
Donald E. Emerson

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PREFACE

This Note is one of a four volume-set that collectively describes the latest versions of the TSAR (Theater Simulation of Airbase Resources) and TSARINA (TSAR INputs using AIDA) computer models, which were developed at The RAND Corporation to assess the effect of attacks on the sortie generation capabilities of airbases. These new versions replace earlier ones, including the versions documented in 1985. Among the more significant new features are those that permit representation of (1) austere dispersed operating bases, (2) attacks on the minimum operating surface (MOS) defined after prior attacks, (3) multistep parts and equipment repairs, (4) repair of damaged aircraft shelters, (5) improved fidelity in the runway repair representation, and (6) damage generated by the delayed detonation of unexploded ordnance (UXO). This development was carried out under the Project Air Force Resource Management Program project entitled "TSAR/TSARINA."

The TSAR model provides an analytic context within which a variety of airbase improvements may be tested. New passive defenses, new chemical defenses, new maintenance doctrine, improved base repair and recovery capabilities, increased stock levels for parts and equipment, and concepts for improved theater-wide resource management can be examined for their effect on aircraft sortie generation. The TSAR model has also proven useful for evaluating initiatives that would improve weapons and weapons-delivery systems, enhance multibase support, upgrade the reliability and maintainability of new aircraft designs, and revise training curricula to broaden the capabilities of maintenance specialists. These models have been briefed to several Air Force organizations during the development process and are currently in use at several Air Force agencies, aerospace corporations, and at selected overseas sites.

This volume of the User's Manual should be useful primarily to those persons interested in modifying and extending the existing program logic or in clarifying apparent errors. The companion Notes include:

N-3010-AF  TSARINA—A Computer Model for Assessing Conventional and Chemical Attacks on Airbases

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TABLE

C.1 Alternate entries for the REPRQT array ................................... 73
GLOSSARY

ABDR  Aircraft Battle Damage Repair
AGE  Aerospace Ground Equipment and other support equipment used for carrying out various tasks
AIDA  Airbase Damage Assessment model; the forerunner of TSARINA
AIS  Avionics Intermediate Shops; special test equipment used for repairing avionic LRUs and SRUs
AMU  Aircraft Maintenance Unit; the organization providing maintenance for an aircraft squadron
ATC  Air Traffic Control
BKEP  Ballistic Kinetic Energy Penetrator
BLSS  Base-Level Self-Sufficiency stock of aircraft spare parts, composed of the stocks for peacetime, plus additional material to meet wartime demands
CAP  Combat Air Patrol
CAS  Close Air Support
CBU  Cluster Bomblet Unit
CILC  Centralized Intermediate Logistics Concept
CIRF  Centralized Intermediate Repair Facility
COB  Collocated Operating Base
COMO  Combat-Oriented Maintenance Organization
CONUS  Continental United States
CRS  Component Repair Squadron; a wing-level organization responsible for parts repair
DOW  Chemical warfare
DOB  Dispersed Operating Base
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Term/Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS</td>
<td>Equipment Maintenance Squadron; a wing-level organization responsible for equipment maintenance and repair</td>
</tr>
<tr>
<td>FRAG</td>
<td>FRAGmentary order that specifies flight requirements</td>
</tr>
<tr>
<td>GP</td>
<td>General-Purpose bomb</td>
</tr>
<tr>
<td>ILM</td>
<td>Intermediate Logistics Maintenance; on-base parts repair supporting the AMU</td>
</tr>
<tr>
<td>IPE</td>
<td>Individual Protection Equipment for a chemical environment</td>
</tr>
<tr>
<td>JCL</td>
<td>Job Control Language</td>
</tr>
<tr>
<td>LCOM</td>
<td>Logistics Composite Model</td>
</tr>
<tr>
<td>LRU</td>
<td>Line Replaceable Unit; an aircraft spare part with distinguishable subordinate components</td>
</tr>
<tr>
<td>MOB</td>
<td>Main Operating Base</td>
</tr>
<tr>
<td>MOPP</td>
<td>Mission-Oriented Protective Posture (the chemical protection ensemble)</td>
</tr>
<tr>
<td>MOS</td>
<td>Minimum Operating Surface</td>
</tr>
<tr>
<td>MP</td>
<td>Monitoring Point</td>
</tr>
<tr>
<td>NMCS</td>
<td>Not Mission Capable because of lack of Spare parts</td>
</tr>
<tr>
<td>NORS</td>
<td>Not Operationally Ready because of lack of Spare parts; same as NMCS</td>
</tr>
<tr>
<td>NRTS</td>
<td>Not Reparable This Station</td>
</tr>
<tr>
<td>OST</td>
<td>Order and Ship Time in days; time for a NRTSed or condemned part to be replaced</td>
</tr>
<tr>
<td>PAA</td>
<td>Program Authorization, Aircraft</td>
</tr>
<tr>
<td>POL</td>
<td>Petroleum, Oils, and Lubricants; often used as an abbreviation for aircraft fuel</td>
</tr>
<tr>
<td>POS</td>
<td>Peacetime Operating Stock; an organization's stock of aircraft spare parts for aircraft maintenance in peacetime</td>
</tr>
</tbody>
</table>
RAM Rapid Area Maintenance; special mobile teams used for repairing aircraft battle damage
RR Aircraft maintenance that removes and replaces malfunctioning aircraft parts with serviceable components; generally implies no local repair
RRR Aircraft maintenance that removes, repairs, and replaces aircraft spare parts (actually, usually removes and replaces with a serviceable unit, and then repairs the malfunctioning unit)
RRR Rapid Runway Repair
SAMSOM Support Availability Multi-System Operations Model
SCL Standard Combat Load that designates the aircraft configuration and the mission dependent munitions to be loaded
SE Support Equipment, usually referred to as AGE in TSAR
SRU Shop Replaceable Unit; a component of an LRU
TBM Tactical Ballistic Missile
TRAP Tanks, Racks, Adaptors, and Pylons
TSAR Theater Simulation of Airbase Resources
TSARINA TSAR INputs using AIDA
UXO Unexploded Ordnance
WRM War Reserve Material
WRSK Wartime Readiness Spares Kit
Appendix A

TSAR SUBROUTINES AND PRIMARY FUNCTION

The complete FORTRAN source code for the TSAR airbase simulation is organized into 11 functionally related groups of subroutines that have normally been filed in 11 sections as Tab A through Tab J. The general contents of each tab are indicated below, and the names and basic functions of the subroutines in each group are listed on the following pages in the order in which they are filed. Definitions of the primary variables and data storage arrays will be found in Apps. B and C. All subroutine names and entry point names are listed in App. E.

TAB A  Simulation Management
TAB B1  Input
TAB B2  Data Verification and Organization
TAB C   Parts Initialization and Output
TAB D   Sortie Demand and Aircrew Management
TAB E   Aircraft Maintenance
TAB F   Aircraft Preflight Maintenance and Munitions Assembly
TAB G   Parts Repair and Communications Systems
TAB H   Airbase Attack and Recovery
TAB I   Chemical Warfare
TAB J   Support Services
Subroutine Organization and Primary Function

TAB A  SIMULATION MANAGEMENT

MAIN        Executive
TRIALS      Manage Trials
MANAGE      Manage Simulation
MANAG       Initialize Periodic Heap
CONTRL      Distributes Parts after They Are Repaired
OBTAIN      Manage Intra-theater Spares Requests
REALLO      Reallocate Personnel, Equipment, and Parts among Bases
ADAPT       Manage Adaptive Behavior
FERRY       Recover, Transfer, and Divert Aircraft
LANDIT      Select Aircraft Recovery Base
GOHOME      Manage Aircraft Transfers and Emergency Recoveries
INSPEC      Initiate Morning Preflight Inspections
ENDCW       Stop Calculations of Chemical Effects

TAB B1  INPUT

INIT        Manage Initialization of Common Storage
INIT0       Zero Common Statement Storage Area
INIT1       Assign Dimensions and Compute Storage Requirement
INPUT       Enter Airbase Resource Data
EDOWN       Read and Convert Base-Specific Data Sets
INPUTA      Aid INPUT to Read and Store Card Types #6-22
INPUTB      Aid INPUT to Read and Store Card Types #23-39
INPUTC      Aid INPUT to Read and Store Card Types #41-49
INPUTD      Read Attack and Damage Data from Card or Disk

TAB B2  DATA VERIFICATION AND ORGANIZATION

REVIEW      Check and Organize Input Data
AUDIT       Continue Verification and Organization
WRAPUP      Continue Input Data Manipulation
CREATE      Create Alternate Task and Repair Procedures
ICHECK      Check and Record Shops that Borrow Personnel/AGE
HELPCK      Assist ICHECK
NETIME      Estimate Average Task Network Time
INLIST      List Specified Data Arrays
HEADER      List Summary of Simulation Basic Conditions
CWLST       List Summary of Main Chemical Assumptions
INITIZ      Initialize Heaps, Queues, and Aircraft
ZSHOPS      Initialize On- and Off-equipment Activity
ZSHPS       Assist ZSHOPS
TESTER      Edit Card Input Data
MODIFY      Manage Time Dependent Parameter Changes
- CKNET Check Task Network Segments
- CKRQT Determine Parts Requirements for CKNET
- CKSPLT Assist CKNET with Split and Rejoin Networks
- ZNOR Determine NMCS Aircraft at Zero Time
- NROOTS Store Root Segment Task Numbers for Parts in Multiple Networks
- ORDERT Orders Multiple Part Locations by Ease in Cannibalization

### TAB C  PARTS INITIALIZATION AND OUTPUT

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPRT</td>
<td>Control Spare Parts Initialization</td>
</tr>
<tr>
<td>IPARTS</td>
<td>Manage Parts Stockage Computations</td>
</tr>
<tr>
<td>IPARTI</td>
<td>Compute Stockage Requirements</td>
</tr>
<tr>
<td>IPART2</td>
<td>Initialize Parts Pipelines</td>
</tr>
<tr>
<td>CKNRTS</td>
<td>Compute Effective NRTS Rates</td>
</tr>
<tr>
<td>RREQTS</td>
<td>Compute Average Resource Demand Data</td>
</tr>
<tr>
<td>RREQTS1</td>
<td>Assist RREQTS</td>
</tr>
<tr>
<td>OUTPUT</td>
<td>List Daily Results</td>
</tr>
<tr>
<td>SUMUP</td>
<td>List Final Trial and Multiple Trial Results</td>
</tr>
<tr>
<td>SUMMRY</td>
<td>List Multiple Trial Fatalities, Casualties, and Material Losses</td>
</tr>
<tr>
<td>ASSETS</td>
<td>List Current Stock Levels</td>
</tr>
<tr>
<td>ASSET2</td>
<td>List Current Stocks Levels by Type</td>
</tr>
<tr>
<td>NOWMOP</td>
<td>List Current MOPP</td>
</tr>
<tr>
<td>TIMES</td>
<td>Collect Task Time Data</td>
</tr>
<tr>
<td>DELAYS</td>
<td>Prepare and List Task Times and Delays</td>
</tr>
<tr>
<td>PSHORT</td>
<td>Estimate Parts Shortages</td>
</tr>
<tr>
<td>JOBLST</td>
<td>Format and Print Aircraft Time Histories</td>
</tr>
<tr>
<td>UTILIZ</td>
<td>Collect and Print Personnel Utilization Records</td>
</tr>
</tbody>
</table>

### TAB D  SORTIE DEMAND AND AIRCREW MANAGEMENT

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>READFT</td>
<td>Enter Sortie Demand Data</td>
</tr>
<tr>
<td>FRAG</td>
<td>Select Base for Sortie Demand</td>
</tr>
<tr>
<td>PLAN</td>
<td>Project Sortie Supply</td>
</tr>
<tr>
<td>PLAN1</td>
<td>Project Sortie Demand and Deficiencies</td>
</tr>
<tr>
<td>BASCAP</td>
<td>Estimate Base Capabilities to Generate Sorties</td>
</tr>
<tr>
<td>REASSG</td>
<td>Revise Assigned Mission</td>
</tr>
<tr>
<td>FLYERS</td>
<td>Manage Aircrews</td>
</tr>
<tr>
<td>DISABL</td>
<td>Eliminate Lost Air Crews</td>
</tr>
<tr>
<td>INISHL</td>
<td>Initialize Aircraft Shelter and Ramp Assignments</td>
</tr>
<tr>
<td>GETSHEL</td>
<td>Manage Shelter and Ramp Assignments</td>
</tr>
<tr>
<td>CKSHEL</td>
<td>Check for Available Shelter Space</td>
</tr>
<tr>
<td>FLIGHT</td>
<td>Assemble Ready Aircraft and Crews</td>
</tr>
<tr>
<td>LAUNCH</td>
<td>Launch Flights</td>
</tr>
<tr>
<td>ABORT</td>
<td>Select and Initiate Ground Abort Tasks</td>
</tr>
<tr>
<td>SORT</td>
<td>Order Launch Schedules</td>
</tr>
<tr>
<td>USEATC</td>
<td>Schedule Runway Launch and Recovery Times</td>
</tr>
<tr>
<td>CKATC</td>
<td>Update Air Traffic Control Performance Data</td>
</tr>
</tbody>
</table>
**TAB E**

**AIRCRAFT MAINTENANCE**

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CKMAIN</td>
<td>Determine Maintenance Requirements, Define Aircraft Transfer Requirements</td>
</tr>
<tr>
<td>PSTFLT</td>
<td>Designate Tentative Mission Assignment and Store Required and Deferrable Tasks</td>
</tr>
<tr>
<td>RUNAC</td>
<td>Manage Aircraft Maintenance</td>
</tr>
<tr>
<td>STARTM</td>
<td>Initiate Aircraft Maintenance</td>
</tr>
<tr>
<td>INITSK</td>
<td>Check Resource Availability to Initiate Tasks</td>
</tr>
<tr>
<td>DOTASK</td>
<td>Enter Tasks into In-process Heap</td>
</tr>
<tr>
<td>ENDSK</td>
<td>Conclude On-equipment Tasks, Release Resources</td>
</tr>
<tr>
<td>CHKWX</td>
<td>Check Weather for Deferred Maintenance</td>
</tr>
<tr>
<td>INDEF</td>
<td>Manage Deferred Aircraft Maintenance</td>
</tr>
<tr>
<td>CANNIB</td>
<td>Select Donor Aircraft for Parts Cannibalization</td>
</tr>
<tr>
<td>CKTASK</td>
<td>Checks Network for Specific Part</td>
</tr>
<tr>
<td>NPRIME</td>
<td>Determine &quot;Prime&quot; Part Number for Part with Multiple Locations</td>
</tr>
<tr>
<td>INCOMP</td>
<td>Check for Task Incompatibilities</td>
</tr>
<tr>
<td>CCKRIT</td>
<td>Assist PSTFLT in Assessing Ready-to-fly Time</td>
</tr>
<tr>
<td>CKROOT</td>
<td>Prevent Multiple Processing of Chained Jobs</td>
</tr>
<tr>
<td>SCHJOB</td>
<td>Organize Tasks for Aircraft Ferried to Rear</td>
</tr>
<tr>
<td>SPLIT</td>
<td>Manage Network Paths that Split and Rejoin</td>
</tr>
<tr>
<td>GETPEO</td>
<td>Locate Personnel for On-Equipment Tasks</td>
</tr>
</tbody>
</table>

**TAB F**

**AIRCRAFT PREFLIGHT MAINTENANCE AND MUNITIONS ASSEMBLY**

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREFLT</td>
<td>Manage Preflight Maintenance</td>
</tr>
<tr>
<td>ASSIGN</td>
<td>Finalize Aircraft Mission Assignment</td>
</tr>
<tr>
<td>RECNFG</td>
<td>Check and Perform Needed Reconfiguration</td>
</tr>
<tr>
<td>UPLOAD</td>
<td>Load Munitions</td>
</tr>
<tr>
<td>REFUEL</td>
<td>Refuel Aircraft</td>
</tr>
<tr>
<td>DOWPRE</td>
<td>Check and Initiate Waiting Preflight Tasks</td>
</tr>
<tr>
<td>MUNEEED</td>
<td>Establish Munitions Requirements</td>
</tr>
<tr>
<td>CKBILD</td>
<td>Define Munitions Assembly Requirements</td>
</tr>
<tr>
<td>DOJILD</td>
<td>Initiate and Complete Munitions Assembly</td>
</tr>
<tr>
<td>CKPEOP</td>
<td>Check for Personnel Substitutions</td>
</tr>
<tr>
<td>CKAGE</td>
<td>Check AGE Requirements</td>
</tr>
<tr>
<td>ADDAGE</td>
<td>Reorganize Equipment for a COMO Organization</td>
</tr>
<tr>
<td>CKALRT</td>
<td>Manage Resources Required for an Alert Aircraft</td>
</tr>
<tr>
<td>RELALT</td>
<td>Release Alert Aircraft Resources</td>
</tr>
<tr>
<td>FILTRK</td>
<td>Manage Fuel Truck Refilling</td>
</tr>
</tbody>
</table>
**TAB G PARTS REPAIR AND COMMUNICATIONS SYSTEMS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMIN</td>
<td>Receive Faulty Parts and Manage Administrative Delay Heap</td>
</tr>
<tr>
<td>RUNSHP</td>
<td>Manage Disposition of Repaired Parts</td>
</tr>
<tr>
<td>INIREP</td>
<td>Check Resource Availability to Initiate Repairs</td>
</tr>
<tr>
<td>DOREP</td>
<td>Enter Repairs into In-process Heap—REPQ</td>
</tr>
<tr>
<td>ENDREP</td>
<td>Conclude Repairs, Release Resources</td>
</tr>
<tr>
<td>SALVAG</td>
<td>Disassemble LRUs to Provide SRUs for Repair</td>
</tr>
<tr>
<td>REPRTY</td>
<td>Establish Repair Priorities Periodically</td>
</tr>
<tr>
<td>CKAIS</td>
<td>Manage AIS Activity</td>
</tr>
<tr>
<td>NRTSIT</td>
<td>Select Location to Receive Reparables</td>
</tr>
<tr>
<td>SC ships</td>
<td>Schedule Intra-theater Shipments</td>
</tr>
<tr>
<td>SHPRES</td>
<td>Prepare Resources for Shipment</td>
</tr>
<tr>
<td>ORDER</td>
<td>Order Replacement Resources from CONUS</td>
</tr>
<tr>
<td>DOSHIP</td>
<td>Manage Departures and Arrivals</td>
</tr>
<tr>
<td>STATUS</td>
<td>Transmit and Receive Resource Status Reports</td>
</tr>
</tbody>
</table>

**TAB H AIRBASE ATTACK AND RECOVERY**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOMB</td>
<td>Inflict Specified Damage</td>
</tr>
<tr>
<td>ATTKAC</td>
<td>Assess Damage to Aircraft and Work Crews</td>
</tr>
<tr>
<td>REORGN</td>
<td>Reorganize Base Operations</td>
</tr>
<tr>
<td>REORG2</td>
<td>Complete Base Reorganization</td>
</tr>
<tr>
<td>REORG3</td>
<td>Manage Resources for Interrupted Civil Engineering Tasks</td>
</tr>
<tr>
<td>PICK</td>
<td>Locate Activity in Distributed Shop</td>
</tr>
<tr>
<td>ENDCE</td>
<td>Manage Civil Engineering Resources at Task Completion or Interruption</td>
</tr>
<tr>
<td>REBILD</td>
<td>Manage Postattack Reconstruction</td>
</tr>
<tr>
<td>INICON</td>
<td>Assign Resources and Initiate Facility Reconstruction</td>
</tr>
<tr>
<td>ENDAC</td>
<td>Eliminate Records for Aircraft Killed On Base</td>
</tr>
<tr>
<td>KILLAC</td>
<td>Eliminate Aircraft</td>
</tr>
<tr>
<td>FTIME</td>
<td>Compute Reconstruction Time</td>
</tr>
<tr>
<td>SHCIRF</td>
<td>Ship Faulty Parts to CIRF When Shop Damaged</td>
</tr>
<tr>
<td>BOOMER</td>
<td>Initializes Heap for Delayed Runway Detonations</td>
</tr>
<tr>
<td>BANG</td>
<td>Compute Casualties and Equipment Damage for UXO Explosions</td>
</tr>
</tbody>
</table>

**TAB I CHEMICAL WARFARE**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOPIT</td>
<td>Manage Task Interruption and Completion</td>
</tr>
<tr>
<td>GOREST</td>
<td>Determine Work Crew Disposition</td>
</tr>
<tr>
<td>LETGO</td>
<td>Release Personnel Who Have Cooled Off</td>
</tr>
<tr>
<td>CWTIME</td>
<td>Determine Task and Rest Times</td>
</tr>
<tr>
<td>CWTEMP</td>
<td>Estimate Work Crew Temperature Variations</td>
</tr>
<tr>
<td>DEHYDR</td>
<td>Check Wetting and Dehydration Constraints</td>
</tr>
<tr>
<td>DOSURF</td>
<td>Interrupt Runway/Taxiway Repairs at Attack Time</td>
</tr>
<tr>
<td>STOPCE</td>
<td>Assess Losses of Runway Personnel and Equipment from Attacks/Taxiway Repairs</td>
</tr>
</tbody>
</table>
RWYTAX  Manage Runway and Taxiway Repairs
RUNWAY  Select MOS and Determine Repair Requirements
TAXIWY  Determine Optimum Taxiway Arc Repair Schedule
PATH    Determine Minimum Repair-Time-Paths to MOS
FIXSUR  Initiate Runway and Taxiway Repair
DOCE    Select and Assign Civil Engineers for Runway and Taxiway Repairs
GETCE   Determine Resource Constraints on Surface Repairs
TRIAGE  Determine Casualties and Fatalities by Cause
CLINIC  Place Hospitalized Personnel in Recovery Heap
UPDATE  Manage CW Contamination Update, and Reevaluate Working Conditions
CWMOPP  Determine Appropriate MOPP
CWLOSS  Manage Determination of Losses to Chemical Contamination
CWCAS   Determine Fatalities and Casualties due to CW
CWHITS  Organize Chemical Deposition Data
CWDOSO  Compute Total Contamination at Monitoring Points
COOLOS  Determine Losses to Personnel during the Cool-off Period
CALCLO  Determine Loss Rates for Personnel Who Complete Tasks and Rest Periods
GOHELP  Manage Selection of Buddy Care Personnel
PUTBAC  Release Buddy Care Personnel
SQUADN  Determine Personnel Squadron Assignment

TAB J SUPPORT SERVICES
SHIFT   Manage Shift Changeover
CWSHFT  Assist SHIFT in a CW Environment
REDPEO  Reduce Staff Level and Reorganize Shifts
REDCE   Adjust Shift Levels for Civil Engineers
CHECK   Check Requirements for Released Resources
STRRTSK Store Required and Deferred Tasks
NORRPRT Enter and Remove Aircraft "Hole" Reports
AVGTME  Estimate Unconstrained Shop Performance
INTRUP  Manage Time-ordered Interrupted Queues
WAIT    Manage Time-ordered Wait Queues
HEAP    Manage Data Heaps
ACWAIT  Insert On-Equipment Tasks into WAITSK Array
RESET   Reset Event Times for Extended Simulations
BLOCK DATA Store Task Criticality Definition Data
TTIME   Select True Time from Distributions
SIIPRQT  Select Unscheduled Maintenance Tasks
BREAK   Compute Variable Breakrate Factors
LOSSES  Sample Binomial Loss Distribution
LOOSES  Alternate Binomial Loss Distribution
RANDG   Generate "Controlled" Random Numbers
ACCRIT  Compute Aircraft Criticality Periodically
<table>
<thead>
<tr>
<th>QUEUES</th>
<th>Lists Specified Heaps on Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minor Functions</strong></td>
<td></td>
</tr>
<tr>
<td>LIST1, LIST2, LIST3, LIST4, LIST5</td>
<td></td>
</tr>
<tr>
<td>THF, TH, TOD, DATE, DAY, HRMIN, SHOPEST</td>
<td></td>
</tr>
<tr>
<td><strong>HELPER</strong></td>
<td>Assistant for Debugging</td>
</tr>
<tr>
<td><strong>FRIEND</strong></td>
<td>HELPERS Friend for Periodic Debugging</td>
</tr>
</tbody>
</table>
Appendix B

VARIABLES IN COMMON

Definitions for most of the 418 variables carried in one or another of the several major blocks of common data are listed in this section in alphabetical order. The remainder are listed below in the table of array dimensions and control data. The card type is noted for variables controlled by user input using the notation CTx for Card Type #x.

<p>| Array Name | Array Name | Array Name | Array Name | Array Name | Array Name | Array Name | Array Name | Array Name | Array Name | Array Name | Array Name | Array Name | Array Name |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| ACN        | MAXACN     | NEH        | —          | —          | OVERH      |            |            |            |            |            |            |            |            |            |
| ATC        | NOATC      | NEA        | FEA        | LEA        | OVERA      |            |            |            |            |            |            |            |            |            |
| BACKLG     | LLQ        | NEL        | FEL        | LEL        | OVERL      |            |            |            |            |            |            |            |            |            |
| BUILDQ     | LBQ        | NEB        | FEB        | LEB        | OVERB      |            |            |            |            |            |            |            |            |            |
| CEJOBQ     | LTHCEQ     | NEC        | FEC        | LEC        | OVERC      |            |            |            |            |            |            |            |            |            |
| CHANGE     | NOCHG      | NEV        | FEV        | LEV        | OVERV      |            |            |            |            |            |            |            |            |            |
| COOLER     | LCOOLQ     | NEK        | FEK        | LEK        | OVERK      |            |            |            |            |            |            |            |            |            |
| DEFTSK     | LDT        | NED        | FED        | LED        | OVERD      |            |            |            |            |            |            |            |            |            |
| EXPLOD     | NOUXO      | NEQ        | FEQ        | LEQ        | OVERQ      |            |            |            |            |            |            |            |            |            |
| FLTRQT     | LFQ        | NEF        | FEF        | LEF        | OVERF      |            |            |            |            |            |            |            |            |            |
| INTTSTK    | LIQ        | NEI        | FEI        | LEI        | OVERI      |            |            |            |            |            |            |            |            |            |
| LIMBO      | NLIIMO     | NEX        | FEX        | LEX        | OVERX      |            |            |            |            |            |            |            |            |            |
| MOVEAC     | NOMOVE     | NEM        | FEM        | LEM        | —          |            |            |            |            |            |            |            |            |            |
| NORQ       | LNOR       | NEO        | FEO        | LEO        | OVERO      |            |            |            |            |            |            |            |            |            |
| PILOT      | NOCREW     | NPILOT     | —          | —          | OVERM      |            |            |            |            |            |            |            |            |            |
| REPQ       | LRQ        | NER        | FER        | LER        | OVERR      |            |            |            |            |            |            |            |            |            |
| RESUPP     | LGQ        | NEG        | FEG        | LEG        | OVERG      |            |            |            |            |            |            |            |            |            |
| RQRTSK     | LNT        | NEN        | FEN        | LEN        | OVERN      |            |            |            |            |            |            |            |            |            |
| SHIP       | NOSHIP     | NES        | FES        | LES        | OVERS      |            |            |            |            |            |            |            |            |            |
| SHIQ       | NOPKG      | NEP        | FEP        | LEP        | OVERP      |            |            |            |            |            |            |            |            |            |
| SHPSK      | NOTASK     | —          | —          | —          | —          |            |            |            |            |            |            |            |            |            |
| TASKQ      | LTQ        | NET        | FET        | LET        | OVERT      |            |            |            |            |            |            |            |            |            |
| TOHOSP     | NOHOSP     | NEZ        | FEZ        | LEZ        | OVERZ      |            |            |            |            |            |            |            |            |            |
| WAITSK     | LWQ        | NEW        | FEW        | LEW        | OVERW      |            |            |            |            |            |            |            |            |            |
| REJOIN     | NJOINT     | NEJ        | FEJ        | LEJ        | OVERJ      |            |            |            |            |            |            |            |            |            |</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADAPTR</td>
<td>NRTS policy for RR parts is changed when there are fewer LRUs than ADAPTR percent of initial LRU stocks; they are shipped to lateral resupply base rather than nominal NRTS destination (CT2/2).</td>
</tr>
<tr>
<td>AIDA</td>
<td>Is zero unless the base damage input data are generated with the TSARINA model. When not zero, the resource damage data may be specified both for specific types and for all other types (CT4/2).</td>
</tr>
<tr>
<td>ALERTR</td>
<td>Is set to unity if personnel are required to be assigned for alert aircraft.</td>
</tr>
<tr>
<td>ALTDEF</td>
<td>When unity, DOB aircraft that should be ferried to their host for deferred maintenance, but cannot be because the host’s runway is closed, will be sent to another host base that operates the same type of aircraft; otherwise, if ALTDEF is zero, the maintenance will be further deferred until the aircraft’s host base is open (CT4/3).</td>
</tr>
<tr>
<td>APRINT</td>
<td>Controls special output at attack time (CT2/5) and for attack-related casualties.</td>
</tr>
<tr>
<td>ASSIST</td>
<td>Is set to unity if the theater repair facility is intended only to handle repairs that the operating bases were expected to handle but could not.</td>
</tr>
<tr>
<td>ATRISK</td>
<td>When a shop facility or all elements of a distributed shop are damaged at the time of a subsequent attack, the resources assigned to that shop are assumed to have been relocated and to be invulnerable if ATRISK is zero; if ATRISK is unity, the damage is assessed as though operations were normal (CT2/1).</td>
</tr>
<tr>
<td>ATTWOP</td>
<td>The full MOP to be donned on warning of an attack (CT3/4).</td>
</tr>
<tr>
<td>ATTTSOR</td>
<td>The total number of sorties flown in the “theater”; used in connection with the sortie-dependent attrition option.</td>
</tr>
<tr>
<td>ATTYPE</td>
<td>TSARINA generated attack types: 1 for conventional attack; 2 for a CW attack; and 3 for a mixed CW and conventional attack. User-specified types of conventional attacks: 0 for simplest air attacks; 4 for limited air attacks, and 5 for an attack by ground forces (see App. J).</td>
</tr>
<tr>
<td>AUTHPC</td>
<td>The “authorized” probability of collapse due to excessive heat; tasks may be pursued until this level is reached (assumed to vary linearly with the person’s rectal temperature from about 101°F to 106°F Fahrenheit) (CT3/3).</td>
</tr>
<tr>
<td>AUTHT</td>
<td>Human rectal temperature corresponding to the authorized collapse probability (CT3/5).</td>
</tr>
<tr>
<td>AVGTT</td>
<td>The average shipment time, in hours, from a CIRF to the operating bases, computed internally.</td>
</tr>
</tbody>
</table>
BARWT  Weighting applied to the holes in the triangular area adjacent to the MOS that must also be cleared when mobile arresting barriers are used.

BUILD  If unity, the munitions buildup features are activated (CT1).

CANCAN  Is set to unity when a part may be cannibalized even though there is a reparable part on base.

