

EA-6B MISSION PLANNING PROGRAM

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# THESIS

EA-6B MISSION PLANNING PROGRAM

by

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(20. ABSTRACT Continued)

retrieval, display, and plotting of information. All decision making is done by the aircrewman. The desired goals of this program are increased mission planning efficiency and effectiveness through automation of the clerical tasks of the planning process.





EA-6B Mission Planning Program

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ABSTRACT

The EA-6B Mission Planning Program is designed for use by aircrewmembers deployed on board aircraft carriers. It is an interactive computer program for automated sorting, retrieval, display, and plotting of information. All decision making is done by the aircrewman. The desired goals of this program are increased mission planning efficiency and effectiveness through automation of the clerical tasks of the planning process.

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## I. INTRODUCTION

The process of planning the electronic warfare support for an air strike is complex and time consuming. There are sophisticated methods for data collection, analysis, and storage, and the effective employment of today's weapon systems depends on such data. However, no automated interface has been developed to assist the Electronic Warfare Officer in his efforts to correlate the two. It's all done by hand.

The mission planning process reveals a pattern common to many technical problem solving efforts. The majority of one's time is spent gathering information and setting up the problem to be solved. Very little time is devoted directly to solving it. The data and information needed for EA-6B mission planning must be retrieved, by hand, from numerous source documents such as Kiltling lists, TACMANUALS, computer printouts of the Electronic Order of Battle (EOB), radar handbooks, etc. Much of the information contained in these documents is non-essential to the immediate problem of mission planning, and only adds to the time required for sorting and retrieval. Data lists must be made for later reference in flight, and charts must be marked showing the EOB, route of flight, and emitter detection envelopes. Only when all this preliminary work is complete can the scenario



be subjectively analyzed by the planner, and jammer positioning optimized. Some calculations of jamming effectiveness may be performed, but these are so cumbersome and time consuming that an operator can seldom afford to make more than one or two such calculations, just to obtain a "feel" for the situation. The inefficiency is apparent, and under some circumstances, unaffordable.



## II. DESIGN CONSIDERATIONS

The primary objective was to automate as much of the planning process as possible, and allow the operator to devote more of his time to solving the problem of asset optimization. Speed and simplicity were the foundation for design considerations. The following is a description of the rationale used, and the decisions made which led to the final system design.

Sorting, plotting, and calculating can be most effectively accomplished by a computer. Making decisions, or choosing between options is a relatively simple task for a human. Therefore, the software system is not a completely hands off, optimization routine. Rather, it is a series of steps requiring decisions from the planner at various points, indicating in which direction to proceed. The decision points arise whenever it is more efficient for the planner to perform some portion of the planning process rather than generating a computer code to do the same thing. All probable situations have been included in the system design.

To minimize cost, the system is intended to utilize equipment and facilities currently on board aircraft carriers. Access to the ship's main computer at arbitrarily random times is not considered practical. Therefore, the system is designed for a small, peripheral type, general purpose computer. All Pacific Fleet carriers have been funded for



the WANG 2200 system, which is such a computer. The WANG system has:

- 1) Central processor of moderate capacity - 32K
- 2) Auxiliary storage of three 250K floppy disks
- 3) Video display
- 4) Typewriter for hard copy output
- 5) X-Y plotter capable of accommodating aeronautical charts.

Naval Ocean Systems Command has developed an interface between the WANG computer and the ship's main computer for fast transfer of information, with no apparent interruption of the main computer's functions.

The ship's computer contains the EOB for areas of the world in which the Navy has responsibility. The information contained in other reference documents is not presently in computer files, and the EA-6B TACMANUAL lists 13 separate publications for reference during mission planning. Therefore, an Emitter Parameter Library file was developed containing information retrieved from these various sources and stored in the floppy disk for reference. The library is an array containing EA-6B pertinent information on each type radar listed in the ship's EOB. When site locations are retrieved from the EOB in the main computer, the site type is retrieved also. The listing routine matches site types retrieved with the corresponding type in the Emitter Library and builds a "working" EOB. The parameters listed when the EOB is printed out are:





- 1) Site number
- 2) Latitude and longitude
- 3) Threat type, e.g. Low Blow or Tall King
- 4) Emitter function, e.g. Fire Control or Early Warning
- 5) Frequency band and frequency range of emitter
- 6) PRF range
- 7) Automatic and manual jamming codes against the emitter
- 8) Percent of frequency band of the emitter
- 9) Pertinent remarks, e.g. "HOJ against noise", or "SA-2, DLJ beacon at \_\_\_MHZ".

The listing would be used by the operator to determine computer lists to generate for the mission, site locations to be programmed, and any preemptive jamming assignments to be made. The information included in the Emitter Library is arbitrary, and items can be added or deleted to suit the preferences of the squadron or community. Computer space may be at a premium, so the intent here is to include information of primary importance for quick reaction planning. No in-depth information on how the various codes were generated is presented.

This first generation program produces a "Flat Earth" solution. This was necessary to keep solution time to a minimum. Geographical features are not presently stored in the ship's computer, and an algorithm will have to be



devised to accommodate this problem. One approach will be discussed in the proposals for system expansion. At present, it would require a great deal of time and inputs from the operator to include terrain features, which is at cross purpose with the guidelines of speed and simplicity. All conflicts concerning whether or not to automate a certain phase of the mission planning process were resolved within this framework.



### III. SYSTEM DESCRIPTION

A computer simulation was accomplished utilizing:

- 1) IBM 360/67 general purpose computer
- 2) Tektronix 4012 graphics terminal (30/12 system)
- 3) Tektronix 4610 hard copy unit.

FORTRAN language was used in the simulation and conversion to BASIC language used on the WANG 2200 is relatively straightforward due to the similarities of the two languages.

The system that has been designed assists the operator as follows: The operator initiates the planning process by choosing one of three basic mission profiles; escort, modified escort, or standoff. Next, either a route of flight for the strike group is entered, if it has already been chosen, or just the latitude and longitude of the target may be entered, allowing the operator to choose and enter a route later. The system produces a printout of the area's EOB. Next, the EOB, detection envelopes of the various emitters, and the route of flight are visually presented to the operator. This is a key point in the planning process, for once the visual presentation is available, the optimum route is often apparent at a glance. A large X-Y plotter appropriately marks the operator's chart with this presentation, if and when desired. If the operator wishes to consider a number of alternatives, each may be plotted on a transparent overlay, several of which may be presented to



the strike leader or staff for final decision. Then hard copies of the complete navigation solution and the Time Scenario of the route are printed. The Time Scenario is a minute-by-minute listing of the sites within detection range of the strike group and/or EA-6B. It contains all necessary information to react as quickly as possible to an onboard jamming system malfunction which would cause operation in a degraded mode.

The operator may consider as many combinations of routes and mission profiles as he desires. The point to remember is that this is not an optimization routine. The aircrewman must make all the decisions. The success of his planning efforts will depend on how he uses his training, experience, and imagination, which is no different from the way things have always been. Hopefully he will have the chance to be considerably more effective by utilizing a system which performs most of the clerical tasks of mission planning for him.





#### IV. DETAILED PLANNING SESSION

##### A. INTRODUCTION

The following is a description of all aspects of system assistance available in a complete planning session. The assumption made is that the strike aircraft route of flight to and from the target has already been designated. The operator's task is to pick the most appropriate EA-6B mission profile, and optimize his assets accordingly.

##### B. ESCORT MISSION

Upon initiating the program, the operator can select any of the mission profiles for consideration. This example assumes consideration of the Escort mission profile first. The system then asks the operator to enter the strike aircraft route of flight to and from the target, including turnpoints, speeds on each leg of the route, and the magnetic variation of the area. At this point the system takes the given L/L's of the route, determines the maximum and minimum of each, and adds and subtracts 120 NM to the maximum and minimum, respectively. This sets the geographical limits of search in the EOB to be obtained from the ship's main computer. The system then accesses the current listing of the EOB. It searches through the EOB and retrieves all sites that fall within the geographical limits of the maximum and minimum latitudes and longitudes previously calculated.



It retrieves the site L/L and the site type (Fansong, Barlock, etc.). All these sites are stored in an array (list) in the peripheral machine, and matched with the appropriate parameters in the Emitter Parameter Library, as described in Design Considerations.

The "working" EOB now contains all sites listed in the ship's EOB within the geographical limits set. The operator is asked if he wants to add any additional sites to the EOB that may be a result of recent intelligence (VQ, returning strike a/c, RA-5C missions, etc.). He also has the option to build his own complete EOB, ignoring the ship's listing entirely. This would be useful in exercises against friendly EOB's such as U.S. coastlines, EW ranges at Fallon and Pinecastle, etc.

When the "working" EOB is complete, the system asks if the operator wishes a printout of the EOB. If a listing is desired, the operator can be selective by choosing to list all emitters, just EW/Acq type emitters, or just Terminal Threat types. The information presented comes from the "working" EOB and the Emitter Parameter Library. The listing contains information pertinent to EA-6B operators (see Fig. 1).

The next step in the process is to display the EOB and route of flight to the operator. He can display the route of flight and radar detection envelopes of all emitters, EW/Acq types only, or terminal threat types only. Once the desired combinations are entered, the sites, route of flight,



and detection envelopes are displayed (see Figs. 2,3,4), and the margin is scaled with appropriate L/L. The L/L convention used is + for N and E, - for S and W. The operator may choose to have this presentation drawn on his aeronautical chart, or on a transparent overlay. The display and chart can be studied for terrain features, appropriateness of route, etc.

The next choice offered the operator is 'Do you wish a Navigation solution?' for the route currently being considered. It is necessary to have the NAV solution if a time scenario (discussed in System Description) is desired also. Several items calculated in the NAV solution, such as speeds, headings, times, etc., are used in determining present position of the EA-6B as it proceeds around the route. If the operator doesn't want the NAV solution, he is then asked if he wishes to consider a different route, or a different mission profile. If he does want the solution, it is displayed for him, and a hard copy is produced (see Fig. 8).

Next, the system asks "Do you want a listing of the Time Scenario?" If desired, the system proceeds as follows:

- 1) It asks operator to indicate emitters of interest by type (all, EW/Acq only, Terminal Threat only) and by frequency band.
- 2) It calculates present position (p/p) of the EA-6B beginning at the first point of the route.



- 3) It filters the "working" EOB for the proper type and frequency bands, calculates the range from p/p to each emitter having passed the filter, checks that distance against the "threat" range for that emitter listed in the Emitter Parameter Library. If the distance is within "threat" range, the important inflight parameters are displayed.
- 4) After all sites are checked, time is incremented by a minute, and a new p/p is calculated using headings and speeds obtained from the NAV solution.
- 5) There are detailed routines in this portion to check if the p/p increment goes around a turnpoint and if heading speed changes occur, or if the end of the route is reached.
- 6) The process iterates around the entire route, minute by minute.
- 7) The parameters printed out for the operator (see Fig. 9) in hard copy form are:
  - a) Time
  - b) Present Position
  - c) Emitter Type
  - d) "Working" EOB Number
  - e) Range and Bearing to the emitter
  - f) Automatic and Degraded jamming modes to use
  - g) Relative percent of frequency band of the emitter.





