

CARRIERS AT WAR 1941- 1945

FLEET CARRIER OPERATIONS IN THE PACIFIC

DESIGN MANUAL

Table of Contents

1. INTRODUCTION.....	2	Scenario Length.....	8
2. USING THE DESIGN MENUS.....	2	Scenario Names.....	8
3. EDITING THE DESIGN MENUS.....	2	Task Group Creation.....	8
4. VARYING AN HISTORICAL SCENARIO.....	2	8. COOPERATING WITH THE COMPUTER.....	9
5. CREATING AN ORIGINAL SCENARIO.....	2	9. ACKNOWLEDGEMENTS.....	10
6. CREATING THE 'RAID ON CEYLON' SCENARIO.....	2	APPENDIX A.....	11
7. THE DESIGN HANDBOOK.....	3	The 'Raid on Ceylon' Scenario	
Plane Class Creation.....	3	APPENDIX B.....	16
Squadron Creation.....	4	Blank Design Forms	
Base Creation.....	5	APPENDIX C.....	20
Ship Class Creation.....	5	Principal Naval Radar Systems in Use in the Second World War	
Carrier Creation.....	6	APPENDIX D.....	21
Other Ship Creation.....	6	Japanese, American and Common- wealth Aircraft of the Pacific War	
Map Creation.....	6	BIBLIOGRAPHY.....	23
Weather Creation.....	7	DESIGN KIT MENU DISPLAY.....	24
The Print Utility.....	7		
The Review Utility.....	7		
Scenario Briefing.....	7		

Strategic Studies Group Pty Limited

336 Pitt St, Sydney, Australia



1. INTRODUCTION

The information in this booklet is, hopefully, presented in a sensible order and if you go through it sequentially it will provide you with enough experience to generate a scenario of your own. It is important that you have at least run through the Introductory Tutorial before attempting to use the routines described here.

Quite a lot of thought has been given to selecting the variables in the game and their inter-relationships. It may seem initially that we've 'gone overboard' in the number of separate items we have included. What we have found, and in a sense learned, in the course of 'CAW's extended development, is the importance of avoiding subjective analysis, at least where a more objective approach is possible. Not only does this make the inter-relationships between the contending forces much simpler to assess, but it provides a sound platform on which to build the computer's artificial intelligence. And this last point is especially important in a game system where parameter control is given over to the players. The computer's intelligence is, of course, not infallible as the notes in the Section 'Cooperating with the Computer' attest. What is significant is that the computer's decision making is not dependent upon a pre-programmed analysis of a particular situation.

2. USING THE DESIGN MENUS

Examine the back page of this booklet. It is a schematic display of all the Design Menus. In essence they operate just as do the Start and Game Menu you are already familiar with.

Boot your disk and select Menu J from the Start Menu. This is the Master Menu from which all the Design Menus depend.

3. EDITING THE DESIGN MENUS

The Design Menus fall into four main categories. These are-

(a) **Branch Menus.** {Nos 3,6,7}. No editing of these menus is possible. They signpost the route to other menus or functions.

(b) **Direct Function Menus.** {Nos 2,4,5}. These menus perform a single function upon being selected.

(c) **Direct Edit Menus.** {Nos 1,9,10,11,12,13,14}. These menus are used for editing a 'once only' routine. The Design Handbook explains their use individually.

(d) **Create Menu.** {Nos 8,15,16,17,18,19,20}. The general procedure for editing a Create Menu is explained below.

NUM - This is the number you have allocated to that element.

CLEAR - This will clear the display screen if anything is there.

LIST - This will give you a look at all the elements of this type you have created so far.

LOAD - This will load into the creation screen whatever data {if any} has already been assigned to that particular <NUM>.

EDIT - This will throw the cursor into the display screen. Use (RET) to cycle through the values, entering data as appropriate. The up arrow key will move the cursor in the opposite direction. Type (ESC) to recover the menu window from the display screen.

SAVE - Select this when you are satisfied with the data you have created.

4. VARYING AN HISTORICAL SCENARIO

Very often the smallest alteration to the data in an historical scenario is enough to create an entirely new battle. Even the simple knowledge that a variation may have been made is enough to create the uncertainty so necessary to get the proper 'feel' for those Pacific carrier battles.

We suggest that before attempting to modify the historical scenarios, you create the 'Raid on Ceylon' scenario, as explained in a following Section. The experience this will give you in using the Design menus is more than worth the effort.

The notes accompanying each historical scenario suggest several variations (historical might-have-beens) to the Orders of Battle. For example, ships and/or squadrons can be added or deleted, crew and/or ordnance performance can be modified... indeed, every variable in the data base can be altered. And these variations are most exciting and enjoyable when you can get a 'neutral' party to secretly select them.

5. CREATING AN ORIGINAL SCENARIO

There is, as you will shortly see, an immense amount of information which needs to be researched and collated before you can realistically attempt to develop an historical scenario. Rather than spend several pages listing all the relevant material you will need to have available, we decided to present to you a complete scenario in tabulated form and complement it with Appendices and an extensive bibliography. Furthermore, Appendix B is made up of a series of blank creation sheets which are suitable for photocopying prior to use in scenario design.

Before trying to do anything else with the Design Menus, we suggest you build up the complete 'Raid on Ceylon' scenario. In addition to creating a rewarding and quite exciting scenario, you'll have mastered the creation routines and gained some insight into our design evaluations and prejudices. Appendix A includes all the tabulated information necessary to construct the 'Raid on Ceylon' scenario. Have a brief look through it, then follow the creation sequence explained below. It is advisable, though not essential, to consult the Design Handbook while entering data for Menus 8-11 and 15-20.

6. CREATING THE 'RAID ON CEYLON' SCENARIO

1. Boot the master side of your 'CAW' disk, select the <CREATE> line from Menu A and type (Y)(RET) to obtain the scenario menu. You may select any of these scenarios to provide the skeleton on which the 'Raid on Ceylon' game is built. For example, select the <PEARL> line and type (Y)(RET) to obtain Menu J. Examine the Design menus presented on the back cover of this Design Manual.

Select the <CLEAR> line from Menu J and type (Y)(RET) to obtain Menu 2. Clear both map and data. Type (ESC) to recover Menu J.

Select the <DISK> line from Menu J and type (Y)(RET) to obtain Menu 1. Use the <INIT> line to initialize a blank disk. Select the <EDIT> line and type (Y)(RET) to enter the Save Game display. Select the <SAVE> line in the first save location and type (Y)(RET). The cursor will jump to the 'Comment' line. Type (Raid on Ceylon)(RET). The design skeleton is saved to disk, the cursor returns to the menu window and you are informed that 'Raid on Ceylon' is a 'Creation file'. Type (ESC) to recover Menu J and you are ready to begin entering data.

2. Select Menu 3. It is more convenient to construct the map first. Select Menu 6 then Menu 12. This is the Map Create Utility. The strategic screen will appear completely blank on B&W monitors, blue on colour monitors. Examine the draft map provided in Appendix A. To get you started, the following key strokes will create the island of Ceylon.

Position the strategic cursor over hex block {7,12}, then recover the tactical cursor. It is poised over hex {22,37} as indicated above the Menu Display. Away we go! Type (T4)(2)(T4)(2)(T4)(4)(T4)(3)(T4)(4)(T6){the China Bay airstrip at Trincomalee}(3)(T4)(4)(T4)(4)(T4)4(T4)(3)(T4)(4)(T4)(4)(T4)(5)(T4)(4)(T4)(5)(T4)(5)(T6){Koggala}(5)(T4)(6)(T4)(1)(T4)(6)(T4)(1)(T6){Racecourse and Ratmalana airbases at Colombo}(6)(T4)(1)(T4)(2)(T4)(1)(T4)(1)(T4)(1)(T4)(2)(T4)(1)(T4) and you have created the coastline of Ceylon. Map every hex of the interior with (T4). To put in the mountain ridges, position the tactical cursor in hex {24,42} and type (S3)(4)(S1)(5)(S2)(S3)(4)(S1)(S2)(5)(4)(S2)(3)(S1)(1)(S3)(3)(S1)(1)(S1)(S2)(S3)(3)(S1)(1)(S2)(S3). To correct an improperly built hex, simply type over it with the correct value. Use (S0) to erase all hex-sides from a particular hex, then re-enter the correct value. Note that you can type (0) to centre the screen on the cursor.

Once you have built the entire map, recover Menu J and use the <DISK> line to save the information to disk. This will safeguard you against an accident. The only thing worse than building up a complete map from scratch is having to do it twice.

3. On to the Weather. Recover Menu 6, then select Menu 13. The Strategic Map is displayed with the strategic cursor in the centre of the screen. Examine the Weather Pattern presented in Appendix A. The island of Sumatra in the south-eastern portion of the map is pretty well covered by squalls and low clouds. Use the I, J, K, M keys to position the strategic cursor in hex-block {23,14}. The following keystrokes will create the weather front. Type (2)(I)(2)(K)(2)(M)(3)(M)(3)(M)(2)(M)(2)(K)(2)(I)(2)(I)(2)(I)(2)(K)(3)(M)(3)(M)(2)(M)(2)(K)(2)(I)(2)(I)(3). Complete the remaining Weather Pattern and select the <DISK> line from Menu J to safeguard it on disk. Select Menu 14. The sector forecast display is presented. Enter the data from the Weather Pattern onto the display; i.e. for Sector 1 type (3)(3)(0).

4. Recover Menu 3, then select Menu 7. The bulk of the game's information is entered via this menu. The inter-relationships between the various data bases displayed in Menu 7 are such that it is most convenient to enter them in the following order.

4(a). Plane Class {P TYPE}. Select Menu 17. Locate the tabulated Plane Class data in Appendix A and use the procedure explained earlier in these notes for editing the menu. For example, to enter the data corresponding to the Hurricane fighter, check that the <NUM> line in the menu window is 1. Type (RET) until you have positioned the cursor on the <EDIT> line, then type (Y)(RET) to enter the creation routine. Complete the schedule by typing- (Hur 2)(RET)(0)(RET)(0)(RET)(1)(RET)(3)(RET)(5)(RET), (3)(RET)(3)(RET)(2)(RET)(9)(RET)(4)(RET)(4)(RET)(3)(RET)(5)(RET), (3)(RET)(Y)(RET)(Y)(RET)(N)(RET)(N)(RET)(N)(RET)(N)(RET). Recover the menu, select the <SAVE> line, type (Y)(RET) and cycle around to the <NUM> line. Enter (2), use <CLEAR> to get a clean sheet then edit the next plane in Appendix A. Complete all 15 Plane Classes, use LIST to make sure they're all there, then save the data to disk. Should you make an incorrect entry, type (SPACE) if the cursor is on the incorrect entry or cycle through the display and re-enter the value if otherwise. Note also that the 'UP ARROW' key will move the cursor in the opposite direction.

4(b). Squadrons {SQUADS}. Select Menu 16. Locate the Squadron data in Appendix A. Enter the data for the 53 squadrons in the scenario. Save to disk.

4(c). Airbases {BASES}. Select Menu 15. Locate the Base data in Appendix A. Note the one small difference between this menu and the others dependent on Menu 9. Prior to using <EDIT>, use the <MAP> line to recover the Strategic Map. Locate the appropriate airbase with the I, J, K, M keys, recover the Tactical Map and position the tactical cursor directly over the airbase. Type (RET). The Base Creation routine is recovered and the map location of the base is entered in the correct position. Note that this procedure is optional and the MAP LOC may be entered directly from the draft map or data sheet. Enter the data for the 7 bases in the scenario. Save to disk.