CANFLT  A flag that is set to unity when the remaining segments of a composite flight must be canceled.

CANMOD  Cannibalization mode (see subroutine CANNIB) (CT3/1).

CANMUL  Task time when a part is cannibalized, expressed as a percentage of the nominal time for the task segment that specifies the part (default = 150) (CT3/1).

CANSRU  If greater than zero, the SRUs are removed from an LRU that is waiting for repair at an operating base, if aircraft are NMCS because of the LRU; at a CIRF, an LRU is “cross-canned” if CANSRU aircraft in the theater have this LRU missing (CT3/1).

CCIRF  Control mode for CIRF operations.

CDELAY  The default time for cannibalization is one-half the related on-equipment task time, plus CDELAY minutes (CT4/1).

CEAGE  The maximum number of equipment types associated with civil engineering tasks (CT2/1).

CEDELY  Initiation of all reconstruction tasks is delayed by this number of minutes after an airbase attack, to account for the preliminary delays involved in overcoming the disruptive effects of fires, roadway damage, etc. (CT4/1).

CEOVER  Number of minutes overtime permitted civil engineers to finish an ongoing task (CT4/3).

CEPEO  The maximum number of personnel types associated (exclusively) with civil engineering tasks (CT2/1).

CEWORK  Switch; when = 1, civil engineering resources are allocated to repair damage from airbase attacks in accord with the priorities defined by the CEPRTY array (CT2/1).

CHNRTS  When spare parts are generated with the automatic parts initialization logic, the NRTS rate is that specified in the POLICY array, unless a basic Type #23 Card has been used to modify the computed stock level and CHNRTS is unity; when these conditions all exist the NRTS rate on the basic Type #23 Card will be used (CT3/3).

CIRFLG  Lateral resupply flag is set to unity when part is to be taken from first base that can release a part; it is set to 2 if the base best able to provide the part is to be sought.
CMODE When not zero, defines the mode of operation for theater resource management (see Sec. XI, Vol. 1) (CT1). CMODE = 100 × CTHEA + 10 × CCIRF + SHOPRY.

CONSIG If zero, any parts that are shipped to the theater to replace condemned parts, and LRUs that were NRTSed to CONUS, are consigned to the base of origin on return; if unity, all parts are consigned to the theater manager for distribution (CT1).

CPRINT Controls special outputs relating to chemical attacks. When > 1, the surface contamination and vapor concentration at the time of a chemical attack is listed for each monitoring point; when > 2, these values are listed at each update while any contaminant remains. When > 1, the current value of the MOPP required is listed for each facility whenever the on-base contamination is updated; When > 2, the MOPP is listed at each shelter, and on each ramp; and when > 3, the MOPP is listed for each taxiway segment. If > 4, the number of tasks considered in the WORK/REST statistics are listed, and when > 5, a special report is given for any task limited by the Vogt criteria (CT3/4).

CRASH When runways are closed at all operating bases (and at any emergency base), recovering aircraft will be lost if this variable is initialized to unity; if not initialized, the sortie length is artificially extended such that the aircraft will land after the runway at the planned recovery base has been opened (CT3/1).

CREWS Aircrews are accounted for when = 1, neglected if 0 (CT1).

CTHEA Control mode for theater resource management.

CUMSOR Cumulative sorties during a trial at all bases.

CUMSTA If 0, the task time and delay data are accumulated separately for each trial; if = 1, the data are accumulated over all trials (CT2/1).

CWFREQ The frequency in hours for updating the estimates of the surface contamination and vapor concentration at each monitoring point (CT3/4).

CWRISK The percentage (in tenths) of the chemical protection masks that do not fit properly (for the first chemical attack only) (CT3/5).

C4INT Time interval in hours between periodic theater resource reviews subsequent to the initial review (CT4/1).

C4TM Time for initial theater resource review-hours (CT4/1).

DA Defines location of desired data in direct access File 18.

DAMODE Internally generated flag that denotes the mechanism being used to input damage data:
0 = All TSAR trials use the same data, entered in input deck
1 = All TSAR trials use the same damage data; stored on disk
2 = Unique damage data stored on disk for each trial
3 = Unique damage data entered in TSAR input deck for each trial

DELTA Personnel are required to rest and cool off until their temperature is within DELTA hundredths of a degree Centigrade of the equilibrium temperature associated with their rest location (CT3/5).

DELYPF During the time that DELYPF is unity the preflight assignment task is delayed until LOADTM.

DOATC When = 1, a queue of runway activities is maintained for each airbase, and time slots will be scheduled for the takeoff and landing of each flight; if times are not available because of each base's unique air traffic control constraints, the flight is canceled.

DOBUDY When initialized, an uninjured person will be selected to provide buddy-care for each casualty; if = 1, persons help only nonfatal casualties; if = 2, all casualties are provided buddy care (CT3/5--also see CT4/5).

DOCANN When DOCANN > 0, parts for which the CANNTM value is < -1 may be cannibalized if the number of aircraft that require the part at the base is greater than DOCANN (CT3/1).

DODUMP Controls disk storage of event data for subsequent analysis (CT3/5).

DOLD Number of the last aircraft to have a task entered into the deferred task array.

DONTCK When set to unity, the identification numbers attached to the TSARINA "hit" data and the TSARINA "40 Card" data are not checked for consistency (CT4/2).

DOPHAS If not zero, phased maintenance features are activated. If = 1, phase maintenance is performed at night as required; if = 2, phase maintenance is ignored until DOPHAS is reset to "1" with the appropriate #49 card (CT3/1).

DOPOST Activates the postprocessor, when initialized on CT2/5, a mandatory supplementary card enters the user's specifications for which records are to be stored on disk for postprocessing.

DOSHEL When not 0, aircraft are removed from shelters when they are launched and reassigned an aircraft shelter, if available, upon landing. When DOSHEL is 1, aircraft are assigned a location on a parking ramp if a shelter is not available; when DOSHEL is 2, aircraft may not recover, or be transferred, unless a space is available in an accessible, undamaged shelter, except at a base that has no shelters; when DOSHEL is 3, aircraft may not land, or be transferred, unless a space is available, or unless it is at the EMERG base or a
rear maintenance base. If DOSHEL is 0, and a base has shelters, aircraft are assumed to be in the same aircraft shelter that was assigned at time zero whenever they are on base (CT1).

DOUTIL When DOUTIL > 0, data is collected on personnel utilization; the cumulative average availability of each type of personnel is listed for each odd-numbered hour every DOUTIL days (CT2/5).

DOUXO Activates the feature that permits UXOs to detonate at a random time (CT1).

DOWNTM Parts may not be cannibalized from an aircraft with a ready-to-fly time within DOWNTM hours (CT4/I).

DPRINT Controls special output that summarizes current aircraft status and provides information on deferred aircraft tasks; only aircraft status is summarized when DPRINT = 1; when ≥ 2, aircraft status by aircraft type and a summary of deferred maintenance are also listed; when ≥ 3, mission assignment by aircraft type is listed, and the aircraft status as well as the numbers of tasks and numbers of critical tasks are listed for each aircraft; when ≥ 4, the aircraft number and type are also listed for each aircraft (CT2/5). Detailed information on the tasks that are ongoing, waiting, or interrupted can also be listed for individual aircraft; if DPRINT is 1000, these data are provided for aircraft at all bases; for DPRINT = 100 + BASE, data are provided for only one base.

EF Pointer to the location of the earliest flight to be launched.

EMERG Base designated for emergency recovery when runways are cut at all operating bases; may be the same as a rear maintenance base (CT3/2).

ENDAY End of the nominal flying day (used to control accomplishment of deferred maintenance) – hours (CT4/I).

EXPED When greater than zero, the parts repair and equipment repair administrative delays are reduced by V/EXPED when there are no serviceables available (CT4/I).

EXTEND When initialized to unity, an NTRIAL simulation is a one-trial simulation of NTRIAL × SIMLTH days (CT1).

EXTPRT Dimension of the TPART array; maximum number of special stock level modifications that are permitted at a base, when the automatic parts generation feature is used.

FA Pointer to the next arrival of an intratheater shipment.

FD Pointer to the next departure of an intratheater shipment.

FHOSP Percentage of the casualties caused by conventional weapons that are hospitalized (i.e., are not fatal).
FILLAC Controls use of filler force aircraft (CT3/2).

FIXAGE Set to unity if equipment may be broken and repaired.

FLEVEL When zero, augmentee and filler aircraft are managed so as to maintain the number of aircraft on base equal to the assigned numbers; when unity, the non-battle-damaged aircraft are maintained equal to the assigned number; when two or three, the aircraft, or aircraft without battle damage, are maintained equal to the capacity of the available aircraft shelters (CT3/2, except as modified when DOSHEL > 1).

FSALVG If an aircraft is damaged by air attack and is not reparable, FSALVG percent of the aircraft’s spare parts not destroyed during the attack are salvaged and added to the serviceable (CT3/3).

FULL If unity, all parts are on base, none enroute, at time zero (identified as NOPIPE in Common) (CT3/3).

GRACE An aircraft will not be designated Code 2 or Code 3 if all unscheduled maintenance tasks have a nominal time less than the GRACE period.

HDATA1 Default values of the task heat factor for the five generic task types. The values 118, 222, 315, 425, and 535 are "hard wired" into TSAR; any or all may be replaced using Card.

HDATA2 Type #3/5. It is also necessary to provide SLOWDN inputs for MVDC factors #1, #2, #3, #4, and #5 with Card #43/3.

HIATUS Delivery of parts in the pipeline at the beginning of the simulation are delayed HIATUS days (CT3/3).

HOLDUP Delays assignment of runway repair personnel when the number required for the basic procedure are not available, and others will complete cooling off within HOLDUP minutes (CT3/5).

HOUR Most recent even-numbered hour of the day.

HPEO1 Used for transferring the identity of personnel scheduled for release among subroutines.

HPEO2 Number of days for which the sortie data are aggregated across trials; IDAY is 1 if SIMLTH is 30 or fewer days, 2 if from 31 to 60, and 3 if between 61 and 66 days.

IGNORE When initialized to unity, all jobs that may be deferred for all missions are ignored (CT3/1).

INL Distance along the runway that the "minimum runway rectangle" is shifted during the search for the location with the minimum number of craters to repair.

INSBAS The next base scheduled to conduct early-morning aircraft inspections.
INW  Lateral distance that the "minimum runway rectangle" is shifted in checking for the MOS location.
ISHORT  Parts shortfall from "authorized" levels (percent).
ITRIAL  Number of the current trial.
IWARN  Number of minutes of warning for the first attack on a base x 100/Time distribution (minutes for warning received after the attack time) (CT3/4).
JOBCON  Controls extent of rear-base maintenance (CT3/2).
K1LOW  For parts that are "critically short" (see TOOFEW), the actual stock level as a percentage of the nominal stock level is selected at random in the range K1LOW and (K1LOW + K2LOW) (CT3/3).
LA  Pointer to the last scheduled arrival of an intratheater shipment.
LABAR  Length of the part of the landing area (MOS) that is ahead of a movable arresting barrier.
LBAR  Length of the landing area behind a movable arresting barrier.
LCOOLQ  Length of the COOLER array: maximum number of personnel groups that can cool off simultaneously.
LD  Pointer to the last scheduled departure of an intratheater shipment.
LEVLC  If zero, aircraft transfer demands are satisfied in the order the demand was initiated; if not zero, demands are filled so as to maintain a similar fill rate (CT4/3).
LF  Pointer to the location of the last flight to be launched.
LMVAR  Control for a feature that regularizes loss and damage in combat as a means to limit variance in sorties flown.
LOADTM  Nominal time of day to commence preflight preparation for the day (hour) (CT4/1).
LOSTAC  Cumulative number of aircraft lost in air operations and airbase attacks.
LSTTOD  Last time of day for commencing morning preflight (also used to limit expected time for deferred tasks) (an even-numbered hour only) (CT4/1).
LTHATT Length of ATTACK array: maximum number of airbase attacks that may be scheduled during a simulation.
LTHCEQ  Length of CEJOBQ array: maximum number of simultaneous civil engineering tasks.
LTHCWH  Length of the MPHIT array.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTHDEF</td>
<td>Unscheduled maintenance tasks whose criticality is greater than 66 may be deferred (&quot;hip-pocketed&quot;) for a maximum of LTHDEF sorties (CT3/1).</td>
</tr>
<tr>
<td>LTHLST</td>
<td>Length of LISTIN array: maximum number of task-incompatibility descriptors.</td>
</tr>
<tr>
<td>LTHMP</td>
<td>Counter for entries in the MPPERS array.</td>
</tr>
<tr>
<td>LTHPER</td>
<td>Length of the MPPERS array.</td>
</tr>
<tr>
<td>LTHQPA</td>
<td>Length of the QPA array.</td>
</tr>
<tr>
<td>LTHXRT</td>
<td>Length of the XROOT array.</td>
</tr>
<tr>
<td>MAXACN</td>
<td>Maximum number of aircraft that can be accommodated (size of the ACN array).</td>
</tr>
<tr>
<td>MAXB</td>
<td>Maximum number of airbases (limit = 63).</td>
</tr>
<tr>
<td>MAXFLT</td>
<td>Current number of periodic flight schedules entered in the PRDFLT array.</td>
</tr>
<tr>
<td>MAXM</td>
<td>Maximum number of missions for each type of aircraft (limit = 5).</td>
</tr>
<tr>
<td>MAXMNT</td>
<td>When the projected maintenance time exceeds MAXMNT, a filler aircraft may be requisitioned (see also FILLAC and FLEVEL) (CT3/2).</td>
</tr>
<tr>
<td>MAXPER</td>
<td>Maximum number of periodic flight schedules that may be stored: dimension of the PRDFLT array.</td>
</tr>
<tr>
<td>MAXREC</td>
<td>Maximum number of items stored in daily aircraft activity report: dimension of RECORD array.</td>
</tr>
<tr>
<td>MAXT</td>
<td>Maximum number of aircraft types (limit = 9).</td>
</tr>
<tr>
<td>MAXTME</td>
<td>The time remaining for deferred maintenance before LSTTOD (reassessed every 30 minutes in MANAGE).</td>
</tr>
<tr>
<td>MCL</td>
<td>Minimum clear length of the minimum operating surface.</td>
</tr>
<tr>
<td>MCW</td>
<td>Minimum clear width of the minimum operating surface.</td>
</tr>
<tr>
<td>MEDIC</td>
<td>A dummy personnel type assigned in TSARINA to provide an approximate casualty rate for all TSAR personnel providing buddy care at the time of an attack.</td>
</tr>
<tr>
<td>MLIST</td>
<td>When = 0, the times required to get aircraft ready for flight (excluding deliberately delayed preflight tasks) are cumulated for 0 to 2, 4, 6, and 8 hours; when = 1, the output lists the portion of aircraft readied in each half-hour period from 30 minutes to 24 hours (CT2/1).</td>
</tr>
<tr>
<td>MNTF</td>
<td>In considering whether an aircraft is to be sent to the rear for maintenance, MNTF and MNTR are used in the decision algorithm (CT3/2).</td>
</tr>
<tr>
<td>MNTR</td>
<td>In considering whether an aircraft is to be sent to the rear for maintenance, MNTF and MNTR are used in the decision algorithm (CT3/2).</td>
</tr>
</tbody>
</table>
MNTLMT If the time estimated for getting an aircraft ready to fly exceeds MNTLMT (and certain other conditions are fulfilled—see Card Type #3/2), the aircraft is ferried to a rear base for the required maintenance (CT3/2).

MULTI Number of flights in a composite flight that have been checked and stored temporarily.

MULTI1 When a base's projected sortie generation capability per assigned aircraft is greater than MULTI1 percent than that of the parent base of an aircraft, the aircraft is retained and is not returned to the parent base (CT4/2).

MULTI2 Aircraft reassignment (effective if STATE = 3) occurs among bases whose projected sorties per available aircraft differ by more than MULTI2 percent (CT4/2).

MVDC Length of the SLOWDN array: maximum number of distinct slow-down vs. MOFr 'itasets that can be accommodated.

MXARC Maximum number of taxiway arcs on a single airbase.

MXCRAT Maximum number of crater repair required to open a MOS.

MXFAC Largest valued facility specified for the simulation.

MXHEAT Factor limiting reduction of heat buildup by cutaneous wetting.

MXHOLE The maximum number of missing parts (holes) that are permitted on any particular aircraft (default = 10000) (CT3/1).

MXRAMP Maximum number of aircraft parking ramps on a single airbase.

MXRWY Maximum number of surfaces that may be used for flight operations.

MXSHL Maximum number of aircraft shelters on a single airbase.

MXTLOS Maximum incident thermal flux not leading to pain or local burning.

NACC Number of days of acclimatization to CW conditions (CT3/5).

NAGENT Highest numbered (1, 2, or 3) agent that will be used in the simulation (CT3/4).

NBASE The number of bases that operate aircraft (CT1).

NCARGO Length of the CARGO array; maximum number of items in the support shipments from CONUS.

NCKSHP Number of shops to be distinguished when the special deferred-aircraft-task output is specified with Card Type #2/4.

NCONUS Number of the next shipment from CONUS.

NCRE8 Number of requests to create alternate procedures.

NESHP Number of daily intratheater shipments.
NEWDTA The time when theater resource reports are to be initiated; only applicable if OLDATA is initialized as zero (CT3/2).

NEWPRT A switch: When unity, the automatic parts initialization computations are repeated for each trial (CT3/3).

NEXTCK The next time (TTU) for a special array listing.

NEXTIN Next time the sortie demand data are to be read and reorganized.

NEXTSC Next time the sortie demand data are to be reorganized.

NHEAP The number of the next special array listing to be printed.

NHEAPS The total number of special array listings specified with CT2/4 option.

NJORT Length of the REJOIN array.

NLIMBO Length of the LIMBO array: maximum number of parts and equipments undergoing an administrative delay.

NOAGE Length of AGESTK array: maximum number of types of AGE and other equipment (limit = 320).

NOAGER Length of the AGEREQ array.

NOARC Length of the ARC array: maximum number of arcs at all bases.

NOATC Length of the ATC array: maximum number of simultaneous flight launch and recovery data for all bases.

NOATT Number of attacks stored in the ATTACK array.

NOBILD Length of the MUNRQT array: maximum number of munition assembly procedures.

NOCANN Parts having a probability (× 1000) of being broken when they are cannibalized—greater than NOCANN—will not be cannibalized (CT4/2).

NOCE Length of the CERQTS array: maximum number of civil engineering procedures (limit = 320).

NOCHG Length of the CHANGE array: maximum number of scheduled parameter changes.

NOCONF Length of the CONFIG array: maximum number of configurations.

NOCONS Length of the CONUS array: maximum number of support shipments from CONUS.

NOCREW Length of the PILOT array: maximum number of aircrews accommodated in the theater.

NODECT Length of the DETASK array: maximum number of task numbers that may be stored.
A-1

NOFAC Length of FACLTY array: maximum number of airbase facilities (limit = 399).

NOFIX Maximum number of to-be-repaired taxiway arcs read from subroutine TAXIWAY at one time.

NOFUEL If unity, other preflight tasks are prohibited during refueling (CT3/2).

NOHOSP Length of the TOHOSP heap: maximum number of personnel groups that can be involved in buddy care.

NOITEM Length of DAMAGE array: maximum number of damage data for airbase attacks.

NOLD Number of the last aircraft to have a task stored in the required task array (RQDTSK).

NOMATL Length of the MATERL array: maximum number of types of materials for civil engineering tasks (limit = 99).

NOMOVE Length of the MOVEAC array.

NOMP Maximum number of monitoring points at a base.

NOMUN Length of MUNSTK array: maximum number of types of munitions and munition components (limit = 320).

NOCNODE Length of the NODE array: maximum number of nodes at all bases.

NORARC Length of the RWYARC array: maximum number of arcs that make up runways at all bases.

NONUNI Switch. When unity, resource losses determined by sample from binomial distribution (CT2/1).

NOPART Length of PARTS array: maximum number of parts that may be specified (limit = 9999).

NOPEOP Length of PEOPLE array: maximum number of personnel types that may be specified (limit = 320).

NPIPE When unity, all parts computed by the automatic parts generation logic are on base at the beginning of the simulation; none are in the parts pipelines (see FULL).

NOPKG Length of SHIPQ array: maximum number of sets of items that may be waiting for intratheater shipment.

NOPOMO The average additional on-equipment task time that is required at a base operating under 66-1, when the data apply to 66-5 activities (CT4/2).

NOPRT Length of the PRTCRT and PRTLST arrays (need only equal the highest position in the PARTS array in which a part or LRU is found).
NORAMP Length of the RAMPS array: maximum number of aircraft parking ramps on all bases.

NOREP Length of REPRQT array: maximum number of parts repair procedures.

NOREPA Length of REPALT array: maximum number of alternative parts repair procedures.

NOREPT Length of REPORT array: maximum number of resource reports that may be scheduled during a single day.

NORPT Number of report times stored in the REPORT array.

NOSAVE When NOSAVE = 1, records are not saved for parts that break after an air attack has closed the shop that would normally process the repair, if the projected shop reconstitution time is not earlier than the end of the simulation (CT4/2).

NOSCL Length of SCLRQT array: maximum number of combat loadings that may be specified.

NOSHEL Length of the SHELT array: maximum number of aircraft shelters at all bases.

NOSHIP Length of SHIP array: maximum number of intratheater shipments that may be scheduled at one time.

NOSHP Length of SHIPSC array: maximum number of daily intratheater shipments that may be stored.

NOSTAT Maximum number of types of AIS stations in the simulation.

NOTASK Maximum number of tasks in each shop group for each type of aircraft (must be a multiple of 4).

NOTRAN Set to 1 during initialization when there are no rear maintenance bases and no DOBs.

NOTRAP Length of TRAP array: maximum number of TRAP types (limit = 320).

NOTRAY Maximum number of trays (one for each LRU) in all the AIS stations.

NOTSK Length of TSKRQT array: maximum number of on-equipment maintenance procedures.

NOTSKA Length of TSKALT array: maximum number of alternative on-equipment task procedures.

NOUSER Length of the BORROW array.

NOUXO Length of the EXPLOD array.

NOVOGT When set to unity, the effects of excessive perspiration and dehydration are neglected (CT3/5).
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOW</td>
<td>Current simulation time (TTU).</td>
</tr>
<tr>
<td>NOWEAP</td>
<td>Number of types of munitions (≤ NOMUN).</td>
</tr>
<tr>
<td>NPART</td>
<td>The number of the highest numbered LRU or SRU (default is NOPART) (CT3/3).</td>
</tr>
<tr>
<td>NRTPOL</td>
<td>If unity, an LRU that requires an unavailable SRU that is not nominally stocked is NRTSed (CT2/2).</td>
</tr>
<tr>
<td>NSCROL</td>
<td>Maximum number of aircraft whose activities may be stored in the RECORD array (CT2/1).</td>
</tr>
<tr>
<td>NTrial</td>
<td>Number of repetitions of the simulation (CT1).</td>
</tr>
<tr>
<td>NTYPE</td>
<td>Number of aircraft types to be employed in the simulation (may be less than or as great as MAXT) (CT1).</td>
</tr>
<tr>
<td>NUMADD</td>
<td>The number of lending shops that are to have borrowing shops added to the BORROW array (CT#21/77).</td>
</tr>
<tr>
<td>NUMBORG</td>
<td>The number of lending shops for which the priority of the borrowing shops is to be changed in the BORROW array (CT#21/78).</td>
</tr>
<tr>
<td>NXSCH</td>
<td>Next time at which the intratheater shipments are to be rescheduled.</td>
</tr>
<tr>
<td>NXSEED</td>
<td>The value of the seed for the random number that is entered using Card Type #2/3 in order to repeat a specific trial from a previous run.</td>
</tr>
<tr>
<td>OLDATA</td>
<td>If zero, base resource reports are generated starting at the beginning of the simulation; if 1, these reports are deferred until time &quot;NEWPTA&quot; (CT#3/2).</td>
</tr>
<tr>
<td>ONLYUE</td>
<td>When unity, the loss rates generated in TSARINA for civil engineering equipments are applied only to unassigned equipment (CT2/1).</td>
</tr>
<tr>
<td>OPSBSE</td>
<td>Number of bases used in the simulation for supporting combat operations; excludes rear maintenance bases and the emergency recovery base when one is used (CT3/1).</td>
</tr>
<tr>
<td>ORDER1</td>
<td>Threshold controlling CIRF response to parts shortages; responds only if (Enroute Parts + On-base Reparables - Required Parts) is less than ORDER1 (CT3/1).</td>
</tr>
<tr>
<td>ORDER2</td>
<td>Threshold controlling an operating base's recourse to lateral resupply; seeks lateral resupply only if (On-base Reparables - Required Parts) is less than ORDER2 (Reparables are assessed only if the shop open and functioning) (CT3/1).</td>
</tr>
<tr>
<td>ORDIT</td>
<td>Interrupted tasks and repairs are prioritized when ORDIT = 1; FIFO if 0 (CT3/1).</td>
</tr>
<tr>
<td>ORDWT</td>
<td>Waiting tasks and repairs are prioritized when ORDWT = 1; FIFO if 0 (CT3/1).</td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
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</tr>
<tr>
<td>OUTFIT</td>
<td>Activates the automatic parts stock initialization (CT3/3).</td>
</tr>
<tr>
<td>OVERFL</td>
<td>Value controls simulation behavior if the dimensions of the arrays used to store internally generated data are exceeded:</td>
</tr>
<tr>
<td></td>
<td>When OVERFL = 0, simulation stops;</td>
</tr>
<tr>
<td></td>
<td>= 1, overflow noted and tabulated;</td>
</tr>
<tr>
<td></td>
<td>= 2, overflow noted for first entry and tabulated;</td>
</tr>
<tr>
<td></td>
<td>= 3, overflow tabulated.</td>
</tr>
<tr>
<td>OVERTM</td>
<td>Number of minutes of overtime permitted (CT4/1).</td>
</tr>
<tr>
<td>PKGTM</td>
<td>Number of minutes required to package resources for intratheater shipment (CT4/1).</td>
</tr>
<tr>
<td>PMODE</td>
<td>When unity, parts initialization for WRSKs approximate DO-29; otherwise the Chapter 11 procedures from AFM 67-1 apply (CT3/3).</td>
</tr>
<tr>
<td>POSTPN</td>
<td>If zero, all unscheduled maintenance tasks must be accomplished prior to next flight; if = 1, tasks will be deferred (postponed) that are not critical for next mission (CT3/1).</td>
</tr>
<tr>
<td>PPRINT</td>
<td>Controls output summaries of the initial stock levels and the parts pipelines. When increased by 10, residual parts levels are listed after the delay statistics (CT3/3).</td>
</tr>
<tr>
<td>PRINT</td>
<td>Value controls content of simulation output (CT2/1).</td>
</tr>
<tr>
<td>PROTME</td>
<td>When insufficient aircraft are ready for a scheduled flight, and none can be found in the spare queue or a lower priority alert, an aircraft can be taken from another scheduled flight of the same or lower priority if the flight time is at least PROTME minutes later (default = 30 minutes). To set PROTME = 0, enter -1 on Card #4/1.</td>
</tr>
<tr>
<td>QUIK</td>
<td>If zero, filler aircraft are launched when the aircraft being replaced are sent to the rear; if unity, the filler aircraft are launched as soon as the decision is made to send aircraft to the rear (CT3/2).</td>
</tr>
<tr>
<td>RANDM</td>
<td>When unity, parts shortages and the location of parts in the pipelines are determined with samples from the Poisson approximation of a binomial distribution (CT3/3).</td>
</tr>
<tr>
<td>RECUP</td>
<td>If unity, the personnel who collapse from excessive heat or are hospitalized because of conventional or chemical attacks are returned to duty after hospitalization (CT3/5).</td>
</tr>
<tr>
<td>RELAX</td>
<td>Required time that personnel must rest (in the Vogt formulation) when a task must be stopped due to excessive heat buildup or excessive sweating.</td>
</tr>
</tbody>
</table>
RELIEV When = 1, aircrews are assumed to go off duty immediately after their last flight of the day and to be ready for duty SLEEP hours later; otherwise they remain on duty the full shift whether or not they are needed.

REMOTE If unity, the first of a distributed set of collective-protection facilities is chosen for the occasional extended cooling-off period provided by a relative collective-protection option (see discussion for Card Type #43/6) (CT3/5).

REPSHL Activates repair of damaged aircraft shelters.

REST Minimum number of minutes for aircrews between flights (CT4/1).

RPARTS User-specified fraction of the generated spare parts stocks that are placed at the rear maintenance base to service aircraft taken to the rear because the estimated ready-to-fly time exceeded MNTLMT (CT3/2).

RPRINT Controls intermediate output that defines the status of the runway/taxiway clearance tasks: If ≥ 1, lists the numbers of UXO, mines, and craters that must be cleared to open the MOS, extended MOS, or entire runway, and the percentage of the aircraft shelters that can access the MOS. If ≥ 2, indicates when the MOS, extended MOS, and entire runway are cleared, and when the individual taxiway segments are clear. If ≥ 3, lists the start time, stop time, and interrupt time for each runway and taxiway clearance task, along with key task data (CT2/5).

RUNWT Weighting applied to the holes in the prospective MOS when craters must be repaired to accommodate a movable arresting barrier.

SCROLL When unity, daily activity reports are preserved for NSCROL specified aircraft for a specified number of days (CT2/1).

SCROL1 Aircraft number of the first of the NSCROL aircraft for which a daily activity report is prepared.

SCROL2 Number of last of NSCROL aircraft for which a daily activity report is prepared.

SEED If not zero, the value used for the seed of the random-number generator is controlled (i.e., is prespecified by the local operating system) (CT1).

SEEKSH When unity, another in-theater shop is sought for parts repair when the nominal shop is closed by damage (CT2/2).

SELECT When not zero, a daily summary of sortie demands is prepared to facilitate selection of bases for sorties (CT4/2).

= -1 Sortie demands are not reassigned when runway is closed.

≥ 1 Summary data used when base not specified.