The entire purpose of producing this scenario is to provide the operator with all information necessary to devote a minimum of "inflight" time searching, analyzing, and reacting to known sites, allowing more time to concentrate on the unknown or unexpected emitters. The information will allow him to handle system degradations with as little confusion and consternation as possible. This program does not attempt to solve the problem of having fewer assets than number of sites in range. Here, again, the operator must decide relative priorities using information available such as ranges to the various sites (just entering or about to exit an envelope), type emitters (AAA vs SAM, or SA-2 vs SA-6), and choose his asset deployment scheme accordingly. If the route is too saturated, perhaps a case can be made for an alternative route.

After the Time Scenario is complete, the system offers the operator the options to consider a different strike route, or a different mission profile. If he wishes to consider a new strike route, he enters it and the system returns to the Display portion of the program. This example will retain the same strike route and next, consider the Standoff mission profile.

### C. STANDOFF MISSION

A standoff mission is hereby defined as using an EA-6B to primarily jam EW/Acq type radars as the strike group proceeds to and from the target. The "raid" can usually be



divided into three phases; ingress, over the target, and egress. The standoff objective is to optimize jamming against EW/Acq emitters during ingress and egress. While the strike aircraft are over the target there is little in the way of effective jamming that can be accomplished (from a standoff orbit) against narrow beam fire control and missile control radars. Therefore, the operator usually attempts to optimize his track or orbit to cover the first and last phases of the strike.

The program offers the operator a chance to view the EOB and various standoff stations. Often a single orbit for each phase (ingress and egress) is the optimum jamming position. Standoff jamming positioning is dictated by strike aircraft location. Therefore the system takes as inputs for the standoff solution, the strike aircraft route (in this example it has already been entered and need not be done so again), and the latitude and longitude of a standoff jamming point. Standoff jamming orbits are usually short enough in length with respect to distances to target emitters that jamming effectiveness will not vary significantly from one point in the orbit to another. Therefore, the midpoint of an orbit will suffice for most cases.

Next the system displays the strike aircraft route, the EOB sites and their detection envelopes, and the standoff point for the EA-6B. The display may be filtered by the operator, as before, by type emitter groupings. Additionally,



detection envelopes depressed by jamming may be displayed. The operator can assess the effectiveness of this jamming orbit for various strike group locations around the route. Several different standoff points may be considered before the operator decides on the optimum position(s). As an example, perhaps a stationary orbit is optimum for the first 15 minutes of the strike. Then the EA-6B must transit to an orbit some distance away, say 100 NM, for optimum positioning to cover the egress. The operator can display the first orbit, the last orbit, and as many points between the two as desired. He would then have a visual indication of how his jamming effectiveness will be affected during the transit phase, and where the strike group is most vulnerable to EW/Acq emitters during the strike (see Figs. 5,6).

As with the Escort mission discussed earlier, the operator would receive a hardcopy printout of:

- 1) Strike group navigation solution
- 2) List of jamming parameters for use in flight  
(see Fig. 11)
- 3) Chart appropriately marked with the EOB, route of flight, and emitter detection envelopes.

Operator judgment will play a large part in determining the success and speed at which optimum positioning of the stand-off EA-6B is accomplished. He must vary the parameters, consider the options, and then make the decision. The system will not do it for him. It does provide enough speed



and ease of computation to allow the operator the luxury of considering many alternatives before making his selection, something seldom affordable with current planning procedures.

#### D. MODIFIED ESCORT

The Modified Escort mission profile is one in which the jamming aircraft directly accompanies the strike group on it's route until such time as the group must penetrate AAA or SAM weapon envelopes. At such time, the EA-6B parallels the strike group just outside the weapon envelopes. Timing and positioning of the EA-6B is critical if any measurable success is to be achieved against fire control and missile control radars.

If the operator wishes to plan for this profile, he proceeds as mentioned in the previous sections. He may enter the strike group route and the EA-6B route, or just the strike group route, or neither. In this example, the strike group route has been entered previously. The operator has the option of viewing the EOB and strike route before entering the modified escort route for the EA-6B. He also has available the NAV solution for the strike group, with the times at various turnpoints on the route. He may use this information to coordinate the timing and positioning of the EA-6B, consistent with the strike group route. Once this route has been entered, the Modified Escort route is added to the visual presentation (see Fig. 7). If this





route is acceptable to the operator, he may have his chart marked with that route. He receives a printout of the EA-6B navigation solution, and a Time Scenario for the mission, if desired (see Figs. 8,10). The Time Scenario considers threats to both the strike group and the EA-6B, and lists the emitters "in range" accordingly. At the end of this sequence, the operator can alter the strike route, change the EA-6B route, change mission profiles again, or terminate the planning process.



## V. PROPOSALS FOR PROGRAM EXPANSION

- 1) The data base (Emitter Parameter Library) could be expanded to include EA-6B information grouped by weapon platforms such as ships, aircraft, and missile threat (ASM, SSM, and AAM). This information is easily compiled and requires no additional computer calculations. Current auxiliary storage space is sufficient. A simple call for information on a particular ship or aircraft would produce a printout similar to the EOB listing available in the current program (see Fig. 12).
  
- 2) Terrain consideration is one of the most important aspects of EW mission planning. The U.S. Geological Survey has developed a procedure to store geographical features in computer format that may prove adaptable to this planning program. The approach would be to store the terrain features of various areas of the world on cassette tapes and load the particular area of interest into the computer when planning a mission. The amount of computer space and complexity of application may prove to be beyond the capabilities of a mini computer, but that should be investigated.
  
- 3) If a refresh graphics display is available (the Tektronix is a storage tube, i.e. once the picture is drawn, it cannot be altered without redrawing the entire presentation), it



may be possible to present a dynamic visual display of jamming effectiveness as a mission proceeds from beginning to end. The current program presents "snapshots" of the situation at various points selected by the planner.

4) A current proposal for the ICAP II version of the EA-6B is to load a complete mission plan into the aircraft with a cassette tape. The intent is to go through the complete mission planning procedure in the Ready Room, compile all necessary data, enter it on a cassette tape, then take it to the aircraft and load it. The entire known scenario would then be stored in the aircraft's computer, lists would be automatically activated and deactivated, pre-programmed jamming assignments made, etc. Practially all the information required for such an effort is available in its current status. There would be a necessity to develop a language interface between the WANG and the aircraft computer.



SITE	NAME	MSH	DAND	RICE	LIST	FLO	FMI	PRF1	PRF1	PRF2	PRF2	AUTO	DEGR	PRCT	REMARKS
1	FANGONG B-F	MC	7	23. 11		2700	2759	1900	1050	2000	2100	T050	MSS	44	SA-2, CCI PCN AT 800MHZ
	20.05	-37.30													
2	TALL KING	EW	2	100. 8		100	200	150	200	200	240	FT7	MFT	40	NONE
	26.52	-37.44													
3	FANGONG C-E	MC	8	20. 15		4200	4250	800	850	1000	1700	T902	MSS	36	SA-2,CCI PCN AT 800MHZ,E-O BACKUP
	27.20	-39.23													
4	SPRST AC	EW	2	150. 8		180	100	120	180			FT2	MFT	40	SA-2 ACQUISITION
	27.27	-90.28													
5	LOW BLOW	MC	0	10. 17		8725	8775	1.20	--50			T900	MSS	83	SA-3, LOW ALT 150FT, E-O BACKUP
	27.50	-37.33													
6	SPRST B	EW	1	120. 0		50	50	00	00			FT4	MFT	28	NONE
	27.50	-37.37													
7	FIREHEEL	FC	7	5. 11		2600	2720	1000	1900			T425	SS1	18	AAA, CONSCAN
	27.54	-37.21													
8	FANGONG C-E	MC	8	20. 15		4200	4250	800	850	1000	1700	T902	MSS	36	SA-2,CCI PCN AT 800MHZ,F-O BACKUP
	27.20	-37.12													
9	STRAIT FLUSH	MC	8	10. 15		4210	4200	3080	4000			T385	MSS	12	SA-6, ACQ-TRKR, FAST FLYER, 3-0 SEC
	27.33	-37.22													
10	DRLK-BCDR B E	EW	7	90. 11		2050	2080	420	430	840	850	FT3	MFT	21	DRLK, 6 BEANS, STABLE PRF 300
	25.31	-96.00													
11	TALL KING	EW	2	100. 8		100	200	100	200	200	240	FT7	MFT	40	NONE
	23.41	-90.48													
12	FIREHEEL	FC	7	5. 11		2710	2750	2500	2520			T377	SS3	32	AAA, CONSCAN
	25.44	-37.33													
13	STRAIT FLUSH	MC	8	10. 15		4210	4200	3080	4000			T385	MSS	12	SA-6, ACQ-TRKR, FAST FLYER, 3-0 SEC
	29.16	-38.01													
14	LOW BLOW	MC	0	10. 17		8725	8775	1.20	--50			T900	MSS	83	SA-3, LOW ALT 150FT, E-O BACKUP
	29.20	-38.10													
15	WHIFF	FC	7	5. 11		2020	2040	2000	2050			FT3	SS2	27	AAA, CONSCAN
	29.27	-38.23													
16	LOW BLOW	MC	0	10. 17		8725	8775	1.20	--50			T900	MSS	83	SA-3, LOW ALT 150FT, E-O BACKUP
	29.38	-38.38													
17	LOW BLOW	MC	0	10. 17		8725	8775	1.20	--50			T900	MSS	83	SA-3, LOW ALT 150FT, E-O BACKUP
	29.15	-38.38													

Figure - 1 LISTING OF E.O.B. WITH EA-6B PERTINENT PARAMETERS.

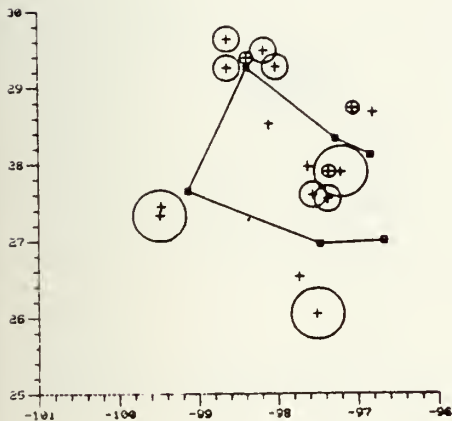


FIGURE - 2 VISUAL PRESENTATION FOR AN ESCORT MISSION PROFILE WITH ONLY TERMINAL THREAT (FIRE CONTROL, MISSILE CONTROL) EMITTER DETECTION ENVELOPES DISPLAYED. SITE LOCATIONS +, AND ROUTE OF FLIGHT —■— ARE SHOWN. THE SCALE INDICATES LAT/LONG WITH THE CONVENTION N/S = +/-, AND E/W = +/-.

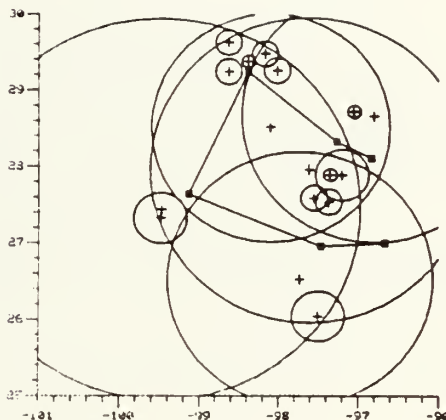


FIGURE - 3 VISUAL PRESENTATION FOR AN ESCORT MISSION PROFILE WITH ALL EMITTERS AND THEIR DETECTION ENVELOPES PRESENTED. SITE LOCATIONS +, AND ROUTE OF FLIGHT —■— ARE SHOWN, AND THE SCALE INDICATES LAT/LONG WITH THE CONVENTION N/S = +/-, AND E/W = +/-.

