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LIST OF ILLUSTRATIONS

SECTION I

INTRODUCTION

1-1. GENERAL.

1-2. The Maintenance volume presents a detailed description
of the TITAN I Targeting and Missile System Simulation (MSS)
Programs. The information contained herein is furnished to
aid personnel responsible for maintenance of the computer
programs developed to perform the targeting and MSS functions.
The volume is divided into four physical parts to facilitate
its use. Part 1 contains Section I Introduction and Section
II Program Description; and Part 2 contains Section III Flow
Diagrams and Section IV Common Area.

1-3. The subprogram descriptions and flow diagrams in the
original issue of this document reflect the subprogram list-
ings delivered January 1962. Where the subprogram reflects
a listing subsequent to that date, the Mod number appears
on where an error correction was made as part of this revision,
in the upper right hand corner on the first page of the de-
scription and flow diagram.

1-4. The targeting program produces in appropriate format

the data required to target the TITAN I Ground Guidance System. The MSS program permits missile flight simulations under special test conditions for system studies and produces additional range safety data required for operation with the prototype system. These programs are integrated into one overall system composed of program packages common to the requirements of both programs. Flexibility is achieved by resolving program differences into a control package which enables the reading and interpretation of different input cards to determine the mode of operation.

1-5. <u>INTEGRATED PROGRAM DESIGN.</u>

1-6. The TITAN I Integrated Targeting and Simulation Programs (TTP) comprise a program system in which the subprograms required to perform separate functions are all integrated into a single program "package". Operation of a specific function involves reading into the targeting computer special control cards. These control cards are read by the DOC (Dynamic Operational Control) program which then selects the necessary control area for the requested function.

1-7. Since the basic tool used by all functions is simulation of the entire missile system, many basic subprograms are common to all functions. All the subprograms are stored on magnetic tape or in core memory for use by the function control subprogram. The function control subprograms are selected by DOC and they in turn control the processing of the requested

program operation. After loading the TTP, complex and target sensitive data are read from magnetic tapes and/or punched cards and stored in the Common Area for later use. Control then is transferred to the specified program function.

1-8. The Common Area contains the results of the computations performed by the computer and all of the constants that define the system (i.e., constants that define the missile, re-entry vehicle, geophysical model of the earth, target location, guidance equation constants, etc.). The initial value of these constants is established by compiling the section of the TTP Common Area that is not target and complex sensitive, and by loading target and complex sensitive data for a particular run from input data tapes and/or cards. Revisions can be made by recompiling as necessary. The control package for the simulation program can accept as inputs on cards new values of selected system constants for each problem. However, operation of the targeting program will restore automatically the modified constants to their initially established values.

1-9. The TITAN I Integrated Targeting and MSS Programs consist of an overall controlling subprogram, four major subprograms, and a manufacturing section. Brief descriptions are given as follows:

a. Dynamic Operational Control (DOC). DOC is the major subprogram control which determines the requested function, initializes parameters, and causes the requested operation to be performed.

b. Offset Target Computation (OTC). OTC is the main function of the targeting program. It is a two-step operation in which a target tape is produced in the first step and verified in the second step. Provisions also are incorporated, Output Data Verification (TOT), to verify a previously produced target tape under certain circumstances in which verification by the second step of OTC is not possible.

c. Target Accessibility Area Determination (TAA). TAA determines the geographic area which contains all possible targets accessible from a given ground guidance complex.

d. Special Flight Simulation (SIM). SIM is the main function performed by the MSS program. It performs special flight simulations under controlled test conditions.

e. Range Safety Data Extraction (RSD). RSD processes data stored on a specified magnetic output tape generated during the operation of SIM (item d), and produces printouts of nominal missile trajectory information as required for range safety.

f. Manufacturing Section. The subprograms of this section are of two types: The first initializes the program and its parameters in core and the second comprises a special utility section which can be used to compare or duplicate tapes or perform RSD auxiliary dump independent of any other function or program.

1-10. ORGANIZATION.

1-11. The remaining sections of this volume discuss the

functions of the targeting and MSS programs in detail. The sections and their contents are as follows:

a. Section II Program Description. This section describes the primary program functions, program inputs, and the subprograms which execute the various functions.

b. Section III Flow Diagrams. This section contains flow diagrams of the subprograms described in Section II. Flow diagrams are included only for those subprograms where they will aid significantly in the understanding of the program logic.

c. Section IV Common Area. This section describes the contents of the Common Area which is an area reserved in core memory for data storage and communication among subprograms. Registers of the Common Area are listed, together with item descriptions of their contents, and the subprograms which use or operate from these contents.