≥ 2 Summary data used for reallocating demands on airbases with closed runways.
SHOPRY  Controls the choice of rules for prioritizing repairs at a CIRF.
SHORT  Parts shortfalls from "authorized" levels (percent) that result from system-wide shortages (CT3/3).
SHPDLY  This delay is introduced to all on-equipment and off-equipment aircraft-related tasks, to account for the disruption following an air-base attack (CT4/1).
SHPREP  If not zero, all parts repaired at an operating base are shipped to the base selected with the SEND logic in the CONTRL subroutine, when (On-base NORS Aircraft – Required Parts) is greater than or equal to SHPREP (CT2/2).
SIMLTH  Length in days of the period to be simulated (CT1).
SLEEP  Minimum number of off-duty hours between shifts (CT4/1).
SPAREI  Nine undefined variables included in the BASIC common for future requirements.
SPARE9  
STATE  If not zero, the state of each base's capability to generate sorties is computed daily (CT4/2).
  ≥ 1  Base-state-data used to select base for diversion.
  ≥ 2  Base-state-data used to decide when aircraft recover at their parent base (see MULTI1).
  ≥ 3  Aircraft base assignment reorganized nightly when workloads are disproportionate (see MULTI2).
STATFQ  The frequency in days with which the summary data regarding the average length of time for tasks and jobs, and the causes and lengths of the aircraft delays, are printed. If STATFQ = 0, these data are not collected or printed (CT2/1).
STOPCW  The time during the scenario when calculations of the chemical effects are to be stopped, if the contaminants have dissipated (CT3/6).
TBEFOR  The time before ENDAY when DOL aircraft begin to be checked for outstanding overnight maintenance (CT4/3).
TCOND  The time for the first periodic deferred-aircraft-task report (TTU).
TCONUS  Time of the next shipment from CONUS.
TEST  Controls internal debugging features. If >0, diagnostic messages are printed for the entire simulation; if −1, a special card must follow Card Type #2/1 that defines the number of the trial and the up to seven time intervals during which debugging data are required (CT2/1).
TESTI  The value for TEST during the specified intervals for debugging output.
When initialized, special outputs will be printed for each activity of the TESTAC aircraft (CT2/3).

The period at which deferred-aircraft-task reports will be printed (TTU).

The time (TTU) for the next early morning aircraft inspection (CT17/3).

If unity, parts that are normally NRTSed to another base but can't be because no shipment schedule exists are held for later lateral repair rather than being sent to CONUS (CT2/2).

If positive, the parts supply system is critically short of a percentage of aircraft spare parts (equal to TOOFEW/10); the part numbers that are short are selected at random. If −1, the probability a part is short is proportional to the cost of the part (CT3/3).

Square of the total number of sorties in the theater during each trial, summed across all trials.

Average percentage of the personnel casualties in aircraft shelters affected by conventional weapons during an air attack.

Time that aircraft supply and demand were last projected (TTU).

Controls reports of shipment arrival times (CT2/5).

Controls theater resource management; initialize to unity if the management of resources is to be centralized; initialize as 2 if the theater also has a CIRF for parts repair (CT1).

Controls logic used for selecting location for the MOS; when zero, the location is selected that has the fewest craters, with ties broken with the location that has the fewest manhours required to clear mines and UXO; when unity, the location selected for the MOS is that with the smallest total number of manhours required to clear the mines and UXO, and to repair the craters (CT1).

The number of the trial during which special debugging data are to be output.

When initialized with the number of a distribution from the TTIME subroutine, the "actual" unscheduled maintenance task probabilities used in the simulation are determined by selecting a value from that distribution, assuming the mean is the value entered by Card Type #7. (Parts initialization and shop activity at zero time are based on the values entered—i.e., "peacetime" data points.) (CT3/2)

If USECP = 1 or = 3, personnel cool off in collective-protection facilities (designated with Card Type #43/6) only when there is contaminant on base; when = 2 or = 4, the facilities are always used; when = 3 or = 4, the entry queues at each collective facility are
simulated. If zero, personnel cool off at the location of their last task (CT3/4).

USECW
Set to unity if the heat generation features are to be used; set to 2 if chemical attacks are being simulated, and those features are also needed (CT3/4).

USEDCW
The time (TTU) at which the chemical computations were actually stopped, when the STOPCW option is used.

USEMER
When unity, MOB and COB aircraft will recover at the EMERG base rather than at a DOB, if all runways are closed at MOBs and COBs; otherwise they will recover at a DOB (CT4/3).

VARMOP
Unity if the appropriate personnel MOPP is to be varied for each building, shelter, taxiway, and ramp in accordance with the chemical conditions at the closest monitoring point; the MOPP will be that appropriate for the worst on-base CW conditions for the type of facility if VARMOP is zero (CT3/4).

VBREAK
A switch. If zero or -1, unscheduled maintenance task probabilities are modified in proportion to the Card Type #18/2 entries. If unity, the basic probabilities are varied by shop and aircraft type as a function of achieved sortie rate. If set to -1 or +1, the basic values are used for estimating average shop task times, average resource requirements (in BSECAP) and initial parts stocks (CT3/2).

VERIFY
If set > 0, most card types are subjected to additional checks of input data accuracy in subroutine TESTER. When set to 2, either by the user or automatically when certain input errors are detected, execution is stopped following data entry (CT2/1).

WARN
Number of minutes of warning for attacks other than the first x 100/Time distribution (minus for warning received after the attack time) (CT3/4).

WDBAR
Distance between the cable drums of a movable arresting barrier.

WHEN2
Used for transferring the initiation time of a task element among certain subroutines.

WXDAYS
Maximum of days for which weather data may be stored (maximum value = 65).

XTEST
If initialized when VERIFY = 2, TEST is set to XTEST for the last part of the initialization process (CT2/1).

ZNORS
A switch. When unity, parts that were not available to be placed in the pipeline during parts initialization because of shortages are obtained by removing them from aircraft, thus creating NMCS (NORS) aircraft. If zero, a message is printed noting the shortage (CT3/3).
ZSHOP  Internally set to unity when Card Type #42 is used to initialize on-equipment or off-equipment work at time zero.

ZTSK  Number of specific part and equipment repairs to be underway at zero time (CT42/2 and CT42/3).
Appendix C

DATA STORAGE ARRAYS IN COMMON

The 348 storage arrays used in TSAR and contained in one or another of the 34 Common statements are listed alphabetically in this section (except for those in the LOCALx Common statements). Data that are input primarily by the user are denoted by INPUT-#xx after the array descriptor; "xx" provides a cross-reference to the Card Type used for data input. Data that are generated internally are denoted by GENERATED.

The array name and dimensions follow an English-language descriptor. Dimensions controlled by the user are listed in terms of the variable that defines the particular dimension (see App. B). MAXB, MAXT, and MAXM refer to the maximum numbers of bases, aircraft types, and missions, respectively. Unless otherwise specified, the dimension of SHOP is 30. The nature of the stored data is defined for each element along the program-fixed dimension.

In many cases more than one datum are contained in a single element. The packing factor is shown as a multiplier using the FORTRAN symbol for multiplication; the first item is multiplied by the packing factor and then added to a second before storage; e.g., "Time*10/distribution" defines ten times a time plus a distribution number. The symbol ** implies exponentiation. As will be noted, the final organization and packing of the data are often different than specified in the Card-Image input formats.

Aircraft Assigned (GENERATED)

ACA (I, MAXM, MAXT, MAXB)

I = 1 Number of aircraft assigned to 3rd priority flights
    = 2 Number of aircraft assigned to 5th priority flights
    = 3 Number of aircraft assigned to 6th priority flights

Temporary Storage for Aircraft ATC Data (GENERATED)

ACATC (1,50)

I = 1 Aircraft number
    = 2 Scheduled takeoff time
    = 3 Scheduled recovery time
**Data for Controlling Aircraft Break Rates**

ACCODE (MAXB, MAXT, I)

<table>
<thead>
<tr>
<th>I</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adjusted percentage of the aircraft that are to land with a Code 2 or Code 3 break</td>
</tr>
<tr>
<td>2</td>
<td>Percentage increase required for unscheduled maintenance probabilities when overall break rate is controlled</td>
</tr>
</tbody>
</table>

**Aircraft Type Data**

ACDATA (INPUT-#15)

<table>
<thead>
<tr>
<th>I</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Postflight inspection delay—Mean time*10/distribution</td>
</tr>
<tr>
<td>2</td>
<td>Preflight inspection delay—Mean time*10/distribution</td>
</tr>
<tr>
<td>3</td>
<td>Fuel—Thousands of pounds</td>
</tr>
<tr>
<td>4</td>
<td>Task number for fueling resources</td>
</tr>
<tr>
<td>5</td>
<td>Number of assignable mission types</td>
</tr>
<tr>
<td>6</td>
<td>Nominal time for unscheduled maintenance</td>
</tr>
<tr>
<td>7</td>
<td>Nominal time for complete sortie cycle</td>
</tr>
<tr>
<td>8</td>
<td>Pointer to 1st item in PRTLST</td>
</tr>
<tr>
<td>9</td>
<td>Munitions load team personnel: Type*100/Number (Enter to prohibit two teams per aircraft)</td>
</tr>
<tr>
<td>10</td>
<td>Special AGE#1: one unit is sufficient for all tasks</td>
</tr>
<tr>
<td>11</td>
<td>Special AGE#2: one unit is sufficient for all tasks</td>
</tr>
<tr>
<td>12</td>
<td>Basic munitions #1; Type*100/number</td>
</tr>
<tr>
<td>13</td>
<td>Basic munitions #2; Type*100/number</td>
</tr>
<tr>
<td>14</td>
<td>Basic munitions #3; Type*100/number</td>
</tr>
<tr>
<td>15</td>
<td>Administrative delay for transferred aircraft</td>
</tr>
<tr>
<td>16</td>
<td>First battle-damage task</td>
</tr>
<tr>
<td>17</td>
<td>Last battle-damage task</td>
</tr>
<tr>
<td>18</td>
<td>Percentage of parts that are recoverable from a salvaged aircraft</td>
</tr>
<tr>
<td>19</td>
<td>First airbase-attack-damage task</td>
</tr>
<tr>
<td>20</td>
<td>Last airbase-attack-damage task</td>
</tr>
<tr>
<td>21</td>
<td>Personnel required for an alert aircraft - Type*100/number</td>
</tr>
<tr>
<td>22</td>
<td>Equipment type #1 required for an alert aircraft</td>
</tr>
<tr>
<td>23</td>
<td>Equipment type #2 required for an alert aircraft</td>
</tr>
<tr>
<td>24</td>
<td>Base number where rear-base maintenance is performed</td>
</tr>
<tr>
<td>25</td>
<td>Unity if aircraft may be assigned to &quot;special&quot; alert</td>
</tr>
<tr>
<td>26-28</td>
<td>Mission effectiveness degradation when the (I-25)th basic munition is not loaded</td>
</tr>
<tr>
<td>29</td>
<td>Mission number for air-to-air defense</td>
</tr>
<tr>
<td>30</td>
<td>Hot-pit task number</td>
</tr>
<tr>
<td>31</td>
<td>Postflight decontamination task</td>
</tr>
<tr>
<td>32</td>
<td>User-specified percentage of aircraft that land with Code 2 or Code 3 maintenance required</td>
</tr>
<tr>
<td>33</td>
<td>Percent (*10) aircraft that sustain a ground abort</td>
</tr>
<tr>
<td>Task number for the early morning inspection</td>
<td></td>
</tr>
<tr>
<td>Number of sorties per PAA for which battle damage spares are to be procured</td>
<td></td>
</tr>
<tr>
<td>Spare</td>
<td></td>
</tr>
</tbody>
</table>

**Aircraft Mission Data**

<table>
<thead>
<tr>
<th>ACMDTA (I, MAXM, MAXT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
</tr>
<tr>
<td>2</td>
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<td>5</td>
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<td>8–10</td>
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<tr>
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<tr>
<td>18–20</td>
</tr>
</tbody>
</table>

**Individual Aircraft Data Array**

<table>
<thead>
<tr>
<th>ACN (MAXACN, 1)</th>
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</thead>
<tbody>
<tr>
<td>I</td>
</tr>
<tr>
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<tr>
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<td>Field</td>
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</tbody>
</table>
= 45 Time when aircraft is expected to be in an aircraft shelter
= 46 Time when aircraft launch was last canceled because of air traffic control constraints.
= 47 Cumulative flight time (TTU)
= 48 Flight time at last phase inspection (TTU)
= 49 Flag indicating check made for ground abort
= 50 Flag indicating base aircraft is to be ferried to
= 51 Flag indicating that aircraft will require deferred maintenance at night
= 52 Flag indicating aircraft is waiting until conditions permit transfer for deferred maintenance
= 53 Functional check-flight flag
= 54 Time aircraft took off for a DOB
= 55-64 Spare

**Numbers of NMCS Aircraft** (GENERATED)

ACNMCS (MAXT, MAXB)

**Aircraft Activity Statistics** (GENERATED)

ACSTAT (I, L, MAXT, MAXB)

<table>
<thead>
<tr>
<th>I</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of aircraft lost in combat</td>
</tr>
<tr>
<td>2</td>
<td>Number of aircraft damaged in combat</td>
</tr>
<tr>
<td>3</td>
<td>Number of aircraft lost in air attack</td>
</tr>
<tr>
<td>4</td>
<td>Number of aircraft damaged in air attack</td>
</tr>
<tr>
<td>5</td>
<td>Number of air aborts</td>
</tr>
<tr>
<td>6</td>
<td>Number of ground aborts</td>
</tr>
<tr>
<td>7</td>
<td>Number of times parts are cannibalized</td>
</tr>
<tr>
<td>8</td>
<td>NMCS hours</td>
</tr>
<tr>
<td>9-10</td>
<td>Spare</td>
</tr>
<tr>
<td>11</td>
<td>Number of aircraft flown to a rear maintenance base</td>
</tr>
<tr>
<td>12</td>
<td>Number of aircraft transferred from the filler force and CONUS and number transferred to the filler force from the rear maintenance base</td>
</tr>
<tr>
<td>13</td>
<td>Number of aircraft transferred to/from a dispersed operating base</td>
</tr>
<tr>
<td>14</td>
<td>Spare</td>
</tr>
<tr>
<td>15</td>
<td>Number for check flights flown</td>
</tr>
<tr>
<td>16-20</td>
<td>Daily number of sorties of mission type (1-15)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cumulative during day</td>
</tr>
<tr>
<td>2</td>
<td>Cumulative during trial</td>
</tr>
<tr>
<td>3</td>
<td>End-of-trial results cumulated across trials</td>
</tr>
</tbody>
</table>
Cumulative Aircraft Transfer Requirement

ACTRAN (MAXT, MAXB)
Total number of each aircraft type to be maintained at each DOB.

Temporary Data Storage

ADDBOR (10, 6)
Stores up to six shop numbers to be added to the borrowers list for up to ten shops; used during initialization.

Administrative Time Delays for Parts and Equipment Repair

ADELAY (SHOP, I, MAXB) (for Shops #1 to #24)

I = 1 When a faulty part is removed from an aircraft and sent to a shop for repair, or when a part arrives at a CIRF, the repair process is delayed this length of time, except when EXPED is not 0.
I = 2 When a piece of equipment is found to be faulty, the repair process is delayed this length of time, except when EXPED is not 0.
Entry: Hours*100/Time distribution

Cumulative Manhours for Individual AFSCs

AFSCHR (I, OPCOP, MAXB)
Cumulative TM expended by each personnel type; used for listing total manhours at the end of each trial.

Equipment Repair Procedures

AGEREP (NOAGER, I)

I = 1 Shop assigned to repair AGi; or pointer to next procedure.
For subsequent procedures in series is minus PARENT procedure
I = 2 Probability AGE requires repair following use *10000; or minus probability this particular repair procedure is required*100; or probability subsequent procedure is required x 100; or -1 for an alternate procedure.
I = 3 Repair time Mean *10/Distribution; or, minus AIS station number
I = 4 Personnel Type *100/Number; or, -1 if multiple procedures are to be considered
I = 5 Type #1 equipment or, first procedure to be considered
I = 6 Alternative procedure
I = 7 Task heat factor
I = 8 Subsequent procedure*10/Personnel substitutability flag
I = 9 Type #2 equipment
Characteristics of the Chemical Agents

AGENT (I, J, K, L, M)

I = 1–3  Number of the agent
J = 1–14  MOPP
K = 1  Lethality data
   = 2  Incapacitation data
   = 3  Ocular effects
L = 1  Effects due to liquid fallout
   = 2  Effects due to surface contamination
   = 3  Effects due to vapor concentration
M = 1  Median dosage
   = 2  Standard deviation

Resource Report on AGE and Equipment

AGERPT (NOAGE, MAXB)
Total number on base—Data received/Data in transit.

AGE Requirements per Sortie

AGERQT (NOAGE, MAXM, MAXT)
Likelihood needed*(10**7)/Expected requirements for AGE per sortie—(100000*TTU).

AGE and Equipment Stocks

AGESTK (NOAGE, I, MAXB)
I = 1  Number serviceables on base*100/Nominal stock level
   = 2  Number available*100/Nominal shop
   = 3  Number serviceables enroute

Alert Aircraft Resources Flag

AIDALT (MAXT)
Switch; set to unity if resources are required for alert aircraft.

Data on AIS Station Equipment

AISDTA (NOSTAT, I)
I = 1  Pointer to the first tray in TRAYS associated with the station
   = 2  Part breakage probability per LRU repair
   = 3  Part order and ship time (days) *10/Distribution
= 4 Added time needed for AIS maintenance; a percentage of LRU repair
time— with one station*128/with more stations
= 5 Equivalent AGE number of AIS station

Tray Utilization of AIS (GENERATED)

AISUSE (NOSTAT, I, MAXB)

<table>
<thead>
<tr>
<th>I</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TRAY in use on string #1</td>
</tr>
<tr>
<td>2</td>
<td>TRAY in use on string #2</td>
</tr>
<tr>
<td>3</td>
<td>TRAY in use on string #3</td>
</tr>
<tr>
<td>4</td>
<td>TRAY in use on string #4</td>
</tr>
<tr>
<td>5</td>
<td>TRAY in use on string #5</td>
</tr>
<tr>
<td>6-10</td>
<td>TRAY in use on strings #6 to #10</td>
</tr>
<tr>
<td>11</td>
<td>Cumulative LRUs and SRUs repaired by this station type</td>
</tr>
</tbody>
</table>

Alert Aircraft (GENERATED)

ALERT (I, MAXM, MAXT, MAXB)

<table>
<thead>
<tr>
<th>I</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number aircraft required for Priority #2 alert</td>
</tr>
<tr>
<td>2</td>
<td>Number aircraft required for Priority #4 alert</td>
</tr>
<tr>
<td>3</td>
<td>Pointer to first aircraft assigned to priority #2</td>
</tr>
<tr>
<td>4</td>
<td>Pointer to first aircraft assigned to priority #4</td>
</tr>
<tr>
<td>5</td>
<td>Number of aircraft readied for priority #2</td>
</tr>
<tr>
<td>6</td>
<td>Number of aircraft readied for priority #4</td>
</tr>
</tbody>
</table>

Squadron Equipment Equivalence Designators (INPUT-#46)

ALTAGE (NOAGE, I)

<table>
<thead>
<tr>
<th>I</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type designator for AGE assigned to the second squadron</td>
</tr>
<tr>
<td>2</td>
<td>Type designator for assignments to the third squadron</td>
</tr>
<tr>
<td>3</td>
<td>Type designator for assignments to the wing organization</td>
</tr>
</tbody>
</table>

Squadron Personnel Equivalence Designators (INPUT-#45/1)

ALTPEO (NOPEOP, I)

<table>
<thead>
<tr>
<th>I</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type designator for personnel assigned to the second squadron</td>
</tr>
<tr>
<td>2</td>
<td>Type designator for assignments to the third squadron</td>
</tr>
<tr>
<td>3</td>
<td>Type designator for assignments to the wing organization</td>
</tr>
</tbody>
</table>

Task-Assist-Qualified Personnel Types (INPUT-#45/3)

AQPEOP (NOPEOP, I)

<table>
<thead>
<tr>
<th>I</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>Personnel types who may assist with on-equipment tasks</td>
</tr>
</tbody>
</table>
Taxiway Segment Data (INPUT-#17/4)

ARC (NOARC, I)

I = 1  Number of the node at one end of the segment (arc)
I = 2  Number of the node at the other end
I = 3  Number of UXO that must be removed from the taxiway
I = 4  Number of mines that must be cleared
I = 5  Number of "equivalent" crater repairs required for
       an aircraft to transit taxiway segment
I = 6  Weighted total of work required on taxiway segment
I = 7  Length of the segment in hundreds of feet
I = 8  Number of closest monitoring point
I = 9  Personnel MOPP appropriate for the current CW conditions
I = 10 Number of manual mine removal tasks
I = 11–20 Number of UXO type (I-10) that must be removed from this area

Storage Array for Runway Flight Activities (GENERATED)

ATC (1,NOATC)

I = 1  Pointer to the next event at the same base in the runway
       activity queue, or pointer to the next unused location
I = 2  Runway activity time for the first aircraft in a flight
I = 3  Runway activity time for the last aircraft in a flight
I = 4  10000*flight priority/number of first aircraft to be launched
       plus 100000 if the aircraft flight is landing

Temporary Storage for Composite Flight ATC Schedules (GENERATED)

ATCLOC (1,6)

I = 1  Base
I = 2  Location in the ATC array of the takeoff data for up to six
       flights in a composite group of flights
I = 3  Location in the ATC array of the recovery data

Airbase Air Traffic Control Data (GENERATED)

ATCPT (1,MAXB)

I = 1  Pointer to the earliest event in the runway activity queue
       in the ATC array
I = 2  Pointer to the last event in the runway activity queue in the
       ATC array
I = 3  Cumulative number of sorties canceled because of air traffic
       conflicts for takeoff
I = 4  Cumulative number of sorties canceled because of air traffic
       conflicts at the projected recovery time
I = 5  Cumulative number of sorties canceled because of space lacking
       in the ATC array
Airbase Attack Data

ATTACK (LTHATT, I)

I = 1 Attack time
I = 2 Heap pointers
I = 3 Heap pointers
I = 4 Position of first damage data in DAMAGE array
I = 5 Base

Current Postattack Delays

ATTDLY (I, MAXB)

I = 1 Total delay imposed on all on-base activities (except for civil engineering tasks) after the last attack.
I = 2 Total delay imposed on all civil engineering tasks, except those concerned with runway and taxiway repair, after the last attack.

Aircraft Attrition Thresholds

ATTLEV (I)

Stores up to ten levels of total theater sorties that may be used (in conjunction with ATTPOCT) to change aircraft attrition rate at these sortie thresholds.

MOPP Levels

ATTMOP (Ensemble, I)

I = 1 Number of MOPP donned at attack time; highest value for ensemble
I = 2 Number for MOPP that affords least protection

Location of Minimum Operating Surface

ATTMOS (ATTACKS, I, MAXB)

I = 1 Runway number where MOS was located for up to 20 attacks
I = 2 Distance along runway to center of MOS

Sortie Dependent Attrition Rates

ATTPOCT (10, MAXT, MAXM)

Ten attrition levels used with the sortie-dependent attrition option.

Average Shop Performance

AVGP (I, SHOP, BASE)

I = 1 Average task time
\[ = 2 \quad \text{Average task capacity} \]
\[ = 3 \quad \text{Expected closure time} \times 10 / \text{distribution} \]

**Standard Backshop Parts Repair Times**
\[ \text{AVGREP (SHOP, MAXT)} \quad \text{(for Shops #1 to #25)} \]
Ten times the average on-base repair time that would be required with unlimited resources for jobs generated by a particular aircraft type, taking into account the several probabilities affecting whether the job would be done on base.

**Average Interbase Shipment Time**
\[ \text{AVGSHP (MAXB)} \]
Average shipment time from each operating base to all other operating bases (TTU).

**Standard On-Equipment Task Times**
\[ \text{AVGTSK (SHOP(25), MAXT)} \]
Ten times the average time that each shop would take to complete on-equipment tasks on a given aircraft type, when resources are unlimited.

**Munitions Buildup Wait Queue**
\[ \text{BACKLG (I, LLQ)} \]
- \( I = 1 \): Munitions type
- \( I = 2 \): Next task in shop (unused elements)
- \( I = 3 \): Resource causing delay
- \( I = 4 \): Time task first attempted
- \( I = 5 \): Base

**Cannibalization Breakage Rate**
\[ \text{BADCAN (NOPART)} \]
Probability that a part is broken when cannibalized \( \times 100 \).

**Accidental Dosage Data**
\[ \text{BADFIT (Agent, CWTYPE, MP)} \]
Vapor dosage due to bad fitting mask; computed for each agent at each monitoring point for each facility type.

**Base Transfer Directives**
\[ \text{BASDIR (8, I, MAXB)} \]
Storage array for transfer directives after they are operational; up to eight directives may be in effect simultaneously at each base.
I = 1  Time directive was initiated
      = 2  Total aircraft to be maintained at base
      = 3  Number yet to be assigned*100/Mission assignment of aircraft
to be selected
      = 4  Aircraft type*100/Destination base

Special Base Data

BASDTA (I, MAXB)

I = 1  Time that aircraft takeoffs are prohibited following an
      attack (TTU)
      = 2  Additional postattack maintenance delay (TTU)
      = 3  Additional postattack civil engineering delay (TTU)
      = 4  Time for runway survey prior to runway/taxiway repair (TTU)
      = 5  First aircraft type that is not to be assigned a shelter
      = 6  Second aircraft type that is not to be assigned a shelter
      = 7  Third aircraft type that is not to be assigned a shelter
      = 8  Unity if a separate set of facilities is provided for
          off-duty aircrews
      = 9  Switch; set to unity when aircraft transfer directives
          are in effect at base
      = 10–11 Spare
      = 12  Switch; set to unity when shelter assignments are to be
            without regard to shelter type
      = 13  Type CW ensemble used on base
      = 14–24 Spare

Special Base Data

BASES (I, MAXB)

I = 1  Number of first aircraft assigned to base
      = 2  Number of last aircraft assigned to base
      = 3  Number of aircraft possessed
      = 4  Runway status (0 if open, 1 if closed)
      = 5  Number of aircraft shelters that cannot access the runway
      = 6  Total cannibalizations
      = 7  Number of LRUs cross-canned
      = 8  Number of repairs expedited
      = 9  Initial number of LRUs; negative if current number less than
            ADAPTR percent of initial
      = 10  Personnel qualifications:+10 if on-base personnel are
            cross-trained; +1 if personnel are task-assist-qualified
      = 11  Number of aircraft assigned initially or by preplanned
            reinforcement
      = 12  Number of aircraft with broken or missing parts
      = 13  Time of last airbase attack
Coded record of aircraft types assigned to base [Sum of $2^{(ACTYPE-1)}$]

Number of host airbase for a dispersed operating base (DOB)

Parts repair organization type: 0 for data as entered; 1 when the flight line is a 66-1 organization and the data apply to a 66-5 organization (and resource equivalents must be used for parts repair work)

Number of aircraft receiving postflight inspection

Number of aircraft that require unscheduled maintenance

Ten times the average number of aircraft that may be accommodated in a shelter (default = 10)

Number of shelters on base

Number of aircraft of type (1 - 20) * 8/Number of squadrons

Number of COMO squadrons

Number of serviceable parts shipped

Number of serviceable parts received from an operating base

Number of serviceable parts received from a CIRF

Number of serviceable parts received from CONUS

Number of reparable parts shipped to an operating base

Number of reparable parts shipped to a CIRF

Number of reparable parts shipped to CONUS

Number of parts condemned

Current number of battle damaged aircraft

Cumulative number of bent parts

Base kind: 1 for MOB; 2 for COB; 3 for DOB

Storage capacity for POL

Number of aircraft shelters designated for "special" alert

Actual taxi time (TTU) *100 / Nominal taxi time (TTU)

Time required to add an aircraft to an aircraft shelter

Unity if the base is used for rear-area maintenance

Cumulative number of aircraft damaged in air operations

Number of aircraft flown to rear for maintenance

Number of aircraft transferred from filler force and CONUS, and number transferred to filler force from rear maintenance base

Aircraft killed on base by air attack *180 / Aircraft damaged

Location in CEJOBQ of postattack maintenance delay

Location in CEJOBQ of the postattack civil engineering delay

Location in CEJOBQ of the postattack runway repair (RRR) delay

Total number of aircraft maintenance completions

Number of fuel trucks currently being refilled

Number of types of aircraft shelters

Time for next morning preflight inspection

Number of aircraft sustaining a ground abort (Code 5)

Number of aircraft landing with Code 3 unscheduled maintenance
= 60 Number of aircraft landing with Code 2 unscheduled maintenance
= 61 Number of MOB/COB aircraft sent a DOB or number of DOB aircraft returned to host
= 62 Current number of damaged aircraft shelters
= 63 Current percentage of shelters that can access the MOS
= 64 Number of shelters reserved for in-flight aircraft when DOSHEL > 1.
= 65-75 Spare

Cumulative Buddy Care Statistics (GENERATED)

BCSTAT (I, MAXB)

I = 1 Number of personnel needed for buddy care
I = 2 Number of personnel used for buddy care
I = 3 Total time expended for buddy care (TTU)
I = 4 Spare

Task Assistance List (GENERATED)

BORROW (NOUSER, I)

This array stores the shop numbers of shops that borrow personnel from other shops (I = 1) or equipment (I = 2).

Base Parts Provisioning Policy Data (INPUT-#23/70 and 23/72)

BPARTS (I, MAXT, MAXB)

I = 1 Kind of base: 1 for in-place units to have POS/BLSS
2 for deployed unit to receive a WRSK
I = 2 Type of aircraft
I = 3 Number of aircraft (PAA)
I = 4 Peacetime sorties per day per PAA*100
I = 5 Wartime sorties per day per PAA*100
I = 6 Average peacetime base parts repair time (hours)
I = 7 Average wartime base parts repair time (hours)
I = 8 Peacetime order and ship time (days)
I = 9 Wartime order and ship time (days)
I = 10 One-way travel time to CIRF, when applicable (hours)
I = 11 Unity when all faulty parts are to be NRTSed
I = 12 ALPHA1; safety factor for high priority LRUs
I = 13 ALPHA2; safety factor for low priority LRUs
I = 14 BETA1; safety factor for high priority SRUs
I = 15 BETA2; safety factor for low priority SRUs
Average Sorties by Base (GENERATED)
BSESOR (MAXB)
Used during the multiple statistics computations.

Temporary Storage for Shelter Status (GENERATED)
BSHELT (MXSHL)
Stores the TSARINA-generated shelter damage status during the air attack computations.

Cumulative Sorties (GENERATED)
BSOR (MAXB)
Cumulative sorties by base.

Temporary Collection Array for Buddy Care (GENERATED)
BUDDY (NOPEOP + MAXT, I)
I = 1 Number of on-duty personnel selected to provide initial care for casualties
= 2 Number of off-duty personnel selected for buddy care

Munitions Build-up Task Heap (GENERATED)
BUILDQ (LBQ, I)
I = 1 Type of munitions
= 2 Completion time
= 3 Pointers: To heap (Unused elements)
= 4 Heap pointer
= 5 Prior task, same shop
= 6 Personnel Type*100/Number
= 7 First equipment type
= 8 Time task first attempted
= 9 Base*500/Assembly procedure
= 10 Alternate personnel type*100/Number
= 11 Facility where assembly is being conducted
= 12 Start time for current action
= 13 Total task time excluding CW effects
= 14 Percent job completion when current task began *100
= 15 Percent completion when task terminates *100
= 16 Work crew temperature when action terminates *100
(minus when crew is to collapse)
= 17 Time rate of change of temperature (°C/hr)
= 18 Second equipment type
Record of Pilot Shortages and Effects

CANCEL (I, MAXT, MAXB)

I = 1 Cumulative number of fully ready aircraft canceled from tentative flights because of pilot shortages
I = 2 Cumulative number of pilots needed to have met minimum flight size requirements, assuming that sufficient aircraft are ready
I = 3-5 Spare

Sortie Generation Capabilities

CANFLY (I, MAXM, MAXT, MAXB)

I = 1 Estimated daily limit without regard to available aircraft
I = 2 Estimated daily limit for aircraft of the specified type that are not constrained by a "hole"
I = 3 Estimated daily sortie limit for aircraft of specified type, taking into account all aircraft types on base

Time Required to Obtain a Part by Cannibalization

CANNTM (NOPART)

The additional on-equipment task time required to obtain a part by cannibalization; if -1, part may not be cannibalized. If < -1, cannibalization is permitted if more than DOCANN aircraft require this part type; the time required is the absolute value of CANNTM.

