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A RAND NOTE

TSAR User's Manual—A Program for Assessing the Effects of Conventional and Chemical Attacks on Sortie Generation: Vol. III, Variable and Array Definitions, and Other Program Aids

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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*

N-3011-AF *TSAR User's Manual—A Program for Assessing the Effects of Conventional and Chemical Attacks on Sortie Generation: Vol. I, Program Features, Logic, and Interactions*

N-3012-AF *TSAR User's Manual—A Program for Assessing the Effects of Conventional and Chemical Attacks on Sortie Generation: Vol. II, Data Input, Program Operation and Redimensioning, and Sample Problem*

CONTENTS

TABLE

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
CW	Chemical warfare
DOB	Dispersed Operating Base

EMS	Equipment Maintenance Squadron; a wing-level organization responsible for equipment maintenance and repair
FRAG	FRAGmentary order that specifies flight requirements
GP	General-Purpose bomb
ILM	Intermediate Logistics Maintenance; on-base parts repair supporting the AMU
IPE	Individual Protection Equipment for a chemical environment
JCL	Job Control Language
LCOM	Logistics Composite Model
LRU	Line Replaceable Unit; an aircraft spare part with distinguishable subordinate components
MOB	Main Operating Base
MOPP	Mission-Oriented Protective Posture (the chemical protection ensemble)
MOS	Minimum Operating Surface
MP	Monitoring Point
NMCS	Not Mission Capable because of lack of Spare parts
NORS	Not Operationally Ready because of lack of Spare parts; same as NMCS
NRTS	Not Reparable This Station
OST	Order and Ship Time in days; time for a NRTSed or condemned part to be replaced
PAA	Program Authorization, Aircraft
POL	Petroleum, Oils, and Lubricants; often used as an abbreviation for aircraft fuel
POS	Peacetime Operating Stock; an organization's stock of aircraft spare parts for aircraft maintenance in peacetime

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

Submoutine 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 Intratheater 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
BEDOWN	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
CWLIST	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

COMPRT	Control Spare Parts Initialization
IPARTS	Manage Parts Stockage Computations
IPART1	Compute Stockage Requirements
IPART2	Initialize Parts Pipelines
CKNRTS	Compute Effective NRTS Rates
RREQTS	Compute Average Resource Demand Data
REQTS1	Assist RREQTS
OUTPUT	List Daily Results
SUMUP	List Final Trial and Multiple Trial Results
SUMMRY	List Multiple Trial Fatalities, Casualties, and Material Losses
ASSETS	List Current Stock Levels
ASSET2	List Current Stocks Levels by Type
NOWMOP	List Current MOPP
TIMES	Collect Task Time Data
DELAYS	Prepare and List Task Times and Delays
PSHORT	Estimate Parts Shortages
JOBLST	Format and Print Aircraft Time Histories
UTILIZ	Collect and Print Personnel Utilization Records

TAB D SORTIE DEMAND AND AIRCREW MANAGEMENT

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

TAB E AIRCRAFT MAINTENANCE

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

TAB F AIRCRAFT PREFLIGHT MAINTENANCE AND MUNITIONS ASSEMBLY

PREFLT	Manage Preflight Maintenance
ASSIGN	Finalize Aircraft Mission Assignment
RECNFG	Check and Perform Needed Reconfiguration
UPLOAD	Load Munitions
REFUEL	Refuel Aircraft
DOWPRE	Check and Initiate Waiting Preflight Tasks
MUNEED	Establish Munitions Requirements
CKBILD	Define Munitions Assembly Requirements
DOBILD	Initiate and Complete Munitions Assembly
CKPEOP	Check for Personnel Substitutions
CKAGE	Check AGE Requirements
ADDAGE	Reorganize Equipment for a COMO Organization
CKALRT	Manage Resources Required for an Alert Aircraft
RELALT	Release Alert Aircraft Resources
FILTRK	Manage Fuel Truck Refilling

TAB G PARTS REPAIR AND COMMUNICATIONS SYSTEMS

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

TAB H AIRBASE ATTACK AND RECOVERY

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

TAB I CHEMICAL WARFARE

STOPIT	Manage Task Interruption and Completion
GOREST	Determine Work Crew Disposition
LETGO	Release Personnel Who Have Cooled Off
CWTIME	Determine Task and Rest Times
CWTEMP	Estimate Work Crew Temperature Variations
DEHYDR	Check Wetting and Dehydration Constraints
DOSURF	Interrupt Runway/Taxiway Repairs at Attack Time
STOPCE	Assess Losses of Runway Personnel and Equipment from Attacks/Taxiway Repairs

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
CWDOSE	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
STRTSK	Store Required and Deferred Tasks
NORRPT	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 Deposition Data
TTIME	Select True Time from Distributions
SHPRQT	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

QUEUES	Lists Specified Heaps on Demand

Minor Functions

LIST1, LIST2, LIST3, LIST4, LIST5
THF, TH, TOD, DATE, DAY, HRMIN, SHOPST

HELPER	Assistant for Debugging
FRIEND	HELPERS Friend for Periodic Debugging

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.

Array Name	Array Length	Current Number of Entries	First Empty Location	Last Empty Location	Overflow Tally
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
INTTSK	LIQ	NEI	FEI	LEI	OVERI
LIMBO	NLIMBO	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
RQDTSK	LNT	NEN	FEN	LEN	OVERN
SHIP	NOSHIP	NES	FES	LES	OVERS
SHIPQ	NOPKG	NEP	FEP	LEP	OVERP
SHPTSK	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

ADAPTR 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).

AIDA 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).

ALERTR Is set to unity if personnel are required to be assigned for alert aircraft.

ALTDEF 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).

APRINT Controls special output at attack time (CT2/5) and for attack-related casualties.

ASSIST 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.

ATRISK 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).

ATTMOP The full MOPP to be donned on warning of an attack (CT3/4).

ATTSOR The total number of sorties flown in the "theater"; used in connection with the sortie-dependent attrition option.

ATTYPE 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).

AUTHPC 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° to 106° Fahrenheit) (CT3/5).

AUTHT Human rectal temperature corresponding to the authorized collapse probability (CT3/5).

AVGTT The average shipment time, in hours, from a CIRF to the operating bases, computed internally.

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 CT44/5).

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 (CT2/5).

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 (CT4/1).

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 (CT4/1).

EXPED When greater than zero, the parts repair and equipment repair administrative delays are reduced by 1/EXPED when there are no serviceables available (CT4/1).

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 HDATA2 HDATA3 HDATA4 HDATA5	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 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 HPEO2	Used for transferring the identity of personnel scheduled for release among subroutines.
IDAY	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 × 100/Time distribution (minus for warning received after the attack time) (CT3/4).
JOBCON	Controls extent of rear-base maintenance (CT3/2).
K1LOW K2LOW	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.
LBBAR	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.
LEVLAC	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.
LMTVAR	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.

LTHDEF	Unscheduled maintenance tasks whose criticality is greater than 66 may be deferred ("hip-pocketed") for a maximum of LTHDEF sorties (CT3/1).
LTHLST	Length of LISTIN array: maximum number of task-incompatibility descriptors.
LTHMP	Counter for entries in the MPPERS array.
LTHPER	Length of the MPPERS array.
LTHQPA	Length of the QPA array.
LTHXRT	Length of the XROOT array.
MAXACN	Maximum number of aircraft that can be accommodated (size of the ACN array).
MAXB	Maximum number of airbases (limit = 63).
MAXFLT	Current number of periodic flight schedules entered in the PRDFLT array.
MAXM	Maximum number of missions for each type of aircraft (limit = 5).
MAXMNT	When the projected maintenance time exceeds MAXMNT, a filler aircraft may be requisitioned (see also FILLAC and FLEVEL) (CT3/2).
MAXPER	Maximum number of periodic flight schedules that may be stored: dimension of the PRDFLT array.
MAXREC	Maximum number of items stored in daily aircraft activity report: dimension of RECORD array.
MAXT	Maximum number of aircraft types (limit = 9).
MAXTME	The time remaining for deferred maintenance before LSTTOD (reassessed every 30 minutes in MANAGE).
MCL	Minimum clear length of the minimum operating surface.
MCW	Minimum clear width of the minimum operating surface.
MEDIC	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.
MLIST	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).
MNTF MNTR	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).

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 by 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. MOPr datasets that can be accommodated.

MXARC Maximum number of taxiway arcs on a single airbase.

MXCRAT Maximum number of crater repairs 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 CT2/5 option.
NJOINT	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 AGEREP 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 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 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.

NOFAC	Length of FACLTY array: maximum number of airbase facilities (limit = 399).
NOFIX	Maximum number of to-be-repaired taxiway arcs read from subroutine TAXIWY 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).
NONODE	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).
NOPIPE	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).

NOW	Current simulation time (TTU).
NOWEAP	Number of types of munitions (≤ NOMUN).
NPART	The number of the highest numbered LRU or SRU (default is NOPART) (CT3/3).
NRTPOL	If unity, an LRU that requires an unavailable SRU that is not nominally stocked is NRTSed (CT2/2).
NSCROL	Maximum number of aircraft whose activities may be stored in the RECORD array (CT2/1).
NTRIAL	Number of repetitions of the simulation (CT1).
NTYPE	Number of aircraft types to be employed in the simulation (may be less than or as great as MAXT) (CT1).
NUMADD	The number of lending shops that are to have borrowing shops added to the BORROW array (CT#21/77).
NUMBOR	The number of lending shops for which the priority of the borrowing shops is to be changed in the BORROW array (CT#21/78).
NXSCH	Next time at which the intratheater shipments are to be rescheduled.
NXSEED	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.
OLDATA	If zero, base resource reports are generated starting at the beginning of the simulation; if 1, these reports are deferred until time "NEWPTA" (CT#3/2).
ONLYUE	When unity, the loss rates generated in TSARINA for civil engineering equipments are applied only to unassigned equipment (CT2/1).
OPSBSE	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).
ORDER1	Threshold controlling CIRF response to parts shortages; responds only if (Enroute Parts + On-base Reparables – Required Parts) is less than ORDER1 (CT3/1).
ORDER2	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).
ORDIT	Interrupted tasks and repairs are prioritized when ORDIT = 1; FIFO if 0 (CT3/1).
ORDWT	Waiting tasks and repairs are prioritized when ORDWT = 1; FIFO if 0 (CT3/1).