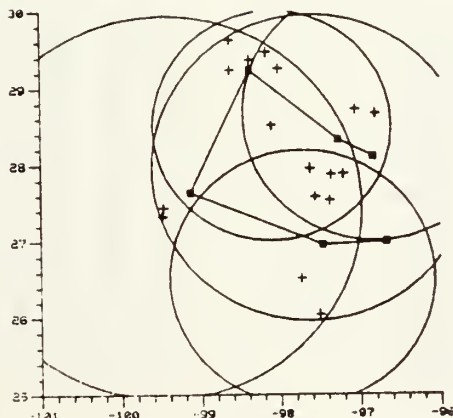


FIGURE - 4 VISUAL PRESENTATION FOR AN ESCORT MISSION PROFILE WITH ONLY EARLY WARNING/ACQUISITION TYPE RADAR DETECTION ENVELOPES PRESENTED. SITE LOCATIONS +, AND ROUTE OF FLIGHT —■— ARE SHOWN. SCALE INDICATES LAT/LONG WITH THE CONVENTION N/S = +/-, AND E/W = +/-.





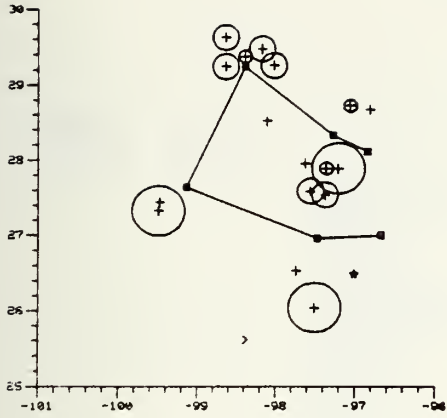


FIGURE - 5 SHOWS STRIKE GROUP ROUTE, STANDOFF JAMMER POSITION +, AND TERMINAL THREAT EMITTER ENVELOPES (NOT DEPRESSED BY JAMMING).

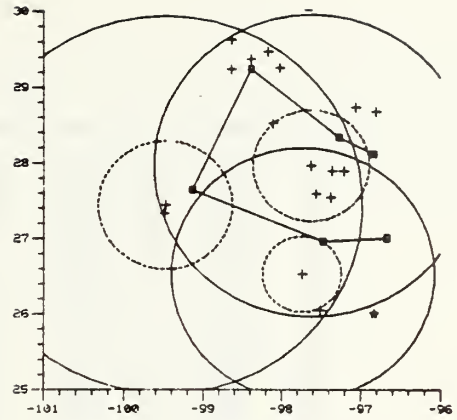


FIGURE - 6 SHOWS STRIKE GROUP ROUTE, STANDOFF JAMMER POSITION +, EM/ACC EMITTER ENVELOPES UNJAMMED (SOLID LINES) AND JAMMED (DASHED LINES).

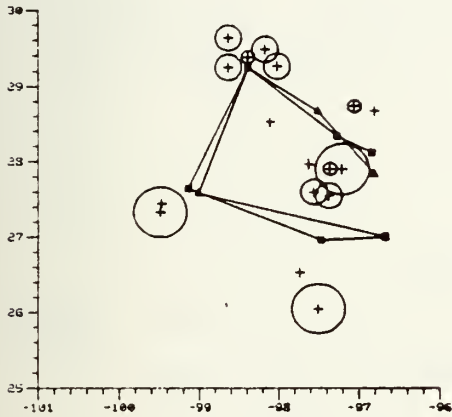


FIGURE - 7 SHOWS STRIKE GROUP ROUTE ■, EA-6B ROUTE ---, AND TERMINAL THREAT EMITTER ENVELOPES (NOT JAMMED).

Strike Group Navigation Solution

Leg	Dist	Time	Th	MH	AS	FOFD	FOFD	To Turnpt	L/L
1	13.0	7	67	254	300	7.1	43.0	26.65	-97.25
2	93.2	14	205	237	420	21.2	141.2	27.39	-99.03
3	101.1	13	22	14	480	34.2	245.1	29.15	-98.23
4	80.6	10	133	125	430	44.3	325.7	28.80	-97.16
5	26.4	3	110	111	480	47.6	352.1	29.07	-96.50

Mod Escort Navigation Solution

Leg	Dist	Time	TH	MH	FAS	FOFD	FOFD	To Turnpt	L/L
1	129.7	19	286	278	400	18.5	129.7	27.35	-99.00
2	105.2	13	16	10	480	31.7	234.9	29.15	-98.23
3	58.3	7	127	119	480	39.0	293.2	29.10	-97.30
4	62.3	9	143	135	480	46.8	361.5	27.0	-96.43

FIGURE - 8 THIS IS A LISTING OF THE STRIKE GROUP AND EA-6B NAVIGATION SOLUTIONS FOR A MODIFIED ESCORT MISSION.

TIME	PRES POS	TYPE	E08	RNGE	BRG	AUTO	DEGR	PRCT
0	27 00 -06 48	TALL KING	2	63	244	FT7	UFT	40
		SPNRST B	6	77	319	FT4	UFT	28
1	26 59 -06 46	TALL KING	2	58	242	FT7	UFT	40
		SPNRST AC	4	148	281	FT2	UFT	46
		SPNRST B	6	74	328	FT4	UFT	28
2	26 59 -06 52	TALL KING	2	54	239	FT7	UFT	40
		SPNRST AC	4	141	281	FT2	UFT	46
		SPNRST B	6	71	328	FT4	UFT	28
3	26 59 -06 58	TALL KING	2	49	236	FT7	UFT	40
		SPNRST AC	4	136	282	FT2	UFT	46
		SPNRST B	6	68	330	FT4	UFT	28
4	26 59 -07 04	TALL KING	2	44	233	FT7	UFT	40
		SPNRST AC	4	131	282	FT2	UFT	46
		SPNRST B	6	66	334	FT4	UFT	28
5	26 58 -07 10	TALL KING	2	48	229	FT7	UFT	40
		SPNRST AC	4	128	283	FT2	UFT	46
		SPNRST B	6	64	338	FT4	UFT	28
6	26 58 -07 16	TALL KING	2	36	224	FT7	UFT	40
		SPNRST AC	4	121	284	FT2	UFT	46
		SPNRST B	6	62	343	FT4	UFT	28
7	26 58 -07 22	TALL KING	2	32	217	FT7	UFT	40
		SPNRST AC	4	116	285	FT2	UFT	46
		SPNRST B	6	52	347	FT4	UFT	28

FIGURE - 9 THIS IS A PORTION OF THE TIME SCENARIO FOR AN ESCORT MISSION SHOWING PARAMETERS NECESSARY TO ANTICIPATE ALL KNOWN SITES, AND TO REACT TO SYSTEM MALFUNCTIONS CAUSING DEGRADED MODE OPERATION WITH A MINIMUM OF CALCULATION. THE SITES ARE ONLY LISTED IF THE STRIKE GROUP IS WITHIN THE DESIGNATED DETECTION RANGE.

TIME	PRES POS	TYPE	E08	RNGE	BRG	AUTO	DEGR	PRCT
0	27 00 -06 24	TALL KING	2	76	248	FT7	UFT	40
		SPNRST B	6	87	312	FT4	UFT	28
1	27 02 -06 31	TALL KING	2	81	249	FT7	UFT	40
		SPNRST AC	4	170	279	FT2	UFT	46
		SPNRST B	6	90	308	FT4	UFT	28
2	27 03 -06 28	TALL KING	2	84	249	FT7	UFT	40
		SPNRST AC	4	173	278	FT2	UFT	46
		SPNRST B	6	92	308	FT4	UFT	28
3	27 04 -06 27	TALL KING	2	88	249	FT7	UFT	40
		SPNRST AC	4	175	278	FT2	UFT	46
		SPNRST B	6	93	307	FT4	UFT	28
4	27 04 -06 20	TALL KING	2	87	250	FT7	UFT	40
		SPNRST AC	4	176	278	FT2	UFT	46
		SPNRST B	6	94	306	FT4	UFT	28
5	27 04 -06 19	TALL KING	2	88	250	FT7	UFT	40
		SPNRST AC	4	178	278	FT2	UFT	46
		SPNRST B	6	94	306	FT4	UFT	28
6	27 05 -06 18	TALL KING	2	88	250	FT7	UFT	40
		SPNRST AC	4	177	278	FT2	UFT	46
		SPNRST B	6	94	306	FT4	UFT	28
7	27 05 -06 17	TALL KING	2	89	250	FT7	UFT	40
		SPNRST AC	4	177	278	FT2	UFT	46
		SPNRST B	6	94	306	FT4	UFT	28

FIGURE - 10 THIS IS A PORTION OF THE TIME SCENARIO PRINTOUT FOR A MODIFIED ESCORT MISSION. ANGLES ARE FROM THE -06 TO VARIOUS EMITTERS. EMITTERS ARE LISTED IF EITHER THE STRIKE GROUP OR THE EA-6B ARE WITHIN THE DESIGNATED ENGAGEMENT RANGE.



STANDOFF L/L	TYPE	EOB	RNGE	DRG	AUTO	DEGR	PRCT
26.00 -96 59	FANSONG B-F	1	36.	275	T960	WSS	44
	TALL KING	2	58	304	FT7	WFT	40
	SPNRST AC	4	165	302	FT2	WFT	46
	LOW BLOW	5	103	338	T900	WSS	83
	SPNRST B	6	125	340	FT4	WFT	28
	FIREWHEEL	7	117.	346	T483	SS1	18
	BRK-BGBAR B	10	165	336	FT3	WFT	21
	TALL KING	11	161.	1	FT7	WFT	40
	FIRECAN	12	164	358	T377	SS3	32
	LOW BLOW	14	221	341	T900	WSS	83
	WHIFF	15	219	338	FT3	SS2	27
	LOW BLOW	16	238	336	T900	WSS	83
	LOW BLOW	17	222	332	T900	WSS	83

FIGURE - 11 JAMMING PARAMETERS FOR A STANDOFF MISSION FROM ORBIT POINT INDICATED.

KASHIN DLG

ARMAMENT: SAM 20 x SA-N-15 (2 TWIN)  
 GUNS 4 x 50MM (TWIN MOUNT)  
 ASW 2 x RBU- 1000  
 2 x RBU- 2000  
 4 x 10 IN. TORPEDOES  
 A/C 1 x HORMONE

ELECTRONICS:

EMITTER	FUNC	BAND	LIST	RNGE	FLO	FHI	PRF1	PRF1	PRF2	PRF2	AUTO	DEGR	PRCT	REMARKS
BIG BOY	EW	1	4	100	25	50	100	110	----	----	S123	WSS	12	PRIMARY AIR SCH
BAD NEWS	EW	4	2	50	100	200	250	269	----	----	FT20	WFT	23	NONE
POPCORN	FC	7	15	22	2000	2100	1000	1010	----	----	T321	WSS	44	AAA, E-O ALSO
DON-2	NAV	9	12	8	4000	4400	8800	8900	9300	9400	FTC3	NFT2	67	NONE
FOOLYA	MC	8	30	45	6000	7000	1800	1850	----	----	T456	NSS	97	SA-N-15, DLJ

FIGURE - 12 TYPICAL PRINTOUT OF EA-6B PERTINENT INFORMATION BY WEAPON PLATFORM.