Cargo Shipped from CONUS

CARGO (NCARGO, I)

I = 1 Base*256 + Quantity
I = 2 Commodity class and type (coded)
(64 is added to the base number for parts enroute from a CIRF to a base at zero time)

Civil Engineering Job Queue

CEJOBQ (LTHCEQ, I)

I = 1 Base*512 /coded facility number
   (building numbers from 1 to 400; shelter numbers from 401 to 511; arc numbers from -1 to -400; runway segments from -401 to -511)
I = 2 Personnel#1 Type*100/number
I = 3 Personnel#2 Type*100/number
I = 4 Equipment#1 Type*100/number
I = 5 Equipment#2 Type*100/number
I = 6 Task initiation time
I = 7 Task completion time
I = 8 Pointers: To heap (Unused elements)
Heap pointer
= 9
Total time excluding CW effects
= 10
Percentage task completion when task began *100, or
(for runway and taxiway repairs) the number of repair
jobs
= 11
Percentage task completion when task terminates *100, or
(for runway and taxiway repairs) the percentages of
jobs completed when task terminates * 100
= 12
Work crew temperature when action terminates
(minus when crew is to collapse)
= 13
Time rate of change of temperature
= 14
1000*KIND/Reconstruction procedure being used
= 15
Reconstruction procedure (alternate location)
= 16

Civil Engineering Task Priority

(CERQTY (NOFAC, MAXB))
The facility number in the ith position is the ith on the repair
priority list.

Civil Engineering Task Requirements

(CERQTS (I, NOCE))

1 = 1 Time per unit task*100/time function
= 2 Personnel#1 Type*100/number
= 3 Personnel#2 Type*100/number
= 4 Equipment#1 Type*100/number
= 5 Equipment#2 Type*100/number
= 6 Material#1 Quantity*100/Type
= 7 Material#2 Quantity*100/Type
= 8 Alternate resource set
= 9 Task heat factor
= 10 Percent (*10) personnel that are casualties
= 11 Percent (*10) casualties that are fatal
= 12 Percent Type #1 equipment that is irreparably damaged
*128/percent Type #2 equipment that is irreparably damaged

Preset and Dynamic Parameter Change Storage

(CHANGE (NOCHG, I))

1 = 1 Time change is to be accomplished
= 2 Pointers: To time heap (unused elements)
= 3 Heap pointer
= 4 Type of change *100/miscellaneous data
= 5 Value after change (this number may be "packed": see
   subroutine MODIFY)
Temporary Part Generation Status Array (GENERATED)
CHECKED (NOPART)
Set to unity when part type has been checked in subroutine IPARTS.

Shipping Instruction Counter (GENERATED)
CHITEM (MAXB)
Assists data entry in the SHIPTO array.

Check Flight Task Data (INPUT-15/88)
CHKFLT (0:50, MAXT, I)
\[ I = 1 \quad \text{Root segment task number.} \]
\[ I = 2 \quad \text{Probability (x 10000) that a check flight will not be required when the task has been completed.} \]

CIRF Parts Repair Time Modifiers (INPUT-48)
CIRFTM (SHOP)
Modifies the nominal shop repair time at a CIRF by a specified percentage for Shop #1 to #24.

Check Filler Aircraft Assignment (GENERATED)
CKFILL (MAXT)
Automatically reset from zero to one whenever filler aircraft fall to zero; subsequently a check is made at midnight to assign any new, unassigned filler aircraft.

Check-Flight Control (INPUT-15/5)
CKFLGT (MAXT)
Check flights are considered when this array is initialized for an aircraft type.

Storage Array for Special Debugging Data (INPUT-2/6)
CKHEAP (25, I)
\[ I = 1 \quad \text{Time in TTU that the contents of a specific heap are to be listed} \]
\[ I = 2 \quad \text{Number denoting heap name (options to limit listing and to terminate execution)} \]
Discrete NOMINI override

CKMINI (MAXB)

Deactivates the NOMINI constraints on a base-by-base basis.

Part Types with Multiple Locations

CKQPA (NOPART)

Flags all LRUs and SRUs that are used in more than one location on an aircraft.

Critical Shops for Deferred Maintenance Reports

CKSHOP (12)

Up to 12 shops to be distinguished as "critical" shops in the periodic report of deferred aircraft maintenance (CT2/4).

Dimensions of Flight Surface Being Repaired

CMCL (MAXB)

CMCW (MAXB)

Length and width of flight surface currently being cleared for operations.

Aircraft Munition Configuration Data

CONFIG (NOCONF, I)

I = 1  Task #1—Time*100/distribution*10/personnel substitutability

  = 2  TRAP  Type*10/Number

  = 3  Equipment type 1

  = 4  Equipment type 2

  = 5  Personnel Type*100/Number

  = 6  Task #2—Time*100/distribution*10/personnel substitutability

  = 7  TRAP  Type*10/Number

  = 8  Equipment type 3

  = 9  Equipment type 4

  = 10  Personnel Type*100/Number

  = 11  Task #1 heat factor

  = 12  Task #2 heat factor

Scheduled Support Shipments from CONUS

CONUS (NOCONS, I)

I = 1  (Day of arrival-1)*480 + Hour of arrival*20

  = 2  Pointer to the position of the first item in the CARGO array
Heap for Personnel Who Are Cooling Off

COOLER (LCOOLQ, I)

I = 1 Completion time
   = 2 Pointers: To heap (unused elements)
   = 3 Heap pointer
   = 4 Team #1—Personnel type*100/humber
   = 5 Team #2—Personnel type*100/humber
   = 6 Base #512 + "facility" number
      (buildings 1 to 400; aircraft shelters 401 to 511;
       arcs from -1 to -400; parking ramps -401 to -511)
   = 7 Generic personnel type flag*1000/time in cooler

Parts Cost Data

COSTS (NOPART)
The cost of an individual part (LRU or SRU) in hundreds of dollars.

Data for Craters to Be Repaired to Open the MOS

CRATER (MXCRAT, I, MAXB)

I = 1 Crater radius
   = 2 Arc number on which crater is located

Critical Building for Civil Engineering Task Prioritization

CRBLDG (MAXB)

Unless civil engineering resources are sufficient to initiate repairs to
all damaged facilities up to and including the building with this priority,
reconstruction tasks are pursued with secondary procedures using lesser
resources.

Requests to Create Alternate Procedures

CR8DTA (100, I)

I = 1 Resource type to be replaced/10000*MODE
   (where MODE defines request as on-equipment or parts repair;
    personnel or equipment substitution)
   = 2 Resource type to be substituted; enter -1 if no resource is to be
      substituted
   = 3 Time modification factor, default = 1000
      If positive, time multiplier (a percentage) of basic procedure
      time*10/time distribution;
      if negative, absolute value is an additive time (TTU)*10/time
      distribution
   = 4 "Heat factor": if null, value for basic procedure is used
Temporary Parts Storage
CSTOCK (NOPART, I)
I = 1 Authorized on-base stocks
   = 2 Actual on-base stocks

Cross-Trained Personnel
CTPEO (NOPEOP)
Entry set to unity for personnel types that are cross-trained for any activity of another specialty.

Cross-Trained Personnel Types
CTPEOP (NOPEOP, I)
I = 1–5 Personnel types that may be substituted for on-equiment tasks.

Distribution of Hospitalization Times
CURE (10, I)
Five ten-element distributions indicating the hospitalization times for 100 percent of the affected personnel.
I = 1 Hours hospitalization after collapsing from excess heat
   = 2 Hours hospitalization after suffering ocular impairment
   = 3 Hours hospitalization after suffering toxic effects of Agent #1
   = 4 Hours hospitalization after suffering toxic effects of Agent #2
   = 5 Hours hospitalization after suffering toxic effects of Agent #3

Temporary Storage for Taxiway Contamination
CWARC (150, I)
I = 1 Initial surface deposition of Agent #1 or, when computed, fraction fatalities *10000
   = 2 Initial surface deposition of Agent #2; or, when computed, fraction hospitalized *10000
   = 3 Initial surface deposition of Agent #3; or, *1 after loss rates computed

Base Data Relating to CW Attacks
CWATTK (I, MAXB)
I = 1 Time of last attack that employed chemical munitions
   = 2 Location of first data in the MPPERS array
   = 3 Total number of monitoring points
   = 4 Number of chemical attacks that have been sustained
   = 5 Type of meteorological conditions that prevail currently
= 6 Number of Agent #1
= 7 Number of Agent #2
= 8 Number of Agent #3
= 9 Wind velocity in tenths of meters/second
= 10 Wind direction (degrees from North)
= 11 Ambient temperature for vapor computations
= 12 Switch: Reset from zero to 1 when on-base contamination is nonzero
= 13 Aircraft decontamination switch; see Card Type #17/9
= 14–15 Spare

Temporary Storage for Facility Contamination

CWFAC (NOPART, I)

I = 1 Initial surface deposition of Agent #1; or, when computed, fraction *10000
I = 2 Initial surface deposition of Agent #2; or, when computed, fraction *10000
I = 3 Initial surface deposition of Agent #3; or \( \frac{1}{10} \) after loss rates are computed

Meteorological Conditions

CWMET (1, 12, Type)

Typical meteorological conditions for 2-hour time increments for each of up to 20 different typical weather "types."

I = 1 Ambient temperature (deg C)
I = 2 Percent humidity
I = 3 Wind velocity in tenths of meters/second
I = 4 Atmospheric vertical stability category

Cumulative Resource Statistics for Multiple Trials

CWOUT (I, MAXB)

I = 1 Aircrews lost in combat
I = 2 Aircrews killed by air attacks
I = 3 Aircrews hospitalized by air attacks
I = 4 Average number of maintenance personnel
I = 5 Maintenance personnel fatalities
I = 6 Maintenance personnel hospitalizations
I = 7 Number of personnel that collapse from excessive temperature
I = 8 Number of personnel that have had to rest in "cooler"
I = 9 Total manhours in hospital during period of simulation
I = 10 Total manhours expended in "cooler"
I = 11 Aircraft lost in combat
12 Aircraft destroyed by air attack
13 Aircraft damaged by air attack
14 Numbers of equipments destroyed by air attack
15 Numbers of spare parts destroyed by air attack
16 Numbers of munitions destroyed by air attack
17 Total manhours expended in collective protection queues
18-24 Spare

Facility Chemical Protection Characteristics (INPUT #44/1)

CW PROT (I, CWTYPE)

I = 1 Temperature in facility relative to ambient: a minus quantity signifies temperature is this number of degrees C less than ambient; 0 signifies ambient; a positive number signifies that the temperature is controlled at this level

I = 2 Attenuation of the first agent in liquid form
I = 3 Attenuation of the first agent in vapor form
I = 4 Attenuation of the second agent in liquid form
I = 5 Attenuation of the second agent in vapor form
I = 6 Attenuation of the third agent in liquid form
I = 7 Attenuation of the third agent in vapor form
I = 8 Number of minutes for one exchange of the air in the facility

Temporary Storage for Aircraft Parking Ramp Contamination Data (GENERATED)

CWRAMP (40, I)

I = 1 Initial surface deposition of Agent #1; or, when computed, fraction fatalities * 10000
I = 2 Initial surface deposition of Agent #2; or, when computed, fraction hospitalized * 10000
I = 3 Initial surface deposition of Agent #3; or -1 after loss rates are computed

Temporary Storage for Aircraft Shelter Contamination Data (GENERATED)

CWSHEL (150, I)

I = 1 Initial surface deposition of Agent #1; or, when computed, fraction fatalities * 10000
I = 2 Initial surface deposition of Agent #2; or, when computed, fraction hospitalized * 10000
I = 3 Initial surface deposition of Agent #3; or -1 after loss rates are computed
Chemical Protection Equivalencies for TSARINA Target Types

CWTYP (30)

Specifies the TSAR number for the type of CW protection afforded by the 30 different TSARINA target types.

Base Damage Data

DAMAGE (NOITEM,I)

Data are packed differently for different types of resources.

I = 1 Resource Class

Personnel (#1) 10000 + Type
AGE/Equip (#2) 12000 + Type
Parts (#3) Type
Munitions (#4) 16000 + Type
TRAP (#5) 18000 + Type
Material (#6) 20000 + Type
POL (#7) 22000 + Type
Facilities (#9) 24000 + Type

I = 2 Resource Class

#1 through #7 and #9 Percent destroyed

For facilities, the casualty rate, equipment loss rate, and parts loss rate are stored in the following two columns of the DAMAGE array.

If no resource type is entered for classes 1, 2, 3, 4, 5, or 6, all types in the class sustain same level of damage.

Shelter Numbers for Damaged Shelters

DAMSHL (MXSHL, MAXB)

List of aircraft shelters, ordered from least to most damaged.

Personnel Shift Indicators

DAYNIT (NOPEOP)

Set to 1 for personnel types on day shift, to 2 when on night shift.

Deferred Task Storage Array

DEFTSK (LDT, I)

I = 1 Task number
= 2 Next task, same aircraft (unused elements)
= 3 Next task, same shop
= 4 Aircraft number*10 + Task status
Dehydration/Exhaustion Control Factors

DEHYD (6)

Factors that permit the cooling-off time to be adjusted for dehydration and exhaustion.

Resources Available to Replace Losses

DEPOT1 (NOPEOP)
DEPOT2 (NOAGE)
DEPOT3 (NOPART)
DEPOT4 (NOMUN)
DEPOT5 (NOTRAP)
DEPOT6 (NOMATL)
DEPOT7 for POL aircraft
DEPOT8 (MAXT) aircrews

Available quantities of each type of resource that may be requisitioned to replace losses; default = 32500.

Numbers of Data in the DETECT Array

DETASK (MAXT)

The number of undetected-task probabilities stored in the DETECT array.

Auxiliary Data on Undetected Tasks

DETECT (I, MAXT, NODECT)

I = 1 Unscheduled task number
    = 2 Probability task is not detected by an aircraft that lands at a DOB.

Duplicate Facility Data from TSARINA

DUPFAC (NOFAC, MAXB)

When two or more functions are located in the same building, these data identify the "facilities" that are so related; entry J in element I denotes that facility J occupies the identical area as facility I.

Heap for UXO Detonation Times

EXPLOD (NOUXO, I)

I = 1 Time the UXO is to detonate
    = 2 Pointers: To heap
    = 3 Heap pointer
    = 4 Base*100/Weapon type
    = 5 Arc number where UXO is located
Nonspecific Air Attack Casualty Rates (INPUT-#39/99)

EXTRAK (I, MAXB)

I = 1 Casualty loss rate of on-equipment maintenance personnel because of unaccounted-for reasons
I = 2 Casualty loss rate of preflight personnel because of nonspecific reasons
I = 3 Casualty loss rate of backshop personnel
I = 4 Casualty loss rate of munitions assembly personnel
I = 5 Casualty loss rate of civil engineering personnel
I = 6 Casualty loss rate of off-duty personnel

Temporary Facility Damage Data (GENERATED)

FACDAM (NOFAC, I)

I = 1 Flag Set to 1 if facility damaged by attack
I = 2 Percent of facility damaged
I = 3 Percent personnel lost
I = 4 Percent equipment lost
I = 5 Percent parts lost
I = 6 Percent personnel hospitalized from toxic effects
I = 7 Percent personnel hospitalized from conventional weapon effects

Collective Protection Entry Queue End Time (GENERATED)

FACLTE (NOFAC, MAXB)

Current estimate of the time when the queue of personnel waiting to enter a collective-protection facility will be empty (tenths of minutes from beginning of the simulation).

Facility Data for Other than Horizontal Surfaces (INPUT-#37)

FACLTY (I, NOFAC, MAXB) (excluding facility #39)

I = 1 Task type for reconstruction *100/Type of CW protection
I = 2 Size in units consistent with the CERQTS data
I = 3 Current percent damage*100
I = 4 Repair location in the CEJOBQ array
I = 5 Alternate shop location
I = 6 "Facility" where subsequent task type is defined
I = 7 "Facility" at origin of subsequent tasks; or for the primary "facility," minus the number of ongoing tasks, or minus 1000 if the "facility" is damaged
I = 8 Number of the closest monitoring point
I = 9 Personnel equilibrium temperature in facility (deg C*100)
I = 10 Time rate of change of temperature (at DELTA above equilibrium) when personnel are resting
I = 11 Number of MOPP appropriate under existing CW conditions
I.  
-54-  

12 Parent shop of a set of distributed shops  
13 Collective-protection facility processing capacity*1000  
   entry time in tenths of minutes  
14 Initial damage fraction*10000  
15 Repair capacity*100/simultaneity flag for subsequent task  

Special Facility Data for Aircraft Shelters  

11 Percent of total shelter repair task completed before this  
   repair step  
12 Percent of total shelter repair task completed during this  
   repair step  
13 Number of manhours to repair 25 percent damage to this type of  
   aircraft shelter  

Filler Aircraft  (INPUT-#20/77)  

FILLER (MAXT, I)  
I = 1 Number of aircraft available as fillers  
   2 Time required for a filler aircraft to reach assigned base  

Taxiway Repair Strategy Storage  (GENERATED)  

FIXARC (NOFIX, I, MAXB)  
I = 1 Number of a taxiway arc to be repaired (ordered by repair  
   priority); set to -1 when repairs have been completed and  
   the arc has access to MOS  
   2 Current kind of repair (1 = UXOs, 2 = Mines, 3 = Craters);  
   set to -1 when all repairs have been completed  
   3 Number of repairs of the current kind that have not yet been started  
   4 Number of repairs of the current kind that have been started  
   but have not yet been completed for this arc  
   5 Path number to the MOS from this arc  

Sortie Demand Data  (INPUT-#50)  

FLTRQT (MAXFLT, I)  
I = 1 Launch base*128/Air raft type*8/Mission  
   2 Priority*1000/Daily demand probability  
   3 Number aircraft required*32/Minimum number  
   4 Time flight calculated before takeoff*64/Recovery base  
   5 Flight time  
   6 Pointers: Next later flight—all bases  
   7 Next earlier flight (and unused element pointer)  
   8 Next flight same mission, aircraft, base  
   9 First aircraft assigned this flight  
   10 Number aircraft assigned
Fractional Capacity of Distributed Facilities (GENERATED) FRAC (NOFAC)

For distributed functions, contains that fraction of the undamaged functional capacity residing in the facility; generated in subroutine REORGN at the time of each air attack.

Temporary Parts Allocation Array (GENERATED) FRACBS (NOPART, MAXB)

Fraction of parts assigned to base rather than to the CIRF.

Fuel Truck Status (GENERATED) FUELER (40, MAXB)

Fuel truck status: Number of aircraft loads remaining, plus 100 if truck is in use (40 trucks maximum per base)

Fuel Truck Capacity and Refill Data (INPUT-#17/1) FUELOD (I, MAXB)

I = 1 Fuel truck equipment number*100/Aircraft loads per truck
    = 2 Fuel truck refill time
    = 3 Total number of fuel trucks on base with fuel

Part Replacement Time Flag (GENERATED) GTLMT (NOPART)

Flag designating that time for associated maintenance task exceeds MNTLMT.

Temporary Storage for Taxiway Damage (GENERATED) HITAID (I, MXARC)

I = 1 Number of UXOs on the taxiway arc from the current attack
    = 2 Number of mines on the taxiway arc from the current attack
    = 3 Number of craters on the taxiway arc from the current attack
    = 4 Personnel loss rate*128/Equipment loss rate
    = 5 Number of the first UXO type delivered by the current attack
    = 6 Number of the second UXO type delivered by the current attack
    = 7 Number of the third UXO type delivered by the current attack

Temporary Storage for Ramp Damage (GENERATED) HITRMP (I, MXRAMP)

I = 1 Personnel loss rate*128/Equipment loss rate
    = 2 Aircraft damage rate*128/Aircraft kill rate
**Task Time Multipliers**

**HURRY (MAXB, J, I)**

- **I = 1** Nominal percentage of standard task times
- **I = 2** Current percentage of standard task times
- **J = 1** Unscheduled on-equipment tasks
- **J = 2** Preflight tasks
- **J = 3** Off-equipment repairs
- **J = 4** Munitions assembly jobs
- **J = 5** Civil engineering jobs

**Incomplete CE Repair Job Data for Runway and Taxiway Repairs**

**ICEJOB (I, NCEJOB, MAXB)**

- **I = 1** $1000 \times \frac{\text{KIND}}{\text{INDEX}}$ (multiplied by $-1$ when job is being worked on)
  - where KIND = 1, 2, 3 for UXO removal, mine clearances, and crater repairs respectively, and INDEX defines the particular step of the current repair procedure; when the job is inactive (i.e., is not on the MOS or on a taxiway arc currently being repaired), this entry is set equal to $-(10000 \times \frac{\text{KIND}}{\text{INDEX}})$.
- **I = 2** NSEG or NTAXI For runway repairs, NSEG is the number of the entry in the RWYDAM array for which this runway repair job was initiated, and, for taxiway repairs, NTAXI is the number of the entry in the FIXARC array for which this taxiway repair job was initiated; when this repair job is inactive, NSEG or NTAXI is replaced by NARC, the (local) arc number of the repair.
- **I = 3** $2500 \times \text{Number of runway/Hill number.}$
- **I = 4** $10 \times \frac{\text{FCOMP}}{\text{Flag}}$ where FCOMP is the fraction of the repair task completed, and the flag designates when a subsequent task has been initiated.

**Temporary Pipeline Parts Storage**

**INPIPE (NOPART, MAXB, I)**

- **I = 1** Total in pipeline consigned to base
- **I = 2** Total in pipeline consigned off base

**Temporary Pipeline Storage**

**IPIPE (NOPART, I)**

- **I = 1** Total in pipeline to base
- **I = 2** Total in pipeline for base including off-base storage
Storage Array for Interrupted Tasks

INTTSK (LIQ, I)

I = 1  Task number, part or AGE repair procedure, or munition type
     = 2  Basic task number (if prior is alternate)
     = 3  Aircraft number*10/task status, or Base*64/Base of origin
         or Base *100/Assembly procedure (-aircraft number for a
         job that will need to be repeated)
     = 4  Pointers: Next task, same aircraft; LRU, for a simple repair;
         or –LRU, when job is SRU replacement; or
         –SRU(+10000), for an SRU repair; or –AGE(+20000)
         for an equipment repair (unused elements)
     = 5  Next lower priority task for shop
     = 6  Next higher priority shop task
     = 7  Remaining time
     = 8  Time basic task initiation attempted
     = 9  Time task element initiation first attempted
     = 10 Root segment fur elements of a task network
     = 11 Total task time, excluding CW effects
     = 12 Percentage task completed when interrupted
     = 13 Facility number where task was last assigned

Numbers of Manual Entries

ITEMS (MAXB)
Number of "manual" entries when automatic parts generation feature is used.

Temporary Data Storage in Subroutine INCOMP

JOBDTA (20, 2)

Cumulative Requirement for Rear-Base Maintenance

JOBPR (KIND, MAXT)
Cumulative probability of the tasks that must be carried out at a rear base for aircraft
based at a MOB (KIND = 1), or at a COB (KIND = 2).

Cumulative Number of Landings by Base

LANDNG (MAXB)

Lateral Resupply Bases

LATERL (I, MAXB)
Stores up to 14 bases that may be selected for lateral repair.
Heap for Reparable Parts and Equipment during Administrative Delays

LIMBO (NLIMBO, I)

I = 1  Part number
    = 2  Base*64/Original base
    = 3  Time delay began
    = 4  Time delay complete
    = 5  To heap (Unused elements)
    = 6  Heap pointer

Storage Array for Task Incompatibilities

LISTIN (LTHLST)
This linear array is used to store task numbers, shop numbers, and blocks of task numbers that are incompatible with specific on-equipment tasks.

Attrition Counter Used to Reduce Sortie Variance

LOWVAR (I, MAXM, MAXT, MAXB)

I = 1  Counter for aircraft combat attrition
  = 2  Counter for combat battle damage
  = 3  Counter for nonreparable battle damage

Materials Stocks

MATERL (NOMATL, MAXB)
Current on-base stock level for each type of material.

Numbers of Part Types Required In Rear

MAXOFF (KIND, MAXT)
Maximum number of part types that are required at a rear operating base for an aircraft at a MOB (KIND = 1), or at a COB (KIND = 2).

Personnel Types Used for Buddy-Care

MEDICS (MAX B, 10)
User-specified list of up to nine personnel types to be selected for buddy care if none of type injured are available.

Temporary Data Storage

MODBOR (10, 11)
Stores up to 11 shop numbers whose priorities are to be changed in the BORROW array for up to 10 leading shops; used during initialization.
Time to Change from Partial MOPP to Full MOPP  
MOPMOP (MOPP, I)  
I = 1  Time in minutes to change from preattack MOPP to MAXMOP  
    = 2  Spare

Preattack MOPP Requirements
MOPPOL (t, 3)
Specifies, for up to three different chemical ensembles, the MOPP required to be worn for each of the six generic task types before an attack is sustained or after all effects dissipate.

Storage for Aircraft Transfer Directives
MOVEAC (NOMOVE, I)
I = 1  Time when the transfer directive is to be activated  
    = 2  Pointers: To heap  
    = 3  Heap pointer  
    = 4  Base sending aircraft*100/Destination base  
    = 5  Aircraft type#100/Number of aircraft  
    = 6  Mission assignment for MOB aircraft to be transferred from a MOB

Time of Arrival of Chemicals at Monitoring Points
MPARR (NOMP)
Arrival time of droplets from closest (upwind) CW hit to the monitoring point (min).

Current On-Base Chemical Intensity Data
MPDOSO (I, I, NOMP, MAXB)
I = 1  Current estimate of the surface contamination of Agent J  
    = 2  Current estimate of the vapor concentration of Agent J

Temporary Storage for Preattack Contamination
MPDOSE (J, I, NOMP)
I = 1  Surface contamination from Agent J from prior attacks  
    = 2  Vapor concentration from Agent J from prior attacks

Current Vapor Concentration
MPDOST (Agent, CWTYPE, MP, MAXB)
Periodically updated record of the vapor concentration of each agent in facilities with different CVI protection (CWTYPE) at each monitoring point.
Chemical Deposition Data for Each Chemical "Hit" (TSARINA)

MPHIT (LTHCWH, J)

- 1 = Attack Time (attack # on input and changed to attack time) (TTU)
- 2 = Agent Number
- 3 = Wind Velocity (m/sec)
- 4 = Arrival time (min)
- 5 = TEE (steady-state time) (min)
- 6 = TAU (Total evaporation time) (min)
- 7 = Agent surface density (mg/m²)
- 8 = Agent steady-state vapor concentration (microgram/m²)

Pointers for Locating Chemical Deposition Data (GENERATED)

MPOINT (MAXB, NOMP, I)

- 1 = Pointer to first chemical hit entry in MPHIT for base and monitoring point (hits are ordered by base and monitoring point)
- 2 = Pointer to last chemical hit entry in MPHIT for base and monitoring point

TSARINA-Generated Personnel Location Data (INPUT-#40/10/5)

MPPERS (LTHPER)

Identifies the closest monitoring point and TSARINA target type for increments of personnel identified in TSARINA input data.

Munition Components Requirement Data (INPUT-#11/2)

MUNCOM (NOWEAP, 10)

The type number of weapon components/10/the number of that component needed to assemble a round; up to ten different component types for each type of munition.

Munition Component Trade-off Data (GENERATED)

MUNRED (I, J)

The number of munitions of type J that cannot be assembled when the components for one of type I are assembled*100.

Munition Requirements per Sortie (GENERATED)

MUNRQD (NOMUN, MAXM, MAXT)

Expected requirements for munitions per sortie times 100.

Munitions Build-up Resource Requirements (INPUT-#11/1)

MUNRQT (I, NOBILD)

1 = Time*10/Distribution (minus for unguided munitions)
= 2 Personnel: Type*100/Number
= 3 Equipment type 1
= 4 Equipment type 2
= 5 Number assembled each task*10/Personnel substitutability flag
= 6 Task heat factor
= 7 Alternate resource set

Ammunition Stocks
MUNSTK (NOMUN, I, MAXB)
- I = 1 Number available for loading
- I = 2 Number available for assembly
- I = 3 Total on base, except for I = 2
- I = 4 Temporary tally used during munitions construction

Phased Maintenance Period
MXPHAS (MAXT)
The period of the least frequent phased maintenance task (TTU).

Total Unscheduled Aircraft Maintenance Tasks
MXTASK (MAXT)
Total number of unscheduled maintenance task root segments.

Aircraft Recovery Status Data
NBREAK (I, 10 MAXT)
- I = 1 The number of aircraft to land with 1(1)9, 10 or more, Code 2 maintenance tasks
- I = 2 The number of aircraft to land with 1(1)9, 10 or more, Code 3 maintenance tasks
- I = 3 The number of aircraft to land with 1(1)9, 10 or more, Code 2 and Code 3 tasks.

Estimated Munitions Loads
NOAMMO (MAXM, MAXT, MAXB)
Available munition loads; updated periodically in subroutine PLAN.

Node (Taxiway Intersection) Data
NODE (NONODE, 2)
- I = 1 Number of aircraft shelters associated with the node
- I = 2 Zero if the runway is accessible from node; or the number of the arc whose repair will permit access
Extend Deferred Maintenance (INPUT-#17/12)
NODEFD (8, MAXB)
List of aircraft types for which deferred maintenance should not be initiated while the aircraft is on a specified base.

Base Arc and Node Data (INPUT-#17/3)
NODES (I, MAXB)

I = 1 Number of the first node at base (location in the NODE array)
= 2 Number of nodes on base
= 3 Number of the first arc (taxiway segment) at base (location in the ARC array)
= 4 Number of arcs on base

The following three data may be changed from the values specified in the TSARINA data by using either Card Type #17/7, or Change #25 with Card Type #49

= 5 The number of surfaces to be examined for a minimum operating surface (MOS)
= 6 MCL—the length required for an MLS
= 7 MCW—the width required for an MOS
= 8 Equilibrium temperature for personnel in the open
= 9 Time rate of change of temperature (at DELTA above equilibrium)
= 10 Personnel MOPP appropriate in the open when VARMOP = 0
= 11 Number of the first aircraft parking ramp at the base
= 12 Spare
= 13–15 The arc number corresponding to the hot-pit refueling locations for the three squadrons

Current Number of Damaged Aircraft Shelters (GENERATED)
NODSHL (MAXB)

Main Shop Repair Constraints (INPUT-#35/3)
NOMINI (NOPART)
Part types specified must be repaired in the parent facility; minishop capabilities in the other locations for a distributed facility are inadequate.