OUTFIT Activates the automatic parts stock initialization (CT3/3).

OVERFL Value controls simulation behavior if the dimensions of the arrays used to store internally generated data are exceeded:

When OVERFL = 0, simulation stops;
= 1, overflow noted and tabulated;
= 2, overflow noted for first entry and tabulated;
= 3, overflow tabulated.

This feature must be used with caution because program behavior can become highly erratic when records are discarded. In any event execution is terminated automatically at the end of any day when the cumulative number of discarded records is 20 or more (CT2/1).

OVERTM Number of minutes of overtime permitted (CT4/1).

PKGTM Number of minutes required to package resources for intratheater shipment (CT4/1).

PMODE When unity, parts initialization for WRSKs approximate DO-29; otherwise the Chapter 11 procedures from AFM 67-1 apply (CT3/3).

POSTPN 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).

PPRINT 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).

PRINT Value controls content of simulation output (CT2/1).

PROTME 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.

QUIK 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).

RANDM 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).

RECUP 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).

RELAX Required time that personnel must rest (in the Vogt formulation) when a task must be stopped due to excessive heat buildup or excessive sweating.

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).
SPARE1 . . . SPARE9	Nine undefined variables included in the BASIC common for future requirements.
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).
TEST1	The value for TEST during the specified intervals for debugging output.

TESTAC When initialized, special outputs will be printed for each activity of the TESTAC aircraft (CT2/3).

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

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

TODOCK 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).

TOOFEW 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).

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

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

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

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

TSAR 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).

TSKRWY 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).

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

UNCER 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)

USECP 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 × 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 (I,50)

I = 1	Aircraft number
= 2	Scheduled takeoff time
= 3	Scheduled recovery time

Data for Controlling Aircraft Break Rates (GENERATED)

ACCODE (MAXB, MAXT, I)

I = 1 Adjusted percentage of the aircraft that are to land with a Code 2 or Code 3 break

= 2 Percentage increase required for unscheduled maintenance probabilities when overall breakrate is controlled

Aircraft Type Data (INPUT-#15)

ACDATA (I,MAXT)

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

= 34	Task number for the early morning inspection
= 35	Number of sorties per PAA for which battle damage spares are to be procured
= 36–40	Spare

Aircraft Mission Data (INPUT-#16)

ACMDTA (I, MAXM, MAXT)

I = 1	Flight duration—Mean time*10/distribution
= 2	Nonreparable damaged aircraft fraction*128/Damage to kill ratio*10
= 3	Late takeoff time allowance
= 4	Percent aborts per sortie (in tenths)*128/Percent crews lost when aircraft lost in combat
= 5	Equivalent percent sorties retaining mission-dependent munitions*128/Percent sorties retaining basic-munitions
= 6	Last day for initial attrition rate*500/percent attrition*10 (maximum attrition rate is 49.9 percent per sortie)
= 7	Last day for second attrition rate*500/second percentage attrition*10
= 8–10	Third through fifth attrition rate data
= 11	If unity, aircraft in a flight land at the same time
= 12	Total theater sortie demand outstanding at beginning of current two-hour period
= 13	Time needed in addition to REST for aircrew prebriefings (TTU)
= 14	Time an aircraft may orbit at time of recovery (hundredths of TTU)
= 15	First mission-dependent battle-damage task
= 16	Last mission-dependent battle-damage task
= 17	Task number for mission dependent postflight inspection
= 18–20	Spare

Individual Aircraft Data Array (GENERATED)

ACN (MAXACN, I)

I = 1	Aircraft type *512/ Prior mission *64/ Parent base
= 2	Next base*100/Present base
= 3	Pointers: First interrupted task
= 4	Last interrupted task
= 5	First waiting task
= 6	Last waiting task
= 7	First required task
= 8	First deferred task
= 9	First task in TASKQ
= 10	Next aircraft, same base
= 11	Next aircraft assigned to the same flight, same alert force, or same spare force

= 12	Status (1) In flight (2) PSTFLT delay (3) Maintenance (unassigned) (4) PREFLT delay (5) Maintenance (assigned) (6) Ready to fly (7) Deferred maintenance
= 13	Configuration*128/Standard combat load (SCL)
= 14	Earliest projected flight time
= 15	Designated mission*5000/Assigned FLT
= 16	Preflight flag
= 17	Current criticality based on deferred tasks; minus while the aircraft is waiting for a late launch
= 18	Time present delay is complete
= 19	Pointers: To delay time heap
= 20	Heap pointer
= 21	Actual completion time of longest in-process task
= 22	Number of "holes" in aircraft
= 23	Crew number for current flight
= 24	Squadron number when COMO maintenance is used
= 25	Number of tasks requiring munitions load crew; + 100 if crew at work; + 200 if crew is being held momentarily
= 26	Number of ongoing tasks that demand a unit of special AGE#1 be present
= 27	Number of tasks that demand a unit of AGE#2
= 28	Assignment status: 0 = Unassigned; 1 = Flight; 2 = Alert; 3 = Unassigned (spare) queue
= 29	Aircraft "hole" criticality (generated in ACCRIT)
= 30	Completion time of most recent sortie
= 31	Temporary flag used in FLIGHT and LAUNCH
= 32	Number of sorties initiated during the current day
= 33	Flag denoting status of rear-base maintenance
= 34	Sorties flown since a temporarily deferrable task arose
= 35	Sum of "1", if battle damage tasks are scheduled at operational base, and "10" if damage tasks are scheduled for a rear base
= 36	Pointer to a list of any ongoing tasks that must rejoin
= 37	Defines regular base when diverted for emergency recovery
= 38	Mission effectiveness degradation for omitted basic munitions*10/coded record of munitions that are loaded.
= 39	Number of assigned shelter; if negative, number of assigned ramp
= 40	Number of times aircraft has been passed over for lack of pilot
= 41	Set to one for aircraft that has been hot-pit refueled; zeroed when task 30029 is canceled; also, time when aircraft is expected to complete taxi and be launched
= 42	Munitions load-crew temperature at end of current task (°C*100)
= 43	Rate of change of load-crew temperature at end of current task
= 44	Time that a diverted or transferred aircraft is expected to land

= 45	Time when an 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)

I = 1	Number of aircraft lost in combat
= 2	Number of aircraft damaged in combat
= 3	Number of aircraft lost in air attack
= 4	Number of aircraft damaged in air attack
= 5	Number of air aborts
= 6	Number of ground aborts
= 7	Number of times parts are cannibalized
= 8	NMCS hours
= 9–10	Spare
= 11	Number of aircraft flown to a rear maintenance base
= 12	Number of aircraft transferred from the filler force and CONUS and number transferred to the filler force from the rear maintenance base
= 13	Number of aircraft transferred to/from a dispersed operating base
= 14	Spare
= 15	Number for check flights flown
= 16–20	Daily number of sorties of mission type (I-15)
L = 1	Cumulative during day
= 2	Cumulative during trial
= 3	End-of-trial results cumulated across trials

Cumulative Aircraft Transfer Requirement (GENERATED)

ACTRAN (MAXT, MAXB)

Total number of each aircraft type to be maintained at each DOB.

Temporary Data Storage (INPUT-#21/78)

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 (INPUT-#47)

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.

= 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 (GENERATED)

AFSCHR (NOPCOP, MAXB)

Cumulative TTU expended by each personnel type; used for listing total manhours at the end of each trial.

Equipment Repair Procedures (INPUT-#10)

AGEREP (NOAGER, I)

I = 1 Shop assigned to repair AGE; or pointer to next procedure. For subsequent procedure in series is minus PARENT procedure

= 2 Probability AGE requires repair following use *10000; or minus probability this particular repair procedure is required*100; or probability subsequent procedure is required × 100; or −1 for an alternate procedure.

= 3 Repair time Mean *10/Distribution; or, minus AIS station number

= 4 Personnel Type *100/Number; or, −1 if multiple procedures are to be considered

= 5 Type #1 equipment or, first procedure to be considered

= 6 Alternative procedure

= 7 Task heat factor

= 8 Subsequent procedure*10/Personnel substitutability flag

= 9 Type #2 equipment

Characteristics of the Chemical Agents (INPUT-#44/3)

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 (GENERATED)

AGERPT (NOAGE, MAXB)

Total number on base—Data received*128/Data in transit.

AGE Requirements per Sortie (GENERATED)

AGERQT (NOAGE, MAXM, MAXT)

Likelihood needed*(10**7)/Expected requirements for AGE per sortie—(100000*TTU).

AGE and Equipment Stocks (INPUT-#22)

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 (GENERATED)

AIDALT (MAXT)

Switch; set to unity if resources are required for alert aircraft.

