TM-969/001/00

TECHNICAL MEMORANDUM

(TM Series)

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Personnel Planning Information for the Bird Buffer Operator

by
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Approved
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1.0 INTRODUCTION

1.1 SCOPE AND CONTENT OF THE PERSONNEL PLANNING INFORMATION (PPI)

The purpose of this document is to define the general (non-flight specific) duties, responsibilities, and work environment for the Bird Buffer operator at the Satellite Test Annex (STA). This document supersedes the PPI portion of TM-(L)-969, 21 January 1963, and contains task statements appropriate to modifications in the Bird Buffer computer program and operating instructions. The informational content of this document is appropriate to only operator/maintenance tasks, and is derived from an analysis of the functions of the operating instructions (TM-L-834/002/00).

1.2 STATION PROGRAM LOADING AND WORKING ASSUMPTIONS

1.2.1 Facility/Equipment/Personnel Chart

The physical relationship between the Bird Buffer 160A operator and the 160A and associated equipment will not be illustrated in the required F/E/P chart form. In order to conform to the PPI requirement and remain within the limitations of this document, a list of the equipment for which the Bird Buffer operator is responsible will be included. An Equipment Position Summary Chart will also be presented.

1.2.2 Work Position Diagram

A work position diagram showing the present 160A and associated equipment layout will be included. This diagram will depict a single Bird Buffer complex, since all Bird Buffer complexes will have similar layouts.

1.2.3 O&M Concept (Operations - Operator Relationship)

The interface requirements between the Bird Buffer and the other Operations personnel will be specified in this document. General interface operations between the Bird Buffer and the 1604 computer and Tracking Station operations will be specified in chart form. Interaction requirements imposed on other operations areas will also be specified in this document.

1.3 MANNING FORECAST TABLES

An estimate of the number of operator/maintainers for each Bird Buffer complex will be made from an analysis of the tasks required for operations. This estimate will be included as a part of the Job Description (Section 1.4).

1.4 JOB DESCRIPTION

This section will include the following:

a. Position Title
b. Recommended Primary and Secondary AFSC's
c. Recommended Utilization
d. Recommended Manning
e. Summary of Position Responsibilities
f. Duties During Each Operational Phase

2.0 GENERAL FUNCTIONS OF THE BIRD BUFFER PROGRAM

The Bird Buffer System provides a vehicle-specific communication link between a remote station and the following areas; a 1604 computer, Data Analysis, Data Presentation, and Multi-ops (if connected). The program system is designed to process the data from the tracking station, display the data on the remote printers in selected formats, and store the data for later transfer to a 1604 computer (or make such a transfer in real-time). In addition, the program system transmits certain data to the tracking station. These data transfers are made via the 1200 bit-per-second line. The CDC 160A computer system is utilized to provide these functions. The operation of this system is divided into three phases: Non-Station Contact, Station Contact Non-real-time, and Station Contact Real-time.

The typical sequence of functions is shown in Figure 5. During the Non-Station Contact Phase, which encompasses the Preflight period, the Prepass period, and the Postpass period when the Bird Buffer is not connected to a remote site, the following functions are performed. Prepass data are accepted by the Bird Buffer program for storage on the Prepass Tape from the 1604 computer via core-to-core transfer and/or from the 167 card reader in the form of punched cards in Prepass Data format. Tracking and Vehicle Time data from the previous pass(es) may be transferred to the 1604 computer from the 163 Recording Tape. If requested, a command history printout, which lists the command operational status reports received from the tracking station(s) during designated passes, may be produced on the remote 166 printers, and on the Bird Buffer printer.

During the Station Contact Non-real-time phase, which encompasses the prepass and postpass periods when the Bird Buffer is connected to a remote site but is not processing data in real-time, Prepass data are read from the Prepass Tape and is transmitted to the tracking station. Certain prepass messages which were not recorded on the Prepass Tape may be transmitted directly to the tracking station from the 1604 computer (Schedule messages) or from punched cards. If a real-time transfer of Vehicle Time and Tracking data to the 1604 computer is requested, the proper communication between the Bird Buffer and the 1604 is established.

