RULE THE WAVES II

GAME PLAY MANUAL AND NOTES
COPYRIGHT © 2019, 2020 Naval Warfare Simulations
VERSION 1.16

INTRODUCTION TO '*RULE THE WAVES II*'

Rule the Waves II places you in the role of 'Grand Admiral' of one of the great navies during the first half of the 20th Century. In the game you will be able to design and build your own ships, and lead them in battle against your nation's enemies. Politics and economic and foreign policy decisions also play a part as you guide your navy's deployment, construction and operations during a period of great technological innovation and political tensions.

Rule the Waves II is modeled on the period from 1900 up to the end of the Second World War, and creates an alternative history where you are in charge of design and procurement of the ships of one of the leading Naval powers in the 20th century.

Rule the Waves II includes aircraft and aircraft carrying ships such as floatplane carriers and aircraft carriers.

Rule the Waves II is not a simple game, and it covers a complex subject. Some grasp of 20th century naval warfare and warships is recommended for the player to be able to enjoy the game.

Overview

Rule the Waves II has a strategic level with one month turns that covers things like shipbuilding and strategic level events. When wars break out there may be naval battles, which are played out on a tactical level where you maneuver your ships and led them to victory against the enemy. This manual is organized in sections describing the strategic level, how to build your ships and tactical battles.

It is recommended for new players that you read the sections up to "Aircraft". You can then start your first game in 1900 and play along until you get to 1920 before you have to worry about aircraft. This will give you an opportunity to get the hang of surface battles before you start learning about the aerial dimension.

Many tips and useful discussions about RTW2 can be found in the game forum at http://nws-online.proboards.com/board/27/rule-waves-2.

The strategic level

The strategic turn

The strategic turns in the game represent one month of time.

During the strategic turn, the player will receive notifications about political or technological events. The player will sometimes be able to react to these events in various ways that will affect the game.

The player will manage his fleet and design and order new ships.

When the player is finished, pressing the turn button will advance to the next month.

If there is a state of war, there may be naval battles that are resolved after the strategic turn.

Areas and possessions

The world is divided into areas. In each area there are a number of possessions that can be controlled by one of the player nations. In some cases they can also be neutral. The possessions have naval bases and can have coastal artillery or other defences. The base values and fortifications of possessions can be improved by the player.
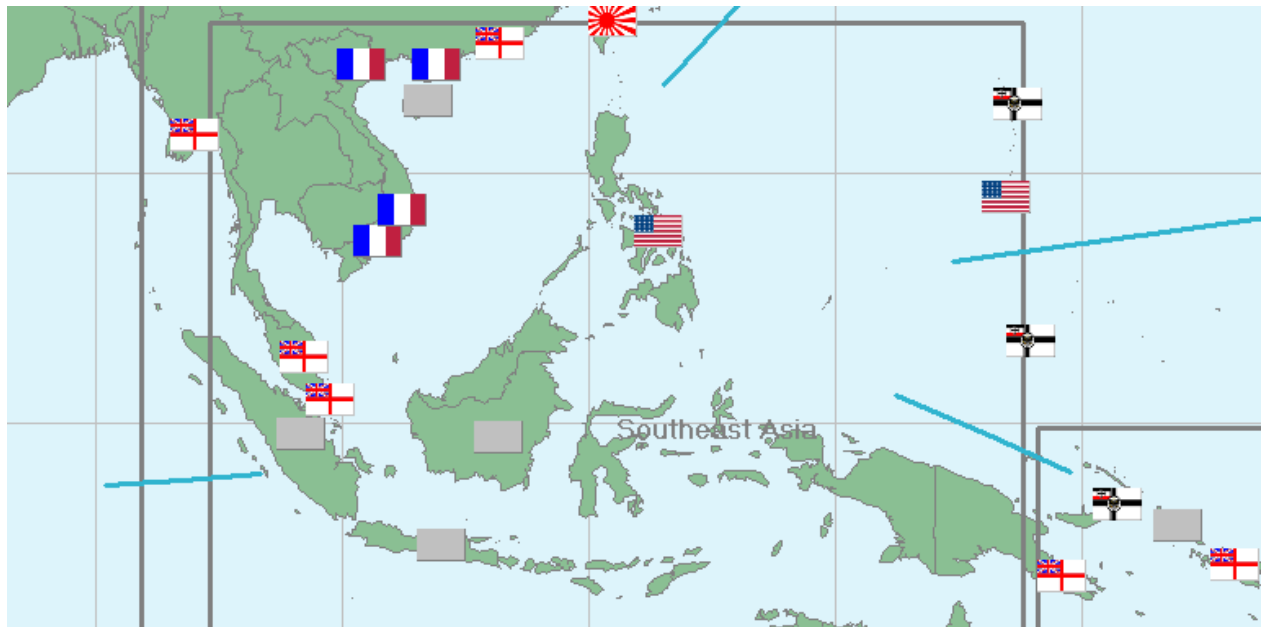
A section of the strategic map showing the area of Southeast Asia and great power possessions marked by flags.

Possessions can change hands, most often as a result of peace treaties. In some cases possessions can be transferred in other ways as a result of events. This represents for example the seizure of Ottoman territory by Italy in 1912 or the sale of the Danish West Indies to the USA. If a player nation acquires new possessions in an area where other nations are preeminent

this will probably increase tension.

The possession value is used when calculating the budget effect of acquiring or losing possessions. The budget effect of possessions is relatively limited compared to the rest of income. Income from colonies will slowly decline over time.

Possession with a value over ten cannot change owner.

Some possessions have oil, and access to oil fuel is necessary to build oil fuelled ships before 1920. After that, oil extraction and trade is assumed to have spread so that all nations can gain access to oil. Before 1920, oil might be randomly discovered in new places.

To view possessions and areas in the game, select the game map. There will be flags for the various possessions to show ownership. Grey flags represent neutral possessions. Areas will be shown by grey rectangles with blue lines to show movement routes between areas.

Clicking a possession flag will bring up a details window with options for building bases etc.

There is also a base overview tab in the main window. Here you can find a list of all your possessions. You can right click a possession or a base to build naval bases or airfields.

The Budget

You will have a yearly naval budget at your disposition. The budget is a function of the base resources of the nation, incomes from colonies and the proportion of expenditures devoted to the navy. All of these can vary as an effect of events in the game.

The base resources will increase as a result of wars won, and decrease when wars are lost. Loss or gain of possessions will also affect the resources available. The base resources will also increase steadily at about 3-5% a year as a result of economic growth.

The naval budget percentage will vary with various events and your response to them (see Events). In general it will tend to rise in times of high tension and be low in periods of low tension.