Data on AIS Station Equipment (INPUT-#22/66)

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)

I = 1 TRAY in use on string #1
= 2 TRAY in use on string #2
= 3 TRAY in use on string #3
= 4 TRAY in use on string #4
= 5 TRAY in use on string #5
= 6–10 TRAY in use on strings #6 to #10
= 11 Cumulative LRUs and SRUs repaired by this station type

Alert Aircraft (GENERATED)

ALERT (I, MAXM, MAXT, MAXB)

I = 1 Number aircraft required for Priority #2 alert
= 2 Number aircraft required for Priority #4 alert
= 3 Pointer to first aircraft assigned to priority #2
= 4 Pointer to first aircraft assigned to priority #4
= 5 Number of aircraft readied for priority #2
= 6 Number of aircraft readied for priority #4

Squadron Equipment Equivalence Designators (INPUT-#46)

ALTAGE (NOAGE, I)

I = 1 Type designator for AGE assigned to the second squadron
= 2 Type designator for assignments to the third squadron
= 3 Type designator for assignments to the wing organization

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

ALTPEO (NOPEOP, I)

I = 1 Type designator for personnel assigned to the second squadron
= 2 Type designator for assignments to the third squadron
= 3 Type designator for assignments to the wing organization

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

AQPEOP (NOPEOP, I)

I = 1–5 Personnel types who may assist with on-equipment tasks

Taxiway Segment Data (INPUT-#17/4)

ARC (NOARC, I)

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

Storage Array for Runway Flight Activities (GENERATED)

ATC (I,NOATC)

I = 1	Pointer to the next event at the same base in the runway activity queue, or pointer to the next unused location
= 2	Runway activity time for the first aircraft in a flight
= 3	Runway activity time for the last aircraft in a flight
= 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 (I,6)

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

Airbase Air Traffic Control Data (GENERATED)

ATCPT (I,MAXB)

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

Airbase Attack Data (INPUT-#40)

ATTACK (LTHATT, I)

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

Current Postattack Delays (GENERATED)

ATTDLY (I,MAXB)

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

Aircraft Attrition Thresholds (INPUT-#16/88)

ATTLEV (I)

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

MOPP Levels (INPUT-#3/4 and INPUT-#3/7)

ATTMOP (Ensemble, I)

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

Location of Minimum Operating Surface (GENERATED)

ATTMOS (ATTACKS, I, MAXB)

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

Sortie Dependent Attrition Rates (INPUT-#16/99)

ATTPCT (10, MAXT, MAXM)

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

Average Shop Performance (GENERATED)

AVGP (I, SHOP, BASE)

I = 1 Average task time

= 2 Average task capacity
= 3 Expected closure time*10/distribution

Standard Backshop Parts Repair Times (GENERATED)

AVGREP (SHOP, MAXT) (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 (GENERATED)

AVGSHP (MAXB)

Average shipment time from each operating base to all other operating bases (TTU).

Standard On-Equipment Task Times (GENERATED)

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 (GENERATED)

BACKLG (I, LLQ)

I = 1 Munitions type
= 2 Next task in shop (unused elements)
= 3 Resource causing delay
= 4 Time task first attempted
= 5 Base

Cannibalization Breakage Rate (INPUT-#35/2)

BADCAN (NOPART)

Probability that a part is broken when cannibalized * 100.

Accidental Dosage Data (GENERATED)

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 (INPUT-#20/66)

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 (INPUT-#17/9)

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 (GENERATED)

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

= 14	Coded record of aircraft types assigned to base [Sum of 2**(ACTYPE–1)]
= 15	Number of host airbase for a dispersed operating base (DOB)
= 16	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)
= 17	Number of aircraft receiving postflight inspection
= 18	Number of aircraft that require unscheduled maintenance
= 19	Ten times the average number of aircraft that may be accommodated in a shelter (default = 10)
= 20	Number of shelters on base
= 21–29	Number of aircraft of type (I - 20) * 8/Number of squadrons
= 30	Number of COMO squadrons
= 31	Number of serviceable parts shipped
= 32	Number of serviceable parts received from an operating base
= 33	Number of serviceable parts received from a CIRF
= 34	Number of serviceable parts received from CONUS
= 35	Number of reparable parts shipped to an operating base
= 36	Number of reparable parts shipped to a CIRF
= 37	Number of reparable parts shipped to CONUS
= 38	Number of parts condemned
= 39	Current number of battle damaged aircraft
= 40	Cumulative number of bent parts
= 41	Base kind:1 for MOB; 2 for COB; 3 for DOB
= 42	Storage capacity for POL
= 43	Number of aircraft shelters designated for "special" alert
= 44	Actual taxi time (TTU) *100 / Nominal taxi time (TTU)
= 45	Time required to add an aircraft to an aircraft shelter
= 46	Unity if the base is used for rear-area maintenance
= 47	Cumulative number of aircraft damaged in air operations
= 48	Number of aircraft flown to rear for maintenance
= 49	Number of aircraft transferred from filler force and CONUS, and number transferred to filler force from rear maintenance base
= 50	Aircraft killed on base by air attack *180 / Aircraft damaged
= 51	Location in CEJOBQ of postattack maintenance delay
= 52	Location in CEJOBQ of the postattack civil engineering delay
= 53	Location in CEJOBQ of the postattack runway repair (RRR) delay
= 54	Total number of aircraft maintenance completions
= 55	Number of fuel trucks currently being refilled
= 56	Number of types of aircraft shelters
= 57	Time for next morning preflight inspection
= 58	Number of aircraft sustaining a ground abort (Code 5)
= 59	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
= 2 Number of personnel used for buddy care
= 3 Total time expended for buddy care (TTU)
= 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
= 2 Type of aircraft
= 3 Number of aircraft (PAA)
= 4 Peacetime sorties per day per PAA*100
= 5 Wartime sorties per day per PAA*100
= 6 Average peacetime base parts repair time (hours)
= 7 Average wartime base parts repair time (hours)
= 8 Peacetime order and ship time (days)
= 9 Wartime order and ship time (days)
= 10 One-way travel time to CIRF, when applicable (hours)
= 11 Unity when all faulty parts are to be NRTSed
= 12 ALPHA1; safety factor for high priority LRUs
= 13 ALPHA2; safety factor for low priority LRUs
= 14 BETA1; safety factor for high priority SRUs
= 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 (GENERATED)

CANCEL (I, MAXT, MAXB)

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

Sortie Generation Capabilities (GENERATED)

CANFLY (I, MAXM, MAXT, MAXB)

I = 1	Estimated daily limit without regard to available aircraft
= 2	Estimated daily limit for aircraft of the specified type that are not constrained by a "hole"
= 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 (INPUT-#35)

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 (INPUT-#31)

CARGO (NCARGO, I)

I = 1	Base*256 + Quantity
= 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 (GENERATED)

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)
= 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	Task initiation time
= 7	Task completion time
= 8	Pointers: To heap (Unused elements)

= 9	Heap pointer
= 10	Total time excluding CW effects
= 11	Percentage task completion when task began *100, or (for runway and taxiway repairs) the number of repair jobs
= 12	Percentage task completion when task terminates *100, or (for runway and taxiway repairs) the percentages of jobs completed when task terminates * 100
= 13	Work crew temperature when action terminates (minus when crew is to collapse)
= 14	Time rate of change of temperature
= 15	1000*KIND/Reconstruction procedure being used
= 16	Reconstruction procedure (alternate location)

Civil Engineering Task Priority (INPUT-#39)

CEPRTY (NOFAC, MAXB)

The facility number in the *ith* position is the *ith* on the repair priority list.

Civil Engineering Task Requirements (INPUT-#38)

CERQTS (I, NOCE)

I = 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 (INPUT-#49)

CHANGE (NOCHG, I)

I = 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)

CHCKED (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 Root segment task number.
= 2 Probability (× 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 Time in TTU that the contents of a specific heap are to be listed
= 2 Number denoting heap name (options to limit listing and to terminate execution)

Discrete NOMINI override (INPUT-#17/3)

CKMINI (MAXB)

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

Part Types with Multiple Locations (GENERATED)

CKQPA (NOPART)

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

Critical Shops for Deferred Maintenance Reports (INPUT-#2/4)

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 (GENERATED)

CMCL (MAXB)

CMCW (MAXB)

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

Aircraft Munition Configuration Data (INPUT-#14)

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 (INPUT-#31)

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 (GENERATED)

COOLER (LCOOLQ, I)

I = 1 Completion time
= 2 Pointers: To heap (unused elements)
= 3 Heap pointer
= 4 Team #1—Personnel type*100/number
= 5 Team #2—Personnel type*100/number
= 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 INPUT-#23/66)

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 (GENERATED)

CRATER (MXCRAT, I, MAXB)

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

Critical Building for Civil Engineering Task Prioritization (INPUT-#17/3)

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 (INPUT-#6/88 et al.)

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 (GENERATED)

CSTOCK (NOPART, I)

I = 1 Authorized on-base stocks
= 2 Actual on-base stocks

Cross-Trained Personnel (GENERATED)

CTPEO (NOPEOP)

Entry set to unity for personnel types that are cross-trained for any activity of another specialty.

Cross-Trained Personnel Types (INPUT-#45/2)

CTPEOP (NOPEOP, I)

I = 1–5 Personnel types that may be substituted for on-equipment tasks.

Distribution of Hospitalization Times (INPUT-#43/5)

CURE (10, I)

Five ten-element distributions indicating the hospitalization times for 10 (10) 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 (GENERATED)

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 (GENERATED)

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 (GENERATED)

CWFAC (NOPART, I)

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

Meteorological Conditions (INPUT-#43/2)

CWMET (I, 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)
= 2 Percent humidity
= 3 Wind velocity in tenths of meters/second
= 4 Atmospheric vertical stability category

Cumulative Resource Statistics for Multiple Trials (GENERATED)

CWOUT (I, MAXB)

I = 1 Aircrews lost in combat
= 2 Aircrews killed by air attacks
= 3 Aircrews hospitalized by air attacks
= 4 Average number of maintenance personnel
= 5 Maintenance personnel fatalities
= 6 Maintenance personnel hospitalizations
= 7 Number of personnel that collapse from excessive temperature
= 8 Number of personnel that have had to rest in "cooler"
= 9 Total manhours in hospital during period of simulation
= 10 Total manhours expended in "cooler"
= 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)

CWPROT (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
= 2 Attenuation of the first agent in liquid form
= 3 Attenuation of the first agent in vapor form
= 4 Attenuation of the second agent in liquid form
= 5 Attenuation of the second agent in vapor form
= 6 Attenuation of the third agent in liquid form
= 7 Attenuation of the third agent in vapor form
= 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
= 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 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
= 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 are computed

Chemical Protection Equivalencies for TSARINA Target Types (INPUT-#44/2)

CWTYP (30)

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

Base Damage Data (INPUT-#40)

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 (GENERATED)

DAMSHL (MXSHL, MAXB)

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

Personnel Shift Indicators (GENERATED)