4(d). Ship Class {S TYPE}. Select Menu 20. Locate the Ship Class data in Appendix A. Enter all 43 classes, then save to disk.

4(e). Carriers. {CARR}. Select Menu 18. Locate the Carrier data in Appendix A. Enter the 9 flat-tops, then save to disk.

4(f). Other Ships. {SHIPS}. Select Menu 19. Locate the Other Ship data in Appendix A. Note that the data entry for submarines is slightly different to that for surface ships. Consult the Design Handbook for the method of deploying submarines. Enter the 99 ships, then save to disk.

5. Now to organising the Task Groups. Recover Menu 3 and select Menu 8. Note there are no LOAD or SAVE functions in this routine. Both occur automatically. Locate the Task Group data in Appendix A. Set the <ALLY> line to Y and the <NUM> line to 1, then edit the display using the procedure described in the Design Handbook. There are 7 Japanese Task Groups and 16 Allied Task Groups. Remember to set the <ALLY> line to N when editing Japanese Task Groups.

6. Almost Finished! The Briefing <BRIEF> Length <TIME> and name <NAME> routines are all that remain to be completed. Locate the data from Appendix A. Use Menus 9,10,11 to enter the information. The information necessary to complete Menu 11 is given below. [AXIS: Land (0) - 5th AIR XX, Naval (0) - Nagumo, Naval (1) - Ozawa. ALLIED: Land (0) - Layton, Naval (0) - Somerville, Naval (1) - 'Colombo', Naval (2) - 'Trinco', Naval (3) - 'Transport'.] That's it. The scenario is ready for play.

7. THE DESIGN HANDBOOK

The following Section is both an explanation of, and a guide to, the proper use of the Creation and Edit Menus.

Plane Class Creation {Menu 17}

This routine is used to define the characteristics and performance of the various aircraft employed in the scenario. Examine Appendix A for a completed example. To enter the correct value for each characteristic, follow the guide below. A maximum of 63 aircraft types may be created per scenario.

TYPE - Enter any five letter word which will distinguish the aircraft (e.g. SBD-3, BETTY, G4M1 etc).

ROLE - Enter the combat role for which the aircraft was primarily designed; viz - fighter=0, bomber=1, recon=2.

RANGE - Enter the endurance of the aircraft at each of normal, extended and transfer ranges. Endurance is measured in hours aloft at the aircraft's rated cruising speed. Table 1 illustrates the relationship between endurance and mission capability.

ALTITUDE - Enter the combat performance of the aircraft at high { > 25,000 ft}, medium {10,001 - 25,000 ft} and low { < 10,000 ft} altitudes from the data presented in Table 2.

Table 1

	FIGHTER	BOMBER	RECON
NORMAL RANGE	STRIKE (FULL PAYLOAD) (TORPEDO)		
EXTENDED RANGE	C A P ESCORT STRAFE SEARCH	STRIKE (REDUCED PAYLOAD) SEARCH	
TRANSFER RANGE	UNARMED TRANSFER		

Table 2

SERVICE CEILING (ft)	ALTITUDE RATING		
	HIGH	MED	LOW*
> 35,000	3	3	3
30,001 - 35,000	2	3	3
25,001 - 30,000	1	3	3
20,001 - 25,000	0	3	3
15,001 - 20,000	0	2	3
10,001 - 15,000	0	1	3
5,001 - 10,000	0	0	3
< 5,000	0	0	2

* If maximum speed is achieved at an altitude greater than 18,000 ft, reduce LOW rating to 2; If maximum speed is achieved at an altitude greater than 25,000 ft, reduce LOW rating to 1.

CRUISING SPEED - This characteristic is measured in hexes traversed per hour. Each hexagon on the map represents 20 nautical miles from side to side. Thus a cruising speed of 120 knots equals 6 for this purpose. The maximum value which can be entered is 15 {300 knots}. Round off any fraction to the nearest number.

BOMB LOAD - This characteristic is measured in increments of 300 lb of bombs. A payload of 10,000 lb of bombs equals 34 for this purpose. The maximum value which can be entered is 63 {19,000 lb}. Round up any fraction.

FIREPOWER - This value measures the quality and quantity of the aircraft's guns. Generally, 1 point is awarded for every 1 fixed forward gun and/or 1 point for every 2-4 flexible guns. The value obtained is modified {+ or - 1} by the suitability of the aircraft as a firing platform and/or the type of mounting provided for the flexible guns. The final value is somewhat subjective however, and a glance at Appendix D {Specifications for US, Japanese and Commonwealth Aircraft in the Pacific War} will provide the necessary familiarity to start work on your own design. The maximum value is 7. Unarmed planes have a value of 0.

VULNERABILITY - This value measures the protection afforded to the crew, the fuel tanks and other vital equipment. A glance at Appendix D will again provide the necessary familiarity to start work. The maximum value is 7. The minimum value is 0.

MANOEUVERABILITY - This value measures the aircraft's agility primarily through the evaluation of wing loading; i.e. in general, the lower the wing loading then the more manoeuvrable will the aircraft be. Pilot reports, where available, are also a useful source of information. See Appendix D. The maximum value is 7. The minimum value is 0.

POWER - This value measures the aircraft's maximum speed. Consult Table 3 for the correct value.

Table 3

MAXIMUM SPEED (Knots)	POWER RATING
< 210	0
210 - 240	1
241 - 270	2
271 - 300	3
301 - 330	4
331 - 360	5
361 - 390	6
> 390	7

Table 4

STRIP NO.	RUNWAY	SQUAD CAP
0	Water	1
1	Dirt	1
2	Dirt	2
3	All Weath	2
4	All Weath	3
5	All Weath	4
6	Sealed	3
7	Sealed	4

ALLIED - Yes or No.

CARRIER - Is the aircraft capable of taking-off from a carrier? Yes or No.

SEAPLANE - Yes or No. Amphibians have a crew value of 3-5; floatplanes have a crew value of 0-2.

TORPEDO - Is the aircraft designed to carry a torpedo? Yes or No.

NIGHT - Is the aircraft modified to operate at night? Yes or No.

ANTI-SUB - Is the aircraft modified to carry anti-submarine ordnance? Yes or No. If Yes, then the bomb load value must be set at 0.

Squadron Creation {Menu 16}

This routine is used to assign the aircraft types created in the previous routine to their historical organizations. Examine Appendix A for a completed example. Up to 126 individual squadrons may be created, each one of which may accommodate from 1-63 aircraft. All aircraft in a particular squadron must be of the same type. To enter the correct value for each characteristic, follow the guide below.

PLANE TYPE - Enter the <NUM> corresponding to the <P TYPE> created in the previous routine.

NUM PLANES - Total number of planes to be allocated to the squadron.

FATIGUE - This value measures the physical condition of the squadron's combat and ground personnel. 7=bright-eyed and bushy-tailed; 0=totally exhausted.

EXPERIENCE - This value measures the combat experience of the squadron's aircrew. 3=elite, 2=experienced, 1=trained but without combat experience, 0=untrained.

ADMIN - This value measures the experience of the ground personnel as well as briefing and debriefing routines. 3=terrific, 2=good, 1=adequate, 0=hopeless.

RECON - Is the squadron trained for reconnaissance operations? Yes or No.

NIGHT OPS - Is the squadron trained for night operations? Yes or No.

CARRIER OPS - Is the squadron trained for carrier operations? Yes or No.

Base Creation {Menu 15}

This routine is used to establish airbases and ports. A total of 23 may be created in each scenario. Any number of bases may be located in the same hex. Examine [Appendix A](#) for a completed example. To enter the correct value for each characteristic, follow the guide below.

BASE - Name the base {up to a maximum of 11 letters}.

MAP LOC - Enter the X and Y map co-ordinates of the base. These can be found by selecting the MAP option on the Base Creation Menu and then using the I,J,K,M keys to position the cursor in the approximate position on the Strategic Map. Hit (RET) to recover the Tactical Map and use the I,J,K,M or 1-6 keys to locate the correct hex. Hit (RET) and the co-ordinates will be entered. Alternatively, you can manually enter the co-ordinates from a reference to your draft map.

ASSIGNED SQUADRON - Enter the <NUM>'s of the squadrons which are to be assigned to this base. A maximum of 10 squadrons may be assigned to each base.

DAM STAT - This value measures the degree of damage sustained by the base. 15=undamaged, 0=completely destroyed. Generally, bases will begin a scenario in an undamaged state; i.e. the value is 15. To provide for those circumstances where a base begins a scenario in a damaged condition, you may enter any value below 15.

AIRSTRIPE - This value defines the runway surface and the operational capacity of the base. Consult [Table 4](#) for the appropriate value.

RADAR - This value defines the radar search pattern in terms of a hex radius from the base. The air and surface components are treated separately. Consult [Table 5](#) for the appropriate value. [Appendix C](#) lists most of the radar systems used in the Pacific War together with their performance converted into game terms.

ACCURACY - This value measures anti-aircraft fire control. 0=poor, 1=fair, 2=good, 3=excellent {3 is only possible with radar directed fire control}.

DAM CONT - This value measures the base personnel's experience and effectiveness in combating enemy inflicted damage. 0=poor, 1=fair, 2=good, 3=excellent.

THEATRE - Up to 2 land based commands can be created per scenario. These commands are essentially independent from each other {as well as from the various Task Force commands} and are especially useful for simulating the lack of co-operation between the IJN and the JAAF, to say nothing of the similar situation between 5th Air Force {MacArthur} and 13th Air Force {Nimitz}. 0=theatre 0, 1=theatre 1.

HEAVY AA - This value measures the number of large calibre anti-aircraft weapons deployed for the protection of the base. In general, score 1 point for each 4"-5" AA or DP {dual purpose} gun and/or two 3" AA or DP guns. The maximum value is 31. The minimum value is 0.

LIGHT AA - This value measures the number of small calibre AA weapons deployed to protect the base. For every four tubes with a calibre greater than 30mm, score 1 point. For every eight tubes with a calibre less than 30mm, score 1 point. The maximum value is 31. The minimum value is 0. Round up any fractions.

SPOT NUMBER - This value defines the number of aircraft which can fit on the runway at any one time. It is a measure of the optimum strike size. Each point of this value represents four aircraft. The maximum value is 31. The minimum value is 0.

SEARCH PATTERN - Each base can be assigned a standing search along any or all of the eight bearings displayed on the compass rose. Type (Y) for each bearing you wish included in your standing search.

ALLIED - Yes or No.

FIGHTER - Are facilities present for arming fighters and light bombers {i.e. those with a crew rating 0-2}? Yes or No.

BOMBER - Are facilities present for arming heavy bombers {crew rating > 2}? Yes or No.

PORT FAC - Are port facilities present? Yes or No.

Ship Class Creation {Menu 20}

This routine is used to define the classes to which the various warships in the scenario will be assigned. 63 classes may be designed for each scenario. Examine [Appendix A](#) for a completed example. Characteristics common to a group of warships are established here; variable characteristics are handled on a ship or carrier basis.

