT | PRES SCL HT | 1.E+01 | M |
| 1010 | SKEW ANGLE DEFININ GEOG UNIT VECTRS:1-3 | ROT ANGL-GG | 1.E-02 | DEG |
| 1410 | NEUTRAL WIND IN DIRECTION 1 | VN1 | 1. | M/S |
| 1420 | NEUTRAL WIND IN DIRECTION 2 | VN2 | 1. | M/S |
| 1430 | NEUTRAL WIND IN DIRECTION 3 | VN3 | 1. | M/S |

Codes for error values are the negative of the corresponding parameter code, e.g. -1410 is the code for the error in the measured neutral wind in direction 1.

Missing data values are entered as -32767.

The angle given under code 1010 gives the rotation of direction 1 from eastward and of direction 2 from northward. Direction 3 is upward.

## 9.2.3 SUMMARY

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The first three papers presented information on some data management procedures used at different radars. An issue was brought up in the last two talks concerning data exchange. The MSTRAC chairman, Dr. P. K. Rastogi, noted that several impediments exist to data exchange, notably the lack of time and resources needed to prepare and transfer data. Although Richmond noted that NCAR could handle archiving and sending data copies to interested users, it was not clear that this alone would be sufficient to provide for an active data exchange.