The Station-Contact Real-time phase is indicated by the receipt of the Real-time Near message from the tracking station. The following functions are performed. Any new untransmitted prepass data are sent to the tracking station. Approximately two minutes before the expected acquisition of the vehicle the tracking station transmits the Operational Telemetry Mode message to the STA, which causes the Bird Buffer program to load the appropriate TLM Mode Tables into core from the 163 Prepass Tape. These tables designate how the Bird Buffer program will convert and display the data received from the site on the remote 166 printers. Tracking and Vehicle Time data will be stored on the 163 recording tape and, if requested, transmitted to the 1604 computer in real-time. Telemetry mode changes and/or modifications, real-time commands, and text messages may be sent to the tracking station during this phase.

3.0 SELECTED PERSONNEL PLANNING INFORMATION

3.1 THE BIRD BUFFER COMPLEX POSITIONAL REQUIREMENTS

Operation of the Bird Buffer Complex will normally require one position, an operator/maintainer. Preliminary analysis suggests approximately one maintainer/operator for three Bird Buffers will be required to provide assistance in peak load or malfunction conditions.

3.2 EQUIPMENT LAYOUT AND WORKSPACE ALLOCATION

The equipment layout of the Bird Buffer 160A complex is shown in Figure 1. This configuration is the final design for the Bird Buffer subsystem, and shows the relative positions of the equipments. Only one complex is shown, since all Bird Buffer complexes will have the same layout.

3.3 INTERFACES BETWEEN BIRD BUFFER AND OTHER OPERATIONAL AREAS

3.3.1 Figure 2 shows the general interfaces and Bird Buffer operations during the non-station contact phase of processing. Detailed descriptions of the program functions and the operator functions are contained in TM-1165, section 4.1 A summary of the tasks to be performed by the operator is described in this document, section 4.3.6.1.

3.3.2 Figure 3 shows the general interfaces and Bird Buffer operations during the station contact non-real-time phase of processing. Detailed descriptions of the program functions and the operator functions are contained in TM-1165, section 4.2 A summary of the tasks to be performed by the operator is described in this document, section 4.3.6.2.

3.3.3 Figure 4 shows the general interfaces and Bird Buffer operations during the station contact real-time phase of processing. Detailed descriptions of the program functions and the operator functions are contained in TM-1165,

section 4.3. A summary of the tasks to be performed by the operator is described in this document, section 4.3.6.3.

3.4 JOB DESCRIPTION

3.4.1 Position Title: (160A) Bird Buffer Operator

3.4.2 Related AFSC: 68550B - Data Processing Machine Operator (160A Computer)

Secondary AFSC: 68550A - Data Processing Machine Operator (Punched Card Equipment)

Utilization: Operator/Maintainer

Manning: One Operator (Based upon estimates of the loading and in consideration of interfacing personnel).

3.4.3 Environment: Reports to Computer Controller in the Computer Control section (TWRUC). Operates a 160A Bird Buffer located in Room 318 at the STA.

3.4.4 Equipment Responsible for:

CDC 160A Bird Buffer Computer
CDC 169 External Memory
CDC 160-AP Phantom Resume
CDC 161 I/O Typewriter
CDC 350 Paper Tape Reader
CDC BPRE-11 Paper Tape Punch
CDC 163A-4 Magnetic Tape Unit
CDC 167-2 Card Reader
CDC 166-2B Printer
ACF Computer Communications Converter (CCC)

3.4.5 Position Summary

Operation of the 160A computer and peripheral equipment. This includes loading the appropriate tapes onto the tape drives, and reading in the Bootstrap paper tape on the paper tape reader to load the Bird Buffer program into core. Operation of the card reader, tape drives, and 166 printer to assure that a ready conditon is maintained for operations. Reading control cards to initiate requested functions and enter data for transmission to the tracking station or to operations areas within the STA. Inspection of the Bird Buffer printer to assure the successful completion of each function initiated, and to identify the operations phase from appropriate status messages. In the event of an error printout,

takes corrective action and/or reports the condition to the Computer Controller. Coordinates with other operations areas to insure the effecting of requested functions, and to provide the required real-time display of tracking and telemetry data.

3.4.6 Summary of Tasks

The summary of the tasks to be performed by the Bird Buffer operator is described within each appropriate operations phase.