Number of QPA Array Entries (GENERATED)
NOQPA (MAXT)
The total number of entries in the QPA array for each aircraft type.
Current Number of NMCS Aircraft
NOR (MAXB) (GENERATED)

Current Number of NMCS and Battle Damaged Aircraft
NORBD (MAXB) (GENERATED)

Cumulative Number of NMCS Hours at Each Base
NORHRS (MAXB) (GENERATED)

NMCS Aircraft Storage
:TORQ (LNOR, I) (GENERATED)

I = 1 Aircraft affected
   = 2 Pointer to next aircraft, same item (or unused elements)
   = 3 Time remaining until the ready-to-fly time at time of report

Number of XROOT Array Entries
NROOT (MAXT) (GENERATED)

The total number of entries in the XROOT array for each aircraft type.

AIS Station Status
NSTAT (NOSTAT, I, MAXB)

I = 1 Total number of stations of each type on base
    = 2 Number in stations in use

Parts Requirement for Rear-Base Maintenance
OFFBSE (KIND, 50, I, MAXT) (GENERATED)

J = 1 Part number
    = 2 Probability (*10000) that an aircraft at an MOB (KIND = 1), or a COB (KIND = 2), will require the part at a rear maintenance base

Temporary Part Demand Storage
OFFCOB (NOPART, MAXT) (GENERATED)

Per sortie part demand probability at a COB that will be handled at a rear maintenance base.

Temporary Part Demand Storage
OFFMOB (NOPART, MAXT) (GENERATED)

Per sortie part demand probability at an MOB that will be handled at a rear maintenance base.
Arrays for On-Equipment Task Delay Data (GENERATED)

OUTAGE (I, NOAGE, MAXB) AGE and equipment
OUTFAC (I, 30, MAXB) Facilities
OUTMAT(I, NOMATL, MAXB) Building materials
OUTMUN (I, NOMUN, MAXB) Munitions
OUTPER (I, NOPEOP, MAXB) Personnel
OUTPOL (I, MAXB) Fuel
OUTPRT (I, NOPART, MAXB) Parts
OUTTRP (I, NOTRAP, MAXB) TRAP

\[ I = 1 \quad \text{Incidents} \times 10^6 / \text{Sum of the delay times} \]

\[ = 2 \quad \text{Sum of the delay times squared} \]

Arrays for Off-Equipment Repair Delay Data (GENERATED)

OUTPEO (I, NOPEOP, MAXB) Personnel
OUTEQP (I, NOAGE, MAXB) Equipment

\[ I = 1 \quad \text{Incidents} \times 10^6 / \text{Sum of delay times} \]

\[ = 2 \quad \text{Sum of delay times squared} \]

Sortie Production Data (GENERATED)

OUTPT1 (I, PRTY, MAXM, MAXT, MAXB)

\[ I = 1 \quad \text{Cumulative sorties demanded during day} \]

\[ = 2 \quad \text{Cumulative sorties flown during day} \]

\[ = 3 \quad \text{Flight data: PRTY = 1 Demanded daily} \]

\[ = 2 \quad \text{Launched daily} \]

\[ = 3 \quad \text{Demanded overall} \]

\[ = 4 \quad \text{Launched overall} \]

\[ = 4 \quad \text{Cumulative sorties demanded during simulation} \]

\[ = 5 \quad \text{Cumulative sorties flown during simulation} \]

Daily Shop Completion Records (GENERATED)

OUTPT2 (I, J, SHOP, MAXB) (for Shops #1 to #25)

\[ I = 1 \quad \text{Daily number for each shop at each base} \]

\[ = 2 \quad \text{Cumulative number for each shop at each base} \]

\[ = 3 \quad \text{Spare} \]

\[ J = 1 \quad \text{On-equipment tasks} \]

\[ = 2 \quad \text{Off-equipment parts repair jobs} \]

\[ = 3 \quad \text{AGE repair jobs} \]

Effectiveness Summaries for Sorties Flown (GENERATED)

OUTPT3 (I, MAXM, MAXT, MAXB)

\[ I = 1 \quad \text{Daily total of sortie-effectiveness-proxy values} \]

\[ = 2 \quad \text{Cumulative total of these values} \]
Overall Sortie Production Data (GENERATED)

OUTPT4 (I, J, MAXM, MAXB)

I = 1  Sorties for day J cumulated over all trials
    = 2  Square of the Jth days sorties, cumulated over all trials

Shop Manhour Expenditure Records (GENERATED)

OUTPT5 (I, SHOP, MAXB)

I = 1  Cumulative manhours on on-equipment tasks by men assigned to the shop
    = 2  Cumulative manhours on parts repair jobs assigned to the shop
    = 3  Cumulative manhours on equipment repair jobs assigned to the shop

Shop Activity Records (GENERATED)

OUTSHP (I, SHOP, MAXB)

I = 1  Cumulative number of on-equipment tasks
    = 2  Sum of total time for on-equipment tasks from the first attempt to initiate until completion
    = 3  Sum of on-equipment task times squared
    = 4  Cumulative number of off-equipment repair jobs
    = 5  Sum of total time from first attempt to initiate repair until completion
    = 6  Sum of off-equipment repair times squared
    = 7  Cumulative number of AGE repair jobs
    = 8  Sum of total time from first attempt to initiate repair until completion
    = 9  Sum of AGE repair times squared

Preacttack Worst Monitoring Point Data (GENERATED)

OWORST (CWTYPE)
Temporary storage of WORST array data immediately prior to the time of an attack.

Parts Requirements (GENERATED)

PARTRQ (NOPART, MAXT)
Expected number of parts required per sortie (*10000).

Spare Parts Stocks (INPUT-#23)

PARTS (NOPART, I, MAXB)

I = 1  Number serviceable on base*100/Shop number
    = 2  Number reparables on base*100/Total items in shop
    = 3  Nominal stock level*128/Percent NRTS
    = 4  Pointer to NORQ array of first aircraft that requires part or -LRU
= 5 Number of aircraft requiring part*100 (or number of LRUs waiting for this SRU*100)/Number serviceables enroute to an operating base (or number reparables enroute to the CIRF)

**Base Personnel** (INPUT-#21)

PEOPLE (NOPEOP, I, MAXB)

I = 1 Total available on base
I = 2 Number on "day" shift
I = 3 Unassigned*100/Assigned off-equipment
I = 4 Nominal shop*100/Minimum number on shift
I = 5 Number personnel enroute to base
I = 6 Shift change status: =1 when checked; =2 all released
I = 7 Number remaining to be released after shift change
I = 8 Personnel lost during current shift
I = 9 Time last personnel were released from cooler
I = 10 Number of off-duty personnel currently providing buddy care
I = 11 Total number authorized (target number
I = 12 Authorized size of the "day" shift (target number)

**Resource Report on Personnel** (GENERATED)

PEORPT (I, NOPEOP, MAXB)

I = 1 Data in transit for total personnel on base
I = 2 Data received for total personnel on base

**Personnel Requirements** (GENERATED)

PEORQT (NOPEOP, MAXM, MAXT)

Likelihood needed*(10**7)/Expected requirements for personnel per sortie (10000 * men * TTU).

**Periodic/Scheduled Task Time Heap** (GENERATED)

PERIOD (I, J)

I = 1 Planning and shift changes
I = 2 Next flight schedule input time
I = 3 Next time for scheduling flights, if none input
I = 4 Next time for an early morning inspection
I = 5 Next time for periodic resource management
I = 6 Schedule intratheater shipments
I = 7 Receive shipments from CONUS
I = 8 Next shipment departure
I = 9 Next shipment arrival
I = 10 Transmit and receive reports
I = 11 Periodic "hole" summary
= 12 Conclude administrative parts delays
= 13 Periodic computation of base capabilities
= 14 Next parameter change
= 15 Next airbase attack
= 16 Next special report of deferred tasks
= 17 Next time to release buddy care personnel
= 18 Time for next update of CW conditions
= 19 Time for next update of CW conditions
= 20 Time to initiate next aircraft transfer directive
= 21 Time of next UXO explosion
= 22 Time for next periodic reprioritization of reparables
= 23–24 Spare

J = 1 Time of earliest event
= 2 Pointers: To time heap
= 3 Heap pointer

**Phased Maintenance**

PHASED (100, MAXT, I)

I = 1 Times at which phased maintenance is required (TTU)
= 2 Root segment for required task network

**Aircrew Status Data**

PILOT (1, NOCREW)

I = 1 Pointer: Next crew at rest, same aircraft type
= 2 Next crew on-duty, same aircraft type
= 3 Earliest time off-duty period complete or time on-duty
= 4 Landing time most recent flight
= 5 Tentative assignment flag
= 6 Facility number where crew is located

**Aircrew Locator Data**

PILOTS (I, MAXT, MAXB)

I = 1 Number of aircrews on base
= 2 Pointer: First aircrew assigned to rest
= 3 Last aircrew assigned to rest
= 4 First on-duty aircrew
= 5 Last on-duty aircrew

**List for Personnel Utilization Record**

PLIST (I, 75, MAXB)

I = 1 Number of personnel type
= 2 Size of day shift at time zero
= 3 Size of night shift at time zero
On-Base Parts Repair Policy Data (INPUT-#23/2xx and #23/3xx)

POLICY (NOPART, MAXB, I)

I = 1 The NRTS rate for each part at each base when there is no CIRF*106
= 2 The NRTS rate for each part at each base when there is a CIRF*100

Base Fuel Stocks (INPUT-#27)

POLSTK (MAXB)

On-base fuel stocks.

Postprocessor Control Data (INPUT-#25/5 Supp)

PPC (80)

Controls the output of up to 80 records for postprocessing as specified by the user. Formatted records are stocked on devices 8 or 9 when PPC(-) is greater than zero. If PPC(-)
= 2, the corresponding TSAR listing is omitted from the normal output for many of these records. See Sec. XV.4, Vol. I, for particulars.

Periodic Flight Data Storage (INPUT-50)

PRDFLT (MAXFLT, I)

I = 1 Launch base*128/Aircraft type*8/Mission
= 2 Priority*1000/Daily demand probability
= 3 Number flights required*1024/Number aircraft required*32/Minimum number of aircraft that are acceptable
= 4 Time flight announced before takeoff(hr)*16/Recovery base
= 5 Launch time uncertainty (min/10)*512/Daily launch time

Collective Protection Facilities (INPUT-#43/6)

PROTEC (I, FLAG, MAXB)

I = 1 First of a set of facilities used for collective protection of personnel that must cool off when USECP ≥ 1
= 2 Nominal time (TTU) for entering facility *100/Distribution

FLAG = 1: Aircraft maintenance personnel
= 2 Backshop repair personnel
= 3 Munitions assembly personnel
= 4 Civil engineering personnel

* If PROTEC(1, 1, -) is zero, the squadron "assembly" locations will be used for collective protection when USECP ≥ 1.

Part Criticality Data (GENERATED)

PRTCRT (NOPRT, 2)

Provides a record of the criticality of each part for up to nine types of aircraft for which it may be used and for each mission that that aircraft type may fly.
Aircraft Parts List

PRTLST (NOPRT)
Entries are part number*10/Number installed on each aircraft; these data are used only to indicate components that may be salvaged for a damaged aircraft.

Resource Reports on Parts

PRTRPT (I, NOPART, MAXB)
I = 1 Data in transit regarding number of usable parts
= 2 Data received regarding number of usable parts
= 3 Reparables on base—Data received*128/Data in transit
= 4 Number aircraft NORS—Data received*128/Data in transit

Temporary Parts Demand Data

PRTRQ (NOPART, I, MAXT)
Temporary storage array for accumulating demand for a part needed in a task network after parallel paths have split and rejoined (see subroutine CKSPLT).
I = 1 Cumulative probability part is required on mutually exclusive paths
= 2 Cumulative probability part is required on nonmutually exclusive paths

Flight Requirements Pointers

PTZ (MAXM, MAXT, MAXB)
Pointer to location of first sortie demand of a specific type

Multiple Part Location Data

QPA (LTHQPA, I, MAXT)
I = 1 Number of the part
= 2 Pointer to the next alternate
= 3 Count (minus) of the alternate locations for the "prime," or number of the prime for alternate parts
= 4 First task number where part appears
= 5 Priority for cannibalization

Aircraft Parking Ramp Data

RAMPS (I, NORAMP)
I = 1 Relative aircraft parking capacity
= 2 Number of closest monitoring point
= 3 Personnel MOPP appropriate for CW conditions on the ramp
= 4 Number of a node adjacent to the ramp
= 5 Current number of aircraft assigned
MOS Extension Status Flag
RCLEAR (MAXB)
Maintains current status of MOS extension activity.

Personnel Availability at Shift Change
READY (30, MAXB)
Rally used to count available personnel at time shift changes; used only when USECW > 0.

Daily Aircraft Activity Storage Array
RECORD (24, I, MAXREC)
I = 1 Time of day for completion of task
   = 2 Time of day task was initiated
   = 3 Task number; zero designates a sortie; -1, a lost aircraft

Task Time Reduction Factors
REDUCE (MAXB, J, I)
I = 1 Nominal reduction in TTU in standard task times
   = 2 Current reduction in TTU in standard task times
J = 1 Unscheduled on-equipment tasks
   = 2 Pre-flight tasks
   = 3 Off-equipment repairs
   = 4 Munitions assembly jobs
   = 5 Civil engineering jobs

Theater Resource Requisition Control Data
REFILL (I, J)
I = 1 Switch*100/Time distribution
   = 2 Mean resupply time
J = Resource Class
Temporary Split Rejoin Records
(REJOIN (NJINT, I))
Maintains record of parallel paths that have not yet rejoined.
I = 1 Task element where paths rejoin
= 2 Pointer to next path location that rejoins (unused elements)

Relative Importance of On-Equipment Tasks
(RELIMP (33, MAXM))
Stores, for each task criticality index, the number of missions for which task is critical.

Mine Removal Procedures Data
(REMINE (I, MAXB, J))
I = 1 Manual removal of 10 mines on runway
   = 2 Manual removal of 10 mines on taxiway
   = 3 Sweeping mines on 1000 feet of runway
   = 4 Sweeping mines on 1000 feet of taxiway
J = 1 CE procedure number (CT38)
   = 2 Manhours (TTU) for completion
I = 5 Factor controlling use of the less efficient mine-clearing procedure
J = 1 Runways
   = 2 Taxiways

Fully and Partially Completed Crater Repairs
(REPAIR (MAXB, 1000))
2500*Runway number/Hit number

Alternative Parts Repair Procedures
(REPALT (NOREPA, I))
I = 1 Required time*10/distribution
   = 2 Personnel Type*100/number
   = 3 Equipment type 1
   = 4 Equipment type 2
   = 5 Alternate resource set
   = 6 Heat factor

Daily Base Resource Reporting Schedules
(REPORT (NOREPT, I))
I = 1 Transmittal or receipt time (20*HR+MIN/3)
   = 2 Heap pointers
- 72 -

= 3 Heap pointers
= 4 Base

**Storage Queue for In-process Parts Repair** (GENERATED)

REPQ (LRQ, I)

I = 1 Part or equipment repair resource set
I = 2 "Basic" resource set (if prior an alternative)
I = 3 Base*64/Base of origin
I = 4 Completion time
I = 5 Pointers: To time heap (Unused elements)
I = 6 Heap pointer
I = 7 Prior repairs, same shop
I = 8 Resources: Personnel Type*100/Number
I = 9 First equipment type required
I = 10 Parent LRU, for an SRU replacement job; SRU(+10000), for an SRU repair; or, AGE(+20000), for an equipment repair; -PART for simple repairs
I = 11 Time job initiation first attempted
I = 12 Facility where repair is being conducted
I = 13 Start time for current activity
I = 14 Total task time excluding CW effects
I = 15 Percent task completion when current action began *100
I = 16 Percent task completion when action terminates *100
I = 17 Work crew temperature when action terminates °C*100
   (minus when crew is to collapse)
I = 18 Time rate of change of temperature (°C*100/hr)
I = 19 Alternate personnel type*100/Number
I = 20 Second equipment type required

**Basic Parts Repair Procedures** (INPUT-#8)

REPRQT (NOREP, I)

Data content varies for parts with one or more types of repair, for an LRU and for SRUs. See Table C.1.

**Requisitioned Resource Storage Heap** (GENERATED)

RESUPP (LGQ, I)

I = 1 Base*256 + Number
I = 2 Resource class and type (coded)
I = 3 Arrival time
I = 4 Pointers: To time heap (Unused elements)
I = 5 Heap pointer
### Table C.1
ALTERNATE ENTRIES FOR THE REPROT ARRAY

<table>
<thead>
<tr>
<th>Simple Part with Single Repair Procedure</th>
<th>SRU or Repair Procedure</th>
<th>LRU or Part with Multiple Repair Procedures</th>
<th>Subsequent Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = 1 Shop<em>10/P.S.</em></td>
<td>Next procedure or &lt;SRU</td>
<td>Shop</td>
<td>PARENT procedure</td>
</tr>
<tr>
<td>2 = Mean repair time*10/distribution</td>
<td>Time*10/distribution</td>
<td>Expected time*10</td>
<td>Expected time*10</td>
</tr>
<tr>
<td>3 = Personnel: Type*100/Number</td>
<td>Personnel</td>
<td>-1 for LRU</td>
<td>Personnel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-2 for multitask</td>
<td></td>
</tr>
<tr>
<td>4 = Type 1 equipment</td>
<td>AGE1</td>
<td>First procedure or SRU</td>
<td>AGE1</td>
</tr>
<tr>
<td>5 = Alternative resource set</td>
<td>Alternate</td>
<td>Alternate</td>
<td>Alternate</td>
</tr>
<tr>
<td>6 = MTBF (where MTBF is expressed as units per failure and is generated in subroutine AVGTSK)</td>
<td>Probability*10000/PS</td>
<td>MTBF</td>
<td>PS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Probability procedure</td>
<td>Probability procedure is required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Probability procedure for a procedure rather than an SRU</td>
<td></td>
</tr>
<tr>
<td>7 = First SRU repair procedure: 1.5 for a procedure rather than an SRU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 = Repair heat factor</td>
<td>Heat factor</td>
<td>Heat factor</td>
<td></td>
</tr>
<tr>
<td>9 = Subsequent procedure</td>
<td>Subsequent procedure</td>
<td>Subsequent procedure</td>
<td></td>
</tr>
<tr>
<td>10 = Expected time for remaining repair</td>
<td>Remaining time</td>
<td>Remaining time</td>
<td></td>
</tr>
<tr>
<td>11 = Type 2 equipment</td>
<td>AGE2</td>
<td>AGE2</td>
<td></td>
</tr>
<tr>
<td>12 = Percentage condemned</td>
<td>Percentage condemned</td>
<td>Percentage condemned</td>
<td></td>
</tr>
</tbody>
</table>

*P.S. = personnel substitutability.
**Aircraft Readiness Record** *(GENERATED)*

RINDEX (I, MAXB)

1 = 1  
Cumulative number of aircraft readied for flight in two hours

2 = 2  
Cumulative number of aircraft readied for flight in four hours

3 = 3  
Cumulative number of aircraft readied for flight in six hours

4 = 4  
Cumulative number of aircraft readied for flight in eight hours

**Twenty-four-Hour Aircraft Readiness Record** *(GENERATED)*

RINDX (48, MAXB)

Cumulative number of aircraft readied for flight in each of 48 half-hour periods after landing.

**Runway-Node Relationship Data** *(GENERATED)*

RNWYZ (I, MAXB)

Position in the RWYARC array where the data for the westernmost arc of the Ith runway at the base is stored.

**Part Location in Task Network Structure** *(GENERATED)*

ROOTS (NOPART, MAXT)

Entry is task network root element for network within which part is located.

**Chemical Protection Requirement Thresholds** *(INPUT-#44/4)*

RQDMOP (I, L, AGENT, EFFECT, ENSEMBLE)

L = 1 to 5 Up to five thresholds corresponding to different MOPP requirements. To be entered in order of descending intensity

I = 1  
Intensity threshold

2 = 2  
MOPP required at or above threshold

**Temporary Storage of Mandatory Aircraft Tasks** *(GENERATED)*

RQDTSK (LRT, I)

I = 1  
Task number

2 = 2  
Pointer to next task, same ac (or unused elements)

3 = 3  
Task status*100 + check flight flag

**Runway Crater Repair Procedures** *(INPUT-#37/77)*

RRRTSK (I, L)

I = 1–10  
CE procedure numbers (CT38) for 1–10 steps of the crater repair procedure
Total manhours (TU) to repair the crater = 11
Total time (TU) to repair the crater = 12

L = 1–10  Repair procedures for up to ten different crater radii (to be entered in order of increasing radius)

Runway-Arc Equivalent Data

Runway-Arc Equivalent Data (INPUT-#17/6)

RWYARC (NORARC, I)

I = 1  Arc numbers of the arcs that make up the runways; ordered from the westernmost end of runway
I = 2  Length to the eastern end of the arc, measured from the western end of the runway (100s of feet)

Status of MOS Clearance Activities

Status of MOS Clearance Activities (GENERATED)

RWYDAM (32I, MAXB)

I = 1  Number of UXO removals not yet started on this MOS section (arc)
I = 2  Number of mine clearances not yet started on this MOS section
I = 3  Number of crater repairs not yet started on this MOS section
I = 4  Number of UXO removals underway on this MOS section
I = 5  Number of mine clearances underway on this MOS section
I = 6  Number of crater repairs underway on this MOS section
I = 7  Initial number (after last attack) of craters on this MOS section
I = 8  Arc number (absolute) of this section of the MOS

Position of the MOS in the Taxiway Network

Position of the MOS in the Taxiway Network (GENERATED)

RWYNOD (I, MAXB)

I = 1  Number of the node at the MOS location
I = 2  Arc number of the taxiway arc at the MOS location

Runway Repair Status Data

Runway Repair Status Data (GENERATED)

RWYREP (I, MAXB)

I = 1  Number of MOS clearance jobs (UXOs + mines + craters) that have not yet been completed for the current MOS (i.e., those underway plus those not yet started)
I = 2  Time of last TSARINA generated airbase attack
I = 3  Current cumulative number of TSARINA generated airbase attacks
I = 4  Number of UXO removals not yet started on the MOS
I = 5  Number of mine clearances not yet started on the MOS
I = 6  Number of crater repairs not yet started on the MOS
I = 7  Number of the runway selected for the MOS
I = 8  Current cumulative number of repaired craters on the MOS
I = 9  Number of craters to be repaired to open the MOS
= 10  Arc number of first (in time) MOS arc on which runway
  clearance has started but is not yet complete
= 11  Westernmost X-coordinate of the MOS
= 12  Southernmost Y-coordinate of the MOS
= 13  Length of extended MOS
= 14  Width of extended MOS
= 15  Runway clearance extension mode
= 16  Estimated time runway will be reopened
= 17  Cleared runway length required to discontinue use of mobile
  arresting gear
= 18  The step size for checking skewed MOS locations
= 19  The off-axis angle of a skewed MOS (0.25 * RWYREP(18,-)
  *RWYREP(19,-) degrees)
= 20  Spare

Task Time Save Factors

SAVE (MAXB, J, I)

J = 1  Nominal reduction in overall task times in TTU
= 2  Current reduction in overall task times in TTU

J = 1  Unscheduled on-equipment tasks
= 2  Preflight tasks
= 3  Off-equipment repairs
= 4  Munitions assembly jobs
= 5  Civil engineering jobs

SCL Preference Listing

SCLP (Priority(10), MAXM, MAXT, I)

I = 1  Aircraft combat loading in order of preference for each aircraft
  and mission
= 2  Mission-SCL sortie effectiveness proxy

Resource Requirements for Loading SCLs

SCLRQT (NOSCL, I)

I = 1  Configuration*10/Flag: shop required if unity
= 2  Required time for first munitions*100/distribution*10/personnel
  substitutability
= 3  #1 Type ammunition Type*100/Number
= 4  Loading equipment type 1 EQP1*100/EQP2
= 5  Loading equipment type 2
= 6  #1 Personnel required Type*100/Number
= 7  Required time for second munitions*100/distribution*10/personnel
  substitutability
= 8  #2 Type ammunition Type*100/Number
= 9  Load equipment type 3
= 10 Load equipment type 4
= 11 #2 Personnel required Type*100/Number
= 12 Task #1 heat factor
= 13 Task #2 heat factor

Random Number Stream Control

SEEDED (10)
Controls for the ten controlled random number streams that are disengaged using entries on the #2/2 Card.

Seeds for the Controlled Random Number Generators

SEEDS (10)
Ten seeds are stored for random number streams that may be repeated from trial to trial (see SEEDED).

Aircraft Shelter Data

SHELT (NOSHEL, 1)

I = 1 Number of positions currently available for aircraft *100/
   shelter capacity (set to −1 when destroyed; −100*capacity
   when damaged
= 2 Next empty shelter
= 3 Intensity of CW contamination after last attack
= 4 Number of node at which the shelter is located
= 5 Number of closest monitoring point
= 6 Personnel MOPP appropriate for current CW conditions
= 7 Fraction of shelter damaged (not changed until repair complete)
= 8 Repair procedure interrupted or waiting
= 9 Fraction of the repair step completed (*10000) (not including
   work currently underway)
= 10 Location of aircraft shelter repair in the CEJOBQ array
= 11 Location in the FACLTY array of the first "duplicate" facility
= 12 Type of shelter

Aircraft Shelter Data Summary

SHELTS (1, MAXB)

I = 1 Original number of shelters on base
= 2 Original number of special alert shelters
= 3 First unoccupied shelter
= 4 Last unoccupied aircraft shelter
= 5 Number of the first shelter on base
= 6 Number of the last shelter on base
= 7 Equilibrium temperature for personnel in shelters
= 8  Time rate of change of temperature (at DELTA above equilibrium)
= 9  Personnel MOPP appropriate in shelters when VARMOP = 0
= 10 Number of parking ramps for aircraft in the open

Actual Intra-Theater Shipping Schedules  (GENERATED)
SHIP (NOSHIP, I)

I = 1  Shipment number (i.e., position in SHIPSC array)
I = 2  Departure time
I = 3  Arrival time
I = 4  Pointers: Next departure, same base
I = 5  Next departure, all bases
I = 6  Next arrival, all bases
I = 7  SHIQP location of first resource in shipment

Intra-Theater Shipment Storage  (GENERATED)
SHIPQ (NOPKG, I)

Unit quantities of the various resources must be defined such that the "quantity shipped" is never as large as 256.

I = 1  Base of origin * 256  + Quantity
I = 2  Resource class and type (coded)
I = 3  Pointer to next item, same origin, same destination, and same shipment (unused elements)
I = 4  Spare

Nominal Shipping Schedules  (INPUT-#32/1)
SHIPSC (NOSHP, I)

I = 1  Origination base * 64 / Destination
I = 2  Last day scheduled * 100 / Departure frequency (days)
I = 3  Nominal departure hour

Nominal Transportation Time Delays  (INPUT-#32/2)
SHIPTM (Origin, Destination, I)

I = 1  Takeoff delay * 16 / time distribution
I = 2  Enroute time * 16 / time distribution
I = 3  Probability of arrival * 100 (is set negative when no shipment schedule is active for origin and destination)

Parts Shipping Instructions  (INPUT-#34,#35/5)
SHIPTO (NOPART, MAXB)

This array stores the base number for a NRTSed part for each type of part and for each base.
Temporary Shop Equipment Storage Array
SHOPAG (NOAGE)
Used to store damage data during airbase attack computations.

Temporary Shop Personnel Storage Array
SHOPEO (NOPEOP,I)
Used to store TSARINA personnel loss estimates temporarily during airbase attack computations.

I = 1 Fraction of the on-duty personnel who are casualties
    = 2 Fraction of the on-duty personnel who are hospitalized because of toxic effects (i.e., are not fatal)
    = 3 Fraction of the off-duty personnel who are casualties
    = 4 Fraction of the off-duty personnel who are hospitalized
    = 5 Fraction hospitalized because of conventional effects

Shop Facility Requirements for On-Equipment Tasks
SHOPRQ (SHOP, MAXM, MAXT)
Average probability that shop facility is required per sortie.

Shop Activity Status Array
SHOPS (I, SHOP, MAXB)

I = 1 Number of on-equipment tasks in process
    = 2 Number of parts repair jobs in process (or minus percent damage)
    = 3 Pointers: First interrupted task
    = 4 Last interrupted task
    = 5 Number of interrupted tasks
    = 6 First waiting task
    = 7 Last waiting task
    = 8 Number of tasks waiting
    = 9 First task in TASKQ
    = 10 Last task in TASKQ
    = 11 First interrupted repair
    = 12 Last interrupted repair
    = 13 Number of interrupted repairs
    = 14 First waiting repair
    = 15 Last waiting repair
    = 16 Number of repairs waiting
    = 17 First repair in REPQ
    = 18 Last repair in REPQ
    = 19 Hour (even-numbered) that day shift begins
    = 20 Pointer to first shop that borrows personnel*128/Percent of tasks for which the aircraft is partially exposed while in a shelter
= 21  First deferred task  
= 22  Last deferred task  
= 23  Pointer to first shop that borrows AGE  
= 24  Current job capacity at distributed shop locations  
              (default=10000)  
= 25  Set to unity when the shop capacity is absolute, rather than relative  
= 26  Set to 1 when shop is a parent shop of a distributed set and  
           is closed  
= 27  Estimate of time shop damage will be repaired  
= 28  Spare  

Part Shortage Percentage  
(GENERATED)  
SHORT (NOPART)  
Temporary storage array in IPARTS.  

Shop Sequence Control Data Array  
(INPUT-#29)  
SHPORD (50, MAXT, MAXB)  
A zero separates simultaneous sets of tasks and shops; two zeros end the sequence.  

Shipment Pointers  
(GENERATED)  
SHPT (Origin, Destination, I)  
I = 1  Location of the first shipment in the SHIP array  
= 2  Location of the last shipment in the SHIP array  
= 3  Pointer to the position in the SHIPQ array of first item without  
           scheduled transport  

Shop Task Probability Storage  
(INPUT-#7)  
SHPTSK (I, NOTASK, SHOP(25), MAXT)  
I = 1  Cumulative task probability as input for planning  
= 2  Task number  
= 3  Cumulative task probability as used for simulation (see UNCER)  
= 4  Probability task is detected by aircrew before aircraft recovers  

Nonfatal Casualties from Air Attack  
(GENERATED)  
SICK (NOPEOP, 4)  
Temporary data storage array used at time of an air attack.  
I = 1  Nonfatal casualties due to conventional weapons effects  
= 2  Nonfatal casualties due to the toxic effects of chemical  
           weapons  
= 3,4  Spare
Task Time Slow-down Factors

SLOWDN (MVDC, MOPP (14))

The required time to carry out a task for each MOPP, as a percentage of the nominal, shirt-sleeve time (data can be provided for each of up to 50 sets of MVDC "proficiency factors"); these delays are due to constraints on mobility, visibility, dexterity, and communications.