Your yearly budget will be divided into monthly payments to the navy. Running out of funds is not a good idea, and will tend to upset the finance ministry and lower your prestige. You can run up a surplus and save money for future expenses or for building that super battleship. Be aware however that if you have substantial funds in your coffers, the Kaiser, Prime Minister or the finance ministry might find a use for some of those funds.

The ships in your navy

In the main screen, in the ships in service tab, there will be a list of all the ships in your navy. RTW2 uses abbreviations for ship types according to the following list.

BB Dreadnought Battleship

BC Battlecruiser

B Predreadnought Battleship

CA Armoured Cruiser or Heavy cruiser after 1920

CL Light Cruiser

CV Aircraft carrier

CVL Light aircraft carrier

DD Destroyer

KE Corvettes (used to represent a variety of small surface combatants)

TR Transport or merchant ship

AMC Armed Merchant Cruiser

AV Seaplane carrier

SS Submarine

SSC Coastal submarine

SSM Minelaying submarine

LT Land target

Map	Ships in service	Ships under construction	Submarines	Coastal fortifications	Ships sunk	Area overview	Base overview					

Type	Name	Class	Displacement	Spee...	Ra...	ASW	Year	Location	Status	Crew q...	Mainte...	Description
B	Yashima	Yashima (R 1904)	14 500	19	-	0	1899	Northeast Asia	AF	Good	330	Guns: 4 x 12, 12 x 6, 2 TT
B	Asahi	Yashima (R 1904)	14 500	19	-	0	1899	Northeast Asia	AF	Fair	330	Guns: 4 x 12, 12 x 6, 2 TT
B	Fuji	Yashima	14 500	19	-	0	1899	Northeast Asia	AF	Good	345	Guns: 4 x 12, 12 x 6, 2 TT
B	Mikasa	Yashima	14 500	19	-	0	1899	Northeast Asia	2	Good	460	Guns: 4 x 12, 12 x 6, 2 TT
B	Iki	Yashima	14 500	19	-	0	1902	Northeast Asia	AF	Good	345	Guns: 4 x 12, 12 x 6, 2 TT
CA	Asama	Asama	10 000	23	-	0	1901	Northeast Asia	AF	Elite	382	Guns: 4 x 9, 8 x 5, 2 TT
CL	Naniwa	Naniwa	3 400	21	-	0	1899	Southeast Asia	AF	Good	99	Guns: 10 x 4, 4 x 3, 2 TT
CL	Izumi	Izumi	4 200	22	-	0	1904	Northeast Asia	R	Good	126	Guns: 10 x 5, 4 x 3, 2 TT
CL	Unebi	Unebi	4 600	23	-	0	1904	Northeast Asia	AF	Good	152	Guns: 10 x 5, 4 x 3, 2 TT
CL	Takachiho	Unebi	4 600	23	-	0	1904	Northeast Asia	AF	Good	152	Guns: 10 x 5, 4 x 3, 2 TT
DD	Akikaze	Akikaze	500	28	-	3	1899	Southeast Asia	FS	Fair	15	Guns: 2 x 2, 3 TT
DD	Hakaze	Akikaze	500	28	-	3	1899	Southeast Asia	TP	Fair	15	Guns: 2 x 2, 3 TT
DD	Nokaze	Akikaze	500	28	-	3	1899	Southeast Asia	TP	Fair	15	Guns: 2 x 2, 3 TT
DD	Hokaze	Akikaze	500	28	-	3	1899	Southeast Asia	TP	Fair	15	Guns: 2 x 2, 3 TT
DD	Okikaze	Akikaze	500	28	-	3	1899	Northeast Asia	AF	Good	15	Guns: 2 x 2, 3 TT
DD	Namikaze	Akikaze	500	28	-	3	1899	Northeast Asia	AF	Good	15	Guns: 2 x 2, 3 TT
DD	Sawakaze	Akikaze	500	28	-	3	1899	Northeast Asia	AF	Good	15	Guns: 2 x 2, 3 TT
DD	Numakaze	Numakaze	400	27 Sa	-	3	1899	Northeast Asia	AF	Elite	12	Guns: 1 x 3, 4 x 2, 2 TT
DD	Tachikaze	Numakaze	400	27 Sa	-	3	1899	Northeast Asia	AF	Elite	12	Guns: 1 x 3, 4 x 2, 2 TT
DD	Shimakaze	Numakaze	400	27 Sa	-	3	1899	Northeast Asia	AF	Good	12	Guns: 1 x 3, 4 x 2, 2 TT
DD	Shiokaze	Numakaze	400	27 Sa	-	3	1899	Northeast Asia	AF	Good	12	Guns: 1 x 3, 4 x 2, 2 TT
DD	Yakaze	Numakaze	400	27 Sa	-	3	1899	Northeast Asia	AF	Good	12	Guns: 1 x 3, 4 x 2, 2 TT
DD	Hatakaze	Numakaze	400	27 Sa	-	3	1899	Northeast Asia	AF	Good	12	Guns: 1 x 3, 4 x 2, 2 TT
DD	Harukaze	Harukaze	600	30 Sa	-	4	1904	Northeast Asia	AF	Good	20	Guns: 2 x 3, 2 x 2, 3 TT
DD	Yukaze	Harukaze	600	30 Sa	-	4	1904	Northeast Asia	AF	Good	20	Guns: 2 x 3, 2 x 2, 3 TT
DD	Asakaze	Harukaze	600	30 Sa	-	4	1904	Northeast Asia	AF	Good	20	Guns: 2 x 3, 2 x 2, 3 TT
DD	Asanagi	Harukaze	600	30 Sa	-	4	1904	Northeast Asia	AF	Good	20	Guns: 2 x 3, 2 x 2, 3 TT
DD	Kamikaze	Harukaze	600	30 Sa	-	4	1904	Northeast Asia	AF	Good	20	Guns: 2 x 3, 2 x 2, 3 TT
KE	Kongo Maru	Kongo Maru	400	18	-	1 ms	1905	Northeast Asia	TP	Fair	9	Guns: 1 x 3

The Ship list

Explanations for abbreviations used in the ship list:

Speed: After the speed in knots there will sometimes be letters denoting:
L = Long range
S = Short range

c = Equipped for colonial service
a = Cramped accommodation

Status:
AF = Active fleet
RF = Reserve Fleet
MB = Mothballed
R = Raider
FS = On foreign station
TP = Trade protection
A number means the ship is in repair for that number of months
* after the status means the ship needs maintenance and should return to an area with sufficient base capacity.

Ships are deployed in an area, either a home area or on a foreign station.

The number of ships that can be deployed in an area is dependent on the base value of the area. The number can be exceeded, but this may cause ships to suffer from maintenance problems and reduced crew quality. If a nation has no bases in an area, only a very limited number of ships can be deployed, representing single cruisers and the like that coal at bases of friendly or neutral nations.