DAYNIT (NOPEOP)

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

Deferred Task Storage Array (GENERATED)

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 (INPUT-#43/8)

DEHYD (6)

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

Resources Available to Replace Losses (INPUT-#2x/99)

DEPOT1 (NOPEOP)
DEPOT2 (NOAGE)
DEPOT3 (NOPART)
DEPOT4 (NOMUN)
DEPOT5 (NOTRAP)
DEPOT6 (NOMATL)
DEPOT7 for POL
DEPOT8 (MAXT) aircraft
DEPOT9 (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 (GENERATED)

DETASK (MAXT)

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

Auxiliary Data on Undetected Tasks (INPUT-#29/88)

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 (INPUT-#40)

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 (GENERATED)

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
= 2 Casualty loss rate of preflight personnel because of nonspecific reasons
= 3 Casualty loss rate of backshop personnel
= 4 Casualty loss rate of munitions assembly personnel
= 5 Casualty loss rate of civil engineering personnel
= 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
= 2 Percent of facility damaged
= 3 Percent personnel lost
= 4 Percent equipment lost
= 5 Percent parts lost
= 6 Percent personnel hospitalized from toxic effects
= 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
= 2 Size in units consistent with the CERQTS data
= 3 Current percent damage*100
= 4 Repair location in the CEJOBQ array
= 5 Alternate shop location
= 6 "Facility" where subsequent task type is defined
= 7 "Facility" at origin of subsequent tasks; or for the primary "facility," minus the number of ongoing tasks, or −1000 if the "facility" is damaged
= 8 Number of the closest monitoring point
= 9 Personnel equilibrium temperature in facility (deg C*100)
= 10 Time rate of change of temperature (at DELTA above equilibrium) when personnel are resting
= 11 Number of MOPP appropriate under existing CW conditions

= 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/Aircraft type*8/Mission
= 2 Priority*1000/Daily demand probability
= 3 Number aircraft required*32/Minimum number
= 4 Time flight announced 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 (INPUT-#17/2)

HURRY (MAXB, J, I)

I = 1 Nominal percentage of standard task times
= 2 Current percentage of standard task times

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

Incomplete CE Repair Job Data for Runway and Taxiway Repairs (GENERATED)

ICEJOB (I, NCEJOB, MAXB)

I = 1 1000*KIND/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*KIND/INDEX).

= 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.

= 3 2500*Number of runway/Hit number.

= 4 10*FCOMP/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 (GENERATED)

INPIPE (NOPART, MAXB, I)

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

Temporary Pipeline Storage (GENERATED)

IPIPE (NOPART, I)

I = 1 Total in pipeline to base
= 2 Total in pipeline for base including off-base storage

Storage Array for Interrupted Tasks (GENERATED)

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 for 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 (GENERATED)

ITEMS (MAXB)

Number of "manual" entries when automatic parts generation feature is used.

Temporary Data Storage in Subroutine INCOMP (GENERATED)

JOBDTA (20, 2)

Cumulative Requirement for Rear-Base Maintenance (GENERATED)

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 (GENERATED)

LANDNG (MAXB)

Lateral Resupply Bases (INPUT-#23/74)

LATERL (I, MAXB)

Stores up to 14 bases that may be selected for lateral repair.

Heap for Reparable Parts and Equipment during Administrative Delays (GENERATED)

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 (INPUT-#19)

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 (GENERATED)

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 (INPUT-#26)

MATERL (NOMATL, MAXB)

Current on-base stock level for each type of material.

Numbers of Part Types Required In Rear (GENERATED)

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 (INPUT-#44/5)

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 (INPUT-#21/77)

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 (INPUT-#43/4)

MOPMOP (MOPP, I)

I = 1 Time in minutes to change from preattack MOPP to MAXMOP
= 2 Spare

Preattack MOPP Requirements (INPUT-#3/5)

MOPPOL (6, 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 (INPUT-#20/66)

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 (GENERATED)

MPARR (NOMP)

Arrival time of droplets from closest (upwind) CW hit to the monitoring point (min).

Current On-Base Chemical Intensity Data (GENERATED)

MPDOSE (J, 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 (GENERATED)

MPDOSO (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 (GENERATED)

MPDOST (Agent, CWTYPE, MP, MAXB)

Periodically updated record of the vapor concentration of each agent in facilities with different CW protection (CWTYPE) at each monitoring point.

Chemical Deposition Data for Each Chemical "Hit" (TSARINA)

MPHIT (LTHCWH, J)

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/m*m)
= 8 Agent steady-state vapor concentration (microgram/m*m*m)

Pointers for Locating Chemical Deposition Data (GENERATED)

MPOINT (MAXB, NOMP, I)

I = 1 Pointer to first chemical hit entry in MPHIT for base and monitoring point (hits are order 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)

I = 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 (INPUT-#24)

MUNSTK (NOMUN, I, MAXB)

I = 1 Number available for loading
= 2 Number available for assembly
= 3 Total on base, except for I = 2
= 4 Temporary tally used during munitions construction

Phased Maintenance Period (INPUT-#15/4)

MXPHAS (MAXT)

The period of the least frequent phased maintenance task (TTU).

Total Unscheduled Aircraft Maintenance Tasks (GENERATED)

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, or 10 or more, Code 2 maintenance tasks
= 2 The number of aircraft to land with 1(1)9, or 10 or more, Code 3 maintenance tasks
= 3 The number of aircraft to land with 1(1)9, or 10 or more, Code 2 and Code 3 tasks.

Estimated Munitions Loads (GENERATED)

NOAMMO (MAXM, MAXT, MAXB)

Available munition loads; updated periodically in subroutine PLAN.

Node (Taxiway Intersection) Data (GENERATED)

NODE (NONODE, 2)

I = 1 Number of aircraft shelters associated with the node
= 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 MOS
= 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 (GENERATED)

NOR (MAXB)

Current Number of NMCS and Battle Damaged Aircraft (GENERATED)

NORBD (MAXB)

Cumulative Number of NMCS Hours at Each Base (GENERATED)

NORHRS (MAXB)

NMCS Aircraft Storage (GENERATED)

NORQ (LNOR, I)

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 (GENERATED)

NROOT (MAXT)

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 (GENERATED)

OFFBSE (KIND, 50, I, MAXT)

I = 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 (GENERATED)

OFFCOB (NOPART, MAXT)

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

Temporary Part Demand Storage (GENERATED)

OFFMOB (NOPART, MAXT)

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 Incidents*1000000/Sum of the delay times
= 2 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 Incidents*1000000/Sum of delay times
= 2 Sum of delay times squared

Sortie Production Data (GENERATED)

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

I = 1 Cumulative sorties demanded during day
= 2 Cumulative sorties flown during day
= 3 Flight data: PRTY = 1 Demanded daily
= 2 Launched daily
= 3 Demanded overall
= 4 Launched overall
= 4 Cumulative sorties demanded during simulation
= 5 Cumulative sorties flown during simulation

Daily Shop Completion Records (GENERATED)

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

I = 1 Daily number for each shop at each base
= 2 Cumulative number for each shop at each base
= 3 Spare

J = 1 On-equipment tasks
= 2 Off-equipment parts repair jobs
= 3 AGE repair jobs

Effectiveness Summaries for Sorties Flown (GENERATED)

OUTPT3 (I, MAXM, MAXT, MAXB)

I = 1 Daily total of sortie-effectiveness-proxy values
= 2 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

Preattack 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 serviceables 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
= 2 Number on "day" shift
= 3 Unassigned*100/Assigned off-equipment
= 4 Nominal shop*100/Minimum number on shift
= 5 Number personnel enroute to base
= 6 Shift change status: =1 when checked; =2 all released
= 7 Number remaining to be released after shift change
= 8 Personnel lost during current shift
= 9 Time last personnel were released from cooler
= 10 Number of off-duty personnel currently providing buddy care
= 11 Total number authorized (target number)
= 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
= 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
= 2 Next flight schedule input time
= 3 Next time for scheduling flights, if none input
= 4 Next time for an early morning inspection
= 5 Next time for periodic resource management
= 6 Schedule intratheater shipments
= 7 Receive shipments from CONUS
= 8 Next shipment departure
= 9 Next shipment arrival
= 10 Transmit and receive reports
= 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 (INPUT-#15/4)

PHASED (100, MAXT, I)

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

Aircrew Status Data (GENERATED)

PILOT (I, 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 (GENERATED)

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 (GENERATED)

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*100
= 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 Li s (INPUT-#28)

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 (GENERATED)

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 (GENERATED)

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 (GENERATED)

PTZ (MAXM, MAXT, MAXB)

Pointer to location of first sortie demand of a specific type

Multiple Part Location Data (INPUT-#35/4)

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 (INPUT-#17/8)

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 (GENERATED)

RCLEAR (MAXB)

Maintains current status of MOS extension activity.

Personnel Availability at Shift Change (GENERATED)

READY (30,MAXB)

Rally used to count available personnel at time shift changes; used only when USECW > 0.

Daily Aircraft Activity Storage Array (GENERATED)

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 (INPUT-#17/2)

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 Preflight tasks
= 3 Off-equipment repairs
= 4 Munitions assembly jobs
= 5 Civil engineering jobs

Theater Resource Requisition Control Data (INPUT-#33)

REFILL (I, J)

I = 1 Switch*100/Time distribution
= 2 Mean resupply time

J = Resource Class

Temporary Split Rejoin Records (GENERATED)

REJOIN (NJOINT, 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 (ENCODED)

RELIMP (33, MAXM)

Stores, for each task criticality index, the number of missions for which task is critical.

Mine Removal Procedures Data (INPUT-#37/99)

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 procedur umber (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 (GENERATED)

REPAIR (MAXB, 1000)

2500*Runway number/Hit number

Alternative Parts Repair Procedures (INPUT-#9)

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 (INPUT-#36)

REPORT (NOREPT, I)

I = 1 Transmittal or receipt time (20*HR+MIN/3)
= 2 Heap pointers

= 3 Heap pointers
= 4 Base

Storage Queue for In-process Parts Repair (GENERATED)

REPQ (LRQ, I)

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

Table C.1

ALTERNATE ENTRIES FOR THE REPRQT ARRAY

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

[a]P.S. = personnel substitutability.