Sortie Generation Capabilities

SORCAP (MAXT, MAXB)

Rough estimate of the daily number of sorties that can be flown.

Auxiliary Sortie Record

SORDAY (I, MAXB)

I = 1 Cumulative sorties flown from base yesterday
    = 2 Cumulative sorties flown from base today

Sortie Priority and Deficiency Data

SORDEF (16, I, MAXM, MAXT, MAXB)

Data for 16 time-blocks from the present (see function TU).

I = 1 Highest deficient priority*1000 (or lowest priority with demand
    if no deficiencies*1000)/Remaining demand for sorties
    = 2 Deficiency at highest deficient priority; zero or larger if all
      demands are satisfied
    = 3 Number sorties expected at highest deficient priority; or
      surplus at lowest priority demand

Hourly Record of Daily Sorties

SORTHR (24, MAXB)

Total sorties launched each hour without abort during the current day.

Aircraft Spares

SPARE (I, MAXM, MAXT, MAXB)

I = 1 Pointer to first spare aircraft
    = 2 Number of spare aircraft

Cumulative Sorties Storage Array

SQDEL (MAXB, MAXM)

Multiple trial sum of the square of the sorties flown by base and by mission.
Temporary Personnel Storage Array (GENERATED)

STAFF (NOPEOP, I)
Stores preattack personnel levels in subroutines BOMB and REORGN.

I = 1  Total on base
     = 2  Number unassigned on-duty personnel

Time Intervals for Debug Data (INPUT-#2/1)
START (7)
STOP (7)
The beginning and end of six time intervals during which the debug output is to be printed.

Personnel Hospitalization and Fatality Data (GENERATED)

SURGEN (I, MAXB)
I = 1  Total personnel on base initially, including aircrews
     = 2  Total number of personnel currently on base, including
          aircrews, but not those in clinic
     = 3  Immediate fatalities from conventional and chemical attacks
     = 4  Postattack fatalities due to UXO detonations and the
          toxic effects of chemical attacks, and aircrews lost
          in-flight operations
     = 5  Cumulative number of personnel hospitalized at time of attack
     = 6  Cumulative number of personnel hospitalized from UXO
          explosions and the residual toxic effects of attack
     = 7  Cumulative number of personnel who collapse from heat prostration
     = 8  Cumulative manhours lost in clinic from heat prostration
          and toxic effects
     = 9  Cumulative number of personnel who cool off after work
     = 10 Cumulative number of manhours expended in cooling off
     = 11 Cumulative number of manhours expended in collective-protection queues
     = 12 Number of personnel expected to return from clinic and those
          being transported in from CONUS

Temporary Data Storage for Composite Flights (GENERATED)

SVEFLT (I, 5)
I = 1  Total assigned to the composite flight
     = 2  Aircraft assigned to the component flight
     = 3  Component flight number
     = 4  Mission
     = 5  Aircraft type
     = 6  Base
     = 7-11 Misc. factors
Aircraft In-process Tasks Storage Array

TASKQ (LTQ, I)

1 = 1 Task number
2 = "Basic" task number (when prior is an alternate)
3 = Aircraft number * 10/Task status
4 = Completion time
5 = Pointers: To time heap (unused elements)
6 = Heap pointer
7 = Next task, same aircraft
8 = Prior task, same shop
9 = Resources: Personnel — Team 1 — Type * 100/Number
10 = First equipment type
11 = Time basic task initiation attempted
12 = Time task element initiation first attempted
13 = Root segment for elements of a task network
14 = Additional personnel on Team 1 — Type * 100/Number
   (negative for a load crew)
15 = Personnel Team 2 — Type * 100/Number
16 = Additional personnel on Team 2 — Type * 100/Number
17 = Start time for current action
18 = Total time excluding CW effects (minus if cannibalized part
   is broken)
19 = Percent task completion when current action began *100
20 = Percent task completion when action terminates *100
21 = Work crew temperature when action terminates °C *100
   (minus when crew is to collapse)
22 = Time rate of change of temperature (°C * 100/hr)
23 = Second equipment type

Buddy Care Time Requirement

TBUDDY (MAXB)
Average time personnel are involved in providing buddy care for casualties *100/, a
number defining the distribution of these times.

Record of Serviceables Enroute to the CIRF

TCIRF (NOPART)
Number of serviceable SRUs enroute to the CIRF.

Nominal Reconfiguration Times

TCONF (MAXMI, MAXM2, MAXT)
MAXMI Next mission
MAXM2 Prior mission
Nominal time to reconfigure an aircraft from the preferred configuration for one mission to that for another.

**Temporary Data Storage for Flight Aircraft** (GENERATED)

```plaintext
TEMPF (50, I)
I = 1  Assigned aircraft
    = 2  Previously assigned aircraft
    = 3  Assignment
    = 4  Crew number
```

**Planning Time-Horizon Data** (INPUT-ETVL)

```plaintext
THDATA (J, I)
I = 1  Horizon data (I = 2,3) applies when time of day is greater than
      THDATA (J - 1,1) and no more than THDATA (J,1)
    = 2  Time horizon (TTU)
    = 3  Length of the 16 time blocks within the time horizon (TTU)
    = 1-4 Provides for four different time horizons for planning
```

**Time Lapse Data Array** (GENERATED)

```plaintext
TLAPSE (NOPFOP, MAXB, I)
I = 1  Limits frequency with which deferred tasks are checked in
      subroutine CHECK for personnel
    = 2  Limits frequency deferred tasks are checked for equipment
```

**Temporary CIRF Pipeline Parts Storage** (GENERATED)

```plaintext
TOCIRF (NOPART, 1)
I = 1  Total in CONUS-CIRF pipeline stock (for CIRF and bases)
    = 2  Portion of CONUS-CIRF pipeline to be retained at CIRF
```

**Buddy-Care Heap** (GENERATED)

```plaintext
TOHOSP (INOHOSP)
I = 1  Time person is complete buddy care activity and are
      available for work
    = 2  Pointers: To time heap (unused elements)
    = 3  Heap pointer
    = 4  Base*128/Number of personnel
    = 5  Type of personnel (+ for on-duty, - for off-duty)
```
Temporary Parts Storage

TOTALS (N0PART, MAXB, I)

\( i = 1 \quad \text{Authorized numbers of parts} \\
= 2 \quad \text{Actual on-base numbers of parts} \\
= 3 \quad \text{Actual numbers allocated to a CRF} \)

Average Number of Flight Surface Repairs by Base

TOTREP (MAXB, I)

\( i = 1 \quad \text{Number of L XOs selected for clearance on runway during current trial} \\
= 2 \quad \text{Number of stories to be cleared on runway during current trial} \\
= 3 \quad \text{Number of clearing on runway during current trial} \\
= 4 \quad \text{Number of L XOs cleared on runways during all trials} \\
= 5 \quad \text{Number of stories cleared on runways during all trials} \\
= 6 \quad \text{Number of clearing on runways during all trials} \\
= 7 \quad \text{Number of L XOs to be cleared on taxiways during current trial} \\
= 8 \quad \text{Number of stories to be cleared on taxiways during current trial} \\
= 9 \quad \text{Number of clearing on taxiways during current trial} \\
= 10 \quad \text{Number of L XOs cleared on taxiways during all trials} \\
= 11 \quad \text{Number of stories cleared on taxiways during all trials} \\
= 12 \quad \text{Number of clearing on taxiways during all trials} \)

Temporary Parts Storage Array

TPART (EXTPOR, I, MAXB)

Used with the automatic parts initialization feature to temporarily store additional stock information.

\( l = 1 \quad \text{Number serviceables on base} * 100 \\
= 2 \quad \text{Number repairables on base} * 100 / \text{total items in shop} \\
= 3 \quad \text{Nominal stock level} * 128 / \text{percent NRTS} \\
= 4 \quad \text{Part number} \)

Aircraft Traffic Handling Performance Data

TRAFIC (I, J, B)

[All times are stored as hundredths of TTU]

\( i = 1 \quad \text{Average time between takeoff of aircraft in a flight} \\
= 2 \quad \text{Average time between takeoff of last aircraft in one flight} \\
\quad \text{and first in the next flight} \\
= 3 \quad \text{Average time between take off of one flight and landing of} \\
\quad \text{first aircraft in next flight} \\
= 4 \quad \text{Average time between the landing of aircraft in a flight} \\
= 5 \quad \text{Average time between the landing of the last aircraft in one} \\
\quad \text{flight and the landing of the first aircraft in the next} \\
\quad \text{flight} \)
Average time between landing of one flight and the takeoff of
the first aircraft in the next flight

$J = 1$ Current performance characteristics

$J = 2$ Performance characteristics for fully operational base

Degradation data are entered for $J = 3$ to $J = 8$: Positive values are interpreted as the added time required when the specified damage exists; the absolute values of negative values are interpreted as the percentage increase in the time when the specified damage exists:

- $J = 3$ Main runway not in use
- $J = 4$ Residual craters exist on surface with MOS
- $J = 5$ Facility #46 is damaged
- $J = 6$ Facility #47 is damaged
- $J = 7$ Facility #48 is damaged
- $J = 8$ Facility #49 is damaged

**TRAP Stock Data**  
TRAP (NOTRAP, MAXB)
Current on-base stock level for each type of TRAP.

**Requirements for Expendable TRAP**
TRAPRQ (I, 3, T)

$T = 1$ TRAP type (only three types per aircraft type)

$T = 2$ Expected number of expendable TRAP required per sortie

**Tray Usage for AIS Parts Repairs**
TRAY (NOPART)

AIS tray number used to repair part.

**AIS Tray Characteristics**
TRAYS (NOTRAY)
Probability that a particular tray is affected by the nonavailability of an AIS component *10000.

**AIS Tray Status Data**
TRAYST (NOTRAY, I, MAXB)

$I = 1$ Unity if tray at station #1 is out of service

$I = 2$ Pointer to next affected tray

**Sortie Demand Summary**
TRYFLY (6, MAXT, MAXB)

Daily tally of the sorties demanded during each of six five-hour periods starting at 2000.
Alternative Aircraft Task Procedures

TSKALT (NOTSKA, I)

I = 1  Required time*10/distribution
I = 2  Personnel required—Team 1—Type*100/Number
I = 3  Equipment type 1
I = 4  Equipment type 2
I = 5  Alternative resource/Shop required if >0
I = 6  Personnel required—Team 2—Type*100/Number
I = 7  Heat factor

On-Equipment Task Criticality (ENCODED)

TSKCRT (Task Criticality Index(99), 5)

For each value of the task criticality index, stores a coded number that denotes whether the task is essential for each of the five different mission types. A zero denotes that the task is not essential, a one denotes that it is. TSKCRT is initialized in BLOCK DATA.

Total On-Equipment Task-Incidence Probability (INPUT-#18/2)

TSKPR (SHOP(25), MAXT, I)

I = 1  The cumulative per sortie probability that an aircraft of a specified type will generate a problem that will (eventually) require shop attention; value used for planning
I = 2  Percentage that modifies the breakrates for each task in a given shop for a specified aircraft type*128/percent reduction in breakrate per sortie/day/PAA achieved above unity when VBREAK = I
I = 3  As for I = 1, except value is that used for simulation

Basic Aircraft Task Procedures

TSKRQT (NOTSK, I)

I = 1  Nominal shop*10/Coded entry designating repair location and shop requirement (see Vol. II, Fig. 6)
I = 2  Part number; when -1 is entered for a task following a segment with a part, the task will be skipped (for munitions, entries are 10000 + 400*number + munition type; for TRAP, entries are 20000 + 400*number + TRAP type)
I = 3  Time required*10/distribution
I = 4  Personnel required—Team 1—Type*100/Number
I = 5  First equipment required
I = 6  Alternative resource set
I = 7  Parallel task
I = 8  Subsequent task
I = 9  Probability (in tenths of percent) task is required*10/Flag where Flag is defined as:
1,3,5, or 7 if cross-trained personnel may be used; 
2,3,6, or 7 if task-assist-qualified personnel may be used; 
4–7 if the task is scheduled maintenance 

= 10 Expected total time for network 
= 11 Pointer to first incompatible task 
= 12 Probability part is required*128/Flag denoting ABDR job 
= 13 Task criticality 
= 14 Personnel required—Team2—Type*100/Number 
= 15 Split-rejoin flag 
= 16 Task heat factor 
= 17 Second equipment required 

**Taxiway Crater Repair Procedures**

**TWYRRR (I, MAXB)**

I = 1–10 CE procedure numbers (CT38) for a 1–10 step taxiway crater repair procedure 

= 11 Total manhours (TTU) to repair a taxiway crater

**Customized User Output Control**

**INPUT-#2/5**

**USERS (I)**

I = 1 Number of daily custom output data to be printed daily 

= 2 Number of the daily custom output data that are to be cumulated and printed at the end of each trial 

= 3 Number of other custom output data to be printed each trial and after all trials 

= 4 Spare

**Storage for Customized User Output Data**

**GENERATED**

**USERS1 (20, I, MAXB)**

I = 1 Up to 20 user-specified data that are collected daily 

= 2 Sum of the daily data to be reported at the end of each trial 

= 3 Cumulative number of up to 20 other user-specified data; reported at the end of each trial

**Multitrial Totals of User-Specified Output Data**

**GENERATED**

**USERS2 (20, I, MAXB)**

I = 1 Totals for USERS1 (–, 2, –) 

= 2 Totals for USERS1 (–, 3, –)

**Storage Array for Cumulative Numbers of Available Personnel**

**GENERATED**

**UTIL (12, 75, MAXB)***
Cumulative number of available personnel at each odd-numbered hour for up to 75 personnel types.

**Time Delay and Casualty Data for Unexploded Ordnance**

UXODTA (I, J)

I = Weapon type

J = 1 Percentage casualties among personnel at work on UXO that detonates
J = 2 Percentage casualties working on the UXO that are fatal
J = 3 Percentage losses to equipment in use on UXO that detonates
J = 4 Percentage casualties among other work groups on same taxiway segment with a UXO detonation
J = 5 Percentage losses to equipment in use by other groups on same segments
J = 6 Percentage casualties among work groups on taxiway segments adjacent to segment with a UXO detonation
J = 7 Delay time to earliest detonation (TTU)
J = 8 Maximum detonation delay time (TTU)
J = 9 Crater radius on runway

**Unexploded Ordnance Removal Procedures**

UXOTSK (I, L)

I = 1-10 CE procedure numbers (CT38) for 1-10 steps of the UXO removal procedure
L = 1-10 Weapon type of unexploded ordnance

J = 11 Total manhours (TTU) to remove the UXO
J = 12 Total time (TTU) to remove the UXO

**Heat Generation Factors**

VALUES (I, MOPP (14))

I = 1 Skin temperature (deg C)
I = 2 Gamma—The pumping factor *1000
I = 3 CLO—Clothing insulation factor
I = 4 IM—Clothing permeability factor
I = 5 Spare

**Saturated Vapor Pressure**

[Not in common; TABLED in CKTEMP]

VAPOR (50)

Saturation water vapor pressure as a function of the ambient temperature in tenths of mm Hg for 1 to 50 degrees Centigrade.

**Differential Loss Rate Control Data**

[INPUT-#17/10]
Differential Loss Rate Control Data (INPUT-#17/10)

VARPK (I, MAXB)

Controls the use of the differential loss rates during air attacks for the "all other" items of the six resource classes; I = 1 for personnel, = 2 for equipment, etc. See discussion of Card Type #17/10 in Vol. II.

Storage Array for Waiting Tasks (GENERATED)

WAITSK (LWQ, I)

I = 1 Task number, or part, SRU, or equipment repair procedure
= 2 Aircraft number*10/Tasks status, or (Base*64/base of origin)
= 3 Number of part required, if any; or preflight status flag *10/ personnel substitutability
= 4 AGE for on-equipment tasks; -PART for simple repair, LRU,
 when SRU replacement job is waiting; SRU(+10000), when SRU repair waiting; or AGE(+20000), when selected AGE procedure waiting
= 5 Personnel for on-equipment task; or, for repairs, SFLAG (=1 when required SRU has been checked)
= 6 Pointers: Next task, same aircraft (unused elements)
= 7 Next lower priority task in shop
= 8 Next higher priority shop task
= 9 Estimate of time remaining before aircraft ready to fly
= 10 Resource causing wait; coded class and type
= 11 Time basic task initiation attempted, or repairable began administrative delay
= 12 Time task element initiation first attempted, or repair initiation was first attempted
= 13 Root segment for elements of a task network

Monitoring Point for Most Intense Chemical Effects (GENERATED)

WORST (CWTYPE, MAXB)

Number of the monitoring point that has chemical conditions that require the most restrictive MOPP.

Work-Rest Data (GENERATED)

WRDATA (i, J, MAXB)

J = 1 Number of events
= 2 Total time for events
I = 1–8 Daily cumulative data
= 1 Work phase for flight-line task
= 2 Rest phase for flight-line task
= 3 Work phase for backshop task
= 4 Rest phase for backshop task
= 5 Work phase for munitions tasks
= 6 Rest phase for munitions tasks
= 7 Work phase for civil engineering tasks
= 8 Rest phase for civil engineering tasks
= 9–16 Cumulative data for trial, as for I = 1, 8

\( J = 1 \) Cumulative data for trial

I = 17 Total number of tasks
= 18 Number of tasks limited because of rest requirements
= 19 Number of tasks limited because of VOGT constraints
= 20 Number of rest periods defined by VOGT limits

\( J = 2 \) Cumulative data for trial

I = 17 Number of flight-line events with a nonzero rest time
= 18 Number of backshop events with a nonzero rest time
= 19 Number of munitions assembly events with a nonzero rest time
= 20 Number of civil engineering events with a nonzero rest time

**Theater Weather**

\( \text{WXDATA (DAY, GROUP(2), MAXB)} \)

The five-digit number stored in each element is packed. Each of the two groups of numbers applies to a subset of the aircraft types. The left-hand digit of the first and second groups denotes the flying conditions for aircraft types #1 and #6, respectively; subsequent digits refer to the other aircraft types in numerical order. A zero denotes that the conditions are flyable, a 1 that they are not. DAY may not exceed WXDAYS.

**Compensation Factor When STOPCW Is Activated**

\( \text{XHURRY (I)} \)

Used to store task time modifiers for five generic task types; used when CW computations are stopped artificially to compensate for neglecting CW ensembles (\( I = 5 \)).

**Resource Report Transmittal Data**

\( \text{XMIT (I, MAXB)} \)

I = 1 Transmittal time \( \frac{30 \times (20 \times \text{HR} + \text{MIN}/3)}{\text{Distribution}} \)
= 2 Loss rate of individual data \( \times 100 \)
= 3 Loss rate for entire report \( \times 100 \)
= 4 Base communications status—Link closed if unity

**Roots for Parts with Multiple Root Segments**

\( \text{XROOT (LTHXRT, I, MAXT)} \)

I = 1 Root segments for parts that appear in several networks
= 2 Pointer to the next task number
Multiple Trial Statistics for Each Base (GENERATED)

XSTAT (I, day, MAXB)

I = 1  Assigned aircraft
= 2  Damaged aircraft
= 3  NMCS aircraft
= 4  Cumulative NMCS hours
= 5  Total holes
= 6  Cumulative cannibalizations
= 7  Cumulative expedited repairs
= 8  Daily sortie effectiveness
= 9  NMCS + battle damaged aircraft
= 10 Daily A-A sortie effectiveness

Multiple Trial Theater Statistics (GENERATED)

XXSTAT (I, day)

I = 1  Assigned aircraft
= 2  Cumulative aircraft lost
= 3  Cumulative damaged aircraft
= 4  NMCS aircraft
= 5  Cumulative NMCS hours
= 6  Cumulative theater effectiveness
= 7–10 Spare

Cumulative Multitrial Theater Sorties (GENERATED)

YSTAT (I,L)

I = 1  Square of Lth day sorties, summed over all trials
= 2  Square of cumulative sorties through day L, summed over all trials

Zero-time Parts Activity List (GENERATED)

ZPRTRQ (NOPART)

Used to store a specially constructed parts list required in initializing the zero-time shop activities.

Initialization of Maintenance Activity at Zero Time (INPUT-#42/1)

ZTASKS (I, MAXT, MAXB)

I = 1–3 Percent aircraft with ongoing tasks at time zero*100/Number of tasks (a three-part distribution)
= 4  Number of parts in administrative delay at time zero
= 5  Number of parts repairs at time zero
Storage for Specific Zero Time Backshop Requirements *(INPUT-#42/2 and #42/3)*

**ZZT**SK *(50, 1)*

\[ I = 1 \quad 512*\text{Base}/32*\text{AC Type}/\text{Number of aircraft} \]

\[ I = 2 \quad \text{Part or equipment number for repair (+10000 for equipment or +20000 for parts)} \]
Appendix D

CHANGES REQUIRED TO MODIFY
TSAR 85-87 DATA BASES FOR TSAR

The new features introduced into TSAR have necessitated a considerable number
of changes as well as additions to the input data structure that was documented in N-
2242-AF in August 1985. The changes are such that it generally will be preferable to
revise existing data bases rather than to develop entirely new ones, if the existing data are
otherwise adequate.

There are several reasons for the changes in the data base formats. First, changes
were required to permit the procedures for repairing parts and equipment to consist of a
sequence of steps, rather than just one step, and to allow the user to specify cross-training
and heat factors individually for each step in these procedures; second, the individual
task formats have been modified to provide data fields that are large enough to
accommodate equipment types from 1 to 320; and thirdly, changes were required to
allow for up to 30000 on-equipment tasks and 10000 types of aircraft spares. Various
new features necessitated the other minor changes and additions (see Card Types #1, 2/2,
#2/5, #2/6, #3/4, #3/6, #3/7, #4/3, #15/5, #7/1, #17/3, #20/66, #29/88, #35/4, #43/1,
#43/4, and #44/4).

The auxiliary routine CONVERT has been developed that will transform a TSAR
data base that conforms to the structure outlined in N-2242-AF into a data base that is
consistent with the current structure. This routine will be made available to TSAR users,
along with the source code and other auxiliary data sets. Although this aid will prove
useful in updating the column structure for existing data bases, it naturally will not
supply any of the additional information that may now be introduced.
Appendix E

ENTRY LOCATIONS AND SUBROUTINE STORAGE SIZE

This appendix reprints portions of the load module map generated when TSAR was link-edited. The name of each subroutine and the names of the entry points in each subroutine are listed. In addition the size of the storage area required for each subroutine (expressed in hexadecimal bytes) and the location of the subroutine in the overlay structure are given.

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<thead>
<tr>
<th>Subroutine Name</th>
<th>Length (bytes)</th>
<th>Overlay Segment</th>
<th>Entry Points</th>
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Common Statements in the Root Segment

KEY  B484  1
BASIC1  A57C  1
BASIC2  5002  1
BASIC3  8DE56  1
BASIC4  550  1
STOCKS  9483E  1
JOBS  9B768  1
LOAD  D7A0  1
REQTS  2D998  1
INFO  64CD6  1
OUT  90D36  1
SCROL  3846  1
THEATR  DE24  1
BOMBSE  36EEE  1
CWDATA  610F6  1
CWHELP  1EC34  1
NETJOB  349E6  1
RWWYHIT  6DF4  1
ATCDDTA  43FE  1
BCDATA  2E5A  1
AISCOM  92E0  1
PPDATA  2AD4  1
PURGE5  2724  1
CPARTS  317DC  1
LDAMMO  16  1
RECNF  E  1
TIMHOR  18  1
TESTS  24  1

TEMP0  364  1
DIMENS  78  1

Subroutines in the Input and Initialization Segment

INIT  12B0  2  STORE  RECALL  DOSAVE  RECOVR
INIT0  1BC2  2
INIT1  188E  2
INPUT  4CE8  2
BEDOWN  2B8  2
INPUTA  525C  2
INPUTB  361E  2
INPUTC  23F8  2
INPUTD  26C6  2  INPUTE  INPUTF
-97-

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**Common Statements in the Simulation Segment**

| LOCAL2   | 15B8  |
| LOCAL3   | 242C  |
| LOCAL4   | 64    |
LOCAL5  E06  3
PURGE4  15E0  3

Link #4 Used for Periodic Housekeeping Functions

PLAN  31E0  4
PLAN1  1706  4
MUNEEED  221A  4
CKBILD  1A28  4
SHIFT  301A  4
CWSHFT  AD2  4
ACCRIT  8B4  4
ASSETS  10EC  4
RESET  D96  4
ZSHOPS  228A  4
OBTAIN  1710  4
REALLLO  196C  4
SCSHIP  F1C  4
READFT  2AD0  4
BASCAP  3E40  4
NOWMOP  F74  4
ORDERP  GETPRT  FINDPT

Link #5 Used to List Simulation Results

OUTPUT  6A86  5
SUMUP  854A  5
SUMMARY  18FE  5
DELAYS  6312  5
JOBLST  E9E  5
ADAPT  4DE  5
DEFERS  262A  5
BREAK  690  5
DELAY1  DELAY2

Link #6 Used When Airbase Attacks Are Assessed

BOMB  5F6A  6
ATTKAC  4178  6
REORG  47CC  6
REORG2  4130  6
REORG3  E10  6
ENDAC  2032  6
CWHTS  BD2  6
COLOS  BF4  6
DOSURF  199A  6
STOPCE  D62  6
CWLOSS  AE2  6
GOHELP  23EE  6
ENDCW  8F8  6
BENDAC  CWLOS1
TOHELP  INJURE

TOTAL LENGTH  60FCF8  =  6203 BYTES
Appendix F

RENUMBER—AN AID FOR CREATING MULTI-MDS DATA BASES FOR TSAR

The several TSAR card types that are used in specifying the on-equipment tasks and backshop related work for a particular MDS (i.e., type of aircraft) include the Card Types #5, #6, #7, #8, #9, #13, #14, #15, and #29, and the resources used for that work and other on-base work are treated on Card Types #10, #11, #21, #22, #23, #28, #34, #35, #38, #45, and #46. Normally, a TSAR data base will have been prepared for a single MDS, and the user-specified numbers for the tasks, parts, personnel, equipment, etc., will each be numbered (often consecutively) from #1. If it then becomes appropriate to treat two or more MDS in the same TSAR simulation, it is necessary to renumber many of the entries so that the same number does not refer to two different tasks, two different types of personnel, two different part types, etc., when the two sets of TSAR input cards are combined. The auxiliary routine RENUMBER was created so that the various number changes needed to renumber the various entities is done automatically.

To use RENUMBER, the user simply (1) enters the values that are to be added (or subtracted) to the various data sets, (2) specifies the name of the data set where the revised TSAR cards are to be filed, (3) appends those TSAR input cards in which changes are required, and (4) runs the job. All the entries that the user has specified to change are modified, and the new version of the input data set is filed in the specified location.

The format of the first card to be entered is 715 and the entries include the aircraft type (in columns 1–5) and the values to be added (or subtracted) to each of the following:

<table>
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<th>Columns</th>
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<tr>
<td>11–15</td>
<td>Alternative task number</td>
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<tr>
<td>16–20</td>
<td>Part number</td>
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</tr>
<tr>
<td>21–25</td>
<td>Alternative part repair procedure</td>
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</tr>
<tr>
<td>26–30</td>
<td>Personnel type</td>
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</tr>
<tr>
<td>31–35</td>
<td>Equipment type</td>
<td></td>
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This auxiliary routine will be provided to TSAR users along with the source code and other auxiliary datasets.
To use this routine the user enters a card such as that shown below, along with the card images to be modified. When the job is executed, the new card images are stored on Device 16 under the dataset name specified by the user.

1 500 20 500 20 100 50 0

The preceding card illustrates how to specify that 500 should be added to the task numbers, 20 to the alternative task numbers, 500 to the part numbers, 20 to the alternative part repair procedures, 100 to the personnel type numbers, and 50 to the equipment type numbers. These changes will be made to those #7 and #15 Card Types that apply to aircraft type #1, and to all other relevant card types that have been entered.
Appendix G

SUBROUTINE FOR ORGANIZING TSARINA
TYPE 40 CARDS

The various "40" cards generated by TSARINA are stored in a series of datasets—a separate one for each base and trial. The results for all attacks against a particular airbase in the campaign are stored in the order they are run. After each TSARINA run, the "hit" data must be reorganized and stored as a new dataset (see App. H), and the "40" card data must also be removed from the several storage locations so that those locations may be used for the next TSARINA run; this consolidation of all the "40" cards for one campaign into a single dataset also reduces the total storage space required.

The subroutine listed here is used to collect these several sets of "40" cards. The results for Trial #1 are placed at the beginning of this new dataset, and the results for the last trial are at the end. The data for the first trial are concluded with "40999" in columns 1-5, and the data for all subsequent trials are concluded with "0" in columns 1-2. These entries are appropriate both when the user is going to integrate the "40" cards directly with the other input data cards and when the user wishes to read the "40" cards from a separate data set.

The name of the dataset where the consolidated "40" cards are to be stored must be specified for device "16" by the user in the first executable statement following the "END" statement in the routine.

To execute this subroutine the user must enter (1) the appropriate dataset names for the data stored by TSARINA, (2) the name to be used for the new dataset, and on the final card (3) the number of trials and the number of bases for which the "40" cards are to be consolidated. These data are to be entered in columns 6-10 and 11-15 as shown in the example below for five trials and two bases.
//N0000#40 JOB (xxxxx,50,3), 'ORDER40', CLASS=N
// EXEC FORVCLG, PARMC='NOXREF,NOMAP'
//FORT.SYSIN DD *

IMPLICIT INTEGER *2 (A-Z)
INTEGER*4 DISK,BASE
DIMENSION D(15)

READ(5,1000) NTRIAL, BASES
1000 FORMAT(I10,I5)

C REORGANIZE THE FORTY-CARD DATA AND FILE IN A SEPARATE DATA SET

C IF (BASES .EQ. 0) BASES = 1
DO 80 L = 1, NTRIAL
DISK = 20 + L
DO 70 BASE = 1, BASES
20 READ(DISK,1001,END=40) I, J, (D(K),K=1,15)
WRITE(16,1001) I, J, (D(K),K=1,15)
GO TO 20
1001 FORMAT(I2,13,1515)
40 IF (BASE .LT. BASES) GO TO 70
IF (NTRIAL .LT. BASES) GO TO 70
IF (L .NE. 1) GO TO 50
I = 40
J = 999
WRITE(16,1001) I, J
GO TO 80
50 I = 0
WRITE(16,1001) I
GO TO 80
70 CONTINUE
80 CONTINUE
END

DATA SET "FT16F001" SHOULD BE 'DISP=OLD' WHEN DATA ARE TO
BE ADDED OR REPLACED. "DISP=(NEW,CATLG), ETC " WHENEVER
A NEW "FT16" IS TO BE CREATED.