Nations are required to have a minimum naval presence in each area where they have possessions. This is expressed as a tonnage required in each area, and is dependent on the number and value of the possessions owned by the nation. Only active ships count for the purpose of calculating the naval presence in an area. If the required number is not met, player prestige may suffer and it might even lead to revolts in the affected areas.

Note that you may want to keep more ships than required on foreign stations to be sure of having an adequate force if war should come.

During wartime, the deployment requirements are not enforced if you are under blockade.

Fulfilling the requirements for ships at foreign stations can be done either manually by moving ships to the relevant areas, or by simply assigning them to Foreign Service status, whereupon the AI will move the ship to a suitable area. The latter way is quicker if you need to fulfil sudden foreign service requirements quickly, for example after acquiring territory in a war. It is also useful if you don't want to bother with the minutiae of moving ships around to foreign postings.

To move ships from an area, select one or more ships in the ships in service list and right click, select move ship from the drop down menu. This will bring up a screen where you can select

which ships to move and where.

There is also a key shortcut for moving ships easily. Pressing M in the main window ships in service screen will bring up a menu with all the map areas. Clicking an area in the list will set the destination of all selected ships to that area, regardless of current location.
There are also a few other useful key shortcuts for selected ships: C > cancel move, A > active, T > Trade protection, F > Foreign station.

Movement

Ships can move to adjacent areas in one strategic turn (one month). You can give orders for ships to move to an area farther away, the ships will then plot their own course to their final destination.

Only ships present in an area can take part in battles there. Ships will execute their move before battles take place, so a moving ship will be present in the next destination area for battle purposes.

Short range ships cannot move strategically during wartime. This is an important consideration to keep in mind when designing ships.

If a nation is blockaded, ships are not allowed to move out of the home port unless as raiders, and these may be intercepted by the blockading nation.

Maintenance and readiness

Ships in commission can be put in varying states of readiness, which will affect their maintenance costs, but also their readiness for war.

<u>Active Fleet</u> Ships in the active fleet have the best trained crews and are immediately available for service.

<u>Reserve Fleet</u> Ships in the reserve fleet are manned by reservists and are not trained to the same standard as the active fleet.

<u>Mothballed</u> Ships that are mothballed have poorly trained crews that will take considerable time to get to full effectiveness.

<u>Working up</u> New ships will be placed in "Working up" status until they have decent crew quality, at which point they will automatically be placed in the active fleet. Working up status can be changed by the player to another status, for example if you are desperate to get that new ship in service. Ships in working up status will not take part in battles.

Ships under repair will always cost 1½ times the active maintenance cost, regardless of their status. This is to reflect the cost of making the repairs. In some situations it might not be worth the cost to repair an old ship, and it might be an attractive option to scrap it instead.

In wartime, maintenance costs will rise sharply.

To select the status of your ships, select one or more ships and right click. In the popup menu that appears, there will be choices of Active, Reserve and Mothballed.

Doctrine and Training

In the doctrine screen you can set a number of basic doctrines or operating practices for your fleet. If you do not want to bother with these, you can safely leave them at their default settings. Once you gain some experience in the game, you might want to experiment with these settings.

You have the option of setting special training for your crews. Each special training subject selected will increase maintenance cost for your ships. It takes 12 months to achieve proficiency in an area. You have to keep on spending on training to keep the benefits. The benefits disappear immediately upon stopping spending on that type of training. The different kinds of training are:

Gunnery: Gunnery training will give your ships 10% better accuracy when firing guns. It will cause maintenance costs to be 30% higher.

Night fighting: This will give your ships a bonus when spotting enemy ships at night, and less chance of hesitating before opening fire at night. It also gives a 10% accuracy bonus at night. 20% increase in maintenance.

Torpedo tactics: This will make your light forces more alert when carrying out torpedo attacks, quicker to react on flotilla attack orders and give better hit chances when firing torpedoes. 20% increase in maintenance.

You can select a maximum of two special training subjects.

You can also decide if you want your navy to use some equipment that have both advantages and disadvantages, like diving shells or oxygen fuelled torpedoes. This equipment has to be researched first to be used, of course.

The player can also determine on general rules about what type of ammunition to use at different ranges and targets. Depending on the state of your technological research, some ammunition choices may be more attractive.

Armour piercing shells (AP) should be used against heavily armoured ships. The penetrate armour and will explode inside the target. However, they have smaller explosive charges and will cause less damage than a high explosive shell.

High explosive shells (HE) are not good at penetrating armour, but does cause lots of damage against unarmoured ships or unarmoured parts of enemy ships. They also have a higher chance of causing fires.

<u>Semi armour piercing (SAP)</u> is a kind of in between HE and AP.

Canals and other choke points

There are two canals in the game, the Suez canal and the Panama canal. The Suez canal is operational at the start of the game, and is controlled by the nation owning Egypt (Britain at the start of the game). The Panama Canal will become operational in 1914, and is controlled by the player owning Panama (the USA at the start of the game).

Movement through canals is normally possible for other nations than the owning nation. During wartime, canals will be blocked for players at war with the owner, or if the tension level with the owner is 7 or higher.

Research

You define a portion of your budget up to a maximum of 12% as spent on research. There is a diminishing return on higher values, so while 12% is more effective than 6%, it is not twice as effective.