Aircraft Readiness Record (GENERATED)

RINDEX (I, MAXB)

I = 1 Cumulative number of aircraft readied for flight in two hours
= 2 Cumulative number of aircraft readied for flight in four hours
= 3 Cumulative number of aircraft readied for flight in six hours
= 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 I*th* 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 MOPP required at or above threshold

Temporary Storage of Mandatory Aircraft Tasks (GENERATED)

RQDTSK (LRT, I)

I = 1 Task number
= 2 Pointer to next task, same ac (or unused elements)
= 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

= 11 Total manhours (TTU) to repair the crater
= 12 Total time (TTU) to repair the crater

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

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
= 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 (GENERATED)

RWYDAM (32,I,MAXB)

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

Position of the MOS in the Taxiway Network (GENERATED)

RWYNOD (I, MAXB)

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

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)
= 2 Time of last TSARINA generated airbase attack
= 3 Current cumulative number of TSARINA generated airbase attacks
= 4 Number of UXO removals not yet started on the MOS
= 5 Number of mine clearances not yet started on the MOS
= 6 Number of crater repairs not yet started on the MOS
= 7 Number of the runway selected for the MOS
= 8 Current cumulative number of repaired craters on the MOS
= 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 (INPUT-#17/2)

SAVE (MAXB, J, I)

I = 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 (INPUT-#12)

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 (INPUT-#13)

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 (INPUT-#2/2)

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 (ENCODED)

SEEDS (10)

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

Aircraft Shelter Data (GENERATED)

SHELT (NOSHEL, I)

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 (GENERATED)

SHELTS (I, 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)
= 2 Departure time
= 3 Arrival time
= 4 Pointers: Next departure, same base
= 5 Next departure, all bases
= 6 Next arrival, all bases
= 7 SHIPQ 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
= 2 Resource class and type (coded)
= 3 Pointer to next item, same origin, same destination, and same shipment (unused elements)
= 4 Spare

Nominal Shipping Schedules (INPUT-#32/1)

SHIPSC (NOSHP, I)

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

Nominal Transportation Time Delays (INPUT-#32/2)

SHIPTM (Origin, Destination, I)

I = 1 Takeoff delay*16/time distribution
= 2 Enroute time*16/time distribution
= 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 (GENERATED)

SHOPAG (NOAGE)

Used to store damage data during airbase attack computations.

Temporary Shop Personnel Storage Array (GENERATED)

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 (GENERATED)

SHOPRQ (SHOP, MAXM, MAXT)

Average probability that shop facility is required per sortie.

Shop Activity Status Array (GENERATED)

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 (INPUT-#43/3)

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 (GENERATED)

SORCAP (MAXT, MAXB)

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

Auxiliary Sortie Record (GENERATED)

SORDAY (I, MAXB)

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

Sortie Priority and Deficiency Data (GENERATED)

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 (GENERATED)

SORTHR (24, MAXB)

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

Aircraft Spares (GENERATED)

SPARE (I, MAXM, MAXT, MAXB)

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

Cumulative Sorties Storage Array (GENERATED)

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 (GENERATED)

TASKQ (LTQ, I)

I = 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—Team1—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 Team1—Type*100/Number (negative for a load crew)
= 15	Personnel Team2—Type*100/Number
= 16	Additional personnel on Team2—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 (INPUT CT#45/5)

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 (GENERATED)

TCIRF (NOPART)

Number of serviceable SRUs enroute to the CIRF.

Nominal Reconfiguration Times (GENERATED)

TCONF (MAXM1, MAXM2, MAXT)

MAXM1	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)

TEMPF (50, I)

I = 1 Assigned aircraft
= 2 Previously assigned aircraft
= 3 Assignment
= 4 Crew number

Planning Time-Horizon Data (INPUT-#3/2)

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)

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)

TOCIRF (NOPART, I)

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)

TOHOSP (I,NOHOSP)

I = 1 Time personnel 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 (GENERATED)

TOTALS (NOPART, MAXB, I)

I = 1 Authorized numbers of parts
= 2 Actual on-base numbers of parts
= 3 Actual numbers of parts allocated to a CIRF

Average Number of Flight Surface Repairs by Base (GENERATED)

TOTREP (MAXB, I)

I = 1 Number of UXOs selected for clearance on runway during current trial
= 2 Number of mines to be cleared on runway during current trial
= 3 Number of craters to be repaired on runway during current trial
= 4 Number of UXOs cleared on runways during all trials
= 5 Number of mines cleared on runways during all trials
= 6 Number of craters repaired on runways during all trials
= 7 Number of UXOs to be cleared on taxiways during current trial
= 8 Number of mines to be cleared on taxiways during current trial
= 9 Number of craters to be repaired on taxiways during current trial
= 10 Number of UXOs cleared on taxiways during all trials
= 11 Number of mines cleared on taxiways during all trials
= 12 Number of craters repaired on taxiways during all trials

Temporary Parts Storage Array (INPUT-#23)

TPART (EXTPRT, I, MAXB)

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

I = 1 Number serviceables on base *100
= 2 Number reparables on base *100/total items in shop
= 3 Nominal stock level*128/percent NRTS
= 4 Part number

Aircraft Traffic Handling Performance Data (INPUT-#17/11)

TRAFIC (I, J, B)

[All times are stored as hundredths of TTU]

I = 1 Average time between takeoff of aircraft in a flight
= 2 Average time between takeoff of last aircraft in one flight and first in the next flight
= 3 Average time between take off of one flight and landing of first aircraft in next flight
= 4 Average time between the landing of aircraft in a flight
= 5 Average time between the landing of the last aircraft in one flight and the landing of the first aircraft in the next flight

= 6 Average time between landing of one flight and the takeoff of the first aircraft in the next flight

J = 1 Current performance characteristics
= 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:

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

TRAP Stock Data (INPUT-#25)

TRAP (NOTRAP, MAXB)

Current on-base stock level for each type of TRAP.

Requirements for Expendable TRAP

TRAPRQ (I, 3, T)

I = 1 TRAP type (only three types per aircraft type)
= 2 Expected number of expendable TRAP required per sortie

Tray Usage for AIS Parts Repairs (INPUT-#23/78)

TRAY (NOPART)

AIS tray number used to repair part.

AIS Tray Characteristics (INPUT-#22/77)

TRAYS (NOTRAY)

Probability that a particular tray is affected by the nonavailability of an AIS component *10000.

AIS Tray Status Data (GENERATED)

TRAYST (NOTRAY, I, MAXB)

I = 1 Unity if tray at station #1 is out of service
= 2 Pointer to next affected tray

Sortie Demand Summary (GENERATED)

TRYFLY (6, MAXT, MAXB)

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

Alternative Aircraft Task Procedures (INPUT-#6)

TSKALT (NOTSKA, I)

I = 1 Required time*10/distribution
= 2 Personnel required—Team1—Type*100/Number
= 3 Equipment type 1
= 4 Equipment type 2
= 5 Alternative resource/Shop required if >0
= 6 Personnel required—Team2—Type*100/Number
= 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
= 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 = 1
= 3 As for I = 1, except value is that used for simulation

Basic Aircraft Task Procedures (INPUT-#5)

TSKRQT (NOTSK, I)

I = 1 Nominal shop*10/Coded entry designating repair location and shop requirement (see Vol. II, Fig. 6)
= 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)
= 3 Time required*10/distribution
= 4 Personnel required—Team1—Type*100/Number
= 5 First equipment required
= 6 Alternative resource set
= 7 Parallel task
= 8 Subsequent task
= 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 **(INPUT-#37/88)**

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 (from TSARINA)

UXODTA (I, J)

I = Weapon type

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

Unexploded Ordnance Removal Procedures (INPUT-#37/66)

UXOTSK (I, L)

I = 1–10 CE procedure numbers (CT38) for 1–10 steps of the UXO removal procedure
= 11 Total manhours (TTU) to remove the UXO
= 12 Total time (TTU) to remove the UXO

L = 1–10 Weapon type of unexploded ordnance

Heat Generation Factors (INPUT-#43/1)

VALUES (I, MOPP (14))

I = 1 Skin temperature (deg C)
= 2 Gamma—The pumping factor *1000
= 3 CLO—Clothing insulation factor
= 4 IM—Clothing permeability factor
= 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 reparable 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 (INPUT-#30)

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 (INPUT-#3/6)

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 (INPUT-#36)

XMIT (I, MAXB)

I = 1 Transmittal time [30*(20*HR+MIN/3)]/Distribution
= 2 Loss rate of individual data*100
= 3 Loss rate for entire report*100
= 4 Base communications status—Link closed if unity

Roots for Parts with Multiple Root Segments (GENERATED)

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 L*th* 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)

ZZTSK (50, I)

I = 1 512*Base/32*AC Type/Number of aircraft
= 2 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, #17/1, #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.