COMPUTER PROGRAM

MAI000010  
MAI000020  
MAI000030  
MAI000040

C THIS IS THE MAIN PROGRAM FOR EA-6B MISSION PLANNING.  
C FOR TEST PURPOSES, ENTER FILEDEF 4 DSK BEFORE EACH  
C EXECUTION.

```

DIMENSION X(10), Y(10), SX(20), SY(20), ST(20), DL(9), SPD(9), TL(9),
INTH(9), MH(9), ITAS(9), SR(20), TT(9), DT(9), TYP(30,15), NB(8),
2D2(30), IZ(30), D4(30), D5(30), D6(30), D7(30), D8(30), D9(30),
3D10(30), D11(30), D12(30), D13(30), D14(30), TN(30,3), TRG(30), TRMKS(3),
49), YME(9), XME(9), MTAS(9), SPDM(9), PJ(30), B(30), GJR(30), PR(30), GAIN,
530), TLM(9), DLM(9), DTM(9), NTHM(9), MHM(9)
EQUIVALENCE ( IZ, TYP(1,3) )
DATA TN(1,1), TN(1,2), TN(1,3) // KNFR, ST A, ' ' //
DATA TN(2,1), TN(2,2), TN(2,3) // KNFR, ST B, 'C' //
DATA TN(3,1), TN(3,2), TN(3,3) // SPNR, ST B, ' ' //
DATA TN(4,1), TN(4,2), TN(4,3) // SPNR, ST A, 'C' //
DATA TN(5,1), TN(5,2), TN(5,3) // TALL, KIN, 'G' //
DATA TN(6,1), TN(6,2), TN(6,3) // BIGB, ARIM, 'ESH' //
DATA TN(7,1), TN(7,2), TN(7,3) // SQUA, TEYE, ' ' //
DATA TN(8,1), TN(8,2), TN(8,3) // BIGM, ESHC, 'DE' //
DATA TN(9,1), TN(9,2), TN(9,3) // FLAT, FA, 'E' //
DATA TN(10,1), TN(10,2), TN(10,3) // BRK, -RGR, 'AR B' //
DATA TN(11,1), TN(11,2), TN(11,3) // WHIF, F, ' ' //
DATA TN(12,1), TN(12,2), TN(12,3) // FIRE, CAN, ' ' //
DATA TN(13,1), TN(13,2), TN(13,3) // FIRE, WHFE, 'L' //
DATA TN(14,1), TN(14,2), TN(14,3) // FANS, ONG, 'B-F' //
DATA TN(15,1), TN(15,2), TN(15,3) // FANS, ONG, 'C-E' //
DATA TN(16,1), TN(16,2), TN(16,3) // PAT, HAND, ' ' //
DATA TN(17,1), TN(17,2), TN(17,3) // SA-6, 2*WHFE, 'L' //
DATA TN(18,1), TN(18,2), TN(18,3) // FLAP, BLOW, ' ' //
DATA TN(19,1), TN(19,2), TN(19,3) // LOW, IT F, 'LUSH' //
DATA TN(20,1), TN(20,2), TN(20,3) // STRA, -2, ' ' //
DATA TN(21,1), TN(21,2), TN(21,3) // SRZO, N A3, '12A' //
DATA TN(22,1), TN(22,2), TN(22,3) // TACA, TAL, 'K' //
DATA TN(23,1), TN(23,2), TN(23,3) // LONG, -STC, 'N CK' //
DATA TN(24,1), TN(24,2), TN(24,3) // ROCK, GE, 'CK' //
DATA TN(25,1), TN(25,2), TN(25,3) // SPON, 2* ' ' //
DATA TN(26,1), TN(26,2), TN(26,3) // SA-2, 2* ' ' //
DATA TN(27,1), TN(27,2), TN(27,3) // SA-6, 2*TROU, 'GH' //
DATA TN(28,1), TN(28,2), TN(28,3) // PORK, -12, ' ' //
DATA TN(29,1), TN(29,2), TN(29,3) // BWRX, BEAM, ' ' //
DATA TN(30,1), TN(30,2), TN(30,3) // MOON, FC, 2*MC, 'IFF', 'NAV', 'ATC'
1, 2*HF, BCN, DL, SURV, WX, ' ' //
DATA IZ/3*1, 2, 4*4, 5*7, 8, 8, 3*9, 8, 3*4, 7, 7, 8, 3*9, 6/
DATA TRG/3*120, 1, 150, 2, 100, 75, 100, 80, 90, 3*5, 2*20, 30, 10, 5, MAI000050
MAI000060
MAI000070
MAI000080
MAI000090
MAI000100
MAI000110
MAI000120
MAI000130
MAI000140
MAI000150
MAI000160
MAI000170
MAI000180
MAI000190
MAI000200
MAI000210
MAI000220
MAI000230
MAI000240
MAI000250
MAI000260
MAI000270
MAI000280
MAI000290
MAI000300
MAI000310
MAI000320
MAI000330
MAI000340
MAI000350
MAI000360
MAI000370
MAI000380
MAI000390
MAI000400
MAI000410
MAI000420
MAI000430
MAI000440
MAI000450

```



```

1, 2*10, 2*100, 3*40, 30, 15, 80, 65, 50, /
1, DATA, D5/3*16, 2*8, 9, NONE, 9, 10, 5*, 11, 15, 16, C42, 1, MAI00460
18, 17, 15, 9, NONE, 9, 12, C45, C47, 3*NONE, /, MAI00470
1, DATA, D6/70, 80, 50, 180, 190, 600, 640, 800, 2650, MAI00480
1, 2620, 2710, 2690, 2700, 4200, 4360, 8710, 9380, 8725, MAI00490
2, 2420, 600, 700, 600, 2500, 2800, 6150, 8000, 9000, 9200, MAI00500
3, 1500, /, MAI00510
1, DATA, D7/80, 90, 60, 190, 200, 650, 810, 690, 850, 2680, MAI00520
1, 2640, 2750, 2720, 2759, 4250, 4380, 8800, 9410, 8775, 4, MAI00530
2, 280, 610, 800, 650, 2700, 3000, 2*, 9200, 9400, 1950, /, MAI00540
1, DATA, D8/50, 75, 60, 120, 100, 300, 450, 250, 350, 420, MAI00550
1, 2000, 2500, 1800, 1000, 800, 5005, 1800, 6380, 1-2G, 308, MAI00560
2, PARE, 200, 400, 300, 280, SYNC, 110, 400, 40, 710, /, MAI00570
1, DATA, D9/80, 100, 90, 180, 200, 310, 460, 275, 355, 430, MAI00580
1, 2050, 2520, 1900, 1050, 850, 5015, 1900, 6390, +-50, 40, MAI00590
2, 00, NT, 430, 480, 500, 320, WITH, 200, 500, 50, 720, /, MAI00600
1, DATA, D11/4*, 240, 4*, 860, 3*, 2100, 1700, 5*, R, 4*, MAI00620
1, TWS, 4*, /, MAI00630
1, DATA, D10/4*, 200, 4*, 840, 3*, 2000, 1600, 5*, RADA, MAI00640
14*, SA-2, 4*, /, MAI00650
1, DATA, D12/2*FT3, FT4, FT2, FT7, FT2, SPT3, SPT2, FT5, FT3, MAI00660
1, FT3, T377, T483, T959, T902, DFT8, T709, T888, T900, T3, MAI00670
2, 5, FT5, 3*SS3, 4*SS2, FT4, SS3, /, MAI00680
1, DATA, D13/6*WFT, 2*WSS, 2*WFT, SS2, SS1, 2*WSS, SS5, MAI00690
1, SSI, WFT, 9*WSS, WFT, 2*WSS, /, MAI00700
1, DATA, D14/30, 33, 28, 46, 40, 62, 66, 55, 48, 21, 27, 3, MAI00710
2, 18, 44, 36, 65, 48, 27, 83, 12, 75, 30, 40, 45, MAI00720
2, 30, 40, 86, 77, 78, /, MAI00730
CC 3 I=1, 30
TYP(I, 2)=D2(I)
TYP(I, 4)=D4(I)
TYP(I, 5)=D5(I)
TYP(I, 6)=D6(I)
TYP(I, 7)=D7(I)
TYP(I, 8)=D8(I)
TYP(I, 9)=D9(I)
TYP(I, 10)=D10(I)
TYP(I, 11)=D11(I)
TYP(I, 12)=D12(I)
TYP(I, 13)=D13(I)
TYP(I, 14)=D14(I)
3 CCNTINUF
DC 310 I=1, 30
READ(4, 311)(TRMKS(I, J), J=1, 9)
FCRMTINUF
CCNTINUF
DATA PJ/10*20, 10*50, 10*10. /
DATA B/30*20. /

```





DATA GJR/30\*10./  
 DATA PR/30\*100./  
 DATA GAIN/30\*36./

MAI00940  
 MAI00950  
 MAI00960

MAI00970  
 MAI00980  
 MAI00990  
 MAI01000  
 MAI01010  
 MAI01020  
 MAI01030  
 MAI01040  
 MAI01050  
 MAI01060  
 MAI01070  
 MAI01080  
 MAI01090  
 MAI01100  
 MAI01110  
 MAI01120  
 MAI01130  
 MAI01140  
 MAI01150  
 MAI01160  
 MAI01170  
 MAI01180  
 MAI01190  
 MAI01200  
 MAI01210  
 MAI01220  
 MAI01230  
 MAI01240  
 MAI01250  
 MAI01260  
 MAI01270  
 MAI01280  
 MAI01290  
 MAI01300  
 MAI01310  
 MAI01320  
 MAI01330  
 MAI01340  
 MAI01350  
 MAI01360  
 MAI01370  
 MAI01380

```

YMAX=0.
PI=3.14159
CS=9.
CMFLG=1.
XMAX=0.
YMIN=300.
XMIN=300.
INTEGER VAR,ST
WRITE(6,1)
1  FCRMAT(1,X,/) FOR ALL QUESTIONS: ENTER 1 FOR YES, 0 FOR NO
299 FCRMAT(1,X,/) DO YOU WISH TO CONSIDER A PARTICULAR MSN PROFILE AT
    THIS TIME?
    READ(5,2)MSN
    IF(MSN.EQ.0)GO TO 99
    WRITE(6,300)
300 FCRMAT(1,X,/) WHICH MSN DO YOU WISH TO CONSIDER (FIRST)? 1=ESCORT
    12=MOD ESCORT, 3=STANDOFF
99  WRITE(6,101)
101 FCRMAT(1,/) DO YOU HAVE A STRIKE ROUTE TO ENTER AT THIS TIME?
2  IF(LRTE.EQ.1)GO TO 113
    N=2
    WRITE(6,103)
103 FCRMAT(1,/) THEN ENTER APPROX START PT LAT/LONG, THEN TGT LAT/LONG
4  FCRMAT(1,7,2)
    CALL LL(X,Y,2)
    GO TO 42
113 WRITE(6,115)
115 FCRMAT(1,/) ENTER NUMBER OF TURNPTS
6  M=N-1
    WRITE(6,13)
13  FCRMAT(1,/) ENTER LAT, THEN LONG OF EACH TURNPT IN ORDER
    CALL LL(X,Y,N)
    WRITE(6,40)
40  FCRMAT(1,/) ENTER MAG VAR TO NEAREST DEGREE,+ FOR W,- E, EX:-12=12E