There are a number of different research areas, from battleship projectiles to submarine technology and a lot in between. In the research menu, you can shift priorities between different research areas.
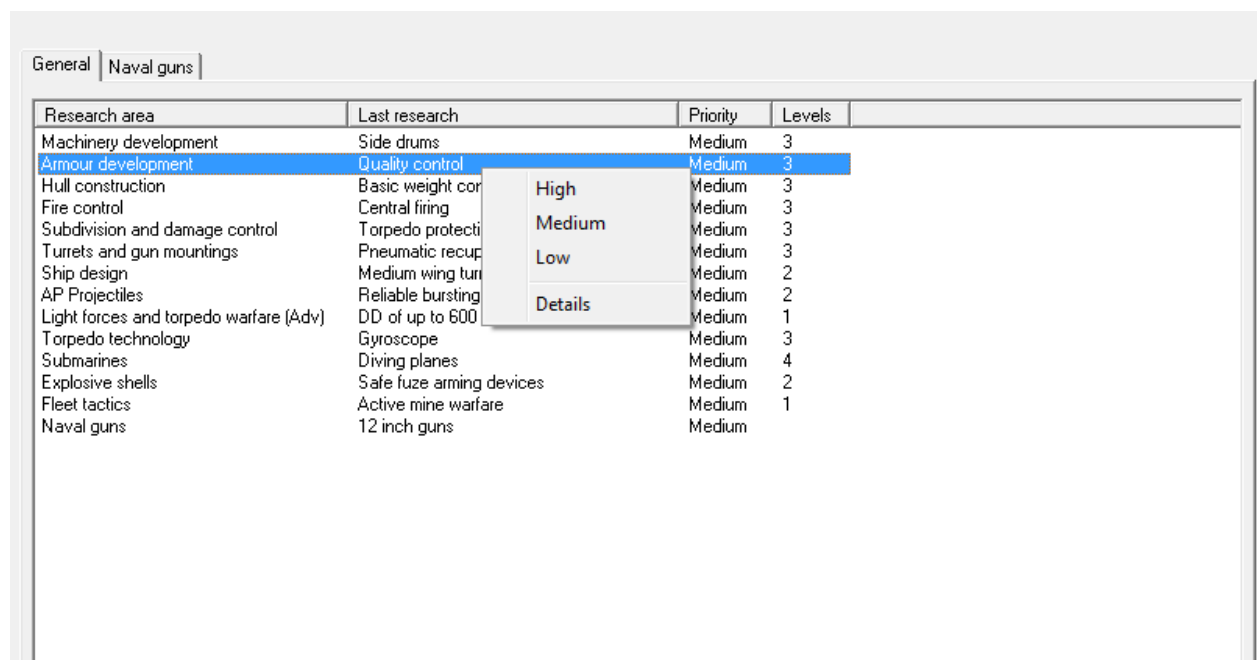
The research screen

Right click a research area in the research screen to change priority.

Note that these priorities are relative, so setting all research areas to high will not increase research; it will just mean that all are equally prioritized. To prioritize everything is to prioritize

nothing, to paraphrase Frederick the Great.

Spending on research will lead to research advances, which will have varying effects depending on the area. Advances in Hull construction and Machinery development will reduce the weights of those components in new ship designs. Other research areas will unlock various technologies to be used in ship designs.

If there are no technologies to discover in a research field, research points spent there will be reallocated to other areas and not wasted.

Many techs are such that once it is invented by someone, it will be easier for other nations to invent them. And technology diffusion is considerable, through spying, tech sharing agreements or sale.

> **Designers Note**: *Research in RTW2 differs from many other games where you can specify a tech before it is invented and tell your scientists to invent that. RTW2 has what I feel to be a more realistic model where you can tell your scientists to focus on particular areas, but you cannot be sure what they will come up with. In other words, there is no "Hey guys, let's invent the Bronze Age" in RTW.*

> **Note**: *Most development in RTW represents technical progress, but there are also a number of developments that reflect the conservatism of naval establishments or simply the time needed to grasp the utility of new concepts before they are commonly adopted. They are also in the game to prevent the player from using too much hindsight in ship designs. For example, there was no technical reason that battleships with three or more main turrets couldn't be built before 1904, indeed some such ships were built. But if the game had allowed the building of such ships from start, players would in all likelihood start building dreadnought- like ships immediately.*

Intelligence

You can set a level of intelligence collection for each other nation. Intelligence activities might give information on research in other nations, boosting your own research, or it might yield information about the capabilities of enemy ships.

The level of intelligence effort gives a number of subtle advantages in war. The risk of unexpected battles that cannot be avoided is smaller with higher intelligence expenditure. Higher intelligence expenditure will also improve your efforts to hinder enemy submarines and catch raiders.

Intelligence activities carry a risk of detection. If your agents are discovered in peacetime, it will

increase the tension level with the nation in question.

Enemy ships

The information you can see about ships belonging to other nations is restricted. For ships under construction, you will only be able to see the ship type and displacement. For completed ships you can see the ship type, displacement, number and calibre of guns and speed, although the official numbers may be misleading.

By performing intelligence you might glean additional details, like armament, armour thickness, torpedo protection etc.

Tension levels

The player nation has a tension level with every other nation. When the tension level rises, there will eventually be a risk of war.

Normally, the tension levels will rise slowly over time and there will usually be several years before a war breaks out. However, you should be aware that there are some events that can cause a war to break out rather quickly and unexpectedly. Thus, you cannot let your guard down and think that any war is in the future. You should keep your navy in shape to fight a war at any time. If you scrap too many old ships and count on having new ones ready in a year or so, you might find yourself in an awkward situation if the international situation takes a turn for the worse. Also, the press and the navy league might come down hard on you if they think the navy is too weak.
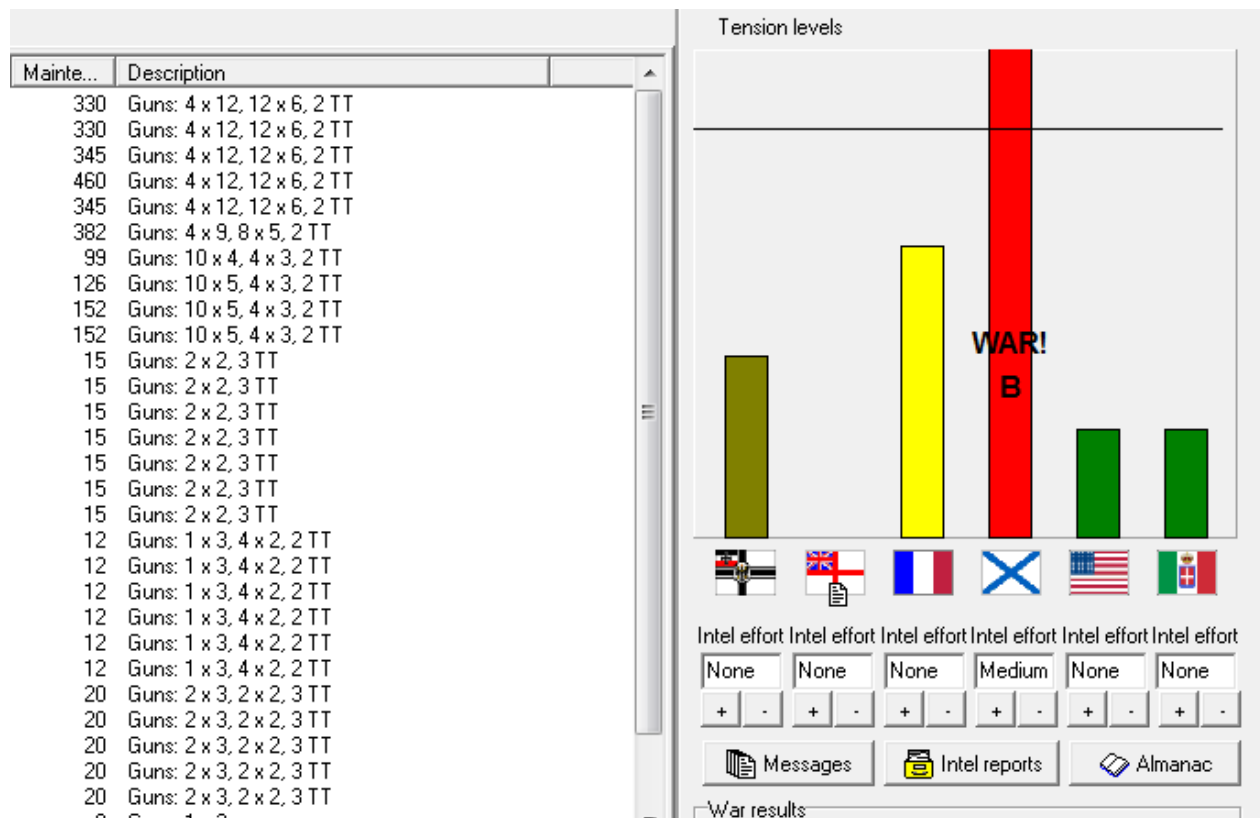
Tension levels. The player (Japan) is allied to Britain and at war with Russia.