3.4.6.1 Non-station Contact Phase (Preflight, Postpass)

(1) Sets up the 160A Bird Buffer for operating (Preflight only) including: loading appropriate magnetic tapes onto the tape drives, reading in the Bootstrap paper tape to load the Bird Buffer program into core, and putting all associated peripheral equipment into a "ready" condition.

(2) Merges the Preflight Tape, obtained from TWREA, with the Prepass Tape, and checks the 166 printout to assure successful completion of this function. (Preflight only.)

(3) Transfers prepass data core-to-core from the 1604 computer for recording on the Prepass tape, and checks the 166 printout to assure successful completion.

(4) Transfers schedule data (output of the SCHOPS or SCHNOPS 1604 program) from the 1604, core-to-core, for recording on the Prepass Tape, and checks the 166 printout to assure successful completion.

(5) Transfers Tracking and Vehicle Time data from the 163 Recording Tape to the 1604 computer, core-to-core, unless this transfer was performed during the previous pass in real-time. Checks the 166 printout to assure successful completion.

(6) If requested, produces a Command History printout which includes a listing of all the commands sent to and the command operational status reports received from the tracking station during the passes designated on the function card.

3.4.6.2 Station Contact Non-real-time Phase (Prelaunch, Prepass)

(1) Establishes contact with the tracking station, or verifies that the tracking station has initiated contact by inspection of the 166 printout for the appropriate status message.

(2) Sends prepass data to the tracking station by insertion of the appropriate control card, and inspects the 166 printout to insure successful completion.

(3) Sends schedule data (SCHOPS or SCHNOPS output) from the 1604 direct to the tracking station if such data was not recorded on the Prepass Tape, and if such a function is requested.

(4) Sends any text messages on punched cards which were not placed onto the Prepass Tape to the tracking station, by reading them in on the 167 card reader.

(5) If requested by the Computer Controller, enables the 1604 computer to accept the real-time transfer of Tracking and Vehicle Time data by reading in the appropriate function card. Inspects the 166 printout to insure successful completion. If necessary, aborts the enable function by making the appropriate switch settings on the 160A console.

3.4.6.3 Station Contact Real-time Phase (Launch and Ascent, Pass, Recovery)

(1) Assures entry into the real-time phase of processing by inspection of the 166 printout for the appropriate status message.

(2) Coordinates with other operations to effect the desired real-time display of tracking and telemetry data on the remote 166 printers. This includes reading in control cards producing TLM Mode Selections and/or Modifications, changes in the TRK sampling rate, and suppression or reactivation of the TRK data printout.

(3) Transmits real-time commands and text messages received from other operations areas on punched cards to the tracking station, and insures the successful transmission of such messages by inspection of the 166 printout for the appropriate status messages.

(4) Inspects the 166 printout for status messages indicating the completion of the real-time phase of processing. Upon receipt of such an indication, prepares for post-pass operations.

5.0 REFERENCES

AFSSD Exhibit 61-94A

TM-(L)-1165, "Integrated Bird Buffer-1604 System Operational Procedures, A-1 Period," dated 15 April 1963, System Development Corporation

TM-(L)-969/000/00, "Preliminary Bird Buffer Operational Procedures and Personnel Planning Information," dated 21 January 1963, System Development Corporation

TM-(L)-834/002/00, "Preliminary Operating Procedures for the Bird Buffer System," dated 5 March 1963, System Development Corporation