```



MAI01390  
 MAI01400  
 MAI01410  
 MAI01420  
 MAI01430  
 MAI01440  
 MAI01450  
 MAI01460  
 MAI01470  
 MAI01480  
 MAI01490  
 MAI01500  
 MAI01510  
 MAI01520  
 MAI01530  
 MAI01540  
 MAI01550  
 MAI01560  
 MAI01570  
 MAI01580  
 MAI01590  
 MAI01600

```

41 READ (4,41)VAR
   FCRRMAT(I3)
   WRITE(6,1)
17 FCRRMAT(I) ENTER TAS FOR EACH LEG IN ORDER.' )
   READ (4,41)(ITAS(I),I=1,M)
   DC 20 I=1,M
   SPD(I)=ITAS(I)/60.
20 CCNT INUE
42 CALL MAX(X,N,FR)
   CALL MAX(Y,N,TP)
   CALL MIN(X,N,FL)
   CALL MIN(Y,N,BOT)
   TCP=TOP+2.
   BCT=BOT-2.
   FR=FR+2.
   FL=FL-2.
16 READ(4,16)(SY(I),SX(I),ST(I),I=1,K)
   FORMAT(2F7.2,I3)
   CALL LL(SX,SY,K)
   IF(LRTE.EQ.0)GO TC 44
   IF(MSN-2)44,400,298
400 WRITE(6,401)

```

MAI01610  
 MAI01620  
 MAI01630  
 MAI01640  
 MAI01650  
 MAI01660  
 MAI01670  
 MAI01680  
 MAI01690  
 MAI01700  
 MAI01710  
 MAI01720  
 MAI01730  
 MAI01740  
 MAI01750  
 MAI01760  
 MAI01770  
 MAI01780

```

401 FORMAT(1X,/' DO YOU HAVE A MOD ESCORT ROUTE TO ENTER NOW?')
   READ(5,2)MERTF
   IF(MERTF.EQ.0)GO TO 44
   WRITE(6,402)
402 FCRRMAT(1X,/' ENTER NUMBER OF TURNPTS IN MOD ESCORT ROUTE')
   READ(4,2)MEN
   WRITE(6,403)
403 FORMAT(1X,/' ENTER LAT, THEN ENTER LONG OF EACH POINT IN ORDER')
   READ(4,4)(YME(I),XME(I),I=1,MEN)
   CALL LL(XME,YME,MEN)
   MEM=MEN-1
   WRITE(6,404)
404 FCRRMAT(1X,/' ENTER TAS FOR EACH LEG, IN ORDER')
   READ(4,41)(MTAS(I),I=1,MEM)
   DC 405 I=1,MEM
405 SPDM(I)=MTAS(I)/60.
   GC TO 44
298 WRITE(6,301)

```

MAI01790  
 MAI01800

```

301 FCRRMAT(1X,/' DO YOU HAVE A STANDOFF POINT TO CONSIDER YET?')
   READ(5,2) LSO

```



MAI01810  
 MAI01820  
 MAI01830  
 MAI01840  
 MAI01850  
 MAI01860

```

327 IF(LSD.EQ.0)GO TO 44
328 WRITE(6,302)
329 FORMAT(1X,/, ENTER LAT, THEN LONG OF STANDOFF POINT')
330 READ(5,4)STOX,STOY
331 CALL LL(STOX,STOY,1)
332 WRITE(6,56)

```

MAI01870  
 MAI01880  
 MAI01890  
 MAI01900  
 MAI01910  
 MAI01920  
 MAI01930  
 MAI01940  
 MAI01950  
 MAI01960  
 MAI01970  
 MAI01980  
 MAI01990  
 MAI02000  
 MAI02010  
 MAI02020  
 MAI02030  
 MAI02040  
 MAI02050  
 MAI02060  
 MAI02070  
 MAI02080  
 MAI02090  
 MAI02100  
 MAI02110  
 MAI02120  
 MAI02130  
 MAI02140  
 MAI02150  
 MAI02160  
 MAI02170  
 MAI02180  
 MAI02190  
 MAI02200  
 MAI02210  
 MAI02220  
 MAI02230  
 MAI02240  
 MAI02250

```

56 FCRMAT(, DO YOU WISH TO USE SHIPS F.O.B. ?')
57 READ(5,2)L
58 IF(L.EQ.0)GO TO 55
59 WRITE(6,51)
51 FCRMAT(, OPERATOR WISH TO ENTER SITES IN ADDITION TO OR INSTEAD OF
1 FRCM THE SHIPS E.C.B.?)
52 READ(5,2)L
53 IF(L.EQ.0)GO TO 57
54 WRITE(6,52)
55 FCRMAT(, ENTER TOTAL NUMBER OF SITES OPERATOR IS ENTERING,USE 2
1 DIGITS, F.G. 04,OR 07, OR 13')
56 READ(5,6)J
57 NL=K+J
58 KI=K+1
59 WRITE(6,53)
60 FCRMAT(, ENTER LAT, THEN LONG OF EACH SITE IN ORDER')
61 READ(5,4)(SY(I),SX(I),I=K1,NL)
62 WRITE(6,54)
63 FCRMAT(, ENTER SITE TYPE ACCORDING TO EMITTER LIST NUMBER IN SAME
1 ORDER AS YOU ENTERED THE SITES')
64 READ(5,4)(ST(I),I=K1,NL)
65 K=NL
66 WRITE(6,58)
67 FCRMAT(, DO YOU WISH A LISTING OF THE F.O.B.?)
68 READ(5,2)L
69 IF(L.EQ.0)GO TO 35
70 CALL RLL(SX,SY,K)
71 WRITE(6,70)
72 FCRMAT(, CHOOSE TYPE EMITTERS TO LIST: 1=ALL;2=EW/ACQ ONLY; 3=TERM
1 MMA ONLY')
73 READ(5,2)L
74 WRITE(6,59)
75 FCRMAT(1X,/, SITE,1X,/, NAME,1X,/,MSN,1X,/,BAND,1X,/,RNGE,1X,/,PRF
1,1X,/,LIST,1X,/,FLO,1X,/,FHI,1X,/,PRF1,1X,/,PRF2,1X,/,PRF,1X,/,REMARKS)
76 IF(L=2)71,72,73
77 DO 74 I=1,K
78 WRITE(6,75)I,(TN(ST(I),J),J=1,3),TYP(ST(I),2),IZ(ST(I)),TRG(ST(I))
1, (TYP(ST(I),JN),JN=5,14),(TRMKS(ST(I),J1),J1=1,9),SY(I),SX(I)

```



```

75 FORMAT(IX, I3, 2X, 3A4, IX, A4, 3X, I1, 2X, F4.0, I0(IX, A4), IX, 9A4, /5X, F7.2,
12X, F7.2)
74 CCNTINUE
CALL LL(SX, SY, K)
GO TO 35
72 DO 76 I=1, K
IF(ST(I).GT.10)GO TO 76
WRITE(6, 75) I, (TN(ST(I), J), J=1, 3), TYP(ST(I), 2), IZ(ST(I)), TRG(ST(I))
1, (TYP(ST(I), JN), JN=5, 14), (TRMKS(ST(I), J1), J1=1, 9), SY(I), SX(I)
76 CCNTINUE
CALL LL(SX, SY, K)
GO TO 35
73 DO 77 I=1, K
IF(ST(I).LE.10)GO TO 77
WRITE(6, 75) I, (TN(ST(I), J), J=1, 3), TYP(ST(I), 2), IZ(ST(I)), TRG(ST(I))
1, (TYP(ST(I), JN), JN=5, 14), (TRMKS(ST(I), J1), J1=1, 9), SY(I), SX(I)
77 CCNTINUE
CALL LL(SX, SY, K)
GO TO 35

```

```

MAI02260
MAI02270
MAI02280
MAI02290
MAI02300
MAI02310
MAI02320
MAI02330
MAI02340
MAI02350
MAI02360
MAI02370
MAI02380
MAI02390
MAI02400
MAI02410
MAI02420
MAI02430
MAI02440

```

```

35 WRITE(6, 32)
32 FORMAT(IX, /' DO YOU WISH TO DISPLAY EOB & RTE?')
IF(J.EQ.0.)GO TO 34
WRITE(6, 31)
31 FORMAT(' AFTER DISPLAY PRESENTED, ENTER ANY SINGLE CHARACTER TO COM
1NTINUE')
WRITE(6, 63)
63 FORMAT(' DO YOU WISH TO DISPLAY FOR THREAT ENVELOPES ALSO?')
READ(5, 2)LDISP
IF(LDISP.EQ.0) GO TO 66
WRITE(6, 61)
61 FORMAT(' TO DISPLAY WEAPON/RADAR ENVELOPES, ENTER APPROPRIATE NUMB
1ER: 1=ALL EMIT
READ(5, 2)LEMIT
IF(MSN.NE.3)GO TO 66
WRITE(6, 60)
600 FORMAT(IX, /' DO YOU WANT TO SEE ENVELOPES DEPRESSED BY JAMMING?')
READ(5, 2)JAM
CALL MAX(X, N, XMAX)
CALL MAX(SX, K, XMAX)
XMAX=XMAX+.2
CALL MAX(Y, N, YMAX)
CALL MAX(SY, K, YMAX)
YMAX=YMAX+.2
CALL MTN(X, N, XMIN)

```

```

MAI02450
MAI02460
MAI02470
MAI02480
MAI02490
COMAI02500
MAI02510
MAI02520
MAI02530
MAI02540
MAI02550
MAI02560
MAI02570
MAI02580
MAI02590
MAI02600
MAI02610
MAI02620
MAI02630
MAI02640
MAI02650
MAI02660
MAI02670
MAI02680
MAI02690
MAI02700

```





```

CALL MIN (SX,K,XMIN)
XMIN=XMIN-.2
CALL MIN (Y,N,YMIN)
CALL MIN (SY,K,YMIN)
YMIN=YMIN-.2
CALL SCALE (XMAX,XMIN,YMAX,YMIN)
CALL INIT
CALL LINE (0)
CALL SLIMX (150,850)
CALL SLIMY (050,700)
CALL XFRM (2)
CALL YFRM (2)
CALL DLIMX (XMIN,XMAX)
CALL DLIMY (YMIN,YMAX)
CALL NPTS (K)
CALL SYMBL (8)
CALL SIZES (1.)
CALL PLOT (SX,SY)
CALL NPTS (N)
CALL SYMBL (4)
IF (LRTE.EQ.0) GO TO 45
CALL LINE (1)
GO TO 46
45 CALL LINE (0)
46 CALL CPLOT (X,Y)
IF (MSN-2) 47,420,380
42C CALL NPTS (MEN)
CALL SYMBL (3)
CALL CPLOT (XME,YME)
GO TO 47
380 CALL NPTS (1)
CALL LINE (0)
CALL SYMBL (5)
CALL CPLOT (STOX,STOY)
CALL LINE (1)
47 IF (LEDISP.EQ.0) GO TO 36
81 IF (LEMIT-2) 81,82,83
DO 80 I=1,K
XD= SX(I)
YC= SY(I)
RAD= TRG (ST(I))/60.
IF (TRG (ST(I)).GE.100.) GO TO 90
IF (TRG (ST(I)).GE.50.) GO TO 100
J=31
GC TO 110
90 J=51
GO TO 110
100 J=41