CLASS - This value describes the type of ship and the year in which the first vessel of the class was launched; e.g. CV 1935, AO 1921, CVL1934, DD1936B. A maximum of 8 letters can be used.

ALLIED - Yes or No.

SEAPLANE - Is the class capable of carrying seaplanes? Yes or No.

SHIP TYPE - 0= carrier or seaplane tender, 1= capital ship, 2= minor ship, 3= submarine, 4= auxiliary vessel.

MAXIMUM SPEED - This value is measured in knots. The maximum value is 45.

DISPLACEMENT - This value is measured in multiples of 2,500 gross tons; e.g. the *Yamato* {72,000 tons} has a value of 29. The maximum value is 31. Vessels under 1250 tons have a value of 0. Round off fractions to the nearest number.

HEAVY AA - This value is calculated in the manner described in the Base Creation routine.

LIGHT AA - This value is calculated in the manner described in the Base Creation routine.

Table 5

RADAR RATING	SEARCH DISTANCE	
	SURF	AIR
0	0	0
1	0	1
2	1	1
3	1	2
4	1	3
5	1	4
6	2	4
7	2	5

Table 6

SUB. RATING	SUB. DEPTH (ft)	SUB. SPEED (kt)
0	< 100	< 6
1	100 - 150	6
2	151 - 200	7
3	201 - 250	8
4	251 - 300	9
5	301 - 350	10
6	351 - 400	11
7	> 400	> 11

ARMOUR - This value measures the thickness of any belt armour protecting the vessel. The units are inches. The maximum value is 15. Vessels without armour possess a value of 0.

PRIMARY GUNS - This value totals the number of tubes with a calibre equal to or greater than 8". The maximum value is 15. Vessels without guns of this calibre possess a value of 0. {Note that the effectiveness of the primary battery is determined by the vessel's displacement.}

SECONDARY GUNS - This value defines the number of 3"- 6" calibre guns aboard the vessel. Count LA and DP weapons for this purpose; ignore AA weapons. Award 1 point for each 6" gun, each two 4"- 5" guns and/or three 3" guns. The maximum value is 15. Vessels without a secondary battery possess a value of 0. Round up any fractions.

TORPEDO TUBES - This value defines the number of torpedo tubes mounted. The maximum number is 15. Vessels without torpedo tubes have a value of 0.

VULNERABILITY - This value is a somewhat subjective assessment of the vessel's overall integrity. Ships with vulnerable areas, old ships and ships with structural weaknesses should be given low values; carriers in particular are subject to low values, generally in the range 0-2. The maximum value is 7. The minimum value is 0.

ANTI-SUBMARINE - This value measures the quality and quantity of active ASW weapons carried. Award 1 point for every two depth charge throwers, each hedgehog and each multiple of 15 depth charges. If any active ASW weapons are carried, the minimum value is 1. The maximum value is 7. The minimum value is 0.

TORPEDO LOADS - This value measures the number of torpedoes carried, expressed as a multiple of the Torpedo Tubes value. Vessels without torpedo tubes have a value of 0. The maximum value is 3. Round off any fractions to the nearest value.

Carrier Creation {Menu 18}

This routine is used to define the characteristics and performance of the aircraft carriers and seaplane tenders employed in the scenario. Examine [Appendix A](#) for a completed example. A maximum of 31 vessels may be created. There is no minimum number.

CARRIER - Use this location to name the carrier or seaplane tender. A maximum of 11 letters can be used.

AIR CAPACITY - This value determines the maximum number of aircraft which can be assigned to the vessel. It also measures the operational limit of the vessel during the scenario. The maximum value is 127. It is important to check that the correct value is not exceeded; i.e. sum the planes in the squadron as a cross reference.

SHIP CLASS - Enter the number corresponding to the vessel's Ship Class from the previous routine.

TASK GROUP - Enter the value corresponding to the task group to which the vessel has been {or will be} assigned. For further details, consult the Task Group Creation routine.

ASSIGNED SQUADRON - Enter the <NUM>'s of the squadrons which are to be assigned to this vessel. The maximum is 5 squadrons.

SPOT NUMBER - This value defines the number of aircraft which can fit onto the flight deck at any one time. It is a measure of the optimum strike size, or 'deckload strike' as it is sometimes termed. Each point of this value represents four aircraft. The maximum value is 31.

RADAR - This value is calculated in the manner described in the Base Creation routine.

ACCURACY - This value is calculated in the manner described in the Base Creation routine.

DAMAGE CONTROL - This value is calculated in the manner described in the Base Creation routine.

DAMAGE STATUS - This value is calculated in the manner described in the Base Creation routine.

Other Ship Creation {Menu 19}

This routine defines the characteristics and performance of the remaining ships employed in the scenario. Examine [Appendix A](#) for a completed example. A maximum of 215 vessels may be created. There is no minimum number.

PENNANT - Enter the pennant number of the vessel to be defined. For example, the *USS North Carolina* has the pennant number BB55. A maximum of five letters can be used.

SHIP CLASS - This value is entered from reference to the Ship Class Creation routine.

DAMAGE CONTROL - This value is calculated in the manner described in the Base Creation routine.

DAMAGE STATUS - This value is calculated in the manner described in the Base Creation routine.

RADAR - This value is calculated in the manner described in the Base Creation routine.

ACCURACY - This value is calculated in the manner described in the Base Creation routine.

CARGO - This value measures the vessel's capacity to carry supplies and/or troops. In general, the maximum capacity for transports is twice their displacement value. Small warships such as destroyers have a capacity of 2; APD's as much as 4.

TASK GROUP - Enter the value corresponding to the Task group to which the vessel has been {or will be} assigned. For further details, consult the Task Group Creation routine. Note that it is not possible to assign a submarine to a Task Group.

ASSIGN PATROL - This entry can only be made for submarines. To allocate a patrol area to the submarine, type (Y) and you will recover the Strategic Map display. Position the strategic cursor over the hex-block containing the hex location you have chosen for deployment, then type (RET). The Tactical Map is now displayed. Locate the hex chosen as the centre of the submarine's patrol area and hit (RET) again. The allocation is complete and you will recover the creation screen. Note that ships other than submarines will not be able to access this location.

SUB DEPTH - This value measures a submarine's operational diving limit. Consult [Table 6](#) for the correct value. Ships other than submarines will not have access to this location.

SUB SPEED - This value measures a submarine's maximum submerged speed. Consult [Table 6](#) for the correct value. Again, only submarines have access to this location.

SEAPLANE SQUADRON - Enter the <NUM> of the Seaplane Squadron which is to be assigned to this vessel. The maximum is 1 squadron.

Map Creation {Menu 12}

Select Menu 12 to enter the Map Creation routine. The Strategic Map is displayed together with the hollow cursor.

Each element of terrain on the Strategic Map represents a block of 9 hexes on the Tactical Map. Each hexagon is 20 nautical miles from side to side for a total of 6048 hexes or just under 3.2 million square miles. Examine the Data Cards.

The X,Y coordinates for both the hex block and individual hex are displayed above the menu window. To edit a particular hex or hex-side, first position the strategic cursor over the

appropriate hex block using the I,J,K,M keys. Type (RET) to recover the Tactical map, then position the tactical cursor over the chosen hex using either the I,J,K,M keys or the 1-6 keys. Note that you may type (0) to centre the screen on the tactical cursor.

There are 6 hex types and 4 hex-side types.

NAVIGABLE OCEAN HEX (T0) - This is the default value. It need only be used when correcting a wrongly edited hex.

PROHIBITED OCEAN HEX (T1) - These hexes are off-limits to all ships. In reality, they are an artifice to prevent the computer from becoming stuck in severely congested waters. The Section on 'Cooperating with the Computer' explains their use. Such ocean hexes appear purple on the Tactical Map. They are not visually distinguishable on B&W monitors. There are about 10 of them on the Solomons map, none on the Midway or Marianas maps.

SHOAL/ATOLL HEX (T2) - These hexes represent shallow water, reefs and small islands. They are navigatable for all ships, including submarines.

LAND HEX (T3,T4) - Two types of land hexes may be created; clear (T3) and jungle (T4). The effect on the play of the game is the same whichever type {or combination of them} you elect to use. For aesthetic reasons, we've chosen T4 for all land hexes. Obviously, land hexes are off-limits to all ships.

AXIS BASE HEX (T5) - This symbol identifies an Axis airbase. Port facilities may or may not be present, depending upon the entry made in Menu 17. Ports may be entered by friendly naval forces.

ALLIED BASE HEX (T6) - This symbol identifies an Allied airbase.

Hex-sides are defined somewhat differently to hexes. (S1)-(S3) will build north, north-eastern and south-eastern hex-sides respectively. Note that the south hex-side of one hex is the north hex-side of the hex directly below it. (S0) will clear all hex-sides from a particular hex. The hexes adjacent to the hex-side being created will determine its type. Thus, a hex-side created between two ocean or shoal hexes is an impassable reef {white}. A hex-side created between any type of land or base hex and an ocean or shoal hex is a coastal hex-side {blue} and is automatically entered by the computer. Finally, the hex-side created between two land or base hexes is a mountain ridge {brown}.

Note that the terrain elements on the Strategic Map are built up as a consequence of the topography of the Tactical Map. The priority given to the strategic display is base, land, shoal, ocean.

Weather Creation {Menus 13 and 14}

There are 2 components involved in creating a weather pattern - the weather report and the weather forecast. Examine [Appendix A](#) for a completed example.

(i). **The Weather Report {Menu 13}** - This routine is used to position the weather elements in their starting locations. The three types of elements available are high clouds, low clouds and squalls. Weather elements are positioned in hex blocks, not hexes. In fact, the prevailing weather in a hex block is an indication of the most likely weather condition for a particular hex. Use the I,J,K,M keys to position the strategic cursor over the chosen hex-block and enter (1) {high cloud}, (2) {low cloud} or (3) {squall}. The default value is (0).

(ii). **The Weather Forecast {Menu 14}** - This routine is used to determine the prevailing winds and current weather activity. The long-term weather forecast is defined in the Scenario Length routine {Menu 10}. Select Menu 14 to obtain the Forecast Display Screen. The Strategic Map is divided into 12 sectors. For each sector, 3 parameters must be set. Examine [Appendix A](#) for

a completed example. The Weather Condition can be any one of the following; 0= clearing, 1= stable, 2= building up, 3= unstable or fluky. The Wind Direction can be from N(1) .NE(2) .E(3), SE(4), S(5), SW(6), W(7), NW(8). Wind speed is determined by prevailing weather conditions and is not entered in the creation routines. The final value in each group measures wind reliability; i.e. 0= wind direction unlikely to vary, 1= variable wind direction expected throughout the day.

During the course of the game, the weather pattern is updated approximately once per hour. To get some idea of how your newly created weather pattern will develop throughout the course of the scenario, recover Menu 13 and type (RET) at 2-3 second intervals. You will notice that in addition to the above, cloud formations are more likely to form over land masses and more likely to break up over bodies of water.

The Print Utility {Menu 5}

This utility is used to obtain a hard copy of the information entered in Menus 17-22. Select Menu 10. Make sure your printer is properly connected, then select the data base of your choice. Each item in that data base will be printed sequentially.

The Review Utility {Menu 4}

This utility is used to quickly review the information presented in Menus 17-22. Select Menu 11. Select the data base of your choice. Type (SPACE) to sequentially view each item in the data base.