Events

There will be random events and crises from time to time, and you will have to respond to them, mostly by giving advice to the government. 'Hawkish' answers will tend to raise the budget and your prestige, but they will also tend to raise tension levels. 'Dovish' answers will tend to lower the tension levels, but risks lowering your prestige and/or the naval budget.

An example of a typical event.

In the event dialog, hover the mouse over the event answers and you will get a hint on the effects of the different answers.

> *Designers note: Most events are geared towards European politics in the 20th century. While the events that can occur and their likelihood are different depending on government type etc, there are still some events that may feel more appropriate to Europe than the USA or Japan.*

Prestige

Prestige in the game represents your general reputation, based mostly on your standing with the Monarch/President and the politicians, the officer corps and other parts of the establishment. Your prestige will be enhanced by generally 'tough' responses to events and success in battle. You prestige will be lowered by 'soft' responses, defeats and mismanagement.

If your prestige goes too low, you will get sacked, thus losing the game. Before being sacked, there will be warnings that you run the risk of being dismissed.

Unrest level

The unrest level represents the feeling among the workers and lower classes. A high unrest level will lead to strikes and demands for lowered military budget, and in wartime can lead to revolution and defeat. Revolution is less likely in liberal democracies.

The unrest level is raised by:
- High military spending
- Long wars
- Being under blockade
- Cramped accommodation in ships
- Defeats

The unrest level is lowered by:
- War breaking out (initially, but longer wars will have the opposite effect)
- Social programmes (event answers)
- Victories
- Low military spending

The amount of money spent for naval and military purposes is the most important factor in affecting the unrest level in the nation. Possible unrest in effect acts as a brake on the naval budget in the game. If you relentlessly press for higher naval expenditures, you will find that the unrest level will be going up. Entering a war with a high unrest level might leave you vulnerable when blockade or trade disruptions caused by war increase unrest further.

Arms limitation treaties

Treaties will result from disarmament conferences, and these are an effect of event responses. You can affect the chances of a treaty by your answers, but 'tough' answers disdaining treaties will tend to raise tensions.

A treaty will set a limit in displacement and main armament calibre for new ships laid down, and will run for a number of years, usually 4 to 12. All ships under construction at the time of signing the treaty that do not fulfil the terms of the treaty will be scrapped. Existing ships may be kept, and may be rebuilt and modernized, even if they exceed the treaty limits.

Liberal democracies must adhere strictly to the treaty. Other nations may 'cheat' by up to 10% of the displacement. No cheating is possible on the main calibre.

Allies

There are several advantages to having an alliance with another nation. An alliance will keep down tension with that nation, and the ally will support you in a war. An ally is also more prone to sell you technology, and will do so at lower prices. You can also buy aircraft types from allied nations.

Allied ships may show up on your side in battles. Similarly, if you are at war with two nations, the allies of your enemy may show up. Allied bases and coastal batteries will also be present in battles.

There are also some potential disadvantages. You might be embroiled in conflicts that are caused by the foreign policy of your ally, and the existence of the alliance might raise tensions with other nations.

Alliances can be revoked if tension goes up between the allies. Alliances have a larger chance of being revoked if one nation is fascist/communist and the other is liberal democracy.

Alliances will not be revoked during war. Instead, your ally may seek a separate peace if the war goes badly and tension with them goes high enough.

Blitzkrieg

In wartime, nations that have a fascist, or to a lesser extent communist, regime can seize possessions in blitzkrieg invasions. Even nations that are not involved in the war may take the opportunity for some land grabs.

Blitzkrieg invasions cannot take place before 1935. The chance of blitzkrieg invasions will be highest at the beginning of a war and then be reduced. As a player, you will be consulted on blitzkrieg attack plans by the General Staff.

Designing and building ships

Designing ships

The first step in building a ship is designing the ship. In the design window you can design any ship you need in your navy, from destroyers to super dreadnoughts.

You can get to the design window either by clicking the design ship button, or if you want to improve on an existing design you can select an existing ship, right click and select 'open design'.

In the design window you determine the characteristics of the ship you want to design. Note that a number of the available technologies and features might need to be researched before they can be used in a ship.

The design window

Ships designed will have their ship type determined automatically by the program. This is to prevent unrealistic ship designs and also because the ship types are used by the tactical AI, and a 30,000 ton destroyer with 15 in guns will tend to confuse the AI. Very unusual designs will be disallowed by the program as illegal ship types.

The easiest way to design a ship is to select an existing class and open the design. You can then

alter or modify the existing design and save as a new class. This saves work because most ships tend to be developments from existing classes, and you don't have to enter all the values from scratch.

Alternatively, you could just select the ship type and let the computer auto design the ship for you. You can then alter any details you might want fixed.

After you have designed your ship you will get a report on the design and any problems it might have.

Items labelled 'Error' in the report must be fixed, otherwise the design is not legal.

Items labelled 'Note' in the report are just reminders or hints that can be disregarded.

Ship designs should have their weights kept within the displacement limit. You are allowed to build ships that are slightly overweight, but that will carry a penalty in stability and flotation.

Before building the first ship in a class, you need to complete a design study. This simulates the time taken to make the detailed design of the new ship class.

A ship developed from an earlier design will get a discount on the development cost and the time to carry out the design study.

To develop from an existing design, right click on an existing ship in service or in construction and select "open design". When changing the design, you can see the percentage of the development cost you will pay in the top left corner in the "Developed from" box. The more changes you make the smaller the discount, and if you make big enough changes you will have to pay the full development cost.

Generally the following are the limits for change before it becomes an entirely new design with no discount.