```

```

MAI02710
MAI02720
MAI02730
MAI02740
MAI02750
MAI02760
MAI02770
MAI02780
MAI02790
MAI02800
MAI02810
MAI02820
MAI02830
MAI02840
MAI02850
MAI02860
MAI02870
MAI02880
MAI02890
MAI02900
MAI02910
MAI02920
MAI02930
MAI02940
MAI02950
MAI02960
MAI02970
MAI02980
MAI02990
MAI03000
MAI03010
MAI03020
MAI03030
MAI03040
MAI03050
MAI03060
MAI03070
MAI03080
MAI03090
MAI03100
MAI03110
MAI03120
MAI03130
MAI03140
MAI03150
MAI03160
MAI03170
MAI03180

```



```

110 CALL CIRCLE(XO,YO,RAD,J)
    IF(MSN.NE.3)GO TO 80
    IF(JAM.EQ.0)GO TO 80
    CALL DIST(XO,YO,STOX,STOY,RJ)
    RAD=BTHRU(PJ(ST(I)),B(ST(I)),GJR(ST(I)),PR(ST(I)),CS,RJ,GAIN(ST(I)
1),CMFLG)
    J=41
    CALL LINE(121)
    CALL CIRCLE(XO,YO,RAD,J)
    CALL LINE(1)
    CONTINUE
80 GO TO 36
    DO 84 I=1,K
    IF(ST(I).GT.10)GO TO 84
    XO=SX(I)
    YO=SY(I)
    RAD=TRG(ST(I))/60.
    IF (TRG(ST(I)).GE.100.)GO TO 85
    J=41
    GO TO 86
85 J=51
    CALL CIRCLE(XO,YO,RAD,J)
86 IF(MSN.NE.3)GO TO 84
    IF(JAM.EQ.0)GO TO 84
    CALL DIST(XO,YO,STOX,STOY,RJ)
    RAD=BTHRU(PJ(ST(I)),B(ST(I)),GJR(ST(I)),PR(ST(I)),CS,RJ,GAIN(ST(I)
1),CMFLG)
    J=41
    CALL LINE(121)
    CALL CIRCLE(XO,YO,RAD,J)
    CALL LINE(1)
    CONTINUE
84 GO TO 36
83 DO 88 I=1,K
    IF((ST(I).LE.10).OR.(ST(I).GT.20))GO TO 88
    XO=SX(I)
    YO=SY(I)
    RAD=TRG(ST(I))/60.
    J=31
    CALL CIRCLE(XO,YO,RAD,J)
    IF(MSN.NE.3)GO TO 88
    IF (JAM.EQ.0)GO TO 88
    CALL DIST(XO,YO,STOX,STOY,RJ)
    RAD=BTHRU(PJ(ST(I)),B(ST(I)),GJR(ST(I)),PR(ST(I)),CS,RJ,GAIN(ST(I)
1),CMFLG)
    J=41
    CALL LINE(121)
    CALL CIRCLE(XO,YO,RAD,J)
    MAI03190
    MAI03200
    MAI03210
    MAI03220
    MAI03230
    MAI03240
    MAI03250
    MAI03260
    MAI03270
    MAI03280
    MAI03290
    MAI03300
    MAI03310
    MAI03320
    MAI03330
    MAI03340
    MAI03350
    MAI03360
    MAI03370
    MAI03380
    MAI03390
    MAI03400
    MAI03410
    MAI03420
    MAI03430
    MAI03440
    MAI03450
    MAI03460
    MAI03470
    MAI03480
    MAI03490
    MAI03500
    MAI03510
    MAI03520
    MAI03530
    MAI03540
    MAI03550
    MAI03560
    MAI03570
    MAI03580
    MAI03590
    MAI03600
    MAI03610
    MAI03620
    MAI03630
    MAI03640
    MAI03650
    MAI03660

```



MA I03670  
MA I03680  
MA I03690  
MA I03700

88 CALL LINE(1)  
88 CONTINUE  
36 CALL PAUSE  
CALL FIN

```
34 IF(LRTE.EQ.0)GO TO 331
   IF (MSN.EQ.0)GO TO 322
   CALL TD(X,Y,M,SPD,TL,TT,DL,DT)
   CALL HDG(X,Y,M,VAR,NTH,MH,PI)
   WRITE(6,21)
21  FORMAT(' WANT NAV SOLN? ITS NECESS. FOR TIME SCENARIO')
   IF(L.EQ.0)GO TO 331
   WRITE(6,500)
500 FORMAT('X,/' STRIKE GROUP NAVIGATION SOLUTION')
   WRITE(6,23)
23  FORMAT('X,/' LEG',3X,'DIST',2X,'TIME',3X,'TH',3X,'MH',2X,'TAS',3X,
1, 'TOT',3X,'TOTD',6X,'TC TURNPT L/L')
   CALL RLL(X,Y,N)
   DO 25 I=1,M
   WRITE(6,24)I,DL(I),TL(I),NTH(I),MH(I),ITAS(I),TT(I),DT(I),Y(I+1),
24  'X',F7.2)
25  CONTINUE
   CALL LL(X,Y,N)
   IF(MSN-2)93,450,330
450 CALL TD(XME,YME,MEM,SPDM,TLM,TTM,DLM,DTM)
   CALL HDG(XME,YME,MEM,VAR,NTHM,MHM,PI)
   CALL RLL(XME,YME,MEN)
   WRITE(6,451)
451 FORMAT('X,/' MOD ESCORT NAVIGATION SOLUTION')
   WRITE(6,23)
   DO 452 I=1,MEM
   WRITE(6,24)I,DLM(I),TLM(I),NTHM(I),MHM(I),MTAS(I),TTM(I),DTM(I),Y
1  'M',F7.2)
   IF(I+1).XME(I+1)
452 CONTINUE
```

MA I04030  
MA I04040  
MA I04050  
MA I04060  
MA I04070  
MA I04080

```
93 WRITE(6,92)
92  FORMAT('X,/' DO YOU WISH A TIME SCENARIO?')
   IF(L.EQ.0)GO TO 331
   WRITE(6,121)
121 FORMAT(' ENTER NUMBER OF DIFFERENT BANDS INTERESTED IN')
```



```

READ(5,2)NUMBND
WRITE(6,122)
FORMAT(1)ENTER THE BAND NO.S ONE AT A TIME, NO COMBOS LIKE 5/6.)
122 READ(5,2)(NB(I),I=1,NUMBND)
WRITE(6,123)
123 FORMAT(1)INDICATE TYPE EMITTERS INTERESTED IN FOR THE BANDS YCU H
IVE SELECTED: 1=ALL, 2=EW/ACQ ONLY, 3=TERM TREAT ONLY.)
C PRINT OUT HEADINGS FOR TIME SCENARIO
WRITE(6,124)
124 FORMAT(1X,7//1 TIME,5X,PRES POS,8X,TYPE,6X,EOB,2X,RNGE,2X
1,BRG,2X,AUTO,2X,DEGR,2X,PRCT,1)
C SET INITIAL CONDITIONS FOR TIME SOLUTION
TIME=0.
PPX=X(1)
PPY=Y(1)
CALL RLL(PPX,PPY,1)
WRITE(6,125)TIME,PPY,PPX
125 FORMAT(1X,F4.0,2X,F7.2,1X,F7.2)
CALL LL(PPX,PPY,1)
CALL PPS(PPX,PPY, SX, SY, ST, K, NB, NUMBND, NTPY, TYP, IZ, TN, TRG, MSN, XSTK,
1YSTK)
C NOW PROCEED AROUND THE ROUTE 1 MIN AT A STEP
I=1
129 TIME=TIME+1/60.
DINC=SPD(I)/60.
IF(TT(I).GT.TIME)GO TO 126
C NOT TRUE MEANS TURNPT WAS .LE. TO ONE MINUTE FRM LAST COMPUTED POSIT.
C FIGURE TIME TO TURNPT, SUBTRACT FROM 1 MIN, INCREMENT I TO GET NEW HEA
C DING, SPEED. USE TIME REMAINING IN MINUTE TO GET NEW PP.
PARTIM=TIME-TT(I)
I=I+1
C IS THIS LAST TURNPOINT?
IF (I.EQ.N)GO TO 127
PPX=X(I)
PPY=Y(I)
CALL RADN(I,NTH,H)
PPX=PPX+PARTIM*SPD(I)/60.*COS(H)
PPY=PPY+PARTIM*SPD(I)/60.*SIN(H)
GO TO 128
C IT WAS THE LAST TURNPOINT
127 PPX=X(N)
PPY=Y(N)
TIME=TT(M)
GO TO 128
C NEXT SECTION MEANS HAVE NOT GONE PAST A TP, JUST ADD INCREMENT FOR TH
C LEG AND CONTINUE.

```

```

MAI04090
MAI04100
MAI04110
MAI04120
MAI04130
MAI04140
MAI04150
MAI04160
MAI04170
MAI04180
MAI04190
MAI04200
MAI04210
MAI04220
MAI04230
MAI04240
MAI04250
MAI04260
MAI04270
MAI04280
MAI04290
MAI04300
MAI04310
MAI04320
MAI04330
MAI04340
MAI04350
MAI04360
MAI04370
MAI04380
MAI04390
MAI04400
MAI04410
MAI04420
MAI04430
MAI04440
MAI04450
MAI04460
MAI04470
MAI04480
MAI04490
MAI04500
MAI04510
MAI04520
MAI04530
MAI04540
MAI04550
MAI04560

```





MAI04570  
MAI04580  
MAI04590  
MAI04600  
MAI04610  
MAI04620  
MAI04630  
MAI04640  
MAI04650  
MAI04660

```
126 CALL RADN(I,NTH,H)  
PPX=PPX+DINC* $\cos(H)$   
PPY=PPY+DINC* $\sin(H)$   
128 CALL RLL(PPX,PPY,1)  
WRITE(6,125)TIME,PPY,PPX  
CALL LL(PPX,PPY,1)  
CALL PPS(PPX,PPY, SX, SY, ST, K, NB, NUMBND, NTPY, TYP, IZ, TN, TRG, MSN, XSTK,  
1YSTK)  
IF(TIME.GE.TT(M))GO TO 331  
GO TO 129
```