Scenario Briefing {Menu 9}

This routine is used to establish national characteristics and ordnance performance and to specify the locations of coastwatchers and anchor points for seaplane tenders. Examine [Appendix A](#) for a completed example.

MORALE - This value is an assessment of the national fighting spirit. 0= cautious, 1= normal, 2= resolute, 3= fanatic. It has an important influence on the resilience and determination the troops will display.

ASW TECH - This value measures the quality of the passive submarine detection technology available to each side. Consult [Table 7](#) for the appropriate rating. The range is 0-3.

RADAR TECH - This value measures the quality of the radar equipment and the competency of its operators. Consult [Table 7](#) for the appropriate rating. The range is 0-3.

Table 7

	YEAR	RADAR TECH.	ASW TECH.	FIRE CONTROL	TORPEDO PERFORMANCE		
					AERIAL	SURFACE	SUBMARINE
COMMONWEALTH	1939-1940	1	1	1	2	2	2
	1941-1942	2	2	2	2	2	2
	1943-1945	3	2	2	2	2	3
UNITED STATES	1939-1941	0	1	1	1	2	0
	1942-1943	2	1	1	2	2	0
	1944-1945	3	3	3	2	2	3
JAPAN	1939-1942	0	0	2	3	3	3
	1943-1945	0	1	2	3	3	3
GERMANY	1939-1941	1	1	1	1	2	3
	1942-1945	2	2	2	2	2	3
ITALY	1939-1945	1	1	1	1	2	2
SOVIET UNION	1939-1943	0	0	1	-	1	1
	1944-1945	1	1	1	-	1	2

FIRE CONTROL - This value measures the accuracy of surface gunnery including the contribution, if any, made by the presence of radar controlled directors. Consult Table 7 for the appropriate rating. The range is 0-3.

TORPEDOES {AERIAL, SURFACE, SUBMARINE} - This value measures the qualitative difference of the torpedoes available to each side. The three types of torpedoes are rated separately. Again, consult Table 7 for the appropriate rating. The range for each is 0-3.

{GENERAL NOTE - For each of the preceding four characteristics, 0= hopeless, 1= inferior, 2= serviceable, 3= excellent.}

INVASION MULTIPLE - This value is used to assess the relative importance of successfully landing troops and supplies at their preset destination. Consult the Victory Schedule in the Rules Manual for a summary of points awarded during the game. Note that cargo landed at an enemy base is more valuable than cargo landed at a friendly location. 0= points multiplied by 1, 1= points multiplied by 2, etc.

ABORT DIRECTION - This heading is used to indicate the direction in which damaged ships or task groups under a 'flee' order will steam. It is the line of retreat. The usual compass rose procedure is followed; i.e. 0=N, 1=NE, etc.

SURPRISED - Yes or No. Surprise can be achieved only against an opponent who is not at war.

PARA-FRAG BOMBS - Are these weapons available? Yes or No.

CLEAR MAP POINTS - This must be done for every scenario, even those which will not use coastwatchers or anchor points.

COASTWATCHER {1-4} - For each coastwatcher hit (Y) to recover the Strategic Map, then use the procedure described for positioning submarines to locate them. Coastwatchers can only be deployed on land hexes.

ANCHOR POINT {1-2} - Anchor points are used by seaplane tenders as additional locations from which they can conduct air operations. For each anchor point, hit (Y) to recover the Strategic Map, then use the submarine deployment procedure to position them. Only shoals and ocean hexes adjacent to land hexes can be designated as anchor points.

Scenario Length {Menu 10}

This routine is used to establish the start and finish times for the scenario, the hours of dawn and dusk, and the long-range weather prediction. You will notice that the game can be set in any year from 1900 to 1955. Aircraft performance and ordnance has changed so much since the latter date that the parameters used in the game are no longer valid. Examine Appendix A for a completed example.

HOUR {START} - Using the 24 hour clock, determine the start hour of the scenario; 7pm is 1900 hrs. Midnight is 0000 hrs. Only the first two digits of the hour can be entered.

DAY {START} - Select the appropriate number from 1-31.

MONTH - Select the appropriate number from 1-12.

YEAR - Select the appropriate number from 0-55; i.e. 1900-1955.

DAWN - Determine the hour of daybreak. Enter a number between 3 and 10; i.e. it must be between 0300 and 1000 hrs.

DUSK - Select the hour of nightfall. Enter a number between 15 and 22; i.e. it must be between 1500 and 2200 hrs.

HOUR {FINISH} - Again using the 24 hour clock, select the end hour for the scenario.

DAY {FINISH} - This number measures the length of time the scenario will run for. A value of one indicates that the scenario will end on the day following its commencement. The range available is 1-9; i.e. the maximum scenario length is 10 days.

WEATHER FORECAST - This value is used to predict the probable change to the sector weather outlooks during the course of the scenario. 0= tendency to clearing, 1= tendency to maintain the status quo, 2= tendency to close in, 3= unpredictable.

Scenario Names {Menu 11}

This menu is optional and is intended for historical interest. Determine the names of the commanders of the Theatres and Naval Forces you have created and enter them in the appropriate locations.

Task Group Creation {Menu 8}

This routine is used to organize the carriers and ships already created into their various Task Groups and Task Forces. Examine Appendix A for a completed example. A maximum of 23 Task Groups can be assigned to each side for a total of 46. Prior to editing this routine, be sure you have set the <ALLY> line in the menu to (Y) if editing Allied Task Groups or (N) if editing Axis Task Groups.

FLAGSHIP - This entry is used to select the flagship for the Task Group. Use the arrow keys to cycle through the vessels allocated to the Task Group. They will be displayed in the box at the top of the screen, together with their ship type and the total number of vessels in the Task Group. Type (RET) once you have made your selection.

OBJECTIVE - Task Groups may have an objective assigned to them. It must be either a friendly or enemy land base. {Note that enemy Task Groups may only be assigned as an objective during the course of the game.} Enter 0 if no objective is to be assigned. Enter the value corresponding to the chosen land base if otherwise. Only Task Groups assigned Strike, Bombard, Refuel or Transport missions can be given an objective.

MISSION - There are 7 voluntary missions which can be given to Task Groups. Consult the Rules Manual for the definition and conditions of use for each. 0= strike, 1= support, 2= escort, 3= cover, 4= bombard, 5= transport, 6= refuel.

HEADING - Task Groups which have not been assigned an objective and which have strike or refuel missions must be given a directional heading. The standard compass rose pattern is used; i.e. 0=N, 1=NE etc.

ENDURANCE - This value determines the length of time the Task Group can remain at sea. It is measured in 'days steaming at 15 kts'. For example a Task Group with an endurance of 25 could steam around the map at 15kts for 25 days. Fuel consumption increases substantially at greater speeds; at 35 kts it is approximately 8 times as great. The maximum value is 31. The minimum value is 0. Note that Task Groups with an endurance of 5 or less will be reduced to a maximum speed of 10 knots until they have refueled. Task Groups with an endurance of 0 will be taken out of your control and returned to port. The refueling rules are explained in more detail in the Player's Manual.

TASK FORCE - All Task Groups must be assigned to one of four Task Forces; i.e. 0-3.

ADMIN - This value measures the degree of co-operation between the vessels within a Task Group. Ships accustomed to working together will have a rating of 1-3. Those new to each other's company or otherwise inexperienced will have a rating of 0.

REINFORCE - Task Groups which do not begin the scenario deployed on the map are reinforcements. They will arrive in their designated starting hex between 0000hrs and 0600 hrs on

their allocated day of arrival. Enter a day of arrival between 1-9. Task Groups not intended as reinforcements are given a value of 0.

TASK FORCE COMMAND - Yes or No. This indicates which Task Group within a Task Force contains the Fleet Flagship. It is, in fact, the residence of the player {human or otherwise} commanding that particular Task Force. The loss of the Fleet Flagship {or any flagship for that matter} will have a serious effect for the remainder of the scenario. The Task Group 'Admin' value is reduced to zero. Should a Task Force command group be wiped out, a new group will be selected to replace it.

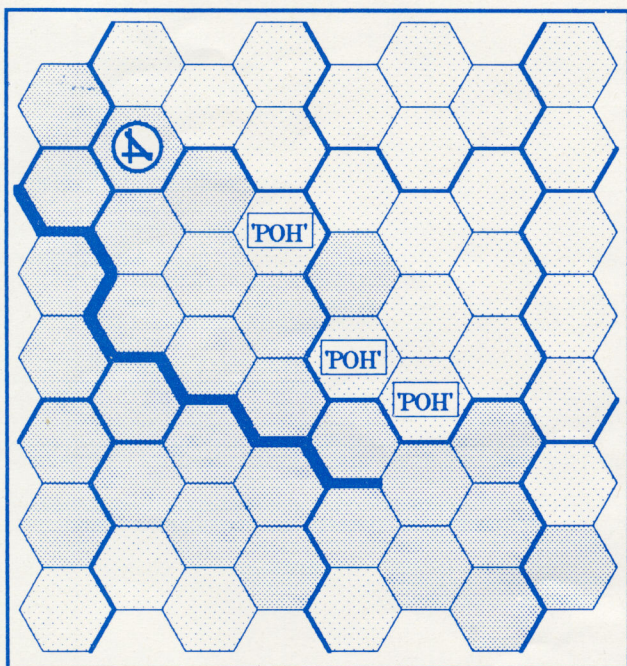
START AREA - To allocate a Start Area type (Y) to recover the Strategic Map, then use the procedure for deploying submarines to position the Task Group.

SEARCH PATTERN - Search bearings, if any, are entered in a manner identical to that used in the Base Creation routine.

8. COOPERATING WITH THE COMPUTER

The purpose of this section is to provide the information necessary to minimize the problems which may arise as you develop an original scenario. Our main concern is with the map. There are no hard and fast rules to follow, simply a few precautions.

(i) **Prohibited Ocean Hexes.** Any ocean hex which will border 4 or more land and/or base hexes should be designated a 'POH' unless there are 2 non-adjacent ocean hexes also adjacent to it. See the accompanying diagram for an example. In addition, it is often preferable to define a navigable passage through areas with extensive impassable reefs and/or land hexes. The Louisiade Archipelago in Battle Map B is one such example.



The above example shows three of the prohibited ocean hexes on the Coral Sea map.

(ii) **The Centre Hex-Block.** It is preferable, though not essential, to keep the centre hex-block {14,12} free of land hexes and reef hex-sides. Furthermore, large land masses are less likely to pose potential navigational hazards if they are more or less positioned around the edges of the map. Please note that, in general, land mass problems are most unlikely to occur while the ratio of land to ocean hexes is less than 1 to 3.

(iii) **Start Times.** It is advisable to begin a scenario between nightfall and 2300 hours. The reason for this is that the game begins with all aircraft in the dispersed station. To start a scenario during daylight would mean a period of several hours before a proper search pattern could be mounted. At midnight, computer controlled forces analyse the current situation and determine their strike plans for the following day. Note that the presence of enemy naval forces may alter these plans.

(iv) **The Reason for the Battle.** When designing a scenario {especially if it's hypothetical}, it is important to include a specific objective for at least one of the belligerents. The most suitable is an invasion site. Historically, as well as in this game, it is very difficult to force an outnumbered opponent to fight unless there is an additional consideration there to influence him.