* Displacement can increase by a maximum of 10% or 1000 tons.
* Main guns over 6 in cannot be changed.
* Secondary guns over 6 in can be changed to a limited extent.
* Speed can be changed by one knot.
* Vertical armor can be changed by one in and horizontal armor by half an in.

See appendix 2 for a fuller explanation of the various values used in designing a ship.

> *Tip*: It can be a good idea to leave a few tons unused on your ships so that there is space for a minor rebuild of for example the fire control system without making the ship overweight.

Building ships

Once you have the design ready, you have to complete a design study for the new ship. This takes from 1 to 4 months depending on ship type. After that you can build ships to the new design.

The time to complete a ship is dependent on the ship type and can be modified by having an efficient or undeveloped shipbuilding industry.

The cost of building a ship is paid in monthly instalments during the build time. If you run into budget problems, it is possible to temporarily halt the construction of one or more ships.

You can also accelerate the construction of ships that are building. This will build them 10% faster, but with a 5% increase in cost. Having ships in accelerated construction risks causing delays in the construction of other ships.

In the build screen, you can select to have up to 12 ships of the same class laid down. The names will be assigned automatically. This might be very handy when building large numbers of destroyers for example. Note however that you will have to consider if your monthly budget is enough to build that many ships.

AMC:s may not be built in peacetime. After a war, they will be automatically sold off to civilian shipping companies. The same applies to corvettes of less than 600 tons. These are assumed to be civilian trawlers and similar craft that are impressed as ASW vessels.

Rebuilding ships

You can rebuild existing ships, but there are limitations on what can be rebuilt. The following actions can be taken while rebuilding ships:

You can change the main armament according to certain conditions. Guns can be changed to more modern versions of the same calibre. Triple turrets can be changed to double turrets with larger guns or vice versa if the calibres are compatible. Double turrets can be changed to single turrets or vice versa if the calibres are compatible. For example, a double 8 in turret can be exchanged for a single 10 in turret or a triple 12 in turret can be exchanged for a double 16 in turret. To see the combinations available during a rebuild, select the turret and press the 'Rebuild?' button under the turret list.

You can change the secondary battery if the existing guns are in casemates or in turrets of 6 inches calibre or less. It can be changed to any arrangement of 6 in guns or less. The same with tertiary guns.

You can swap out the machinery for more modern machinery, increasing speed or using the weight gained for other purposes.

Fire control can be improved

You can add bulges, which will increase torpedo protection but will also reduce speed.

You can also rebuild ships to aircraft carriers (CV or CVL) provided you have researched the technology.

Some rebuilds will change the ship type, most often from something else to CV, but sometimes BC will be reclassified as BB.

You can convert AMC to aircraft carriers. This simulates the conversion of a fast liner to a carrier, such as the Japanese carriers Hiyo and Junyo. To build a converted liner carrier, first build a largish 25 knot AMC, then convert to carrier. This will be faster than building a carrier from scratch, but the resulting carrier will not have any armour or TPS. In the game there is a limit on the number of fast liners that are available for conversion.

AMCs converted to carriers will not be disposed of after a war, they effectively count as carriers.

Ship pictures

You can optionally designate a picture for your ship designs. Pictures to be used should be placed in the save directory for the game (Save1, Save2 etc) under the 'RTW\Save' directory. Pictures for ships should be 640 x 160 pixels and in jpg or bmp format.

You can change the picture for an existing ship class by using the change picture function on the popup in the main ship list.

There is also an option to automatically generate a ship picture and add detail. To do this, use the generate picture function on the popup in the main ship list. First generate the hull. Select options and click "Generate". Change options and redo if you don't like the result. Then go to the superstructure and details tab. There you can select various types of equipment and superstructure. Click in the picture to select, move over the ship and click again to apply them to the ship.

See the appendix at the end of the rules for more details on this function.

Docks

In the game, dock size is used as a limit to the largest ship your nation can build and operate. You cannot build ships larger than your current dock size. Occasionally it is necessary to increase your maximum dock size. Docks take one year to build. Each building step will increase your dock size by 2000 tons. Try to plan ahead. Waiting an extra year to lay down your new battleship can be very frustrating.

Dock size may occasionally increase by itself as a result of development in private shipbuilding, but only up to 30,000 tons. The more ships you build, the more likely it is that private

shipbuilding will expand.

If you cannot build ships at home, you can contract them to foreign yards. You will then be limited by the building nation's dock size. This can have a further advantage if your own nation has an undeveloped shipbuilding industry, as the construction time will be determined by the characteristics of the building nation.

Building ships abroad may give you valuable insights in the technology of the building nations. It is thus often a good strategy for poorer and less developed nations to get access to better technology.

The drawback to building ships abroad is that you risk that your ships will be seized by the building nation and not delivered if a war breaks out and tensions with the building nation gets too high. If you have a treaty with the building nation, ships will always be delivered.

Submarines

Submarines are built much like normal ships, but you cannot design them, they are selected from standardised types. The different types of submarine will be available as a result of your submarine research.

The different submarine types are: Coastal submarines, Medium range submarines and mine laying submarines.

Coastal submarines have shorter operational radius, so will only occur closer to your bases. They also have limited torpedo capacity.

Medium range submarines are the general run of the mill submarine.

Minelaying submarines are much like medium range submarines, but can also lay mines. On the other hand, they have a reduced torpedo load.

Advances in submarine technology will increase the serviceability and the attack effectiveness of your submarines.

Submarines will participate randomly in battles, in proportion to the number of submarines available to either side.

Submarines will also force the enemy to assign ships to anti-submarine patrols.

During wars you have three policy options for your submarines:

Fleet support means that submarines will primarily operate against enemy warships and only attack enemy merchant shipping in very clear cut cases.

Prize rules means that your submarines will attack shipping, attempting to follow prize rules. The occasional incident that will upset neutral nations cannot be avoided.

Unrestricted means your submarines will carry out unrestricted submarine warfare against enemy merchant shipping at the expense of operations in support of the fleet. This will increase sinkings of enemy merchant shipping and may cause starvation and higher unrest level for the enemy. However, it will also anger neutral nations and risk bringing in additional enemies against you.

Submarines will have a sharply reduced effect on enemy merchant shipping if you are blockading the enemy (enemy merchant shipping is assumed to have been reduced to a minimum by the blockade).

Coastal artillery

You can build coastal artillery batteries in the same way you build ships, except that you do not design them and can only chose between predefined types. Coastal artillery must be built in a specific possession.

In tactical battles, coastal artillery will be assigned randomly to positions on the coast of the possession where they are located.

Coastal artillery positions will also increase the number of local minefields in the vicinity of the battery.

Coastal artillery will make it more difficult to invade and capture possessions.

Motor torpedo boats (MTB)

MTBs can be built once the technology is developed. Strategically, MTBs will be treated as coastal fortifications. They are built in an area, and will remain there.