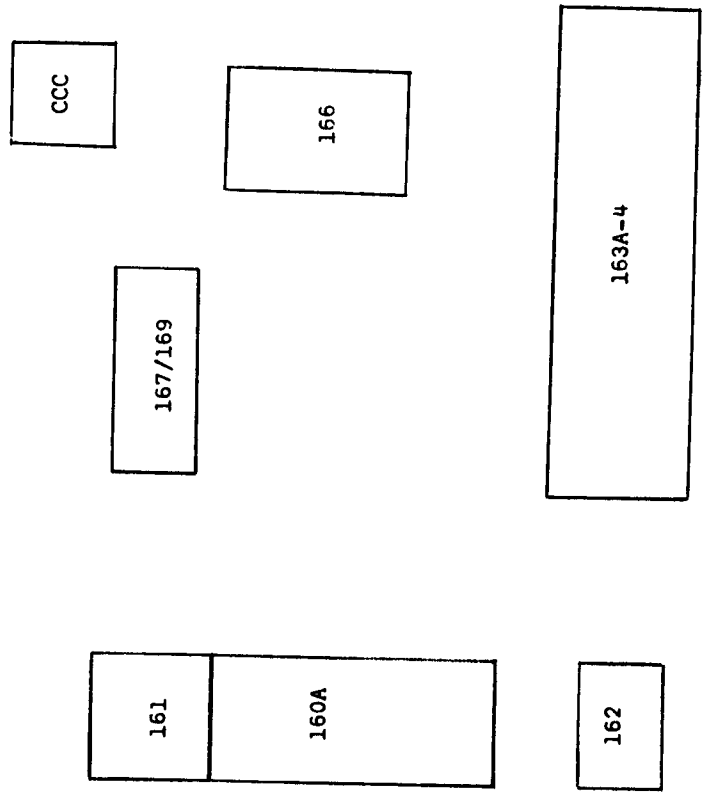

Figure 1. The equipment layout of the Bird Buffer 160A complex.