MAI04670  
MAI04680  
MAI04690  
MAI04700  
MAI04710  
MAI04720  
MAI04730  
MAI04740  
MAI04750  
MAI04760  
MAI04770  
MAI04780  
MAI04790  
MAI04800  
MAI04810  
MAI04820  
MAI04830  
MAI04840  
MAI04850  
MAI04860  
MAI04870  
MAI04880  
MAI04890  
MAI04900  
MAI04910  
MAI04920  
MAI04930  
MAI04940  
MAI04950  
MAI04960  
MAI04970  
MAI04980  
MAI04990  
MAI05000  
MAI05010  
MAI05020

```
PAGE  
SKIP003  
700 TIME=0.  
PPX=XME(1)  
PPY=YME(1)  
XSTK=X(1)  
YSTK=Y(1)  
CALL RLL(PPX,PPY,1)  
WRITE(6,125)TIME,PPY,PPX  
CALL LL(PPX,PPY,1)  
CALL PPS(PPX,PPY, SX, SY, ST, K, NB, NUMBND, NTPY, TYP, IZ, TN, TRG, MSN, XSTK,  
1YSTK)  
I=1  
J=1  
725 TIME=TIME+1.  
DINC=SPD(I)/60.  
DINCM=SPDM(I)/60.  
IF(TT(I).GT.TIME)GO TO 726  
PARTIM=TIME-TT(I)  
I=I+1  
IF(I.EQ.N)GO TO 727  
XSTK=X(I)  
YSTK=Y(I)  
CALL RADN(I,NTH,H)  
XSTK=XSTK+PARTIM*SPD(I)/60.* $\cos(H)$   
YSTK=YSTK+PARTIM*SPD(I)/60.* $\sin(H)$   
GO TO 728  
727 XSTK=X(N)  
YSTK=Y(N)  
GO TO 728  
726 CALL RADN(I,NTH,H)  
XSTK=XSTK+DINC* $\cos(H)$   
YSTK=YSTK+DINC* $\sin(H)$   
728 IF(TT(J).GT.TIME)GO TO 736  
PARTIM=TIME-TT(J)  
J=J+1  
IF(J.EQ.MEN)GO TO 737  
PPX=XME(J)
```



MAI05030  
 MAI05040  
 MAI05050  
 MAI05060  
 MAI05070  
 MAI05080  
 MAI05090  
 MAI05100  
 MAI05110  
 MAI05120  
 MAI05130  
 MAI05140  
 MAI05150  
 MAI05160  
 MAI05170  
 MAI05180  
 MAI05190

```

PPY=YME(J)
CALL RADN(J,NTHM,H)
PPX=PPX+PARTIM*SPDM(J)/60.*COS(H)
PPY=PPY+PARTIM*SPDM(J)/60.*SIN(H)
GO TO 738
737 PPX=XME(MEN)
PPY=YME(MEN)
GO TO 738
736 CALL RADN(J,NTHM,H)
PPX=PPX+DINCM*COS(H)
PPY=PPY+DINCM*SIN(H)
738 CALL RLL(PPX,PPY,1)
WRITE(6,125)TIME,PPY,PPX
CALL PPS(PPX,PPY,SX,SY,ST,K,NB,NUMBND,NTYP,TYP,IZ,TN,TRG,MSN,XSTK,
1YSTK)
IF(TIME.GT.TTM(MEM)) GO TO 331
GO TO 729

```

MAI05200  
 MAI05210  
 MAI05220  
 MAI05230  
 MAI05240  
 MAI05250  
 MAI05260  
 MAI05270  
 MAI05280  
 MAI05290  
 MAI05300  
 MAI05310  
 MAI05320  
 MAI05330  
 MAI05340  
 MAI05350  
 MAI05360  
 MAI05370  
 MAI05380  
 MAI05390

```

330 WRITE(6,315)
315 FORMAT(1X,/, DO YOU WANT A PRINTOUT OF JAMMING PARAMETERS FOR THIS
1STANDOFF POINT?.)
READ(5,2)L
IF(L.EQ.0)GO TO 331
WRITE(6,121)
READ(5,2)NUMBND
WRITE(6,122)
READ(5,2)(NB(I),I=1,NUMBND)
WRITE(6,123)
READ(5,2)NTYP
WRITE(6,316)
316 FORMAT(1X,/, STANDOFF L/L',12X,'TYPE',6X,'EOB ',2X,'RNGE',2X,'BRGMA
1',2X,'AUTO',2X,'DEGR',2X,'PRCT'.)
CALL RLL(STOX,STOY,1)
WRITE(6,317)STOX,STOY
317 FORMAT(1X,F7.2,1X,F7.2)
CALL LL(STOX,STOY,1)
CALL PPS(STOX,STOY,SX,SY,ST,K,NB,NUMBND,NTYP,TYP,IZ,TN,TRG,MSN,XST
1K,YSTK)

```

MAI05400  
 MAI05410  
 MAI05420  
 MAI05430

```

331 WRITE(6,329)
329 FORMAT(1X,/, ARE YOU THROUGH PLANNING?.)
IF(L.EQ.1)GC TO 33

```



MAI05440  
MAI05450  
MAI05460  
MAI05470  
MAI05480  
MAI05490

```
324 WRITE(6,324)  
    FORMAT(IX,/, ' WANT TO CONSIDER A (DIFFERENT) MISSION PROFILE?')  
    READ(5,2)LL  
    IF(L.EQ.0) GO TO 91  
    WRITE(6,300)  
    READ(5,2)MSN
```

MAI05500  
MAI05510  
MAI05520  
MAI05530  
MAI05540  
MAI05550  
MAI05560  
MAI05570  
MAI05580  
MAI05590  
MAI05600  
MAI05610  
MAI05620  
MAI05630  
MAI05640  
MAI05650

```
91 WRITE(6,26)  
26  FORMAT(IX,/, ' DO YOU WISH TO CONSIDER (ANOTHER) STRIKE ROUTE?')  
    READ(5,2)LAGAIN  
    IF(LAGAIN.EQ.0)GO TO 322  
    WRITE(6,115)  
    READ(4,2)N  
    M=N-1  
    WRITE(6,13)  
    READ(4,4)(Y(I),X(I),I=1,N)  
    CALL LL(X,Y,N)  
    WRITE(6,17)  
    READ(4,4)(ITAS(I),I=1,M)  
    DO 28 I=1,M  
28  SPD(I)=ITAS(I)/6.  
    LRTE=1  
322 IF(MSN-2)35,400,318
```

MAI05660  
MAI05670  
MAI05680  
MAI05690  
MAI05700  
MAI05710  
MAI05720  
MAI05730

```
318 WRITE(6,319)  
319  FORMAT(IX,/, ' WANT TO CONSIDER ANOTHER STANDOFF POINT?')  
    READ(5,2)LSO  
    IF (LSO.EQ.0)GO TO 331  
    WRITE(6,302)  
    READ(5,4)STOX,STOY  
    CALL LL(STOX,STOY,1)  
    GO TO 35
```

MAI05740  
MAI05750

```
33  STOP  
    END
```



```

C THIS IS THE SUBROUTINE TO CALCULATE DISTANCE FROM A/C PRESENT
C POSITION TO EACH OF THE SITES IN THE EOB. IT FILTERS FOR TYPE
C EMITTERS AND BANDS DESIRED. IT PRINTS OUT INFO NECESSARY
C TO KEEP A RUNNING ACCOUNT OF UPCOMING ACTICN REQUIRED BY THE
C OPERATOR DURING THE FLIGHT.
C PARAMETERS PASSED:
C PPY, PPX; A/C PRESENT POSIT, LAT AND LONG
C SX, SY; ARRAY CONTAINING LAT/LONG OF EACH SITE IN EOB
C ST; TYPE OF EACH SITE IN THE EOB
C
C K; NUMBER OF SITES IN THE EOB
C NB; ARRAY CONTAINING THE SPECIFIC BANDS INTERESTED IN
C NUMBND; HOW MANY DIFFERENT BANDS INTERESTED IN
C NTYPE; INDICATES TYPE OF EMITTER INTERESTED IN, 1 ALL, 2 EW, 3 TTP
C TYP; ARRAY CONTAINING ENTIRE EMITTER LIBRARY
C SUBROUTINE PPS(PPX,PPY,SX,SY,ST,K,NB,NUMBND,NTYP,TYP,IZ,TN,TRG,MSN)
1, XSTK, YSTK)
1, DIMENSION SX(1), SY(1), NB(1), ST(1), TYP(30,15), IZ(1), TN(30,3), TRG(1)
INTEGER ST
PI=3.14159
DC=180./PI
DC 100 I=1, K
IC=ST(I)
IF(NTYP-2) 10, 20, 30
10 SITES TO BE CHECKED AND DISPLAYED IF IN RANGE
11 DO 11 J=1, NUMBND
IF(IZ(IC).EQ.NB(J))GO TO 110
11 CCNTINUE
GO TO 100
C CHECK ONLY EW/ACQ TYPE EMITTERS
20 IF(IC.GT.10)GO TO 100
DO 21 J=1, NUMBND
IF(IZ(IC).EQ.NB(J))GO TO 110
21 CCNTINUE
C CHECK TERMINAL THREAT TYPE EMITTERS CNLY
30 IF((IC.LT.11).OR.(IC.GT.20))GO TO 100
DO 31 J=1, NUMBND
IF(IZ(IC).EQ.NB(J))GO TO 110
31 CCNTINUE
C IF EMITTER IS RIGHT TYPE AND BAND NOW CHECK IF ITS IN RANGE
110 SDF=1./24-.023*ABS((SY(I+1)+PPY)/2.)-.0001*((SY(I+1)+PPY)/2.)*2
DX=(SX(I)-PPY)
DY=(SQRT(DX**2+DY**2))*60.
IF(MSN.EQ.3)GO TO 111
IF(DS.GT.TRG(IC))GO TO 101
GO TO 111
101 IF(MSN.NE.2)GO TO 100

```

```

PPS00010
PPS00020
PPS00030
PPS00040
PPS00050
PPS00060
PPS00070
PPS00080
PPS00090
PPS00100
PPS00110
PPS00120
PPS00130
PPS00140
PPS00150
PPS00160
PPS00170
PPS00180
PPS00190
PPS00200
PPS00210
PPS00220
PPS00230
PPS00240
PPS00250
PPS00260
PPS00270
PPS00280
PPS00290
PPS00300
PPS00310
PPS00320
PPS00330
PPS00340
PPS00350
PPS00360
PPS00370
PPS00380
PPS00390
PPS00400
PPS00410
PPS00420
PPS00430
PPS00440
PPS00450
PPS00460
PPS00470
PPS00480

```





```

DXX=(SX(I)-XSTK)*SDF
DYY=SY(I)-YSTK
DSS=(SQRT(DXX**2+DYY**2))*60.
IF(DSS.GT.TRG(IC))GO TO 100
C WENT BACK TO 100, ANOTHER SITE, BECAUSE ITS NOT IN RANGE.
  BUT IF IT IS IN RANGE, CONTINUE BELOW. CALC BEARING, PRINT OUT EVRYT
C 111 BRG=ATAN(DY/DX)
  IF(CX.GE.0.)GO TO 60
  BRG=(1.5*PI-BRG)*DG
  GO TO 80
  60 BRG=(PI/2.-BRG)*DG
  80 NBRG=BRG+.5
  IF(NBRG.GE.0)GO TO 40
  NBRG=NBRG+360
  GC TO 89
  40 IF(NBRG.LT.360)GO TO 89
  NBRG=NBRG-360
  89 WRITE(6,90)(TN(IC,J),J=1,3),I,DS,NBRG,TYP(IC,12),TYP(IC,13),TYP(IC,14)
  90 FCRMAT(21X,3A4,3X,I2,3X,F4.0,3X,I3,2X,A4,2X,A4)
  100 CONTINUE
  RETURN
  END
PPS00490
PPS00500
PPS00510
PPS00520
PPS00530
PPS00540
PPS00550
PPS00560
PPS00570
PPS00580
PPS00590
PPS00600
PPS00610
PPS00620
PPS00630
PPS00640
PPS00650
PPS00660
PPS00670
PPS00680
PPS00690
PPS00700
PPS00710