Subroutine Name	Length (bytes)	Overlay Segment	Entry Points			
Subroutines in the Root Segment						
MAIN	81E	1				
TRIALS	BE4	1				
TTIME	B02	1				
HEAP	BE2	1	INHEAP	OUTHEP	EXHEAP	MODHEP
MODIFY	205C	1	NEWVAL	ZVALUE		
SHPRQT	94A	1	SHPRQ			
CKNET	1AB4	1				
CKRQT	DCC	1	CKRQMT	CKRQT2		
PICK	B32	1				
CHKWX	692	1				
FILTRK	406	1				
FTIME	2B2	1				
NPRIME	3FC	1				
RANDG	420	1	IRANDG	CRANDG		
SHOPST	1DC	1				
SQUADN	250	1				
DAY	14E	1				
TOD	152	1				
HRMIN	182	1				
DATE	19A	1				
THF	1CC	1				
TU	1C8	1				
LIST1	6A0	1	LIST1E			
LIST4	69E	1	LIST4E			
LIST6	5DE	1				

CHKFAC	428	1	
UTILIZ	1BC2	1	UTILI
DATIME	2F7	1	

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
RWYHIT	6DF4	1
ATCDTA	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	BB8	2				
INPUTA	525C	2				
INPUTB	361E	2				
INPUTC	23E8	2				
INPUTD	26C6	2	INPUTE	INPUTF		

TESTER	3DD2	2			
REVIEW	58FC	2			
AUDIT	3904	2			
WRAPUP	34B8	2			
INISHL	11EC	2			
PSHORT	2A0	2			
ICHECK	3E7E	2			
HELPCK	A46	2	IHELPC		
NETIME	59C	2			
CKSPLT	BCA	2	TEMPRQ	ZSPLIT	
NROOTS	4A8	2			
ORDERT	612	2			
COMPRT	1A98	2			
IPARTS	1E02	2			
IPART1	3EA4	2			
IPART2	3850	2			
CKNRTS	7D6	2			
INITIZ	E96	2			
INLIST	25CA	2			
HEADER	1A18	2			
CWLIST	1B2E	2			
AVGTME	1D78	2			
RREQTS	114E	2			
REQTS1	14DA	2	REQTS2	REQTS3	
LIST2	2F8	2			
LIST3	348	2			
LIST5	2F8	2			

Common Statements in the Initialization Segment

PURGE1	3A20C	2			
PURGE2	2E630	2			
PURGE3	FB7C0	2			
LOCAL1	DDE	2			

Subroutines in the Simulation Segment

MANAGE	3BF4	3			
MANAG	9AE	3			
ADMIN	188E	3	ZADMIN	ADMINI	ADMINO
CONTRL	12A0	3	SEND		
FRAG	1058	3			
SORT	71A	3	INSORT	OUTSRT	
TIMES	EC4	3	DOTIME	WAITS	LWAITS
ASSET2	151C	3			
HELPER	80C	3	XHELP		
FERRY	41AC	3	LAND	NEWAC	
GOHOME	181A	3	SENDAC		
REDPEO	1AF2	3			

REDCE	9C8	3				
CKPEOP	8EC	3				
CKAIS	19FC	3	USEAIS	AISREP	FIXAIS	
DOBILD	2B44	3	DOWBLD			
ENDBLD	159A	3	STPBLD			
CKMAIN	2282	3				
PSTFLT	5734	3				
LANDIT	FA6	3				
RUNAC	40DA	3	RUNAC2			
STARTM	1ADC	3				
INITSK	51F6	3	ZTASK	NEWTSK	RETASK	DOWTSK
DOTASK	1B7E	3	ADDTSK	ADDTK	STPTSK	
ENDTSK	1608	3				
TOREAR	E0C	3				
INCOMP	9DE	3				
INIDEF	2212	3				
CANNIB	1D08	3				
CKTASK	530	3				
SCHJOB	1ABC	3				
SPLIT	8EC	3	JOIN			
CKROOT	4F0	3				
RUNSHP	1080	3				
INIREP	587C	3	ZREP	NEWREP	REREP	DOWREP
DOREP	1512	3	ADDREP	STPREP	ENDREP	
SALVAG	B9C	3				
REPRTY	6D12	3				
PRTY1	A90	3				
NRTSIT	6F2	3				
STATUS	12A8	3	SNDRPT	RECRPT		
CHECK	3392	3	ZCHECK			
STRTSK	108C	3	STTASK	REMTSK		
NORRPT	F6C	3	RPTNOR	REDNOR		
INTRUP	76A	3	ININT	OUTINT		
WAIT	A26	3	INWAIT	OUTWAT	MODWAT	
ACWAIT	94C	3				
QUEUES	1300	3				
DISABL	C72	3				
GETPEO	1464	3				
CKCRIT	874	3				
CKAGE	11AC	3	USEAGE	RTNAGE		
ADDAGE	136E	3				
CKALRT	E6A	3	DOALRT	ENDALT		
RELALT	8E8	3				
KILLAC	8CA	3				
BANG	2EC8	3	DOBANG			
DOSHIP	302A	3	RECSUP	REFIL		
SHPRES	14DC	3				
ORDER	F66	3				
SHCIRF	70E	3				
CKCIRF	12A	3				

MROOT	40E	3					
ENDCE	4580	3	ENDCE2	ENDCE3			
INICON	1A02	3	FIXSHL				
FIXSUR	2780	3					
DOCE	ECE	3					
GETCE	D2A	3	USECE				
TAXIWY	2E80	3					
TRIAGE	80C	3	ASSAY				
DEHYDR	A16	3					
FLYERS	1EE0	3	GETPLT	SAVPLT	FLYAC	LANDAC	RELIEF
GETSHL	19A2	3	SHLALT	VACATE	KILSHL		
FLIGHT	4482	3					
LAUNCH	2336	3	FLY				
INSPEC	A7A	3					
ABORT	8E8	3					
REASSG	2BB2	3					
ZNOR	860	3					
PREFLT	1CE6	3	PRFLT	REARM			
ASSIGN	1E5C	3					
RECNFG	286E	3					
UPLOAD	193C	3					
REFUEL	1914	3					
DOWPRE	3416	3	INWPRE	DOWPF			
CKFLHT	134A	3					
REBILD	1E2A	3					
LOSSES	2B4	3					
NEEDCK	304	3					
CWTIME	206E	3	ADDTME				
CKTEMP	1E94	3	CKTEM				
CWCAS	1406	3	CWCASR				
CWDOSE	1CC6	3					
CWMOPP	908	3					
RUNWAY	1D2A	3					
RWYTAX	365C	3					
PATH	AD6	3					
STOPIT	3E58	3					
GOREST	2E16	3	DOREST				
LETGO	13BE	3	ZLETGO				
CALCLO	AAC	3					
CLINIC	6EE	3					
UPDATE	EFE	3					
USEATC	28D0	3	REMOVE				
CKATC	6A6	3					
PUTBAC	A72	3					

Common Statements in the Simulation Segment

LOCAL2	15B8	3
LOCAL3	242C	3
LOCAL4	64	3

LOCAL5	E06	3			
PURGE4	15E0	3			

Link #4 Used for Periodic Housekeeping Functions

PLAN	31E0	4			
PLAN1	1706	4			
MUNEED	221A	4			
CKBILD	1A28	4			
SHIFT	301A	4			
CWSHFT	AD2	4			
ACCRIT	8B4	4			
ASSETS	10EC	4			
RESET	D96	4			
ZSHOPS	22BA	4			
OBTAIN	1710	4	ORDERP	GETPRT	FINDPT
REALLO	196C	4			
SCSHIP	F1C	4			
READFT	2AD0	4	DAYONE	SCHFLT	SORTIE
BASCAP	3E40	4			
NOWMOP	F74	4			

Link #5 Used to List Simulation Results

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

Link #6 Used When Airbase Attacks Are Assessed

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

TOTAL LENGTH 60FCF8 = 6208 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:

Columns	6–10	Task number
	11–15	Alternative task number
	16–20	Part number
	21–25	Alternative part repair procedure
	26–30	Personnel type
	31–35	Equipment type

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    (xxxx,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)
C
         READ(5,1000)  NTRIAL, BASES
 1000    FORMAT(I10,I5)
C
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,I3,15I5)
   40    IF (BASE .LT. BASES)  GO TO 70
         IF (NTRIAL .EQ. 1) 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.
//*
```

```
//GO.FT21F001 DD DSN=M.M0000.A0000.BASE1.CARD40.TRIAL1,DISP=OLD
//GO.FT22F001 DD DSN=M.M0000.A0000.BASE1.CARD40.TRIAL2,DISP=OLD
//GO.FT23F001 DD DSN=M.M0000.A0000.BASE1.CARD40.TRIAL3,DISP=OLD
//GO.FT24F001 DD DSN=M.M0000.A0000.BASE1.CARD40.TRIAL4,DISP=OLD
//GO.FT25F001 DD DSN=M.M0000.A0000.BASE1.CARD40.TRIAL5,DISP=OLD
//GO.FT26F001 DD DSN=M.M0000.A0000.BASE1.CARD40.TRIAL6,DISP=OLD
//GO.FT27F001 DD DSN=M.M0000.A0000.BASE1.CARD40.TRIAL7,DISP=OLD
//GO.FT28F001 DD DSN=M.M0000.A0000.BASE1.CARD40.TRIAL8,DISP=OLD
//GO.FT29F001 DD DSN=M.M0000.A0000.BASE1.CARD40.TRIAL9,DISP=OLD
//GO.FT30F001 DD DSN=M.M0000.A0000.BASE1.CARD40.TRIAL10,DISP=OLD
//GO.FT21F002 DD DSN=M.M0000.A0000.BASE2.CARD40.TRIAL1,DISP=OLD
//GO.FT22F002 DD DSN=M.M0000.A0000.BASE2.CARD40.TRIAL2,DISP=OLD
//GO.FT23F002 DD DSN=M.M0000.A0000.BASE2.CARD40.TRIAL3,DISP=OLD
//GO.FT24F002 DD DSN=M.M0000.A0000.BASE2.CARD40.TRIAL4,DISP=OLD
//GO.FT25F002 DD DSN=M.M0000.A0000.BASE2.CARD40.TRIAL5,DISP=OLD
//GO.FT26F002 DD DSN=M.M0000.A0000.BASE2.CARD40.TRIAL6,DISP=OLD
//GO.FT27F002 DD DSN=M.M0000.A0000.BASE2.CARD40.TRIAL7,DISP=OLD
//GO.FT28F002 DD DSN=M.M0000.A0000.BASE2.CARD40.TRIAL8,DISP=OLD
//GO.FT29F002 DD DSN=M.M0000.A0000.BASE2.CARD40.TRIAL9,DISP=OLD
//GO.FT30F002 DD DSN=M.M0000.A0000.BASE2.CARD40.TRIAL10,DISP=OLD
//*
//*
//*      ADD REFERENCES TO FT31 THRU FT60 FOR ADDITIONAL TRIALS
//*
//*
//* NTRIAL BASES     IN COLUMNS 9-10 AND 11-15
//* ****** *****
//*
//GO.SYSIN DD *
         5    2
```

Appendix H

ORDER—AN AUXILIARY PROGRAM FOR PREPARING TSARINA HIT DATA FOR TSAR

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,