(v) **Plane Numbers and Squadron Size.** Each squadron may contain a maximum of 63 aircraft. This fixes the absolute maximum for aircraft numbers to 7,938 since there are only 126 squadrons for allocation. However, the data base contains memory locations for only 1010 aircraft. In scenarios where this number is exceeded, the computer will organize aircraft into multiples of 2 to 8 depending upon the number of aircraft.

Of the six historical scenarios provided, only in the Battle of the Philippine Sea is the multiple other than one. Note that the number of aircraft listed for each squadron will be correct. It is only in the computer's handling of them that a difference occurs.

Our experience is that multiples of 2 or 3 work just as well as single aircraft. Multiples of 6 to 8 are a bit peculiar, especially in regard to searching.

(vi) **Task Group Organization.** By now you have probably recognised that the organization of your Task Groups and Forces has a significant effect on their performance whether human or computer controlled. For example, cover missions can be particularly useful in screening more valuable ships from both surface and air forces.

The information presented here is a guide to the computer's naval strategy and planning. It's probably a good idea to read this section in conjunction with the naval operations notes in the Player's Manual.

Carrier groups are considered either offensive or defensive. The more carriers, the more likely the group will assume an aggressive role. The need to support an invasion is also likely to encourage a bold strategy. National morale is taken into account; fanatic forces may well show more guts than good sense.

Offensive carrier groups will tend to take the fight to you, defensive groups to manoeuvre into a position to launch counter-attacks at embarrassing moments.

The mission given to a Task Force's command group is important. Carrier groups subordinate to a command group with a transport mission will be very reluctant to abandon their responsibility, no matter what the bait.

How you construct Task groups when designing a scenario is, of course, up to you. Please be aware that you may well find it necessary to experiment a little before coming up with the organization best suited to simulating the prevailing conditions.

(vii) **Error checking.** The creation routines are for the most part *not* self-checking. There was no room left on the disk for

that. Note that you can not enter illegal numbers, nor create more units than are allowed.

However, the computer can not stop you from starting a task group in the middle of the jungle so you will have to be a bit careful when entering data.

Any squadron not allocated to a carrier or base will be flagged prior to starting the game, giving you a chance to re-enter the creation routines and fix up the problem.

(viii) **Balancing a Scenario.** The computer takes no account of the equality, or otherwise, of the contending forces when allocating points for the destruction of ships and aircraft. Note that more points are conceded for the loss of aircraft with good crews than poor ones. Points awarded for the destruction of ships are based solely on ship characteristics. The invasion multiple variable in the Scenario Briefing Utility allows some flexibility in weighting the importance of amphibious operations.

In those scenarios where one side is up against hopeless odds, it becomes necessary to establish a points margin which the superior force must attain in order to earn a victory. Other conditions can also be attached to the victory criteria.

The *Battle of the Philippine Sea* scenario is a good example. Not only must the US forces achieve a substantial points superiority, they also can not afford to lose a single fleet carrier. Similarly with the *Midway* scenario. Here it is the Japanese who must overcome a considerable points handicap before they can earn a victory.

It can be very useful to allow the computer to 'test' a newly created scenario several times before deciding if any sort of handicap is necessary. If one is, it is also advisable to keep such information from other players who intend to use it. That's not to say you shouldn't give them some information. A short, written intelligence report giving a rough estimate of enemy strength is an excellent introduction to a new scenario. It is also the only way to reflect the decisive advantage the Allies enjoyed from the deciphering of the Japanese Naval Codes.

All of this brings to mind a small omission in the 'Raid on Ceylon' scenario. The overwhelming strength of the Japanese forces makes a points penalty essential. To do as well as they did historically, and to achieve a victory in this scenario, the IJN must have a margin of 175 points at the end of the scenario. Furthermore, the scenario becomes an automatic Allied victory if the Japanese lose more fleet carriers than their opponents.

(ix) **Miscellaneous Matters.** The design of ships and aircraft is left to your discretion. Be aware that the game's mechanics are designed for 'historically' or 'realistically' evaluated forces. The creation and use of 'fantasy forces' is certain to produce some curious results. Don't say we didn't warn you.

9. ACKNOWLEDGEMENTS

In addition to the acknowledgements listed on the album, there are several more people whose contribution has been of great assistance. Mark Watson, David Freer, Andrew Taubman and Gregor Whiley have found countless bugs between them, including such esoteric ones as the Port Moresby airbase sneaking inland in the middle of the night and the belt armour values being implemented the wrong way around so that destroyers became almost impossible to sink while the *Yamato* would go under at the drop of a hat.

Lisa Eugenides has been kind enough to proof read our manuscripts and offer many valuable suggestions. Ken Trout has given his slow-witted son much useful advice on typesetting, all of which, unfortunately, was not taken.

Our other Lisa, Apple's wondrous machine, has been invaluable. In fact, without it, the game would have been impossible to complete.

Finally, we would most especially like to thank Craig Taylor for his 'Flat Top' game. It's a bit aged now but nonetheless a splendid achievement. Without it, neither of us would have a clue where the Solomon's are.

Roger Keating
Ian Trout

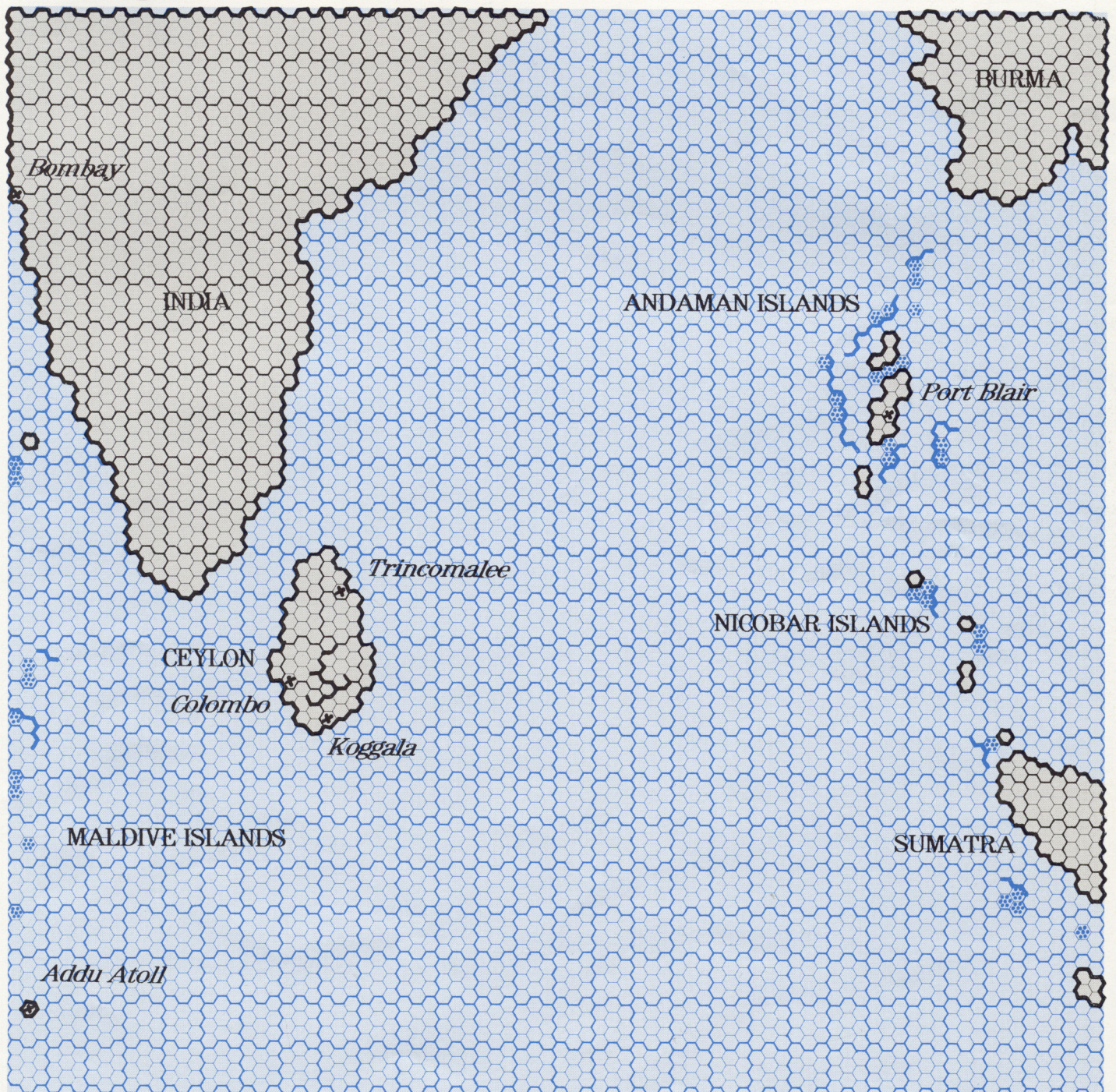
Sydney.
October, 1984.



APPENDIX A

The 'Raid on Ceylon' Scenario

The Map



SCENARIO 7
Raid on Ceylon
 3-8 April, 1942

CW BASES - Colombo (Ratmalana and Racecourse), Trincomalee (China Bay), Koggala, Addu Atoll, Bombay
IJN BASES - Port Blair

Appendix A

Ship Classes (cont)

SHIP CLASS #	0-63	33	34	35	36	37	38	39	40
SHIP CLASS NAME	(B)	DC 1912B	CA 1937	CL 1921	CL 1923	DO 1927	DO 1935	DO 1936	DO 1936
ALLIED	Y/N	N	N	N	N	N	N	N	N
SEAPLANE	Y/N	Y	Y	N	N	N	N	N	N
SHIP TYPE	0-4	1	1	2	2	2	2	2	2
MAXIMUM SPEED	0-45	30	35	36	35	34	34	35	35
DISPLACEMENT	0-31	15	6	2	3	1	1	1	1
HEAVY AA	0-31	4	8	1	1	6	5	6	6
LIGHT AA	0-31	3	2	1	1	1	1	1	1
ARMOUR	0-15	8	6	3	3	0	0	0	0
PRIMARY GUNS	0-15	8	8	0	0	0	0	0	0
SECONDARY GUNS	0-15	14	4	4	4	3	3	3	3
TORPEDO TUBES	0-15	0	12	8	8	9	6	8	8
VULNERABILITY	0-7	4	4	2	3	3	4	4	5
ANTI-SUBMARINE	0-7	0	0	0	0	2	1	2	2
TORPEDO LOADS	0-3	0	2	2	2	1	2	2	2

SHIP CLASS #	0-63	41	42	43
SHIP CLASS NAME	(B)	SS 1934	CA 1930	CA 1934
ALLIED	Y/N	N	N	N
SEAPLANE	Y/N	N	Y	Y
SHIP TYPE	0-4	3	1	1
MAXIMUM SPEED	0-45	23	34	35
DISPLACEMENT	0-31	1	6	6
HEAVY AA	0-31	1	8	8
LIGHT AA	0-31	1	2	2
ARMOUR	0-15	1	5	6
PRIMARY GUNS	0-15	0	10	10
SECONDARY GUNS	0-15	0	4	4
TORPEDO TUBES	0-15	6	15	12
VULNERABILITY	0-7	3	4	3
ANTI-SUBMARINE	0-7	0	0	0
TORPEDO LOADS	0-3	2	2	2