```



```

C THIS SUBROUTINE TAKES THE MAX AND MIN OF THE X AND Y COORDINATES,
C CHOOSES THE LARGER OF THE TWO SPREADS AND ADJUSTS THE OTHER AND
C ACCORDINGLY SO THAT THE PLOT ON THE GRAPH IS ALWAYS SQUARE AND
C THE DISTANCE SCALE IN THE ORZ. IS THE SAME AS IN THE VERT.
C SUBROUTINE SCALE(XMAX,XMIN,YMAX,YMIN)
  CX=ABS(XMAX-XMIN)
  CY=ABS(YMAX-YMIN)
  IF(CX.GE.DY)GO TO 10
  XMP=XMIN+DX/2.
  XMIN=XMP-DY/2.
  XMAX=XMP+DY/2.
  GC TO 20
10 YMP=YMIN+DY/2.
  YMIN=YMP-DX/2.
  YMAX=YMP+DX/2.
20 RETURN
END

```

```

SCA00010
SCA00020
SCA00030
SCA00040
SCA00050
SCA00060
SCA00070
SCA00080
SCA00090
SCA00100
SCA00110
SCA00120
SCA00130
SCA00140
SCA00150
SCA00160
SCA00170

```

```

C THIS SUBROUTINE COMPUTES THE TIME AND DISTANCE AROUND A PARTICULAR
C ROUTE. COMPUTES BOTH TOTAL AND INDIVIDUAL LEG VALUES.
C PARAMETERS PASSED ARE: LONG AND LAT OF TRNPTS, NUMBER OF PTS,
C SPEED (NAUT MILES/MIN) FOR EACH LEG, TIME/LEG, TOTAL TIME, DIST/LEG
C AND TOTAL DISTANCE.
C SUBROUTINE TD(X,Y,M,SPD,TL,TT,DL,DT)
  DIMENSION X(1),Y(1),SPD(1),TL(1),DL(1),DT(1),TT(1)
  T=0.
  D=0.
  DO 10 I=1,M
  C MUST CALCULATE A SCALE DOWN FACTOR SCF, LAT.NE.LONG IN DIST
  SDF=1-.0294-.0023*ABS((Y(I+1)+Y(I))/2.)-.0001*((Y(I+1)+Y(I))/2.)*2
  DX=(X(I+1)-X(I))*SDF
  DY=Y(I+1)-Y(I)
  DL(I)=SQRT(DX**2+DY**2)
  D=D+DL(I)
  DT(I)=D
  TL(I)=DL(I)/SPD(I)
  T=T+TL(I)
  TT(I)=T
10 CCNTINUE
  RETURN
  END

```

```

TD 00010
TD 00020
TD 00030
TD 00040
TD 00050
TD 00060
TD 00070
TD 00080
TD 00090
TD 00100
TD 00110
TD 00120
TD 00130
TD 00140
TD 00150
TD 00160
TD 00170
TD 00180
TD 00190
TD 00200
TD 00210
TD 00220
TD 00230
TD 00240

```



```

C THIS SUBRTN CONVERTS TRUE HEADINGS FROM DEGREES TO RADIANES FOR USE INRAD00010
C COMPUTING THE DISTANCE INCREMENT OF LAT/LONG IN THE TIME SCENARIO. RAD000020
C SPECIFICALLY: SIN AND COS FUNCTIONS REQUIRE RADIANES. RAD000030
C SLBROUTINE RADN(I,NTH,H) RAD000040
C DIMENSION NTH(1) RAD000050
C X=2.*3.14159/360. RAD000060
C IF((NTH(I).GE.0).AND.(NTH(I).LE.90))GO TO 10 RAD000070
C F=(450-NTH(I))*X RAD000080
C GO TO 20 RAD000090
10 H=(90-NTH(I))*X RAD000100
20 RETURN RAD000110
END RAD000120

```

```

C THIS SUBRTN COMPUTES TRUE HDG AND MAG HDG FOR A ROUTE OF FLIGHT. HDG000100
C PARAMETERS PASSED ARE: X AND Y COORDS OF TURNPTS, HDG000020
C NUMBER OF TRNPTS, MAGNETIC VARIATION, DUMMY LISTS FOR TH AND MH, HDG000030
C AND VALUE CF PI. HDG000040
C SLBROUTINE HDG (X,Y,M,VAR,NTH,MH,PI) HDG000050
C DIMENSION X(1),Y(1),NTH(1),MH(1) HDG000060
C INTEGER VAR HDG000070
C DG=180./PI HDG000080
C DO 10 I=1,M HDG000090
C MUST CALC A SCALE DOWN FACTOR SDF, SINCE LAT.NE. LONG IN DIST HDG000100
C SDF=1.0294-.0023*ABS((Y(I+1)+Y(I))/2.)-.0001*((Y(I+1)+Y(I))/2.))*2 HDG000110
C DX=(X(I+1)-X(I))*SDF HDG000120
C DY=Y(I+1)-Y(I) HDG000130
C TH=ATAN(DY/DX) HDG000140
C IF(CX.GE.0)GO TO 60 HDG000150
C TH=(1.5*PI-TH)*DG HDG000160
C GO TO 80 HDG000170
60 TH=(PI/2.-TH)*DG HDG000180
80 NTH(I)=(TH+.5) HDG000190
C MF(I)=NTH(I)+VAR HDG000200
C MD=MH(I) HDG000210
C IF(MD.GE.0)GO TO 40 HDG000220
C MF(I)=MH(I)+360 HDG000230
C GO TO 10 HDG000240
40 IF (MD.LT.360)GO TO 10 HDG000250
10 MH(I)=MH(I)-360 HDG000260
C CONTINUE HDG000270
C RETURN HDG000280
END HDG000290

```



```

C THIS ROUTINE CONVERTS DEGREES AND MINUTES TO DEGREES AND TENTHS OF
C DEGREES.
SUBROUTINE LL(X,Y,N)
DIMENSION X(1),Y(1)
DO 10 I=1,N
NX=X(I)-NX
RX=X(I)*.6
X(I)=NX+RX
NY=Y(I)-NY
RY=Y(I)*.6
Y(I)=NY+RY
10 CONTINUE
RETURN
END
LL 00010
LL 00020
LL 00030
LL 00040
LL 00050
LL 00060
LL 00070
LL 00080
LL 00090
LL 00100
LL 00110
LL 00120
LL 00130
LL 00140
LL 00150
LL 00160

```

```

C THIS ROUTINE RE-CONVERTS LATITUDES AND LONGITUDES FROM DEGREES AND
C TENTHS OF DEG. TO DEGREES AND MINUTES FOR PRINTOUT.
SUBROUTINE RLL(X,Y,N)
DIMENSION X(1),Y(1)
DO 10 I=1,N
NX=X(I)-NX
RX=X(I)*.6
X(I)=NX+RX
NY=Y(I)-NY
RY=Y(I)*.6
Y(I)=NY+RY
10 CONTINUE
RETURN
END
RLL00010
RLL00020
RLL00030
RLL00040
RLL00050
RLL00060
RLL00070
RLL00080
RLL00090
RLL00100
RLL00110
RLL00120
RLL00130
RLL00140
RLL00150
RLL00160

```





```

MAX000010
MAX000020
MAX000030
MAX000040
MAX000050
MAX000060
MAX000070
MAX000080
MAX000090
MAX000100
MAX000110
MAX000120
MAX000130
MAX000140

```

```

C THIS ROUTINE SEARCHES FOR THE MAX VALUE OF THE LIST PASSED TO,
C AND RETURNS THIS VALUE TO THE MAIN PROGRAM. IT IS USED TO
C OBTAIN THE MAX LAT AND LONG FOR USE IN ADJUSTING THE SCALE
C DURING THE PLOTTING SEQUENCE.
C PARAMETERS PASSED ARE: ARRAY OF LATITUDES OR LONGITUDES, NUMBER
C OF ITEMS IN THE ARRAY, DUMMY VALUE OF MAX WITH TRUE MAXIMUM TO BE
C RETURNED.
  SUBROUTINE MAX(X,N,XMAX)
  DIMENSION X(1)
  XMAX=X(1)
  DO 10 I=1,N
  10 XMAX=AMAX1(XMAX,X(I))
  RETURN
  END

```

```

MIN000010
MIN000020
MIN000030
MIN000040
MIN000050
MIN000060
MIN000070
MIN000080
MIN000090
MIN000100
MIN000110
MIN000120
MIN000130

```

```

C THIS SUBROUTINE SEARCHES LIST PASSED FOR THE MIN VALUE AND
C RETURNS IT TO THE MAIN PROGRAM. USED TO SET LIMITS IN SCALING
C DURING THE PLOTTING ROUTINE.
C PARAMETERS PASSED ARE: ARRAY OF LATITUDES OR LONGITUDES,
C NUMBER OF ITEMS IN THE ARRAY, DUMMY VALUE OF MIN WITH THE REAL
C VALUE OF MIN TO BE RETURNED TO THE MAIN PROGRAM.
  SUBROUTINE MIN(X,N,XMIN)
  DIMENSION X(1)
  XMIN=X(1)
  DO 10 I=1,N
  10 XMIN=AMINI(XMIN,X(I))
  RETURN
  END

```



```

C THIS ROUTINE CALCULATES THE DISTANCE FROM A STANDOFF POINT TO EACH
C EMITTER OF INTEREST, WHEN PRINTING PARAMETERS FOR A STANDOFF MSN.
SLBRROUTINE DIST(X0,Y0,STOX,STOY,FJ)
SCF=1.0294-.0023*ABS((Y0+STOY)/2.)-.0001*((YC+STOY)/2.)*2
DX=(X0-STOX)*SDF
DY=Y0-STOY
RJ=SQRT(DX**2+DY**2)
RETURN
END

```

```

DIS00010
DIS00020
DIS00030
DIS00040
DIS00050
DIS00060
DIS00070

```

```

C THIS FUNCTION CALCULATES THE BURNTHRU RANGE FOR JAMMING FROM A STANDOFF
C POINT TO ANY EMITTER OF INTEREST. USED IN PLOTTING DEPRESSED JAMMING
C ENVELOPES IN THE DISPLAY PORTION OF THE PROGRAM.
FUNCTION BTHRU(PJ,B,GJR,PR,CS,RJ,GAIN,CMFLG)
RJ=RJ*1852.
PR=PR*1000.
BTHRU=((PR*GAIN**2*CMFLG*CS*RJ**2)/(12.56637062*PJ
1*B*(10.**(GJR/10.)))**0.25)/1852.
RETURN
END

```

```

BTH00010
BTH00020
BTH00030
BTH00040
BTH00050
BTH00060
BTH00070

```



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