```
FT41F001 DD DSN=TRIAL1.BASE1    FT42F001 DD DSN=TRIAL2.BASE1
FT41F002 DD DSN=TRIAL1.BASE2    FT42F002 DD DSN=TRIAL2.BASE2
FT41F003 DD DSN=TRIAL1.BASE3    FT42F003 DD DSN=TRIAL2.BASE3
```

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 (3I10) 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 I*th* 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.

Appendix I

TTIME UNCERTAINTY DISTRIBUTIONS

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.

Distribution Type	Description
1	Log-normal distribution: Sigma = 0.5*Mean
2	Log-normal distribution: Sigma = 1.0*Mean
3	Log-normal distribution: Sigma = 2.0*Mean
4	Log-normal distribution: Sigma = 4.0*Mean
5	Uniform distribution from 0.5 to 1.5
6	Uniform distribution from 0.7 to 1.3
7	Uniform distribution from 0.9 to 1.1
8	Normal distribution; Sigma = 0.125*Mean
9	Normal distribution; Sigma = 0.250*Mean
10	Normal distribution; Sigma = 0.500*Mean
11	Spare
12	Spare
13	Spare
14	Spare
15	Uniform shipping delay from 0 to "Mean" for 96 percent of the events; remainder "canceled"

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:

Field	Data Description
7	Percent damage to aircraft in the open * 128 plus percent irreparable damage to aircraft in the open
8	Percent casualties among personnel at work in a fuel truck refill area * 128 plus percent damage to fuel trucks being refilled

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.

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

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 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.

```
//N0000##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(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
```

```
//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=2000K,LINSPC2=40,
//  PARMC='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
//SYSIN 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.

```
//N0000VS    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.N0000.A0000.COMPILE(A),DISP=OLD
//            DD DSN=N.N0000.A0000.COMPILE(B),DISP=OLD
//            DD DSN=N.N0000.A0000.COMPILE(C),DISP=OLD
//            DD DSN=N.N0000.A0000.COMPILE(D),DISP=OLD
//            DD DSN=N.N0000.A0000.COMPILE(E),DISP=OLD
//            DD DSN=N.N0000.A0000.COMPILE(F),DISP=OLD
//            DD DSN=N.N0000.A0000.COMPILE(G),DISP=OLD
//            DD DSN=N.N0000.A0000.COMPILE(H),DISP=OLD
//            DD DSN=N.N0000.A0000.COMPILE(I),DISP=OLD
//            DD DSN=N.N0000.A0000.COMPILE(J),DISP=OLD
//            DD DDNAME=SYSIN
//LKED.SYSLMOD DD DSN=N.N0000.A0000.TSAR.VS.MODULE(TSAR),DISP=OLD
//LKED.SYSIN  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,CWHELP
          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,CWHELP
          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,HELPCK,NETIME,CKSPLT,NROOTS,ORDERT
          ORDER COMPRT,IPARTS,IPART1,IPART2,CKNRTS
          ORDER INITIZ,INLIST,HEADER,CWLIST,AVGTME,RREQTS,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,HELPCK,NETIME,CKSPLT,NROOTS,ORDERT
          INSERT COMPRT,IPARTS,IPART1,IPART2,CKNRTS
          INSERT INITIZ,INLIST,HEADER,CWLIST,AVGTME,RREQTS,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 CKMAIN,PSTFLT,LANDIT,RUNAC,STARTM,INITSK,DOTASK,ENDTSK
      ORDER TOREAR,INCOMP,INIDEF,CANNIB,CKTASK,SCHJOB,SPLIT,CKROOT
      ORDER RUNSHP,INIREP,DOREP,ENDREP,SALVAG,REPRTY,PRTY1,NRTSIT
      ORDER STATUS,CHECK,STRTSK,NORRPT,INTRUP,WAIT,ACWAIT,QUEUES
      ORDER DISABL,GETPEO,CKCRIT,CKAGE,ADDAGE,CKALRT,RELALT
      ORDER KILLAC,BANG,DOSHIP,SHPRES,ORDER,SHCIRF,CKCIRF,MROOT
      ORDER ENDCE.INICON,FIXSUR,DOCE,GETCE,TAXIWY,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,CWMOPP,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 CKMAIN,PSTFLT,LANDIT,RUNAC,STARTM,INITSK,DOTASK,ENDTSK
      INSERT TOREAR,INCOMP,INIDEF,CANNIB,CKTASK,SCHJOB,SPLIT,CKROOT
      INSERT RUNSHP,INIREP,DOREP,ENDREP,SALVAG,REPRTY,PRTY1,NRTSIT
      INSERT STATUS,CHECK,STRTSK,NORRPT,INTRUP,WAIT,ACWAIT,QUEUES
      INSERT DISABL,GETPEO,CKCRIT,CKAGE,ADDAGE,CKALRT,RELALT
      INSERT KILLAC,BANG,DOSHIP,SHPRES,ORDER,SHCIRF,CKCIRF,MROOT
      INSERT ENDCE,INICON,FIXSUR,DOCE,GETCE,TAXIWY,TRIAGE,DEHYDR
      INSERT FLYERS,GETSHL,FLIGHT,LAUNCH,INSPEC,ABORT,REASSG,ZNOR
      INSERT PREFLT,ASSIGN,RECNFG,UPLOAD,REFUEL,DOWPRE,CKFLHT
      INSERT REBILD,LOSSES,LOOSES,NEEDCK,PURGE4
      INSERT CWTIME,CKTEMP,CWCAS,CWDOSE,CWMOPP,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,STOPCE,CWLOSS,GOHELP,ENDCW
      INSERT BOMB,ATTKAC,REORGN,REORG2,REORG3,ENDAC,CWHITS,COOLOS
      INSERT DOSURF,STOPCE,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 TEMP10, 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.

```
//N0000COM   JOB   (0000,100,3,40),'JCL FOR TSAR',CLASS=N
//STEP1      EXEC   PGM=IEFBR14
//NEWMOD  DD  DSN=&&TEMP,DISP=(NEW,PASS),UNIT=TEMP,
//            DCB=(RECFM=U,LRECL=3156,BLKSIZE=3156),
//            SPACE=(TRK,(200,10,1))
//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(PPDATA),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   FORVCL,FVPOPT=2,REGC=2000K,LINSPC2=40,
//   PARMC='NOFIPS,NOSDUMP,GOSTMT,NOSRCFLG,NOTERM,NOTRMFLG',
// REGL=256K,LIBL='SYS1.CSDFNLIB',PARML='SIZE=(228K,48K),OVLY,MAP,XCAL'
//FORT.SYSIN  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
//LKED.SYSIN  DD  *
   ENTRY MAIN
    INCLUDE OLDLIB(TSAR2#89)
          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,CWHELP
          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,CWHELP
          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,HELPCK,NETIME,CKSPLT,NROOTS,ORDERT
          ORDER COMPRT,IPARTS,IPART1,IPART2,CKNRTS
          ORDER INITIZ,INLIST,HEADER,CWLIST,AVGTME,RREQTS,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,HELPCK,NETIME,CKSPLT,NROOTS,ORDERT
          INSERT COMPRT,IPARTS,IPART1,IPART2,CKNRTS
          INSERT INITIZ,INLIST,HEADER,CWLIST,AVGTME,RREQTS,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,CKPTOP,CKAIS,DOBILD,ENDBLD
          ORDER CKMAIN,PSTFLT,LANDIT   NAC,STARTM,INITSK,DOTASK,ENDTSK
          ORDER TOREAR,INCOMP,INIDEF,C  NTB,CLTASK,SCHJOB,SPLIT,CKROOT
          ORDER RUNSHP,INIREP,DOREP,ENDREP,SALVAG,REPRTY,PRTY1,NRTSIT
          ORDER STATUS,CHECK,STRTSK.NORRPT,INTRUP,WAIT,ACWAIT,QUEUES
          ORDER DISABL,GETPEO,CKCRIT,CKAGE,ADDAGE,CKALRT,RELALT
          ORDER KILLAC,BANG,DOSHIP,SHPRES,ORDER,SHCIRF,CKCIRF,MROOT
          ORDER ENDCE,INICON,FIXSUR,DOCE,GETCE,TAXIWY,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,CWMOPP,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 CKMAIN,PSTFLT,LANDIT,RUNAC,STARTM,INITSK,DOTASK,ENDTSK
        INSERT TOREAR,INCOMP,INIDEF,CANNIB,CKTASK,SCHJOB,SPLIT,CKROOT
        INSERT RUNSHP,INIREP,DOREP,ENDREP,SALVAG,REPRTY,PRTY1,NRTSIT
        INSERT STATUS,CHECK,STRTSK,NORRPT,INTRUP,WAIT,ACWAIT,QUEUES
        INSERT DISABL,GETPEO,CKCRIT,CKAGE,ADDAGE,CKALRT,RELALT
        INSERT KILLAC,BANG,DOSHIP,SHPRES,ORDER,SHCIRF,CKCIRF,MROOT
        INSERT ENDCE,INICON,FIXSUR,DOCE,GETCE,TAXIWY,TRIAGE,DEHYDR
        INSERT FLYERS,GETSHL,FLIGHT,LAUNCH,INSPEC,ABORT,REASSG,ZNOR
        INSERT PREFLT,ASSIGN,RECNFG,UPLOAD,REFUEL,DOWPRE,CKFLHT
        INSERT REBILD,LOSSES,LOOSES,NEEDCK,PURGE4
        INSERT CWTIME,CKTEMP,CWCAS,CWDOSE,CWMOPP,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,STOPCE,CWLOSS,GOHELP,ENDCW
        INSERT BOMB,ATTKAC,REORGN,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    DSNAME=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=&&TEMP,DISP=(OLD,PASS)
//PRESS      DD    DSN=N.N0000.A0000.TSARVS.MODULE,DISP=SHR
//OUT        DD    DSN=N.N0000.A0000.TSARVS.MODULE,DISP=OLD
```

```
//SYSUT3     DD    UNIT=TEMP,SPACE=(TRK,(10))
//SYSUT4     DD    UNIT=TEMP,SPACE=(TRK,(10))
//SYSIN      DD    *
   COPY INDD=PRESS,OUTDD=OUT
   COPY INDD=IN,OUTDD=OUT
```

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.