Task Groups (Axis)

TASK GROUP (AXIS)	1-23	1	2	3	4
FLAGSHIP	(-)	AKAGI	BC 1	CL 8	CA 12
TOTAL SHIPS	(-)	5	6	12	3
OBJECTIVE	0-23	1	0	0	0
MISSION	0-7	0	2	2	0
HEADING	0-7	6	6	6	7
ENDURANCE	0-31	24	24	12	20
TASK FORCE #	0-3	0	0	0	1
TF ADMIN	0-3	2	2	2	2
REINFORCEMENT	0-9	0	0	0	0
TF COMMAND	Y/N	Y	N	N	Y
START AREA	Y (x,y)	55,60	55,60	55,60	74,37
SEARCH PATTERN	Y/N	N N S N NE N SM N E N W N SE N NW N	N Y S N NE N SM Y E N W N SE N NW Y	N N S N NE N SM N E N W N SE N NW N	N N S N NE N SM N E N W N SE N NW Y

TASK GROUP (AXIS)	1-23	5	6	7
FLAGSHIP	(-)	CA 13	CA 15	CL 14
TOTAL SHIPS	(-)	4	4	8
OBJECTIVE	0-23	0	0	0
MISSION	0-7	2	2	2
HEADING	0-7	7	7	7
ENDURANCE	0-31	16	16	10
TASK FORCE #	0-3	1	1	1
TF ADMIN	0-3	2	2	2
REINFORCEMENT	0-9	0	0	0
TF COMMAND	Y/N	N	N	N
START AREA	Y (x,y)	74,37	74,37	74,37
SEARCH PATTERN	Y/N	N N S N NE N SM N E N W Y SE N NW Y	N N S N NE N SM N E N W N SE N NW N	N N S N NE N SM N E N W N SE N NW N

Task Groups (Allied)

TASK GROUP (ALLIED)	0-23	1	2	3	4
FLAGSHIP	(-)	CA 56	BB 03	CL 66	BB 05
TOTAL SHIPS	(-)	2	3	8	14
OBJECTIVE	0-23	1	5	0	0
MISSION	0-7	0	0	2	3
HEADING	0-7	0	5	5	5
ENDURANCE	0-31	10	17	10	8
TASK FORCE #	0-3	0	0	0	0
TF ADMIN	0-3	1	1	0	0
REINFORCEMENT	0-9	0	0	0	0
TF COMMAND	Y/N	N	Y	N	N
START AREA	Y (x,y)	18,53	13,60	13,60	15,59
SEARCH PATTERN	Y/N	N N S N NE N SM N E N W N SE N NW N	N N S N NE Y SM N E Y W N SE Y NW N	N N S N NE N SM N E N W N SE N NW N	N N S N NE N SM N E N W N SE N NW N

TASK GROUP (ALLIED)	0-23	5	6	7	8
FLAGSHIP	(-)	HERMES	APC 1	ODR64	TR 2
TOTAL SHIPS	(-)	2	3	2	4
OBJECTIVE	0-23	3	0	0	6
MISSION	0-7	0	0	0	5
HEADING	0-7	0	0	0	5
ENDURANCE	0-31	12	0	0	25
TASK FORCE #	0-3	0	1	2	3
TF ADMIN	0-3	1	0	0	0
REINFORCEMENT	0-9	0	0	0	0
TF COMMAND	Y/N	N	Y	Y	Y
START AREA	Y (x,y)	25,54	21,44	25,38	44,1
SEARCH PATTERN	Y/N	N N S N NE Y SM N E Y W N SE Y NW N	N N S N NE N SM N E N W N SE N NW N	N N S N NE N SM N E N W N SE N NW N	N N S N NE N SM N E N W N SE N NW N

TASK GROUP (ALLIED)	1-23	9	10	11	12
FLAGSHIP	(-)	TR 14	TR 17	TR 10	TR 3
TOTAL SHIPS	(-)	4	3	2	2
OBJECTIVE	0-23	6	6	6	6
MISSION	0-7	5	5	5	5
HEADING	0-7	4	4	4	4
ENDURANCE	0-31	22	17	18	28
TASK FORCE #	0-3	3	3	3	3
TF ADMIN	0-3	0	0	0	0
REINFORCEMENT	0-9	0	0	0	0
TF COMMAND	Y/N	N	N	N	N
START AREA	Y (x,y)	32,22	30,15	33,10	24,28
SEARCH PATTERN	Y/N	N N S N NE N SM N E N W N SE N NW N	N N S N NE N SM N E N W N SE N NW N	N N S N NE N SM N E N W N SE N NW N	N N S N NE N SM N E N W N SE N NW N

TASK GROUP (ALLIED)	1-23	13	14	15	16
FLAGSHIP	(-)	TR 11	TR 12	TR 4	TR 5
TOTAL SHIPS	(-)	4	3	3	4
OBJECTIVE	0-23	6	6	6	6
MISSION	0-7	5	5	5	5
HEADING	0-7	5	4	5	5
ENDURANCE	0-31	15	12	14	21
TASK FORCE #	0-3	3	3	3	3
TF ADMIN	0-3	0	0	0	0
REINFORCEMENT	0-9	0	0	0	3
TF COMMAND	Y/N	N	N	N	N
START AREA	Y (x,y)	31,23	25,16	40,9	44,0
SEARCH PATTERN	Y/N	N N S N NE N SM N E N W N SE N NW N	N N S N NE N SM N E N W N SE N NW N	N N S N NE N SM N E N W N SE N NW N	N N S N NE N SM N E N W N SE N NW N

Appendix B

Land Bases

BASE #	0-23								
NAME	(11)								
LOCATION	(x,y)								
ASSIGNED SQUADRON	(10)								
HEAVY AA	0-31								
LIGHT AA	0-31								
SPOT NUMBER	0-31								
DAMAGE STATUS	0-15								
AIRSTRIP	0-7								
RADAR	0-7								
AA ACCURACY	0-3								
DAMAGE CONTROL	0-3								
THEATRE	0-1								
ALLIED	Y/N								
FIGHTER FAC.	Y/N								
BOMBER FAC.	Y/N								
PORT FACILITIES	Y/N								
SEARCH PATTERN	Y/N	N	S	N	S	N	S	N	S
		NE	SW	NE	SW	NE	SW	NE	SW
		E	W	E	W	E	W	E	W
		SE	NW	SE	NW	SE	NW	SE	NW

Carriers

CARRIER #	0-31								
CARRIER NAME	(11)								
AIR CAPACITY	1-127								
SHIP CLASS #	0-63								
TASK GROUP	0-23								
ASSIGNED SQUADRON	(5)								
SPOT NUMBER	0-31								
DAMAGE CONTROL	0-3								
DAMAGE STATUS	0-3								
RADAR	0-7								
AA ACCURACY	0-3								

Appendix B

Ship Classes

SHIP CLASS #	0-63								
SHIP CLASS NAME	(8)								
ALLIED	Y/N								
SEAPLANE	Y/N								
SHIP TYPE	0-4								
MAXIMUM SPEED	0-45								
DISPLACEMENT	0-31								
HEAVY AA	0-31								
LIGHT AA	0-31								
ARMOUR	0-15								
PRIMARY GUNS	0-15								
SECONDARY GUNS	0-15								
TORPEDO TUBES	0-15								
VULNERABILITY	0-7								
ANTI-SUBMARINE	0-7								
TORPEDO LOADS	0-3								

Other Ships

SHIP #	0-215								
PENNANT #	(5)								
SHIP CLASS #	0-63								
DAMAGE CONTROL	0-3								
DAMAGE STATUS	0-15								
CARGO	0-15								
RADAR	0-7								
AA ACCURACY	0-3								
TASK GROUP	0-23								
ASSIGN SUB PATROL	Y (x,y)								
SUBMARINE DEPTH	0-7								
SUBMARINE SPEED	0-7								
SEAPLANE SQUADRON	(1)								

Appendix B

Task Groups (Axis or Allied)

TASK GROUP	0-23								
FLAGSHIP	(-)								
TOTAL SHIPS	(-)								
OBJECTIVE	0-23								
MISSION	0-7								
HEADING	0-7								
ENDURANCE	0-31								
TASK FORCE #	0-3								
TF ADMIN	0-3								
REINFORCEMENT	0-9								
TF COMMAND	Y/N								
START AREA	Y (x,y)								
SEARCH PATTERN	Y/N	N	S	N	S	N	S	N	S
		NE	SW	NE	SW	NE	SW	NE	SW
		E	W	E	W	E	W	E	W
		SE	NW	SE	NW	SE	NW	SE	NW

APPENDIX C

Principal Naval Radar Systems in Use in the Second World War

UNITED STATES	RADAR VALUE
CXBE, SC-1	1
SF-1, SG	2
CXAM	3
CXAM-1, SC-2, SC-5, SM	4
SP	6
SK, SR	7

COMMONWEALTH	RADAR VALUE
267, 268, 272, 273, 285	2
277, 291	3
279	4
79Y	5
281	7

OTHER POWERS	RADAR VALUE
FuMO-22, FuMO-61 (Ge)	2
SF-1, SG (Sov. Un.)	
Type 2, Mk 1 (Japan)	3
FuMO-34 (Ge)	4
Type 2, Mk 2 (Japan)	
EC-3 (Italy)	6
SK (Sov. Un.)	7

Appendix D

Allied Aircraft

PLANE #	0-63													
TYPE	(5)	P-390	P-400	P-39H	P-39Q	P-63	B-17C	B-17E	B-17F	B-17G	B-29			
ROLE	0-2	0	0	0	0	0	1	1	1	1	1			
CREW	0-5	0	0	0	0	0	5	5	5	5	5			
RANGE (N,E,T)	0-31	3 5 6 3 5 6 2 4 5 3 5 6 1 4 5 5 11 16 4 12 15 6 11 17 5 11 15 14 18 20												
ALTIT (H,M,L)	0-3	2 3 3 3 2 3 3 3 3 3 3 3 3 3 2 3 3 2 3 3 2 3 3 2 3 3 2 2 3 2												
CRUISING SPEED	0-15	11	11	13	12	15	10	9	10	8	10			
BOMB LOAD	0-63	2	2	2	2	2	35	27	27	32	63			
CHAR (F,V,M,P)	0-7	3 4 5 4 3 3 5 4 3 3 5 3 4 5 4 5 5 3 3 0 2 5 4 0 3 5 4 0 3 6 6 0 2 5 7 0 4												
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
CARRIER	Y/N	N(Y)	N	N	N	N	N	N	N	N	N			
SEAPLANE	Y/N	N	N	N	N	N	N	N	N	N	N			
TORPEDO	Y/N	N	N	N	N	N	N	N	N	N	N			
NIGHT	Y/N	N	N	N	N	N	N	N	N	N	N			
ANTI-SUB	Y/N	N	N	N	N	N	N	N	N	N	N			