BIRD BUFFER OPERATIONS

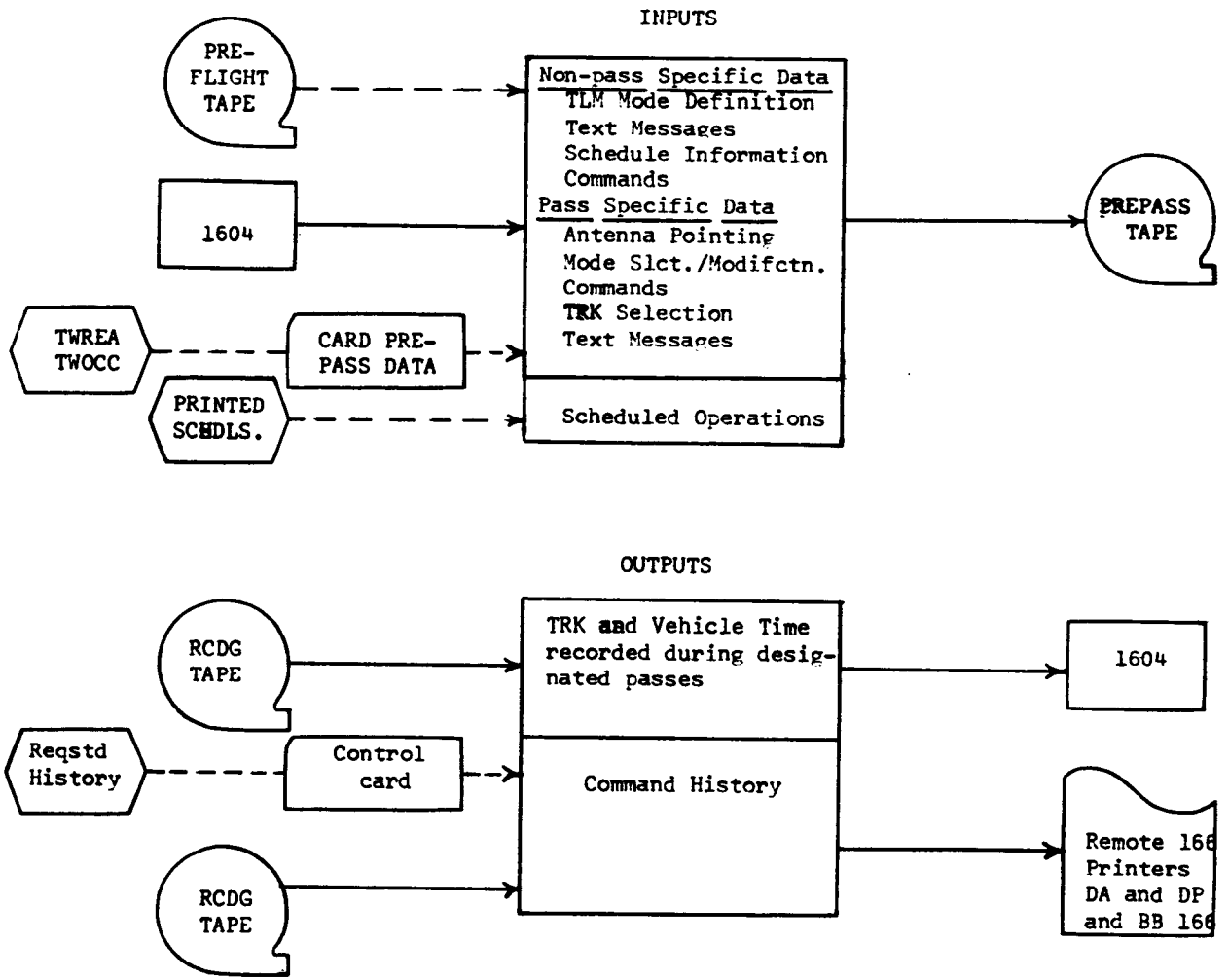

Figure 2. General Interfaces During the Non-station Contact Phase

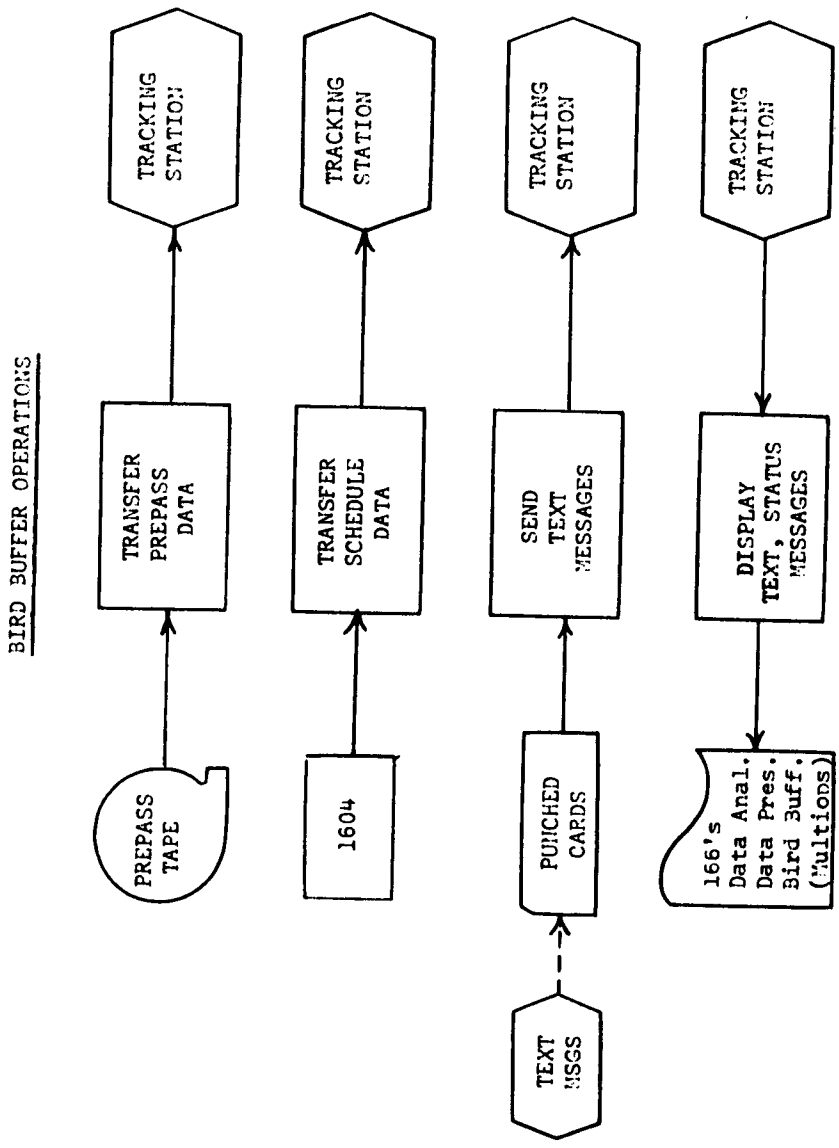

Figure 3. General Interfaces During the Station Contact Non-real-time phase.