```
//N0000III  JOB  (0000,250,3,20),'TSAR JOB CARD',CLASS=N
//JOBLIB  DD  DSN=N.N0000.A0000.TSARVS.MODULE,DISP=SHR
//GO PROC
//GO   EXEC   PGM=TSARIII
//GO.FT05F001  DD  DDNAME=SYSIN
//GO.FT06F001  DD  SYSOUT=A
//GO.FT07F001  DD  SYSOUT=B
//GO.FT08F001  DD  DSN=N.N00000.A00000.LONG.RECORDS,DISP=OLD
//GO.FT09F001  DD  DSN=N.N00000.A00000.SHORT.RECORDS,DISP=OLD
//GO.FT10F001  DD  UNIT=TEMP,SPACE=(TRK,(140,2)),
//    DCB=(RECFM=VS,BLKSIZE=10000),DISP=(NEW,PASS)
```

```
//GO.FT11F001  DD  UNIT=TEMP,SPACE=(TRK,(1,1)),DISP=(NEW,PASS)
//GO.FT12F001  DD  UNIT=TEMP,SPACE=(TRK,(20,2)),
//    DCB=(RECFM=VS,BLKSIZE=5000),DISP=(NEW,PASS)
//GO.FT15F001  DD  UNIT=TEMP,SPACE=(TRK,(60,4)),
//    DCB=(RECFM=VS,BLKSIZE=10000),DISP=(NEW,PASS)
//GO.FT16F001 DD DSN=N.N0000.A0000.FORTY.VSDEMO,DISP=OLD
//GO.FT18F001 DD DSN=N.N0000.A0000.HITS.VSDEMO,DISP=OLD
//GO.FT19F001 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
```

```
                                        NO = MO = 0
        Trial = ITRIAL                  N1 = M1 = 1
        Day   = NNDAY                   N2 = M2 = 2
        Base  = B                       N3 = M3 = 3
                                            etc.
```

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

```
      IF (PPC(1).GT.0) WRITE(8,1088) N1,ITRIAL,NNDAY,B,NO,
                                ((ACSORT(2,AC,M),M=1,MAXM),AC=A1,A2)
      IF (PPC(2).GT.0) WRITE(8,1088) N2,ITRIAL,NNDAY,B,NO,
                                ((ACSORT(1,AC,M),M=1,MAXM),AC=A1,A2)
      IF (PPC(3).GT.0) WRITE(8,1088) N3,ITRIAL,NNDAY,B,NO,
                                ((ACSORT(2,AC,M),M=1,MAXM),AC=A1,A2)
      IF (PPC(4).GT.0) WRITE(8,1088) N4,ITRIAL,NNDAY,B,NO,
                                ((ACSORT(1,AC,M),M=1,MAXM),AC=A1,A2)

      IF (PPC(5).NE.0) WRITE(8,1088) N5,ITRIAL,NNDAY,B,N1,
     X                  (SORTHR(I,B),I=1,12)
      IF (PPC(5).NE.0) WRITE(8,1088) N5,ITRIAL,NNDAY,B,N2,
     X                  (SORTHR(I,B),I=13,24)
```

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

```
      IF(PPC(6).GT.0)  WRITE(8,1088) N6, ITRIAL, NNDAY, B, NN,
                                (OUTPT2(1,1,SHOP,B),SHOP=S1,S2)
      IF(PPC(7).GT.0)  WRITE(8,1088) N7, ITRIAL, NNDAY, B, NN,
                                (OUTPT2(1,2,SHOP,B),SHOP=S1,S2)
      IF(PPC(8).GT.0)  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)
```

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,NO,N,TIME,(E(K),K=1,5)
      IF (DPRINT.GE.2) WRITE(8,1088) N13,ITRIAL,NO,NO,N1,
     X                ((F(I,K),I=1,4),K=1,T1)

      IF (DPRINT.GE.2.AND.T1.LT.NTYPE) WRITE(8,1088) N13,ITRIAL,NO,NO,N2,
     X                ((F(I,K),I=1,4),K=T2,NTYPE)

      IF (DPRINT.GE.2) WRITE(8,1088) N13,ITRIAL,NO,NO,N3,
     X                      N, M1, AID1, AID2, M2, AID3, AID4

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

      IF (DPRINT.GE.3.AND.T1.LT.NTYPE) WRITE(8,1088) N13,ITRIAL,NO,NO,N5,
     X          ((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,NO,NO,(PLIST(1,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,NO,NO,AID1,AID2,AID3,
     X                                       AID4,AID5,AID6
```

Personnel Data (Fatalities, hospitalizations, etc)

```
      IF (PPC(16).GT.0) WRITE(8,1088) N16, ITRIAL, NNDAY, B, NO,
                  (SURGEN(I,B),I=1,9),  AID, AID1, SURGEN(12,B)
```

Work Rest Data

```
      WRITE(8,1088) N17, ITRIAL, NNDAY, B, NO,
                  (WR(L),L=1,8),  ((WR(7+2*K),WR(8+2*K),WR(16+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, (NORHRS(B),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
```

User's Customized Output Data

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.
      NNN = BASES(4,BASE)
      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,TRIAL,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(I,L),L=1,8),I=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<SIMLTH<61)

```
LINE = 0            Changed for different sets of bases
LINE = LINE + 1
WRITE(8,1087) N76,NM,LINE,IDYSOR,ITSOR,                              Sorties
                          ((DEL(B,M),M=1,MAXM),B=B1,B2) *
WRITE(8,1088) N76,NM,LINE,-N1,N0,N0,                                 StdDev
                          ((DEM(B,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, ((DEL(B,M),M=1,MAXM),B=B1,B2) **  Sorties
WRITE(8,1088) N77,NM,LINE,N2,N0,N0, ((DEM(B,M),M=1,MAXM),B=B1,B2) **  Demand
WRITE(8,1088) N77,NM,LINE,N3,N0,N0, (BSESOR(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

NMAX = Number of Days in the Simulation
(or when 30<SIMLTH<61, number of day-pairs)

M2 = 22, or NMAX if NMAX < 22

```
WRITE(8,1088) N78,NTRIAL,NNDAY,N0, N1, N1,
                                        (TOT(N),N=1,M2)
IF (NMAX .LE. 22)  GO TO 1866
WRITE(8,1088) N78,NTRIAL,NNDAY,N0, N1, N2,
                                        (TOT(N),N=21,NMAX)
```

Average Daily Sortie Rate at each Airbase

```
WRITE(8,1088) N79,NTRIAL,NNDAY,B, N1, N1,
                                        (TOT(N),N=1,M2)
IF (NMAX .LE. 22)  GO TO 1865
WRITE(8,1088) N79,NTRIAL,NNDAY,B, N1, N2,
                                        (TOT(N),N=21,NMAX)
```

Store the Multi-Trial Statistics for the Post-Processor

When NMAX <= 22, NN1 = 1, NN2 = NMAX, and NN = 1

When NMAX > 22, NN1 = 1, NN2 = 22 with NN = 1, and
NN1 = 21, NN2 = NMAX with NN = 2.

Results for the Theater as a Whole

```
WRITE(8,1088)  N78,NTRIAL,NNDAY,N0, N1,
                          NN,(XXSTAT(1,I),I=NN1,NN2)
WRITE(8,1088)  N78,NTRIAL,NNDAY,N0, N6,
                          NN,(XXSTAT(6,I),I=NN1,NN2)
WRITE(8,1088)  N78,NTRIAL,NNDAY,N0, N2,
                          NN,(XXSTAT(2,I),I=NN1,NN2)
WRITE(8,1088)  N78,NTRIAL,NNDAY,N0, N4,
                          NN,(XXSTAT(4,I),I=NN1,NN2)
WRITE(8,1088)  N78,NTRIAL,NNDAY,N0, N5,
                          NN,(XXSTAT(5,I),I=NN1,NN2)
```

Results from the Individual Bases

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

Multi-Trial Results from Subroutine SUMMRY

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

```
      WRITE(8,1088) N80,N0,N0,N1,NN, (CWOUT(1,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N2,NN, (CWOUT(2,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N3,NN, (CWOUT(3,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N4,NN, (CWOUT(4,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N5,NN, (CWOUT(5,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N6,NN, (CWOUT(6,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N7,NN, (CWOUT(7,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N8,NN, (CWOUT(8,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N9,NN, (CWOUT(9,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N10,NN, (CWOUT(10,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N17,NN, (CWOUT(17,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N11,NN, (CWOUT(11,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N12,NN, (CWOUT(12,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N13,NN, (CWOUT(13,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N14,NN, (CWOUT(14,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N15,NN, (CWOUT(15,B),B=B1,B2)
      WRITE(8,1088) N80,N0,N0,N16,NN, (CWOUT(16,B),B=B1,B2)
C     WRITE(8,1088) N80,N0,N0,N18,NN, (CWOUT(18,B),B=B1,B2)
C     WRITE(8,1088) N80,N0,N0,N19,NN, (CWOUT(19,B),B=B1,B2)
C     WRITE(8,1088) N80,N0,N0,N20,NN, (CWOUT(20,B),B=B1,B2)
```

```
*  1087   FORMAT('PP',I3, I3,I2,   I5,   23I5 )
                Used only for PP75 and PP76.
   1088   FORMAT('PP',I3, I3,I2, I3,I2,  23I5 )
   1089   FORMAT('PP',I3, I3,I2, I3,I2,   3I5 )
```