PLANE #	0-63													
TYPE	(5)	P-51B	P-51D	P-61B	P-47B	P-47D	P-47N	F4U-1	F4U-4	SB2U3	A-31			
ROLE	0-2	0	0	0	0	0	0	0	0	1	1			
CREW	0-5	0	0	2	0	0	0	0	0	1	1			
RANGE (N,E,T)	0-31	3 4 5 3 6 7 4 9 10 2 2 3 1 3 4 3 7 9 3 6 8 3 5 7 7 8 10 3 4 6												
ALTIT (H,M,L)	0-3	3 3 1 3 3 2 2 3 2 3 3 1 3 3 1 3 3 1 3 3 2 3 3 1 0 3 3 0 3 3												
CRUISING SPEED	0-15	15	15	14	15	15	13	8	9	7	10			
BOMB LOAD	0-63	4	4	22	0	2	7	7	7	4	5			
CHAR (F,V,M,P)	0-7	4 5 6 6 5 5 6 6 5 4 4 4 5 4 6 6 5 5 6 6 5 5 6 7 5 5 6 5 5 6 6 2 3 5 1 2 3 5 1												
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
CARRIER	Y/N	N	N	N	N	N	N	Y(N)	Y(N)	Y	N			
SEAPLANE	Y/N	N	N	N	N	N	N	N	N	N	N			
TORPEDO	Y/N	N	N	N	N	N	N	N	N	N	N			
NIGHT	Y/N	N	N	Y	N	N	N	N	N	N	N			
ANTI-SUB	Y/N	N	N	N	N	N	N	N	N	N	N			

PLANE #	0-63													
TYPE	(5)	F2A-3	PBY-4	PBY-5	PBY5A	B-24D	B-24J	PB4Y2	B-32	F7F-1	P-36A			
ROLE	0-2	0	2	2	2	1	1	2	1	0	0			
CREW	0-5	0	4	4	5	5	5	5	4	1	0			
RANGE (N,E,T)	0-31	3 6 7 15 19 24 17 22 26 14 18 24 6 14 18 7 10 16 6 16 20 4 9 13 3 5 8 3 3 4												
ALTIT (H,M,L)	0-3	2 3 3 3 0 3 3 0 1 3 0 3 3 2 3 2 1 3 2 0 2 3 2 3 2 3 3 2 2 3 3												
CRUISING SPEED	0-15	7	5	5	5	9	9	7	13	8	12			
BOMB LOAD	0-63	1	7	14	7	43	43	43	63	4	0			
CHAR (F,V,M,P)	0-7	4 3 5 3 2 2 0 0 3 2 0 0 3 2 0 0 5 5 0 2 6 5 0 2 5 3 0 1 5 5 0 4 7 6 5 6 3 2 6 2												
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
CARRIER	Y/N	Y	N	N	N	N	N	N	Y	N	N(Y)			
SEAPLANE	Y/N	N	Y	Y	N	N	N	N	N	N	N			
TORPEDO	Y/N	N	N	Y	Y	N	N	N	Y	N	N			
NIGHT	Y/N	N	Y	Y	Y	N	N	Y	N(Y)	N	N			
ANTI-SUB	Y/N	N	N(Y)	N(Y)	N(Y)	N	N	N(Y)	N	N	N			

PLANE #	0-63													
TYPE	(5)	P-38D	P-38H	P-38J	PV-1	B-26B	B-26G	PEM-5	NA-33	B-25B	B-25H			
ROLE	0-2	0	0	0	1	1	1	2	0	1	1			
CREW	0-5	0	0	0	3	4	4	5	1	3	3			
RANGE (N,E,T)	0-31	2 3 5 1 4 6 2 6 12 7 10 13 3 5 8 3 5 9 10 16 20 4 4 4 3 5 7 6 8 9												
ALTIT (H,M,L)	0-3	3 3 1 3 3 1 3 3 1 1 3 3 0 3 3 3 0 2 3 0 2 3 0 2 3 0 2 3 0 2 3												
CRUISING SPEED	0-15	13	13	13	7	11	9	7	7	11	10			
BOMB LOAD	0-63	7	11	11	10	16	18	27	0	18	10			
CHAR (F,V,M,P)	0-7	5 4 4 5 4 5 5 5 4 5 6 3 4 2 3 3 4 1 3 4 5 1 2 4 4 0 1 2 3 5 0 4 4 1 2 6 5 1 1												
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
CARRIER	Y/N	N	N	N	N	N	N	N	N	N	N			
SEAPLANE	Y/N	N	N	N	N	N	N	Y	N	N	N			
TORPEDO	Y/N	N	N	N	N	N(Y)	N	N	N	N(Y)	N			
NIGHT	Y/N	N	N	N	N	N	N	Y	N	N	N			
ANTI-SUB	Y/N	N	N	N	N(Y)	N	N	N	N	N	N			

PLANE #	0-63													
TYPE	(5)	SBO-5	TBO-1	F4F-3	F4F-4	FN-2	F6F-3	F6F-5	TBF1C	TBM-3	HUDD3A			
ROLE	0-2	1	1	0	0	0	0	0	1	1	1			
CREW	0-5	1	2	0	0	0	0	0	2	2	3			
RANGE (N,E,T)	0-31	6 7 10 3 6 7 6 6 7 3 5 7 3 6 7 4 7 9 4 6 9 7 9 12 7 9 12 7 10 12												
ALTIT (H,M,L)	0-3	0 3 3 0 2 3 3 3 2 2 3 2 2 3 2 3 3 3 3 2 0 3 3 0 3 3 1 3 3												
CRUISING SPEED	0-15	6	6	6	7	7	7	7	7	7	9			
BOMB LOAD	0-63	4	4	0	1	1	4	7	7	7	6			
CHAR (F,V,M,P)	0-7	3 4 4 1 1 3 3 0 4 4 6 3 5 4 5 3 5 4 5 5 4 2 4 4 1 4 4 4 1 2 3 3 1												
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
CARRIER	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N			
SEAPLANE	Y/N	N	N	N	N	N	N	N	N	N	N			
TORPEDO	Y/N	N	Y	N	N	N	N	N	Y	Y	N			
NIGHT	Y/N	N	N	N	N	N	N(Y)	N(Y)	N	N	N(Y)			
ANTI-SUB	Y/N	N	N	N	N	N	N	N	N	N	N(Y)			

PLANE #	0-63													
TYPE	(5)	BLEN	BFT 1	BFR F	BFR 6	MOS B	MOS F	SMD 1	ALBA	FUL 1	BARRA			
ROLE	0-2	1	1	0	0	1	0	1	1	1	0	1		
CREW	0-5	2	3	1	1(2)	1	1	1(2)	2	1	2			
RANGE (N,E,T)	0-31	5 7 8 8 10 13 5 5 7 4 5 7 4 7 8 5 7 8 5 6 8 4 5 6 3 3 4 5 7 7												
ALTIT (H,M,L)	0-3	0 3 3 0 2 3 1 3 3 0 1 3 3 3 1 2 3 3 0 1 3 0 3 3 1 3 3 0 2 3												
CRUISING SPEED	0-15	10	6	10	9	11	11	6	6	10	7			
BOMB LOAD	0-63	4	5	0	2	14	4	5	7	0	6			
CHAR (F,V,M,P)	0-7	3 3 2 1 3 3 3 1 6 4 4 2 4 4 3 2 0 2 4 5 6 3 5 5 1 1 4 0 1 2 4 0 6 3 4 2 1 4 4 0												
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
CARRIER	Y/N	N	N	N	N	N	N	N	Y	Y	Y			
SEAPLANE	Y/N	N	N	N	N	N	N	N	N	N	N			
TORPEDO	Y/N	N	Y	N	Y	N	N	Y	Y	N	Y			
NIGHT	Y/N	N	N	N(Y)	N	N(Y)	N(Y)	N	N	N	N			
ANTI-SUB	Y/N	N	N	N	N	N	N	N	N	N	N			

PLANE #	0-63													
TYPE	(5)	P-40E	P-40F	P-40N	SBC-4	SB2C1	SB2C4	A-20C	A-26B	A-20K	SBO-3			
ROLE	0-2	0	0	0	1	1	1	1	1	1	1			
CREW	0-5	0	0	0	1	1	1	2	2	2	1			
RANGE (N,E,T)	0-31	3 3 3 1 4 5 1 3 4 2 5 6 7 7 9 4 6 7 4 6 7 3 5 7 4 6 7 8 11												
ALTIT (H,M,L)	0-3	1 3 3 2 3 2 3 3 3 1 3 3 0 3 3 1 3 3 0 3 3 0 3 3 0 3 3 1 3 3												
CRUISING SPEED	0-15	12	13	13	6	7	7	11	12	11	7			
BOMB LOAD	0-63	0	2	2	4	4	4	7	6	20	7			
CHAR (F,V,M,P)	0-7	5 4 6 3 5 4 6 4 5 4 6 4 1 1 5 0 4 4 4 2 4 4 2 3 4 3 3 4 4 4 3 3 2 4 4 1												
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
CARRIER	Y/N	N(Y)	N(Y)	N	Y	Y	Y	N	N	N	Y			
SEAPLANE	Y/N	N	N	N	N	N	N	N	N	N	N			
TORPEDO	Y/N	N	N	N	N	N	N	N	N	N	N			
NIGHT	Y/N	N	N	N	N	N	N	N	N	N	N			
ANTI-SUB	Y/N	N	N	N	N	N	N	N	N	N	N			

PLANE #	0-63													
TYPE	(5)	FLY 1	HUR 2	TEMP	SUND	SP1T5	SP1T9	SEA 3	WELL	WIRRA	BOOM			
ROLE	0-2	0(2)	0	0	2	0	0	0	1	0(1)	0			
CREW	0-5	1	0	0	5	0	0	0	4	1	0			
RANGE (N,E,T)	0-31	3 6 7 1 3 5 3 5 6 10 18 22 1 2 3 1 3 4 2 3 5 7 10 12 2 3 4 6 6 9												
ALTIT (H,M,L)	0-3	1 3 3 3 2 3 2 3 3 3 1 3 3 0 2 3 3 3 3 1 2 3 3 0 2 3 0 2 3 3 2 3 3												
CRUISING SPEED	0-15	6	9	12	6	12	14	9	8	8	8			
BOMB LOAD	0-63	7	4	7	17	2	4	2	15	2	0			
CHAR (F,V,M,P)	0-7	4 3 5 3 4 3 5 3 4 5 6 5 4 0 5 4 0 5 4 6 5 5 4 5 3 3 4 1 0 2 2 4 0 5 3 5 3												
ALLIED	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
CARRIER	Y/N	Y	N(Y)	N	N	N(Y)	N	Y	Y	N	N			
SEAPLANE	Y/N	N	N	N	Y	N	N	N	N	N	N			
TORPEDO	Y/N	N	N	N	N	N	N	N	Y					