MTBs will appear in battles in the area they are deployed in. They only appear at night and in reasonably good weather. They are always AI controlled, but will move around and attack enemy ships that come nearby.

Surprise attacks

A surprise attack may occur on the first turn of war, if one of the nations has the national characteristic "Surprise attack". A surprise attack will be different depending on the year of the game.

Up to about 1915, the surprise attack will take place at night and involve a group of destroyers making a torpedo attack on the enemy fleet at anchor, with a heavier group of ships following up. The defending ships will be initially surprised.

To make the most of a possible surprise attack, you should have a decent force of destroyers in the same area as an enemy base. Having well developed torpedoes and destroyers also helps of course.

Surprise attacks in the game are arranged so that they can succeed brilliantly, but be prepared that surprise attacks can occasionally end in relative failure.

> **Note:** *Ships in reserve or mothballed status might be included as defending ships in a surprise attack, even though they will otherwise not take part in battles. This is to make them vulnerable, and make it impossible for the player to 'hide' ships from surprise attacks by putting them in reserve.*

Surprise attacks between 1925 and 1935 will be replaced by a submarine sneak attack.

Surprise attacks after 1935 will be a carrier aircraft attack on the enemy's fleet in port. You will only have a carrier force and a few escorting surface ships. You are expected to do an air raid on the enemy ships in port and then withdraw.

National characteristics

There are a number of different national characteristics that will define the specific abilities of the various nations. Their effects are described below.

Efficient shipbuilding industry: Ships will take 10% shorter time to complete.

Undeveloped shipbuilding industry: Ships will take 10% longer to complete and are more prone to have unexpected faults, like not reaching their design speed.

Global naval power: Nation must keep at least 10% of tonnage on foreign stations, cannot have cramped crew quarters. May get automatic budget raise if any other nation has a similar budget.

Cautious: AI controlled forces will be cautious in battles. Player risks extra prestige loss on losing battles or losing capital ships.

Poor education level: Affects the crew quality and build times of ships, and has a slight negative effect on research.

Bombastic head of state: Will affect the likelihood of certain events, like foreign policy gaffes by the national leader.

Surprise attack: The nation has a penchant for starting wars with a surprise attack on the enemy fleet. There will be an 80% chance of a surprise attack on the enemy fleet at the start of a war.

Inconsistent naval policy: The politicians are more likely to interfere in ship building design and priorities.

Attention to detail: Ships are less likely to have hidden defects or vulnerabilities.

Technology Leader: The nation has an advantage in research, and if AI controlled will spend on research to stay among the top nations in technical development.

<u>Hidden faults:</u> The nation has a larger tendency to have unexpected faults in its ships, like a tendency to explode on turret hits or similar.

<u>Kamikaze:</u> The nation will practice suicide air mission if having a fascist regime and losing a war (see air sections).

Government types

Nations will have different government types, reflecting their internal politics. It has some influence on the type of events that can affect the nation. Also, nations of similar government types tend to have less tension. Fascist and communist governments will tend to have higher tension with democracies.

<u>Liberal Democracy:</u> Lowers the risk of revolution and will affect some events.

<u>Limited Democracy:</u> Less accountability in naval affairs, but larger risk of revolution if a war goes badly.

<u>Autocracy:</u> Like Limited Democracy, but even more limited.

<u>Fascist:</u> More resources to the military in general, but also more demanding of the head of the Navy. Can use blitzkrieg attacks. The population is kept in check and there is small risk of revolution. The militaristic bent of the regime will likely lead to high tensions with democracies.

<u>Communist</u>: Small risk of revolution (the nation has likely already had one). Reasonable resources to the navy, but unexpected things can happen at the whim of the General Secretary or the party.

Fleet Exercise

You can hold a fleet exercise once a year with any ships you select from your own fleet. Ships participating in the exercise will cost 150% of the active maintenance cost and gain some experience. Large fleet exercises can raise tensions. In effect you will play out a battle against a part of your own fleet, with no permanent damage of course.

A fleet exercise is a good way of learning the battle system for first time players, or a way of testing tactics and designs.

Construction Choices and other technologies

This is a summary of the construction choices available when designing ships and their effects in the game.

Low Freeboard

Ships with low freeboard will save weight but are more affected by the sea state, with ROF reduced or sometimes turrets being out of action due to being swamped. Low freeboard can be selected for all ships, but the benefit is larger for ships with top speed below 21 knots. Ships with low freeboard will have their speed and gunnery affected more in heavy weather than ships with normal freeboard. The ship is simply less weatherly.

Cramped accommodation

Ships with cramped accommodation save weight, but it may have adverse effects effect on the crew. Cramped accommodation might increase the risk of mutinies during wars, especially if the nation is under blockade. Ships are less useful in the colonies if they have cramped accommodation and crew performance may suffer if away from home waters.

Armour schemes

Protected Cruisers

Protected cruisers will be more vulnerable to hull and superstructure hits, as well as splinter damage from near misses. Before you research light cruiser configuration, CL:s must be protected cruisers.

Belt and sloping deck

This is the standard WW1 era armour configuration. These ships will have extra protection against shells penetrating the belt damaging their vitals.

Flat deck on top of belt

These ships will have a larger volume protected by the belt and deck, but lack the extra protection offered by the sloping deck behind the belt. Note: An "all or nothing" ship (once you have researched it) should have this kind or armour layout and no BE or DE armour.

Narrow belt

This saves weight but means that shells that would have hit the belt instead might hit BE or no armour at all.

Casemates

Secondary guns in casemates are somewhat more vulnerable than secondaries in turrets, but casemate armour will absorb some hits that would otherwise hit un-armoured hull or superstructure. Casemate guns are more sensitive to weather interference and will get higher ROF penalty in heavy seas.

Turret top armour

The program assumes that turret top armor is slightly sloped, at least for part of the turret, so shell penetration is somewhat better against turret tops that against decks. For heavy guns it is recommended to have slightly thicker armour for TT than D, just as was common in historical ships.

Turreted guns of smaller calibres

Until accurate training and elevation motors are developed, there is a ROF and accuracy penalty for secondary guns of 6 inches and below in double and triple turrets.

This also affects main guns of 8 inches calibre and less in double and triple turrets.

Note that smaller guns will still have a higher ROF than larger guns, this is only a relative effect. Do not let this stop you from designing for example armoured cruisers with double 7 or 8 inch turrets as main armament. It is just that single gun turrets have some relative ROF advantages in the early parts of the game.

Triple and quadruple turrets.

Early triple and quadruple turrets will have slightly lower ROF and a higher chance of turret jams. Improved triple and quadruple turrets will rectify these defects.