IF, FOR ANY REASON, THE INPUT DATA SETS ARE NOT USED THEY
WILL BE SCRATCHED BY THE NEXT TSARINA JOB, SINCE ALL "40"
CARDS ARE TEMPORARILY STORED IN THE SAME NTRIAL DATA SETS.

GO.FT16F001 DD DSN=N.N0000.A0000.CARDS40.newname,DISP=(NEW,CATLG),
UNIT=USER, VOL=SER=USER30, SPACE=(400,200), CONTIG,
DCB=(RECFM=FB, LRECL=80, BLKSIZE=800)

THE "40" CARDS FOR EACH TRIAL ARE IN SEPARATE DATA SETS.
ADD REFERENCES TO FT31 THRU FT60 FOR ADDITIONAL TRIALS

***** IN COLS 9-10 AND 1-15

GO.SYSIN DD *
5 2
ORDER uses as input the TSARINA hit data output for multiple bases, attacks, and trials. It rearranges the hit data and outputs all of it into a single Fortran direct access file consisting of 400-byte physical records. All variables are integer*2 and each output record is written by an unformatted direct access "write" containing 200 variables. The output records can be read into an array of 200 integer*2 variables by either an unformatted direct access read or by a formatted read with a format of 200A2.

ORDER is currently dimensioned to handle up to 20 trials and (for each trial) 10 bases, 5 runways per base, 10 attacks per base, 5000 total hits per runway, and 5000 chemical hit/MP entries.

ORDER requires that the runway and chemical hit data for all attacks for a given base and trial be in a separate input file. (Such files are most easily created by making separate TSARINA runs for each base containing all of the attacks on the base.) Input files for different bases but the same trial must have the same Fortran dataset reference number but different dataset sequence numbers as, for example,

\[
\begin{align*}
\text{FT41F001 DD DSN=TRIAL1.BASE1} & \quad \text{FT42F001 DD DSN=TRIAL2.BASE1} \\
\text{FT41F002 DD DSN=TRIAL1.BASE2} & \quad \text{FT42F002 DD DSN=TRIAL2.BASE2} \\
\text{FT41F003 DD DSN=TRIAL1.BASE3} & \quad \text{FT42F003 DD DSN=TRIAL2.BASE3}
\end{align*}
\]

where Trial #1 is Fortran dataset FT41, Trial #2 is Fortran dataset FT42, etc., and the Fortran dataset sequence number, e.g., F002, for a given base must be the same for all trials.

One input card is required for each base, in the same order as the bases are in the (input) datasets. The input cards have three fields (3110) containing the base number, the number of trials, and an indicator variable. The indicator variable is set to one for the first base and to zero for subsequent bases—after the initial run of ORDER the output file may be updated for the last-numbered bases by omitting the Fortran datasets and input cards for the first-numbered bases.
ORDER takes the runway hits (craters) from all attacks for a given base, runway, and trial and orders them by their Y-coordinates (as needed by TSAR). The ordered hit data is then filed in the output direct access dataset as:

1. Runway No., No. of hits, Base No., Trial No. (8 bytes)
2. Attack No., X-coord, Y-coord, WR (8 bytes)
3. Repeat 2 for each hit
4. Repeat 1 to 3 for each runway
5. 0,0,0,0 (End of data for runway hits) (8 bytes)

The hits from all attacks on a given runway for a given trial are output together and the attack number for each hit is indicated. TSAR, by reading from the direct access dataset, can determine at the time of each attack all of the hits up to and including the attack, without keeping a large hit dataset in memory (containing the hit data for all hits, runways, and bases). After each attack, TSAR allocates repair resources to repair craters and open the runway. A record is kept over time of the base, runway, and input sequence number of all repaired hits so that repaired craters can be ignored.

A chemical hit is the agent surface deposition and vapor concentration from one "layer" of a deposition pattern at a monitoring point (MP).

ORDER takes the chemical hits from all attacks for a given base and trial and orders them by monitoring point number. The ordered hit data are then filed in the output direct access dataset as:

1. -MP No., No. of hits, Base No., Trial No. (8 bytes)
2. Attack No., Agent No., Wind velocity, T1 (8 bytes)
3. T2, T3, Surfcd, Conc. (8 bytes)
4. Repeat 2 to 3 for each chemical hit
5. Repeat 1 to 4 for each MP
6. 0,0,0,0 (End of data for CW hits) (8 bytes)

The runway and CW hit data for each base and trial combination starts a new output record and extends through as many (400-byte) records as needed for the data. The hit data for the first base and first trial starts in record number 4.

Record 1 contains an array of pointers indicating the first and last records of hit data for a given base and trial. The array is POINT(2,10,10) where

POINT(1,Base#,Trial#) is the number of the first record for the given base and trial, and

POINT(2,Base #,Trial #) is the last record for the base and trial.
Record 2 contains an array of attack times for each base and each attack. The array is ATTACK(2,10,10), where ATTACK(1,Attack #, Base #) is the time (TTU) of the attack, and ATTACK(2,Attack#,Base#) is the ID number of the TSARINA run.

Record 3 contains an array of runway data for the runways of each base. The array is RUNWAY(20,10) where

- `RUNWAY(1,Base #) = LTH(1)` (2 bytes)
- `RUNWAY(2,Base #) = WID(1)` (2 bytes)
- `RUNWAY(3,Base #) = LTH(2)` (2 bytes)
- `RUNWAY(4,Base #) = WID(2)` (2 bytes)
- `RUNWAY(5,Base #) = LTH(3)` (2 bytes)
- `RUNWAY(6,Base #) = WID(3)` (2 bytes)
- `RUNWAY(7,Base #) = LTH(4)` (2 bytes)
- `RUNWAY(8,Base #) = WID(4)` (2 bytes)
- `RUNWAY(9,Base #) = LTH(5)` (2 bytes)
- `RUNWAY(10,Base #) = WID(5)` (2 bytes)
- `RUNWAY(11,Base #) = INL` (2 bytes)
- `RUNWAY(12,Base #) = INW` (2 bytes)
- `RUNWAY(13,Base #) = MCL` (2 bytes)
- `RUNWAY(14,Base #) = MCW` (2 bytes)
- `RUNWAY(15,Base #) = WDBAR` (2 bytes)
- `RUNWAY(16,Base #) = LABAR` (2 bytes)
- `RUNWAY(17,Base #) = LBBAR` (2 bytes)
- `RUNWAY(18,Base #) = RUNWT` (2 bytes)
- `RUNWAY(19,Base #) = BARWT` (2 bytes)
- `RUNWAY(20,Base #)` is not used (2 bytes)

where LTH(I) and WID(I) are the length and width of the Ith runway and the remaining variables are used in determining the minimum operating strip (MOS). See definitions for the CONT and BAR card entries in App. A of N-3010-AF.
The probability distributions that are currently coded in TSAR (in subroutine TTIME) are indicated below. Each is represented with 25 discrete values of the "sample" value relative to the mean. Only the first nine distributions may be specified for task time uncertainties (and wherever only one column is provided for entering a number for the distribution type), while all 15 may be prescribed for other purposes, such as shipment schedule uncertainties. The 15th distribution, for example, is intended to be used to simulate intratheater shipment delay uncertainties that include a 4 percent chance that the shipments are canceled.

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<tr>
<td>2</td>
<td>Log-normal distribution: ( \text{Sigma} = 1.0 \times \text{Mean} )</td>
</tr>
<tr>
<td>3</td>
<td>Log-normal distribution: ( \text{Sigma} = 2.0 \times \text{Mean} )</td>
</tr>
<tr>
<td>4</td>
<td>Log-normal distribution: ( \text{Sigma} = 4.0 \times \text{Mean} )</td>
</tr>
<tr>
<td>5</td>
<td>Uniform distribution from 0.5 to 1.5</td>
</tr>
<tr>
<td>6</td>
<td>Uniform distribution from 0.7 to 1.3</td>
</tr>
<tr>
<td>7</td>
<td>Uniform distribution from 0.9 to 1.1</td>
</tr>
<tr>
<td>8</td>
<td>Normal distribution; ( \text{Sigma} = 0.125 \times \text{Mean} )</td>
</tr>
<tr>
<td>9</td>
<td>Normal distribution; ( \text{Sigma} = 0.250 \times \text{Mean} )</td>
</tr>
<tr>
<td>10</td>
<td>Normal distribution; ( \text{Sigma} = 0.500 \times \text{Mean} )</td>
</tr>
<tr>
<td>11</td>
<td>Spare</td>
</tr>
<tr>
<td>12</td>
<td>Spare</td>
</tr>
<tr>
<td>13</td>
<td>Spare</td>
</tr>
<tr>
<td>14</td>
<td>Spare</td>
</tr>
<tr>
<td>15</td>
<td>Uniform shipping delay from 0 to &quot;Mean&quot; for 96 percent of the events; remainder &quot;canceled&quot;</td>
</tr>
</tbody>
</table>
Appendix J

SPECIAL INSTRUCTIONS FOR SPECIFYING GROUND FORCE ATTACK DAMAGE AND USER-SPECIFIED AIR ATTACK DAMAGE

The effects of attacks by ground forces can be included in TSAR using TSARINA much as are effects of air attacks, if the user can specify the attacks in terms of aim points, attack characteristics, and weapon effectiveness parameters as described in the TSARINA manual. But the results of ground attacks, or less complex air attacks, that have been determined by other means than TSARINA may also be included in TSAR with user-prepared “40” cards, except that (1) such attacks may use only conventional weapons (i.e., no CW), (2) such attacks may not be made on the runways or on the taxiway network, and (3) only aircraft in the open may be damaged or killed (i.e., sheltered aircraft are assumed not to be at risk). When sets of “40” cards are used to specify attacks that are limited in these ways, they may be combined with “40” cards that were generated for other attacks by TSARINA, or used alone. When such cards are used alone, USECW must be less than 2, and it is necessary for the user to specify a dummy "hits" data file.

When the results for attacks have been determined without the use of TSARINA and the results are to be inserted into TSAR using the Type “40” Cards, the user can prepare those cards as outlined in Vol. II, except that the following special instructions must also be rigorously observed:

- The ATTYPE type on the first “40” card must be set to “4” for limited air attacks and to “5” for ground attacks. This specification is mandatory, otherwise TSAR will expect to find “hit” data for the attack.
- The special delays that may be specified for each base with the Type #17/9 Cards are inoperative for attacks specified by the user with “40” cards. This restriction may be overcome for shop work and building reconstruction with the VDELAY entry in the sixth field on the initial “40” card for the attack; this entry, after being divided by 10, is used as a multiplier of the SHPDLY and CEDELY delays and permits the user to modify each of these delays as desired for the particular attack. The delay imposed for runway and taxiway
repair work will be whatever value is entered (in minutes) in the eleventh field of the initial "40" card for each special attack.

- Cards that specify damage to resource Classes #1 through #7 are to be prepared as described in Vol. II, and *must precede* those for Classes #8 and #9.
- Damage specified for equipment as a Class #2 resource will be applied to all equipment of the specified type, both assigned and unassigned; i.e., the TSAR control variable ONLYUE is assumed to be *zero* for attacks entered with user prepared "40" cards.
- Damage to facilities (Class #9) must be specified before damage to aircraft (Class #8), and damage for "normal" facilities must be specified before damage for the special facilities described next.
- The special Class #9 cards for Bldg #38 and Bldg #39 may be used to transfer damage data for aircraft in the open and for fuel trucks being refilled at the time of an attack.

The Bldg #38 card is used to provide specifications for aircraft that are taxiing to or from the runway and loss rates for personnel and equipment engaged in refilling fuel trucks. The sixth field on the card for Bldg #38 must be null. The entries in the seventh and eighth fields are:

<table>
<thead>
<tr>
<th>Field</th>
<th>Data Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Percent damage to aircraft in the open * 128 plus percent irreparable damage to aircraft in the open</td>
</tr>
<tr>
<td>8</td>
<td>Percent casualties among personnel at work in a fuel truck refill area * 128 plus percent damage to fuel trucks being refilled</td>
</tr>
</tbody>
</table>

All other fields should be zero or null. Aircraft, maintenance personnel, and equipment loss rates for aircraft located on the various parking ramps can be entered with the card for Bldg #39. The sixth field on that card must specify the number of ramps for which data are to be entered; all other fields must be null. The Bldg #39 card must be followed by sufficient cards so that the following data may be entered for the
number of ramps of interest, two ramps per card until the required data have been specified for the proper number of ramps.

<table>
<thead>
<tr>
<th>Columns</th>
<th>Data Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>21–25 (51–55)</td>
<td>Ramp number</td>
</tr>
<tr>
<td>26–30 (56–60)</td>
<td>Percent casualties among personnel at work on the ramp * 128 plus percent damage to equipment</td>
</tr>
<tr>
<td>31–35 (61–65)</td>
<td>Percent damage to aircraft on the ramp * 128</td>
</tr>
<tr>
<td></td>
<td>Percent loss to aircraft on the ramp</td>
</tr>
</tbody>
</table>

All of these special cards must have a "40" entered in columns 1 and 2.

- If any aircraft damage data have been entered as outlined above, the last card for a ground attack must be a card that specifies Class #8 resources and has no additional entries.
Appendix K

IBM JCL TO COMPILE, LINK-EDIT, AND EXECUTE
TSAR LOAD MODULE

This appendix lists four sets of IBM Job Control Language (JCL) card images that have been used for converting the TSAR simulation model source code into an executable load module and for executing the TSAR simulation. Each set of JCL is introduced with a short statement of its purpose.

This first set of JCL can be used to compile sets of TSAR subroutines and to store the object decks as members of the partitioned dataset COMPILE.

```
//NO000##A JOB (0000,400,3,40), 'COMPILE TSAR', CLASS=N
// */
// */ A MEMBER NAME FROM "A" TO "K" MUST BE
// */ ENTERED IN LINES 1 AND 9000 FOR EACH JOB.
// */
// */ THIS JCL WILL COMPILE AND STORE THE OBJECT DECKS
// */ FOR A PORTION OF A TSAR OPERATING MODULE AS A
// */ MEMBER OF THE PARTITIONED DATASET "COMPILE".
// */
// */ THE "COMPILE" DATASET MUST BE CREATED PRIOR
// */ TO COMPILATION AND HOLD AT LEAST 24 MEMBERS.
// */
// */
//STEP1 EXEC PGM=IEFBR14
//KEY DD DSN=N.N0000.A0000.TSAR.COMMON(KEY), DISP=SHR
//BASIC DD DSN=N.N0000.A0000.TSAR.COMMON(BASIC), DISP=SHR
//STOCKS DD DSN=N.N0000.A0000.TSAR.COMMON(STOCKS), DISP=SHR
//LOAD DD DSN=N.N0000.A0000.TSAR.COMMON(LOAD), DISP=SHR
//JOBS DD DSN=N.N0000.A0000.TSAR.COMMON(JOBS), DISP=SHR
//THEATR DD DSN=N.N0000.A0000.TSAR.COMMON(THEATR), DISP=SHR
//BOMBSE DD DSN=N.N0000.A0000.TSAR.COMMON(BOMBSE), DISP=SHR
//REQTS DD DSN=N.N0000.A0000.TSAR.COMMON(REQTS), DISP=SHR
//CPARTS DD DSN=N.N0000.A0000.TSAR.COMMON(CPARTS), DISP=SHR
//INFO DD DSN=N.N0000.A0000.TSAR.COMMON(INFO), DISP=SHR
//OUT DD DSN=N.N0000.A0000.TSAR.COMMON(OUT), DISP=SHR
//OUT DD DSN=N.N0000.A0000.TSAR.COMMON(OUT), DISP=SHR
//AISCOM DD DSN=N.N0000.A0000.TSAR.COMMON(AISCOM), DISP=SHR
//NETJOB DD DSN=N.N0000.A0000.TSAR.COMMON(NETJOB), DISP=SHR
//CWDATA DD DSN=N.N0000.A0000.TSAR.COMMON(CWDATA), DISP=SHR
//CWHELP DD DSN=N.N0000.A0000.TSAR.COMMON(CWHELP), DISP=SHR
```

//RWYHIT DD DSN=N.N0000.A0000.TSAR.COMMON(RWYHIT),DISP=SHR
//ATCDTA DD DSN=N.N0000.A0000.TSAR.COMMON(ATCDTA),DISP=SHR
//BCDATA DD DSN=N.N0000.A0000.TSAR.COMMON(BCDATA),DISP=SHR
//SCROL DD DSN=N.N0000.A0000.TSAR.COMMON(SCROL),DISP=SHR
//PURGE1 DD DSN=N.N0000.A0000.TSAR.COMMON(PURGE1),DISP=SHR
//PURGE2 DD DSN=N.N0000.A0000.TSAR.COMMON(PURGE2),DISP=SHR
//PURGE3 DD DSN=N.N0000.A0000.TSAR.COMMON(PURGE3),DISP=SHR
//PURGE4 DD DSN=N.N0000.A0000.TSAR.COMMON(PURGE4),DISP=SHR
//PURGE5 DD DSN=N.N0000.A0000.TSAR.COMMON(PURGE5),DISP=SHR
//LOCAL1 DD DSN=N.N0000.A0000.TSAR.COMMON(LOCAL1),DISP=SHR
//LOCAL2 DD DSN=N.N0000.A0000.TSAR.COMMON(LOCAL2),DISP=SHR
//LOCAL3 DD DSN=N.N0000.A0000.TSAR.COMMON(LOCAL3),DISP=SHR
//LOCAL4 DD DSN=N.N0000.A0000.TSAR.COMMON(LOCAL4),DISP=SHR
//LOCAL5 DD DSN=N.N0000.A0000.TSAR.COMMON(LOCAL5),DISP=SHR
//STEP2 EXEC FORVC, FVPOPT=2,REGC=20000K, LINSPC=40,
//     PARM="NOFIPS,NOSDUMP,GOSTMT,NOSRCFLG,NOTERM,NOTRMFLG"
//FORT.SYSIN DD *,DCB=BLKSIZE=800

The source decks are to be entered here.

//*** THE SOURCE DECK WILL PRECEDE THIS CARD **************
//STEP3 EXEC PGM=IEBGENER, REGION=280K, COND=(4,LT,STEP2.FORT)
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSN=*.STEP2.FORT.SYSLIN,DISP=(OLD,DELETE)
//SYSUT2 DD DSN=N.N0000.A0000.COMPILE,DISP=OLD
//SYSLIN DD *
    GENERATE MAXNAME=1
    MEMBER NAME=A
//*** CHANGE MEMBER NAME ABOVE EACH COMPILE STEP **************

The second set of JCL can be used (on IBM systems) to
link-edit the members of the COMPILE partitioned dataset
and to store the resultant executable load module as the
member TSAR in the TSAR.VS.MODULE partitioned dataset.

//00000VS JOB (0000,100,3,40), 'LINK EDIT TSAR', CLASS=N
//*** THE PARTITIONED DATASET "TSAR.VS.MODULE"
//*** MUST BE CREATED PRIOR TO EXECUTION.
//*** THIS JCL IS TO BE USED TO COLLECT THE
//*** OBJECT DECKS FILED AS MEMBERS OF THE
//*** TEMPORARY "COMPILE" PARTITIONED DATA
//*** SET, AND TO LINK-EDIT THEM INTO AN
//*** OPERATING MODULE THAT WILL THEN BECOME
//*** THE MEMBER "TSAR" IN THE PARTITIONED
//*** DATASET "TSAR.VS.MODULE"
*
//STEP1 EXEC FORVLG,
// LIBL='SYS1.CSDFNLIB', PARM.LKED='OVLY, MAP, XCAL'
//LKED.SYSLIN DD DSN=N.NOOO0.AOO00.COMPILE(A), DISP=OLD
// DD DSN=N.NOOO0.AOO00.COMPILE(B), DISP=OLD
// DD DSN=N.NOOO0.AOO00.COMPILE(C), DISP=OLD
// DD DSN=N.NOOO0.AOO00.COMPILE(D), DISP=OLD
// DD DSN=N.NOOO0.AOO00.COMPILE(E), DISP=OLD
// DD DSN=N.NOOO0.AOO00.COMPILE(F), DISP=OLD
// DD DSN=N.NOOO0.AOO00.COMPILE(G), DISP=OLD
// DD DSN=N.NOOO0.AOO00.COMPILE(H), DISP=OLD
// DD DSN=N.NOOO0.AOO00.COMPILE(I), DISP=OLD
// DD DSN=N.NOOO0.AOO00.COMPILE(J), DISP=OLD
// DD DNAME=SYSIN
//LKED.SYSLMOD DD DSN=N.NOO000.AOO000.TSAR.VS.MODULE(TSAR), DISP=OLD
//LKED.SYSSIN DD *
ORDER MAIN, TRIALS, TTIME, HEAP, MODIFY
ORDER SHPRQT, CKNET, CKRQT, PICK, CHKWX, FILTRK, FTIME, NPRIME
ORDER RANDG, SHOPST, SQUADN, DAY, TOD, HRMIN, DATE, THF, TU, LOCAL4
ORDER KEY, BASIC1, BASIC2, BASIC3, BASIC4, STOCKS, JOBS, LOAD
ORDER REQTS, INFO, OUT, SCROL, THEATR, BOMBSE, CWDATA, CWHHELP
ORDER NETJOB, RWYHIT, ATCDTA, BCDATA, AISCOM, PPDATA, PURGE5
ORDER CPARTS, LDAMMO, RECNF, TIMHOR, TESTS, LIST1, LIST4, LIST6
INSERT MAIN, TRIALS, TTIME, HEAP, MODIFY
INSERT SHPRQT, CKNET, CKRQT, PICK, CHKWX, FILTRK, FTIME, NPRIME
INSERT RANDG, SHOPST, SQUADN, DAY, TOD, HRMIN, DATE, THF, TU, LOCAL4
INSERT KEY, BASIC1, BASIC2, BASIC3, BASIC4, STOCKS, JOBS, LOAD
INSERT REQTS, INFO, OUT, SCROL, THEATR, BOMBSE, CWDATA, CWHHELP
INSERT NETJOB, RWYHIT, ATCDTA, BCDATA, AISCOM, PPDATA, PURGE5
INSERT CPARTS, LDAMMO, RECNF, TIMHOR, TESTS, LIST1, LIST4, LIST6
OVERLAY ZERO
ORDER INIT, INIT0, INIT1, INPUT, BEDOWN, PURGE1, PURGE2, PURGE3
ORDER INPUTA, INPUTB, INPUTC, INPUTD, TESTER, LOCAL1
ORDER REVIEW, AUDIT, WRAPUP, CREATE, INISHL, PSHORT
ORDER ICHECK, HELPC, NETIME, CKSPLT, NROOTS, ORDERT
ORDER COMPT, IPARTS, IPART1, IPART2, CKNRTS
ORDER INIT2, INLIST, HEADER, CMLIST, AVGTIME, REQTS, REQTS1
ORDER LIST2, LIST3, LIST5
INSERT INIT, INIT0, INIT1, INPUT, BEDOWN, PURGE1, PURGE2, PURGE3
INSERT INPUTA, INPUTB, INPUTC, INPUTD, TESTER, LOCAL1
INSERT REVIEW, AUDIT, WRAPUP, CREATE, INISHL, PSHORT
INSERT ICHECK, HELPC, NETIME, CKSPLT, NROOTS, ORDERT
INSERT COMPT, IPARTS, IPART1, IPART2, CKNRTS
INSERT INIT2, INLIST, HEADER, CMLIST, AVGTIME, REQTS, REQTS1
INSERT LIST2, LIST3, LIST5
OVERLAY ZERO
ORDER MANAGE, MANAG, ADMIN, CONTRL, FRAG, SORT
ORDER TIMES, ASSET2, HELPER, LOCAL2, LOCAL3, LOCAL5
ORDER FERRY, GOHOME, REDPEO, REDCE, CKPEOP, CKAIS, DOBILD, ENDBLD
ORDER CKNAIN, PSTFLT, LANDIT, RUNAC, STARTM, INITSK, DOTASK, ENDTSK
ORDER TOREAR, INCOMP, INIDEF, CANNIB, CKTASK, SCHJOB, SPLIT, CKROOT
ORDER RUNSHIP, INIREP, DOREP, ENDRP, SALVAG, REPRTY, PRY1, NRTSIT
ORDER STATUS, CHECK, STRTSK, NORRPT, INTRUP, WAIT, ACAWAIT, QUEUES
ORDER DISABL, GETPEO, CKCRIT, CKAGE, ADDAGE, CKALRT, RELALT
ORDER KILLAC, BANG, DOSHIP, SHPRES, ORDER, SHCIRF, CKCIRF, MROOT
ORDER ENDCOE. INICOM, FIXSUR, DICE, GETCE, TAXIWAY, TRIAGE, DEHYDR
ORDER FLYERS, GETSHL, FLIGHT, LAUNCH, INSPEC, ABORT, REASSG, 2NOR
ORDER PREFLT, ASSIGN, RECNFG, UPLOAD, REFUEL, DOWNPRE, CKFLHT
ORDER REBILD, LOSES, LOOSES, NEEDCK, PURGE4
ORDER CWTIME, CTEMP, WCAS, CWDOSE, CMOPP, RUNWAY, RWYTAX, PATH
ORDER STOPIT, GOREST, LETGO, CALCLO, CLINIC, UPDATE
ORDER USEATC, CKATC, PUTBAC

INSERT MANAGE, MANAG, ADMIN, CONTRL, FRAG, SORT
INSERT TIMES, ASSET2, HELPER, LOCAL2, LOCAL3, LOCAL5
INSERT FERRY, GOHOME, REDPEO, REDCE, CKPEOP, CKAIS, DOBILD, ENDBLD
INSERT CKNAIN, PSTFLT, LANDIT, RUNAC, STARTM, INITSK, DOTASK, ENDTSK
INSERT TOREAR, INCOMP, INIDEF, CANNIB, CKTASK, SCHJOB, SPLIT, CKROOT
INSERT RUNSHIP, INIREP, DOREP, ENDRP, SALVAG, REPRTY, PRY1, NRTSIT
INSERT STATUS, CHECK, STRTSK, NORRPT, INTRUP, WAIT, ACAWAIT, QUEUES
INSERT DISABL, GETPEO, CKCRIT, CKAGE, ADDAGE, CKALRT, RELALT
INSERT KILLAC, BANG, DOSHIP, SHPRES, ORDER, SHCIRF, CKCIRF, MROOT
INSERT ENDCOE. INICOM, FIXSUR, DICE, GETCE, TAXIWAY, TRIAGE, DEHYDR
INSERT FLYERS, GETSHL, FLIGHT, LAUNCH, INSPEC, ABORT, REASSG, 2NOR
INSERT PREFLT, ASSIGN, RECNFG, UPLOAD, REFUEL, DOWNPRE, CKFLHT
INSERT REBILD, LOSES, LOOSES, NEEDCK, PURGE4
INSERT CWTIME, CTEMP, WCAS, CWDOSE, CMOPP, RUNWAY, RWYTAX, PATH
INSERT STOPIT, GOREST, LETGO, CALCLO, CLINIC, UPDATE
INSERT USEATC, CKATC, PUTBAC

OVERLAY ONE
ORDER PLAN, PLAN1, MUNEED, CKBILD, SHIFT, CWSHFT, ACCRIT, ASSETS
ORDER RESET, ZSHOPS, ZSHPS, OBTAIN, REALLO, SCSHIP, READFT, BASCAP
ORDER NOWMOP
INSERT PLAN, PLAN1, MUNEED, CKBILD, SHIFT, CWSHFT, ACCRIT, ASSETS
INSERT RESET, ZSHOPS, ZSHPS, OBTAIN, REALLO, SCSHIP, READFT, BASCAP
INSERT NOWMOP

OVERLAY ONE
ORDER OUTPUT, SUMUP, SUMMRY, DELAYS, JOBLST
ORDER ADAPT, DEFERS, BREAK
INSERT OUTPUT, SUMUP, SUMMRY, DELAYS, JOBLST
INSERT ADAPT, DEFERS, BREAK

OVERLAY ONE
ORDER BOMB, ATTKAC, REORGN, REORG2, REORG3, ENDAC, CWHITS, COOLOS
ORDER DOSURF, STOCE, CWLOSS, GOHELP, ENDCW
INSERT BOMB, ATTKAC, REORGN, REORG2, REORG3, ENDAC, CWHITS, COOLOS
INSERT DOSURF, STOCE, CWLOSS, GOHELP, ENDCW

The third set of IBM JCL is used to compile subsets of TSAR subroutines and to link-edit the resultant object decks with
a previously existing load-module. With this JCL the newly
link-edited module is temporarily stored on device TEMPlO,
the original module is scratched, and the new module is then
stored in its place. This three-step procedure is used to
avoid the necessity of temporarily finding twice the needed
disk space, as is required when the normal procedure is used.
When the disk is about full and the required space is not
available, the entire job could be lost, hence the procedure
illustrated here.