BIBLIOGRAPHY

- AGAWA, HIROYUKI. *The Reluctant Admiral. Yamamoto and the Imperial Navy*. Kodansha, Tokyo, 1979.
- ALDEN, JOHN D. *The Fleet Submarine in the US Navy*. Arms & Armour Press, London, 1979.
- ANGELUCCI, ENZO. *The Rand McNally Encyclopedia of Military Aircraft 1914-1980*. The Military Press, New York, 1981.
- BIRDSALL, STEVE. *B-29 Superfortress in Action*. Squadron/Signal, Carrollton, 1977.
- BIRDSALL, STEVE. *B-26 Marauder in Action*. Squadron/Signal, Carrollton, 1981.
- BLAIR, CLAY JR. *Silent Victory*. J. B. Lippincott, Philadelphia, 1975.
- CHESNEAU, ROGER. (ed.). *All the World's Fighting Ships 1922-1946*. Conway Maritime Press, London, 1980.
- CHRISTY, JOE & JEFF ETHELL. *P-40 Hawks at War*. Ian Allan, London, 1979.
- COLLIER, BASIL. *Japanese Aircraft of World War II*. Sidgwick & Jackson, London, 1979.
- DAVIS, LARRY. *B-17 in Action*. Squadron/Signal, Carrollton, 1984.
- DICKSON, W.D. *The Battle of the Philippine Sea*. Ian Allan, London, 1975.
- D'OLIER, FRANKLIN (et al). *Campaigns of the Pacific War*. (United States Strategic Bombing Survey, Pacific, Naval Analysis Division). Greenwood Press, New York, 1969.
- DULL, PAUL S. *A Battle History of the Imperial Japanese Navy (1941-1945)*. Naval Institute Press, Annapolis, 1978.
- DUNNIGAN, JAMES. (et al). *War in the Pacific*. Simulations Publications Inc, New York, 1977.
- ESPOSITO, VINCENT J. (ed.). *The West Point Atlas of the American Wars. Vol II 1900-1953*. Praeger, New York, 1972.
- FRANCILLION, RENE J. *Japanese Carrier Air Groups 1941-1945*. Osprey, London, 1979.
- FRANCILLION, RENE J. *US Navy Carrier Air Groups, Pacific 1941-1945*. Osprey, London, 1978.
- FRANCILLION, RENE J. *Japanese Aircraft of the Pacific War*. Putnam, London, 1979.
- FRANCILLION, RENE J. *US Army Air Forces in the Pacific*. Aero, Fallbrook, 1969.
- FRIEDMAN, NORMAN. *Naval Radar*. Conway Maritime Press, London, 1981.
- FRIEDMAN, NORMAN. *Carrier Air Power*. Conway Maritime Press, London, 1981.
- FRIEDMAN, NORMAN. *US Destroyers. An Illustrated Design History*. Arms & Armour Press, London, 1982.
- FRIEDMAN, NORMAN. *US Aircraft Carriers. An Illustrated Design History*. Arms & Armour Press, London, 1983.
- FUCHIDA, MITSUO & MASATAKE OKUMIYA. *Midway*. Naval Institute Press, Annapolis, 1983.
- GRIFFITH, SAMUEL B. *The Battle for Guadalcanal*. Nautical & Aviation, Annapolis, 1979.
- GRIGSBY, GARY. *Carrier Force*. Strategic Simulations Inc, Mountain View, 1984.
- GRIGSBY, GARY. *Guadalcanal Campaign*. Strategic Simulations Inc, Mountain View, 1982.
- HESS, WILLIAM N. *A-20 Boston at War*. Ian Allan, Shepperton, 1979.
- JENTSCHURA, HANSGEORG. (et al). *Warships of the Imperial Japanese Navy 1869-1945*. Arms & Armour Press, London, 1977.
- JONES, LLOYD S. *US Bombers. 1928-1980's*. Aero, Fallbrook, 1980.
- LENTON, H.T. & J.J. COLLEDGE. *Warships of World War II*. Ian Allan, London, 1973.
- MCDOWELL, ERNEST R. *B-25 Mitchell in Action*. Squadron/Signal, Carrollton, 1978.
- MENDENHALL, CHARLES A. *Deadly Duo. The B-25 and B-26 in World War II*. Speciality Press, Osceola, 1981.
- MESKO, JIM. *A-20 Havoc in Action*. Squadron/Signal, Carrollton, 1983.
- MUNDAY, ERIC. *USAAF Bomber Units, Pacific 1941-1945*. Osprey, London, 1979.
- MUNSON, KENNETH. *American Aircraft of World War 2*. Blandford, Poole, 1982.
- NOHARA, SHIGERU. *A6M Zero in Action*. Squadron/Signal, Carrollton, 1983.
- OKUMIYA, MASATAKE (et al). *The Zero Fighter*. Cassell, London, 1958.
- ROSCOE, THEODORE. *United States Destroyer Operations in World War II*. Naval Institute Press, Annapolis, 1972.
- ROSCOE, THEODORE. *United States Submarine Operations in World War II*. Naval Institute Press, Annapolis, 1979.
- SCARBOROUGH, W.E. *PBY Catalina in Action*. Squadron/Signal, Carrollton, 1983.
- SCUTTS, JERRY. *B-25 Mitchell at War*. Ian Allan, Shepperton, 1983.
- SILVERSTONE, PAUL H. *US Warships of World War 2*. Ian Allan, London, 1982.
- STAFFORD, GENE B. *P-38 Lightning in Action*. Squadron/Signal, Carrollton, 1976.
- STERN, ROBERT C. *US Subs in Action*. Squadron/Signal, Carrollton, 1979.
- STERN, ROBERT C. *SB2C Helldiver in Action*. Squadron/Signal, Carrollton, 1982.
- STERN, ROBERT C. *SBD Dauntless in Action*. Squadron/Signal, Carrollton, 1984.
- SULLIVAN, JIM. *F6F Hellcat in Action*. Squadron/Signal, Carrollton, 1979.
- SULLIVAN, JIM. *F4U Corsair in Action*. Squadron/Signal, Carrollton, 1977.
- TAYLOR, S. CRAIG. (et al). *Flat Top*. Battleline Publications, 1977.
- THORPE, DONALD W. *Japanese Naval Air Force Camouflage and Markings World War II*. Aero, Fallbrook, 1977.
- THORPE, DONALD W. *Japanese Army Air Force Camouflage and Markings World War II*. Aero, Fallbrook, 1979.
- TILLMAN, BARRETT. *The Wildcat in World War II*. Nautical & Aviation, 1983.
- WATTS, A.J. *Japanese Warships of World War II*. Ian Allan, London, 1974.
- WEAL, ELKE C. (et al). *Combat Aircraft of World War Two*. Arms & Armour Press, London, 1977.
- WOODBURN KIRBY, S. (et al). *The War Against Japan*. (History of the Second World War, vol. 2). HMSO, London, 1958.

CARRIERS AT WAR 1941-1945

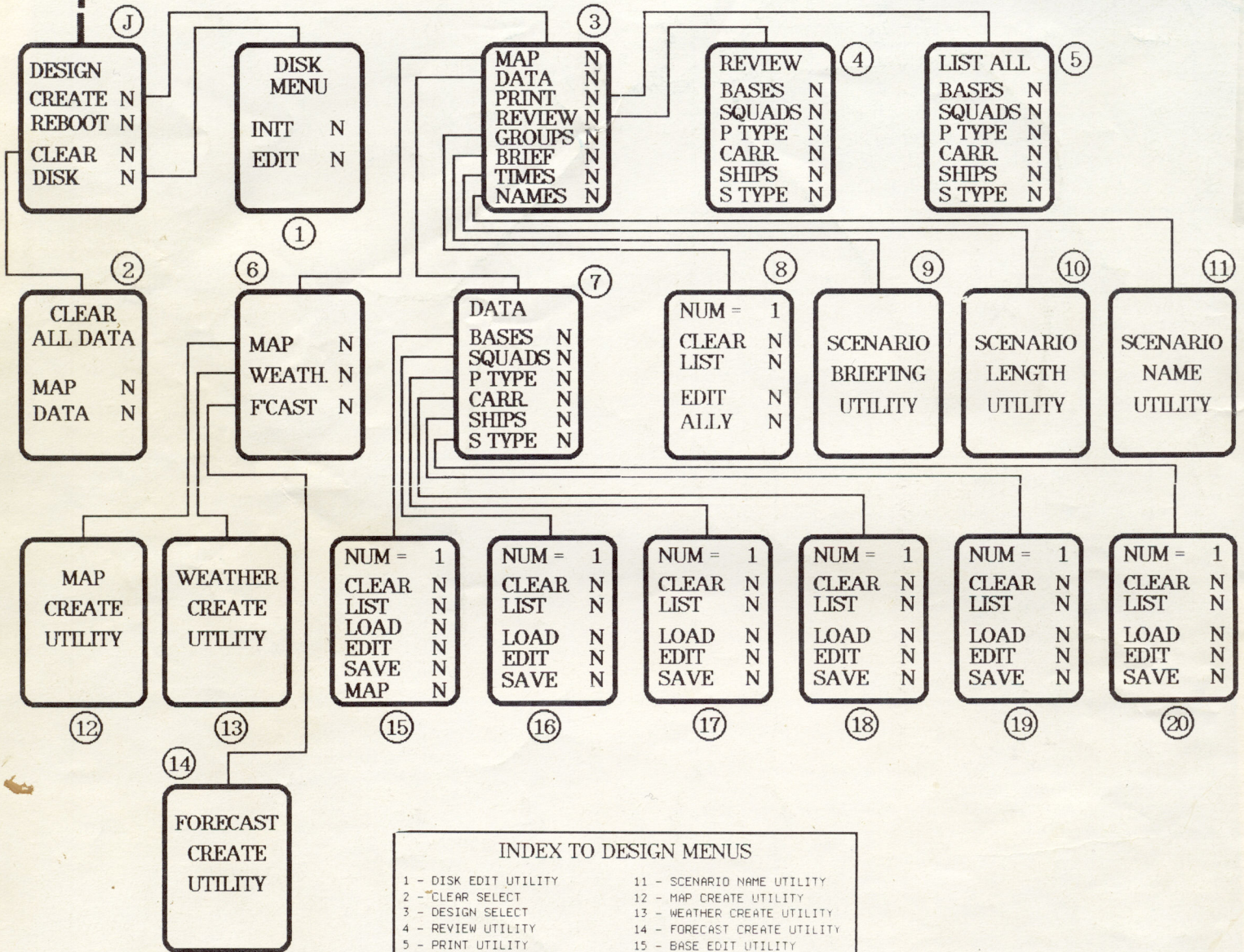
FLEET CARRIER OPERATIONS IN THE PACIFIC

FROM START MENUS

DESIGN KIT MENUS

KEY SUMMARY

To cycle within a menu, type (RET). To select from a menu, type (Y)(RET). To edit a menu, type (RET) to locate, then (#)(RET) or (Y)(RET) to select. To recover the previous menu, type (ESC). Note that the START MENU can not be recovered from the CREATE MENU; use the REBOOT option instead. To move the cursor on the Strategic Map, use the I, J, K, M keys. To move the cursor on the Tactical Map, use the I, J, K, M keys or the 1-6 keys.



INDEX TO DESIGN MENUS

1 - DISK EDIT UTILITY	11 - SCENARIO NAME UTILITY
2 - CLEAR SELECT	12 - MAP CREATE UTILITY
3 - DESIGN SELECT	13 - WEATHER CREATE UTILITY
4 - REVIEW UTILITY	14 - FORECAST CREATE UTILITY
5 - PRINT UTILITY	15 - BASE EDIT UTILITY
6 - MAP SELECT	16 - SQUADRON EDIT UTILITY
7 - DATA SELECT	17 - PLANE TYPE EDIT UTILITY
8 - TASK GROUP EDIT UTILITY	18 - CARRIER EDIT UTILITY
9 - SCENARIO BRIEFING UTILITY	19 - OTHER SHIPS EDIT UTILITY
10 - SCENARIO LENGTH UTILITY	20 - SHIP CLASS EDIT UTILITY