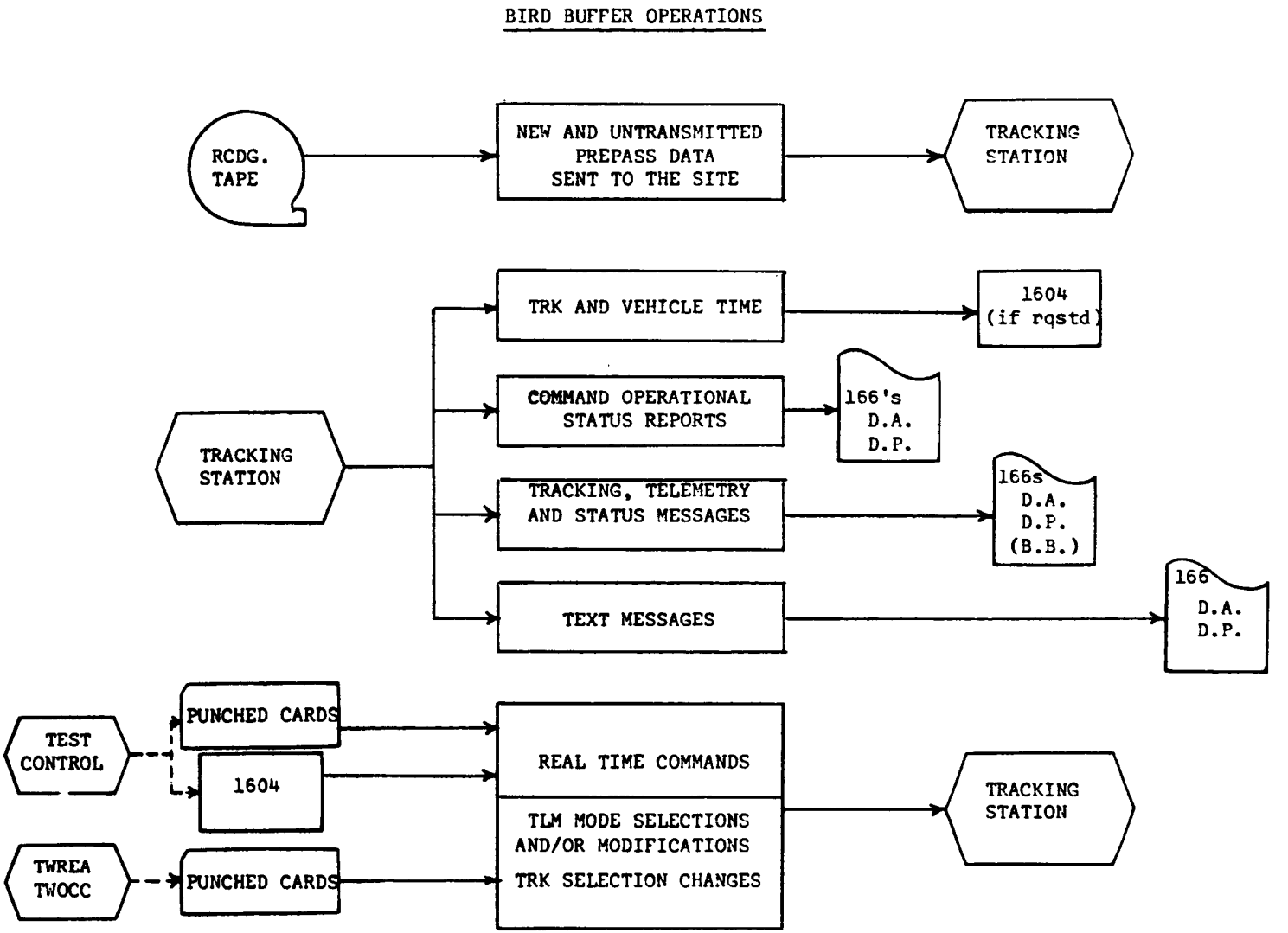

Figure 4. General Interfaces during the Station Contact Real-time Phase.

Figure 5. Bird Buffer sequence of operations.

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