//NO000COM JOB (0000,100,3,40), 'JCL FOR TSAR', CLASS=N
//STEP1 EXEC PGM=IEFB14
//NEWMOD DD DSN=64TEMP,DISP=(NEW,PASS),UNIT=TEMP,
// KEY DD DSN=N.N0000.A0000.TSAR.COMMON(KEY),DISP=SHR
//BASIC DD DSN=N.N0000.A0000.TSAR.COMMON(BASIC),DISP=SHR
//STOCKS DD DSN=N.N0000.A0000.TSAR.COMMON(STOCKS),DISP=SHR
//LOAD DD DSN=N.N0000.A0000.TSAR.COMMON(LOAD),DISP=SHR
//JOBS DD DSN=N.N0000.A0000.TSAR.COMMON(JOBS),DISP=SHR
//THEATR DD DSN=N.N0000.A0000.TSAR.COMMON(THEATR),DISP=SHR
//BOMBSE DD DSN=N.N0000.A0000.TSAR.COMMON(BOMBSE),DISP=SHR
//REQTS DD DSN=N.N0000.A0000.TSAR.COMMON(REQTS),DISP=SHR
//CPARTS DD DSN=N.N0000.A0000.TSAR.COMMON(CPARTS),DISP=SHR
//INFO DD DSN=N.N0000.A0000.TSAR.COMMON(INFO),DISP=SHR
//OUT DD DSN=N.N0000.A0000.TSAR.COMMON(OUT),DISP=SHR
//OUT DD DSN=N.N0000.A0000.TSAR.COMMON(PDATA),DISP=SHR
//AISCOM DD DSN=N.N0000.A0000.TSAR.COMMON(AISCOM),DISP=SHR
//NETJOB DD DSN=N.N0000.A0000.TSAR.COMMON(NETJOB),DISP=SHR
//CWDATA DD DSN=N.N0000.A0000.TSAR.COMMON(CWDATA),DISP=SHR
//CWHELP DD DSN=N.N0000.A0000.TSAR.COMMON(CWHELP),DISP=SHR
//RHYHIT DD DSN=N.N0000.A0000.TSAR.COMMON(RHYHIT),DISP=SHR
//ATCDTA DD DSN=N.N0000.A0000.TSAR.COMMON(ATCDTA),DISP=SHR
//BCDATA DD DSN=N.N0000.A0000.TSAR.COMMON(BCDATA),DISP=SHR
//SCROL DD DSN=N.N0000.A0000.TSAR.COMMON(SCROL),DISP=SHR
//PURGE1 DD DSN=N.N0000.A0000.TSAR.COMMON(PURGE1),DISP=SHR
//PURGE2 DD DSN=N.N0000.A0000.TSAR.COMMON(PURGE2),DISP=SHR
//PURGE3 DD DSN=N.N0000.A0000.TSAR.COMMON(PURGE3),DISP=SHR
//PURGE4 DD DSN=N.N0000.A0000.TSAR.COMMON(PURGE4),DISP=SHR
//PURGE5 DD DSN=N.N0000.A0000.TSAR.COMMON(PURGE5),DISP=SHR
//LOCAL1 DD DSN=N.N0000.A0000.TSAR.COMMON(LOCAL1),DISP=SHR
//LOCAL2 DD DSN=N.N0000.A0000.TSAR.COMMON(LOCAL2),DISP=SHR
//LOCAL3 DD DSN=N.N0000.A0000.TSAR.COMMON(LOCAL3),DISP=SHR
//LOCAL4 DD DSN=N.N0000.A0000.TSAR.COMMON(LOCAL4),DISP=SHR
//LOCAL5 DD DSN=N.N0000.A0000.TSAR.COMMON(LOCAL5),DISP=SHR
//STEP2 EXEC FORVCL,FVPOPT=2,REGC=2000K,LINSPC=40,
// PARM='NOFIPS,NOSDUMP,GOSSMT,NOSRCFLG,NOTERM,NOTRFILG',
// REGL=256K,LIBL='SY1.CSDFLNLIB',PARML='SIZE=(228K,48K),OVLY,MAP,XCAL'
//FORT.SYIN DD *,DCB=BLKSIZE=800
The source decks for the subroutines that are to be compiled should be entered at this point.

//LKED.SYSLMOD DD DSN=&&TEMP (TSAR).DISP=(OLD,PASS)
//LKED.OLDLIB DD DSN=N.N0000.A0000.TSARVS.MODULE,DISP=SHR
ENTRY MAIN
INCLUDE OLDLIB (TSAR2#89)
ORDER MAIN,TRIALS,TTIME,HEAP,MODIFY
ORDER SHPRQT,CNKNET,CKRQT,PICK,CKWX,FILTRK,FTIME,NPRIME
ORDER RANDG,SHOPST,SQUADN,DAY,TOD,HRMIN,DATE,THF,TU,LOCATION
ORDER KEY,BASIC1,BASIC2,BASIC3,BASIC4,STOCKS,JOBS,LOAD
ORDER REQTS,INFO,OUT,SCROLL,THEATR,BOMBSE,CWDATA,CWHELP
ORDER NETJOB,RWYHIT,ATCDTA,BCDATA,AISCOM,PPDATA,FURGES
ORDER CPARTS,LOAMMO,RECNF,TIMHOR,TESTS,LIST1,LIST4,LIST6
INSERT MAIN,TRIALS,TTIME,HEAP,MODIFY
INSERT SHPRQT,CNKNET,CKRQT,PICK,CKWX,FILTRK,FTIME,NPRIME
INSERT RANDG,SHOPST,SQUADN,DAY,TOD,HRMIN,DATE,THF,TU,LOCATION
INSERT KEY,BASIC1,BASIC2,BASIC3,BASIC4,STOCKS,JOBS,LOAD
INSERT REQTS,INFO,OUT,SCROLL,THEATR,BOMBSE,CWDATA,CWHELP
INSERT NETJOB,RWYHIT,ATCDTA,BCDATA,AISCOM,PPDATA,FURGES
INSERT CPARTS,LOAMMO,RECNF,TIMHOR,TESTS,LIST1,LIST4,LIST6
OVERLAY ZERO
ORDER INIT,INIT0,INIT1,INPUT,BEDOWN,PURGE1,PURGE2,PURGE3
ORDER INPUTA,INPUTB,INPUTC,INPUTD,TESTER,LOCAL1
ORDER REVIEW,AUDIT,WRAPUP,CREATE,INISHL,FSHORT
ORDER ICHECK,HELPCK,NETIME,CKSPRT,NROOTS,ORDERT
ORDER COMPRT,IPART1,IPART2,CKRNTS
ORDER INITIZ,INLIST,HEADER,CWLIST,AVGTIME,REQTS,REQTS1
ORDER LIST2,LIST3,LIST5
INSERT INIT,INIT0,INIT1,INPUT,BEDOWN,PURGE1,PURGE2,PURGE3
INSERT INPUTA,INPUTB,INPUTC,INPUTD,TESTER,LOCAL1
INSERT REVIEW,AUDIT,WRAPUP,CREATE,INISHL,FSHORT
INSERT ICHECK,HELPCK,NETIME,CKSPRT,NROOTS,ORDERT
INSERT COMPRT,IPART1,IPART2,CKRNTS
INSERT INITIZ,INLIST,HEADER,CWLIST,AVGTIME,REQTS,REQTS1
INSERT LIST2,LIST3,LIST5
OVERLAY ZERO
ORDER MANAGE,MANAG,ADMIN,CONKL,FRAG,SORT
ORDER TIMES,ASS&2,HELPK,LOCAL2,LOCAL3,LOCAL5
ORDER FERRY,GCHOME,REDPEO,REDCS,CKBID,CKMAI,DOBIID,ENDBLD
ORDER CKMAIN,STFLT,LANDIT,VAC,FIN,MT,INITK,DOTASK,ENDASK
ORDER TOREAR,INCOMP,INDEF,CL,IPK,CLASK,CHJOB,SPLIT,CKROOT
ORDER RUNSHF,INIREP,DOREP,ENREP,SAVEG,HPRTY,PRY1,NRT5
ORDER STATUS,CHECK,SRTSK.HORRRT,INTRUP,WAIT,ACMAIT,QUEUES
ORDER DISABL,GETPEO,CKCRI,CKAGE,ADDAE,CKAKR,RELALE
ORDER KILLAC,BANG,DOSHIP,SHPRES,ORDER,SHCIRF,CKCIRF,NROOT
ORDER ENDOCE,INTCOM,FIXSUR,DOCE,GETCE,TAXINY,TRIAGE,DEHYDR
ORDER FLYERS, GETSHL, FLIGHT, LAUNCH, INSPEC, ABORT, REASSG, ZNOR
ORDER PREFLT, ASSIGN, RECNFG, UPLOAD, REFUEL, DOWPRE, CKFLHT
ORDER REBILD, LOSSES, LOOSES, NEEDCK, PURGE4
ORDER CWTIME, CKTEMP, CWCAS, CWDOSE, CWMPW, RUNWAY, RWYTAX, PATH
ORDER STOPIT, GOREST, LETGO, CALCLO, CLINIC, UPDATE
ORDER USEATC, CKATC, PUTBAC
INSERT MANAGE, MANAG, ADMIN, CONTRL, FRAG, SORT
INSERT TIMES, ASSET2, HELPER, LOCAL2, LOCAL3, LOCAL5
INSERT FERRY, GOHOME, REDPEO, REDCE, CKPEOP, CKAIS, DOBILD, ENDBLD
INSERT CWMAIN, PSSTFT, LANDIT, RUNAC, STARTM, INITSK, DOTASK, ENDSK
INSERT TOREAR, INCOMP, INIDEF, CANNIB, CKSTK, SCHJOB, SPLIT, CKROOT
INSERT RUSHP, INIREP, DOREP, ENDOEP, SALVAG, REFRTE, PRTY1, NRSTIT
INSERT STATUS, CHECK, STRTSK, NRORIT, INTRUP, WATT, ACWATT, QUEUES
INSERT DISABL, GETPEO, CKCRIT, CKAGE, ADDAGE, CKALRT, RELALT
INSERT KILLAC, BANG, DOSHIP, SHPRES, ORDER, SHCIRF, CKCIRF, RMROOT
INSERT ENDEC, INICON, FIXSUR, DOCE, GETCE, TAIW, TRIAGE, DEHYDR
INSERT FLYERS, GETSHL, FLIGHT, LAUNCH, INSPEC, REASSG, ZNOR
INSERT PREFLT, ASSIGN, RECNFG, UPLOAD, REFUEL, DOWPRE, CKFLHT
INSERT USEATC, CKATC, PUTBAC
OVERLAY ONE
ORDER PLAN, PLAN1, MUNEED, CKBILD, SHFT, CWSHFT, ACCRIT, ASSETS
ORDER RESET, ZSHOPS, ZSHPS, OBTAIN, REALLO, SCSHIP, READFT, BASCAP
ORDER NOWMOP
INSERT PLAN, PLAN1, MUNEED, CKBILD, SHFT, CWSHFT, ACCRIT, ASSETS
INSERT RESET, ZSHOPS, ZSHPS, OBTAIN, REALLO, SCSHIP, READFT, BASCAP
INSERT NOWMOP
OVERLAY ONE
ORDER OUTPUT, SUMUP, SUMMRY, DELAYS, JOBLST
ORDER ADAPT, DEFERS, BREAK
INSERT OUTPUT, SUMUP, SUMMRY, DELAYS, JOBLST
INSERT ADAPT, DEFERS, BREAK
OVERLAY ONE
ORDER BOMB, ATTKAC, REORG1, REORG2, REORG3, ENDAC, CWHITS, COOLOS
ORDER DOSURF, STOPCE, CWLOSS, GOHELP, ENDCW
INSERT BOMB, ATTKAC, REORG1, REORG2, REORG3, ENDAC, CWHITS, COOLOS
INSERT DOSURF, STOPCE, CWLOSS, GOHELP, ENDCW

//SYSPRINT DD SYSOUT=A
//DD1 DD DSN=N.N0000.A0000.TSARVS.MODULE,DISP=OLD
//SYSIN DD *
SCRATCH DSNNAME=N.N0000.A0000.TSARVS.MODULE, VOL=USER=USER31, X MEMBER=TSAR
//COPY EXEC PGM=IEBCOPY, REGION=280K, COND=(4,LT)
//SYSPRINT DD SYSOUT=A
//IN DD DSN=46TEMP, DISP=(OLD, PASS)
//PRESS DD DSN=N.N0000.A0000.TSARVS.MODULE,DISP=SHR
//OUT DD DSN=N.N0000.A0000.TSARVS.MODULE,DISP=OLD
The last set of JCL can be used to execute TSAR. Nine storage devices are referenced in addition to those required for Type #40 Card data:

Device 8 is used to store 130-character records for subsequent postprocessing.

Device 9 is used to store occasional 30-character records for the postprocessor.

Device 10 is used to store the majority of the TSAR data base after initialization for use in subsequent trials.

Device 11 is used to store the sortie demand data read in from the Type #50 Cards for use in subsequent trials.

Device 12 is used to store data used for computing spare parts stocks when those calculations are made each trial.

Device 15 is referenced at DOSAVE and RECOVR in subroutine INIT for possible future use.

Device 16 may be used to access the Type #40 Cards generated by TSARINA and organized by the auxiliary routine ORDER40.

Device 18 accesses the runway hit data and chemical deposition data generated by TSARINA and organized by the auxiliary routine ORDERCW.

Device 19 stores TSAR event records for subsequent analysis when DODUMP is initialized.
//GO.FT11FO01 DD UNIT=TEMP, SPACE=(TRK, (1,1)), DISP=(NEW, PASS)
//GO.FT12FO01 DD UNIT=TEMP, SPACE=(TRK, (20,2)),
// DCB=(RECFM=VS, BLKSIZE=5000), DISP=(NEW, PASS)
//GO.FT15FO01 DD UNIT=TEMP, SPACE=(TRK, (60,4)),
// DCB=(RECFM=VS, BLKSIZE=10000), DISP=(NEW, PASS)
//GO.FT16FO01 DD DSN=N.N0000.A0000.FORTY.VSDEMO, DISP=OLD
//GO.FT18FO01 DD DSN=N.N0000.A0000.HITS.VSDEMO, DISP=OLD
//GO.FT19FO01 DD DSN=N.N0000.A0000.DUMP.DATA, DISP=OLD
//PEND
//STEP1 EXEC GO, REGION.GO=2600K
//GO.SYSIN DD *

Insert the TSAR data deck here. The first card controls which card images will be reproduced.
Appendix L

TSAR POSTPROCESSOR FORMAT STATEMENTS

To design a postprocessor it is necessary to understand the organization of data written onto disk by the TSAR simulation. This appendix collects all of the Write statements that the TSAR postprocessor facility employs. Their use is controlled by the user's specification of what is to be stored using the supplementary card that follows the Type #2/5 Card; those data initialize the PPC array—for Postprocessor Control. The postprocessor designer will find array definitions in App. C of this volume, or locally in subroutines OUTPUT and SUMUP; these will permit the designer to create the necessary software.

In several instances the desired records will extend beyond the limit for one line of output, particularly when there are several airbases. When that condition is encountered, the record is extended onto additional lines. A typical example could occur in listing sorties by base and by mission type. What is done is to list the results for each mission for Base #1, then for Base #2, etc., until there is insufficient space for the records of a complete base. Such a record is broken after the last complete base record and started on the next record; a line identifier is included as a review of this section (or the code) will clarify.

The first two records of the "long" output stored on disk provide the IDNUM and overall dimensional data for the postprocessor designer, and the IDNUM is listed on the first "short" record. The organization of those data, on Records numbered 999 and 998, are as follows:
WRITE(8,1088) N999, NTRIAL, SIMDAY, TSAR, USECW, IDNUM, MAXB, NBASE, MAXT, NTYPE, MAXM, NOPEOP, NOAGE, NOPART, NOMUN, NOTRAP, NOMATL
WRITE(8,1088) N998, NO, NO, NO, NO, (BASES(3,B),B=1,NL)
WRITE(9,1089) N999, NO, NO, NO, NO, IDNUM

Trial = ITRIAL
Day = NNDAY
Base = B

NO = M0 = 0
N1 = M1 = 1
N2 = M2 = 2
N3 = M3 = 3
etc.

Daily and Cumulative Sorties Flown and Demanded
(The ACSORT array is now found in LOCAL2)

IF (PPC(1).GT.O) WRITE(8,1088) N1,ITRIAL,NNDAY,B,NO,
((ACSORT(2,AC,M),M=1,MAXM),AC=A1,A2)
IF (PPC(2).GT.O) WRITE(8,1088) N2,ITRIAL,NNDAY,B,NO,
((ACSORT(1,AC,M),M=1,MAXM),AC=A1,A2)
IF (PPC(3).GT.O) WRITE(8,1088) N3,ITRIAL,NNDAY,B,NO,
((ACSORT(2,AC,M),M=1,MAXM),AC=A1,A2)
IF (PPC(4).GT.O) WRITE(8,1088) N4,ITRIAL,NNDAY,B,NO,
((ACSORT(1,AC,M),M=1,MAXM),AC=A1,A2)

IF (PPC(5).NE.O) WRITE(8,1088) N5,ITRIAL,NNDAY,B,N1,
X
IF (PPC(5).NE.O) WRITE(8,1088) N5,ITRIAL,NNDAY,B,N2,
X

Daily Number of Aircraft Tasks, Part and Equipment Repairs by Shop

IF (PPC(6).GT.O) WRITE(8,1088) N6, ITRIAL, NNDAY, B, NN,
(OUTPT2(1,1,SHOP,B),SHOP=S1,S2)
IF (PPC(7).GT.O) WRITE(8,1088) N7, ITRIAL, NNDAY, B, NN,
(OUTPT2(1,2,SHOP,B),SHOP=S1,S2)
IF (PPC(8).GT.O) WRITE(8,1088) N8, ITRIAL, NNDAY, B, NN,
(OUTPT2(1,3,SHOP,B),SHOP=S1,S2)

Cumulative Aircraft Tasks, Parts and Equipment Repairs by Shop

Shop, Number, and Average Time (minutes)

K = GROUP + 8; GROUP = 1, 3
WRITE(8,1088) K,ITRIAL,NNDAY,BASE,M1, (KIND(I),I=N1,COL) Shop
WRITE(8,1088) K,ITRIAL,NNDAY,BASE,M2, (NUM(I), I=N1,COL) Number
WRITE(8,1088) K,ITRIAL,NNDAY,BASE,M3, (TOTMIN(I),I=N1,COL) Time

AIS Usage by Station

WRITE(8,1088) N12,ITRIAL,NNDAY,BASE,NO,
(AISUSE(N1,11,BASE),N1=1,NL)
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Periodic Reports of Aircraft Status and Deferred Maintenance
See subroutine DEFERS for definition of local variables

IF (PPC(13).EQ.0) GO TO 10
WRITE(8,1088) N13,ITRIAL,NNDAY,BASE,N0,N,TIME,(E(K),K=1,5)
IF (DPRINT.GE.2) WRITE(8,1088) N13,ITRIAL,N0,N0,N1,
((F(I,K),I=1,4),K=1,T1)

IF (DPRINT.GE.2.AND.T1.LT.NTYPE) WRITE(8,1088) N13,ITRIAL,N0,N0,N2,
((F(I,K),I=1,4),K=T2,NTYPE)

IF (DPRINT.GE.2) WRITE(8,1088) N13,ITRIAL,N0,N0,N3,
N, M1, AID1, AID2, M2, AID3, AID4

IF (DPRINT.GE.3) WRITE(8,1088) N13,ITRIAL,NNDAY,BASE,N4,
((G(I,K),I=1,MAXM),K=1,T1)

IF (DPRINT.GE.3.AND.T1.LT.NTYPE) WRITE(8,1088) N13,ITRIAL,N0,N0,N5,
((G(I,K),I=1,MAXM),K=T2,NTYPE)

10 CONTINUE

Periodic Reports of Personnel Availability
See subroutine UTILIZ for definitions of local variables

WRITE(8,1088) N14,ITRIAL,NNDAY,B,N0,ND, (PLIST(I,B),I=N1,N2)
DO 20 N = 1, 12
WRITE(8,1088) N14,ITRIAL,NNDAY,B,TIME(N),NO, (A(N,I),I=N1,N2)
20 CONTINUE

Report of UXO, Mines, and Craters Completed on Runways and Taxiways

WRITE(8,1088) N15,ITRIAL,NNDAY,B,N0,AID1,AID2,AID3,
AID4,AID5,AID6

Personnel Data (Fatalities, hospitalizations, etc)

IF (PPC(16).GT.0) WRITE(8,1088) N16,ITRIAL,NNDAY,B,N0,
(SURGEN(I,B),I=1,9), AID, AID1, SURGEN(12,B)

Work Rest Data

WRITE(8,1088) N17,ITRIAL,NNDAY,B,N0,
(WR(L),L=1,8), ((W(K+2*K),K=1,4))
Cumulative Data on Servicable and Reparable Shipments

WRITE(8,1088) N18, ITRIAL, NNDAY, B, NO, (BASES(I,B),I=31,37), BASES(8,B), (BASES(I,B),I=6,7), BASES(38,B)

IF (TSAR.GT.0.AND.PPC(18).NE.0) WRITE(8,1088) N18,ITRIAL,NNDAY, MAXB, NO, ((BASES(I,MAXB),I=31,37), BASES(8,MAXB), (BASES(I,MAXB),I=6,7)), BASES(38,MAXB)

Cumulative NMCS Hours by Base

WRITE(8,1088) N19, ITRIAL, NNDAY, NO, NO, (NORHRSCB),B=1,MAXB)

Parts Stocks: Servicables and Reparables by Type

WRITE(8,1088) N20, ITRIAL, NNDAY, BASE, NO, (C(L),L=1,TALLY) Type
WRITE(8,1088) N20, ITRIAL, NNDAY, BASE, N1, (D(L),L=1,TALLY) Servicables
WRITE(8,1088) N20, ITRIAL, NNDAY, BASE, N2, (E(L),L=1,TALLY) Reparables

Aircraft Activities by Aircraft Type and Base

IF (PPC(21).NE.0) WRITE(8,1088) N21, ITRIAL, NNDAY, B, AC, (ACSTAT(I,1,AC,B),I=1,20)

Causes for Aircraft Delays by Resource Class and Type

Type, Number, and Average Delay (minutes)

K = CLASS + 40;  CLASS = 1, 9

WRITE(8,1088) K, ITRIAL, NNDAY, BASE, M1, (ITEM(I),I=N1,COL) Type
WRITE(8,1088) K, ITRIAL, NNDAY, BASE, M2, (NUM(I),I=N1,COL) Number
WRITE(8,1088) K, ITRIAL, NNDAY, BASE, M3, (TOTMIN(I),I=N1,COL) Time

IF (CLASS.EQ.3) WRITE(8,1088) K, ITRIAL, NNDAY, BASE, M4, (NORS(I),I=N1,COL) "Holes"

Part and Equipment Repair Delays for Personnel and Equipment

Resource type, number delays, and average delay (minutes)

K = CLASS + 48;  CLASS = 1, 2

WRITE(8,1088) K, ITRIAL, NNDAY, BASE, M1, (KIND(I),I=N1,COL) Type
WRITE(8,1088) K, ITRIAL, NNDAY, BASE, M2, (NUM(I),I=N1,COL) Number
WRITE(8,1088) K, ITRIAL, NNDAY, BASE, M3, (TOTMIN(I),I=N1,COL) Time
End of Day Output

IF (PPC(51).NE.0) WRITE(8,1088) N51,ITRIAL,NNDAY,B,NO, (USERS1(L,1,B),L=1,USERS(1))

End of Trial Output

IF (PPC(52).NE.0) WRITE(8,1088) N52,ITRIAL,NNDAY,B,NO, (USERS1(L,2,B),L=1,USERS(2))
IF (PPC(54).NE.0) WRITE(8,1088) N54,ITRIAL, NNDAY, B, NO, (USERS1(L,3,B),L=1,USERS(3))

Multi-trial Results

IF (PPC(53).NE.0) WRITE(8,1088) N53,ITRIAL, NNDAY, B, NO, (USERS2(L,1,B),L=1,USERS(2))
IF (PPC(55).NE.0) WRITE(8,1088) N55,ITRIAL, NNDAY, B, NO, (USERS2(L,2,B),L=1,USERS(3))

NNN = 0 WHEN MOS EXTENDED; NNN = 1 WHEN MOS OPENED;
NNN = 2 WHEN RUNWAY CLOSED; NNN = 3 WHEN EXTENDED MOS STARTED.

WRITE(9,1089) N62,ITRIAL,BASE,NNN,RWYREP(7,BASE),NOW
WRITE(9,1089) N63,ITRIAL,BASE,NSPACE,NO,NOW

NNN = 2
IF (BASES(4,BASE).EQ.0) NNN = 3
WRITE(9,1089) N62,ITRIAL,BASE,NNN,RWYREP(7,BASE),NOW,MCL,MCW

IF (NOACC.NE.100) WRITE(9,1089) N63,TRIAL,BASE,NOACC,NO,NOW

Report of an Aircraft Cannibalization (Subroutine CANNIB)

IF (PPC(65).NE.0) WRITE(9,1089) N65,ITRIAL,NNDAY,BASE,NO,NO, PART,ACTYPE,NOW

Report of a Cross-Cannibalization (Subroutine SALVAG)

WRITE(9,1089) N66,ITRIAL,NNDAY,BASE,NO,NOW,LRU,SRU

Report of an Aircraft Hole (Subroutine NORRPT)

IF (PPC(67).NE.0) WRITE(9,1089) N67,ITRIAL,NNDAY,BASE,NO, NOW,PART

Report of Casualties and Equipment Losses from UXO Detonations

WRITE(8,1088) N68,ITRIAL,NNDAY,BASE,NO,NOW,NO, X ((NLOSS(1,L),L=1,8),L=1,2)
MULTI-TRIAL RESULTS

UXO, Mines, and Craters Removed from Runways and Taxiways

IF (PPC(74).NE. 0)
WRITE(8,1088) N74,N1,N0,N0,N0, (TOTREP(I,4),I=B1,B2)
WRITE(8,1088) N74,N2,N0,N0,N0, (TOTREP(I,5),I=B1,B2)
WRITE(8,1088) N74,N3,N0,N0,N0, (TOTREP(I,6),I=B1,B2)
WRITE(8,1088) N74,N4,N0,N0,N0, (TOTREP(I,10),I=B1,B2)
WRITE(8,1088) N74,N5,N0,N0,N0, (TOTREP(I,11),I=B1,B2)
WRITE(8,1088) N74,N6,N0,N0,N0, (TOTREP(I,12),I=B1,B2)

Average Sorties Flown by Hour, Day, and Base

IF(PPC(75).NE.0) WRITE(8,1087) N75,B,DY, (XSORHR(I,DY,B),I=1,24)*

Summary of Daily Sorties by Base and Mission, and Theater

NM = Number of days (or number of day-pairs for 30<SMI<61)
LINE = 0 Changed for different sets of bases
LINE = LINE + 1
WRITE(8,1087) N76,NM,LINE,IDYSOR,ITSOR,
((DEM(B,M),M=1,MAXM),B=B1,B2)*
WRITE(8,1088) N76,NM,LINE,-N1,N0,N0,
((DELB,M),M=1,MAXM),B=B1,B2)

Summary of Total Sorties by Base and Mission

LINE = 0 Changed for different sets of bases
LINE = LINE + 1
WRITE(8,1088) N77,NM,LINE,N1,N0,N0, ((DELB(M),M=1,MAXM),B=B1,B2)** Sorties
WRITE(8,1088) N77,NM,LINE,N2,N0,N0, ((DEMB(M),M=1,MAXM),B=B1,B2)** Demand
WRITE(8,1088) N77,NM,LINE,N3,N0,N0, (BSelor(B),B=B1,B2)** Totals
WRITE(8,1088) N77,NM,LINE,N4,N0,N0, (SQSOR(B),B=B1,B2)** Std Dev

** These data are reported as 10* Sorties to retain tenths.
**Average Daily Sortie Rate Across the Theater**

\[ N_{MAX} = \text{Number of Days in the Simulation} \]

(or when \(30 < \text{SIMLTH} < 61\), number of day-pairs)

\[ M_2 = 22, \text{ or } N_{MAX} \text{ if } N_{MAX} < 22 \]

WRITE(8,1088) N78,NTRIAL,NNDAY,NO, N1, N1,
\( (\text{TOT}(N),N=1,M_2) \)

IF \((N_{MAX} \leq 22)\) GO TO 1866
WRITE(8,1088) N78,NTRIAL,NNDAY,NO, N1, N2,
\( (\text{TOT}(N),N=21,N_{MAX}) \)

**Average Daily Sortie Rate at each Airbase**

WRITE(8,1088) N79,NTRIAL,NNDAY,B, N1, N1,
\( (\text{TOT}(N),N=1,M_2) \)

IF \((N_{MAX} \leq 22)\) GO TO 1865
WRITE(8,1088) N79,NTRIAL,NNDAY,B, N1, N2,
\( (\text{TOT}(N),N=21,N_{MAX}) \)

**Store the Multi-Trial Statistics for the Post-Processor**

When \(N_{MAX} \leq 22\), \( N_{N1} = 1, N_{N2} = N_{MAX}, \) and \( N_{N} = 1 \)

When \(N_{MAX} > 22\), \( N_{N1} = 1, N_{N2} = 22 \) with \( N_{N} = 1 \), and \( N_{N1} = 21, N_{N2} = N_{MAX} \) with \( N_{N} = 2 \).

**Results for the Theater as a Whole**

WRITE(8,1088) N78,NTRIAL,NNDAY,NO, N1,
\( N_{N},(\text{XXSTAT}(1,I),I=N_{N1},N_{N2}) \)

WRITE(8,1088) N78,NTRIAL,NNDAY,NO, N6,
\( N_{N},(\text{XXSTAT}(6,I),I=N_{N1},N_{N2}) \)

WRITE(8,1088) N78,NTRIAL,NNDAY,NO, N2,
\( N_{N},(\text{XXSTAT}(2,I),I=N_{N1},N_{N2}) \)

WRITE(8,1088) N78,NTRIAL,NNDAY,NO, N4,
\( N_{N},(\text{XXSTAT}(4,I),I=N_{N1},N_{N2}) \)

WRITE(8,1088) N78,NTRIAL,NNDAY,NO, N5,
\( N_{N},(\text{XXSTAT}(5,I),I=N_{N1},N_{N2}) \)
Results from the Individual Bases

WRITE(8,1088) N79,NTRIAL,NNDAY,B,N1,
        (XSTAT(1,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,N8,
        (XSTAT(8,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,N10,
        (XSTAT(10,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,N2,
        (XSTAT(2,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,N3,
        (XSTAT(3,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,N9,
        (XSTAT(9,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,N4,
        (XSTAT(4,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,N5,
        (XSTAT(5,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,N6,
        (XSTAT(6,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,N7,
        (XSTAT(7,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,N8,
        (XSTAT(8,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,N9,
        (XSTAT(9,I,B),I=NN1,NN2)
WRITE(8,1088) N79,NTRIAL,NNDAY,B,NN,
        (XSTAT(10,I,B),I=NN1,NN2)

Multi-Trial Results from Subroutine SUMMARY

NN = 1 for Bases #1 to #20
NN = 2 for Bases #21 to #40, etc.

WRITE(8,1088) N80,NO,NO,N1,NN,
        (CWOUT(1,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N2,NN,
        (CWOUT(2,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N3,NN,
        (CWOUT(3,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N4,NN,
        (CWOUT(4,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N5,NN,
        (CWOUT(5,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N6,NN,
        (CWOUT(6,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N7,NN,
        (CWOUT(7,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N8,NN,
        (CWOUT(8,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N9,NN,
        (CWOUT(9,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N10,NN,
        (CWOUT(10,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N17,NN,
        (CWOUT(17,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N11,NN,
        (CWOUT(11,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N12,NN,
        (CWOUT(12,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N13,NN,
        (CWOUT(13,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N14,NN,
        (CWOUT(14,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N15,NN,
        (CWOUT(15,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N16,NN,
        (CWOUT(16,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N18,NN,
        (CWOUT(18,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N19,NN,
        (CWOUT(19,B),B=Bl,B2)
WRITE(8,1088) N80,NO,NO,N20,NN,
        (CWOUT(20,B),B=Bl,B2)

* 1087 FORMAT('PP',I3, I3,I2, I5, 2315 )
   Used only for PP75 and PP76.
1088 FORMAT('PP',I3, I3,I2, I3,I2, 2315 )
1089 FORMAT('PP',I3, I3,I2, I3,I2, I3, 315 )