Armor in general

Armour thickness up to 20 in allowed for belt armour, but increase in armour over 12 inches will not give the same proportional protection due to difficulties in manufacturing thicker armor plates. Turret armour can be up to 26 inches.

Coal or Oil fuel

Oil fuelled ships have slightly more expensive engines but get a smaller weight penalty for long range and more weight effective and manpower efficient engines. However, only those nations with access to oilfields can use oil firing before 1920. Coal fuelled ships get some extra hull protection from the coal bunkers.

Oil fuelled ships produce less smoke, so are less sensitive to own smoke interfering with spotting.

Oil fuelled destroyers have less chance of missing a battle, as oil fuelled ships can be refuelled at sea.

Range

Ships with long range will:
* Have better chances to escape interception as raiders.

* Better chances of sinking merchants if raiders.
* Better chance of intercepting raiders.
* Less risk of being interned or scuttled from lack of fuel.
* More fuel when a scenario starts (rarely of importance).

Ships with short range will be unsuitable as raiders and are less useful on foreign stations. They are also unable to move strategically during wartime, except between one home area and another.

Engine priority

Engines optimised for speed are 8% lighter, but increase the risk of breakdowns. Ships optimised for reliability decrease the risk of breakdowns, but weigh 8% more.

Unit machinery

A ship with unit machinery will have a smaller risk of suffering engines disabled results if hit in the engine room. Hull, armour and machinery will weigh slightly more.

Armour and splinter damage

Splinter damage can occur to hull, machinery, funnel uptakes, main guns and secondary/tertiary guns from near misses or superstructure hits. Armour of 2 inches and above will protect from splinter damage. If armour is less than 2 inches, there will be a risk of splinter damage proportional to the armour thickness. Note that tertiary guns are always considered to be un-armoured.

Gun shields

Main guns of 6 inches calibre and below in single turrets with 2 inches or less of armour will be considered as shielded mounts. These are lighter than normal turrets, but are vulnerable to splinters (though not nearly as vulnerable as un-armoured mounts).

Colonial Service

Ships fitted for colonial service are more useful on foreign stations. This costs 60 tons displacement, which simulates increased marine contingent, storage spaces and other facilities useful for extended service on foreign stations.

Automatic loading

Autoloaded guns will have a 10% higher ROF. When the ship is straddling the target and going to rapid fire they will give a 30% boost to ROF. They also have better AA performance. They are

about 25% heavier than usual guns.

Dual purpose guns

Dual purpose guns are about 25% heavier than usual guns, but are capable of both AA fire and engaging surface targets. 4 and 5 inch guns are the most capable DP guns.

AA directors

AA directors will considerably increase the effectiveness of heavy and medium AA fire. More AA directors will improve AA fire, up to a maximum of 4.

An AA director will provide a limited anti surface capability if there is no regular director installed.

Diesel engines

Diesel engines are heavier than steam plants but reduce the weight penalty of long and extreme range. Diesel powered ships have better acceleration.

Inclined belt

Inclined belt costs 10% more than a conventional belt. It adds about 10% to the protective effect of the belt, but it also entails a risk that long range hits will be converted to deck or lower belt edge hits.

Box protection to magazines

If this option is selected, belt and deck thickness will be halved for hits to areas other than magazines. Belt and deck weight is reduced by 1/3.

All forward main armament

All forward armament gives substantial weights savings on armour. This means that all main turrets must be in positions A and B and C, L or Q. To get the benefit of all forward main armament (Nelson or Richelieu configuration) a nation needs to research all forward armament.

Radar

Radar will become available as a result of research in the Radar and electronics field.

Radar is divided into search radar and fire control radar. Search radar makes it possible to detect other ships in poor visibility. Radar detected ships will show as greenish outlines on the map. Early search radars are unreliable and prone to malfunctions. They are easily disabled by hits or even by own ships guns firing.

Fire control radar helps gunnery, and from level 3 will allow blind fire.

Once radar is invented, a nation will receive a number of radar sets per month. Radar sets will

be automatically installed in ships with priority given to larger ships and ships in the active fleet. The player can manually install radar sets in ships, with the drawback that the ship will be unavailable the current turn.

Diving shells

Once invented, diving shells can be selected for use in the ammo doctrine screen. Diving shells have a chance for long range near misses to be converted to hull hits bypassing armour. On the flip side, diving shells have a larger chance of passthrough hits and duds.

Oxygen fuelled torpedoes

When oxygen fuelled torpedoes have been invented, their use can be selected in the doctrine screen. Oxygen fuelled torpedoes give considerably better torpedo performance at the risk of more devastating torpedo explosions if torpedo tubes are hit.

Scout aircraft on ships

Ships equipped with scout aircraft will be more effective as raiders. They will also be more effective at hunting raiders.

Aircraft carrier construction

The type and size of the aircraft carriers you can build depends on the level of your "Shipboard aircraft operation" tech.

You will be able to convert existing ships into light aircraft carriers (CVL) after you have researched Flight Deck.

Additional techs will let you build purpose build CVLs, convert larger ships to fleet aircraft carriers and build fleet aircraft carriers from scratch.

The displacement of a purpose built carrier will be limited by the level of the "Shipboard aircraft operation" tech times 4,000. CVLs are limited to no more than a capacity of 34 aircraft.

There is no set limit on CV aircraft capacity, but carriers with aircraft capacity larger than 100 aircraft will have reduced aircraft operations efficiency as well as slightly increased cost. This is to reflect historical operational issues with discovered by the US navy with very large carriers.

Seaplane carriers

Seaplane carriers can be built once you research the tech Seaplane carrier. Seaplane carriers offer a way to get a scouting and limited air attack capability before true aircraft carriers are invented.

Seaplane carriers can only carry floatplanes. Ships without catapults or a flight deck will need to stop to launch aircraft. Ships recovering seaplanes always need to slow down.

Floatplanes on seaplane carriers can fly recon, strike and CAP missions.

Other effects from construction choices

Ships with cramped accommodation and ships with short range are less useful on foreign stations and will count as 70% of their actual displacement for the purpose of fulfilling this requirement.

It is allowed to build a ship that is overweight up to a certain amount. Ships that are overweight in the design stage have a higher risk of not reaching the expected design speed. They also have slightly less flotation points, so can absorb less damage, This may be risk worth taking, though, to cram in those nice 15 inch guns.

Wars and the strategic turn

Battles

When a war breaks out, there will be a chance of some kind of naval action every turn. The missions might be:

Fleet battle: A decisive battle with the entire fleet of both involved nations.

Battleship engagement: A battle with one squadron of battleships and supporting ships on each side.

Cruiser battle: A battle between cruiser forces.

Carrier battle: A battle starting at long range where carriers and other aviation assets will have a large influence on the outcome of the battle.

Coastal raid: Various kinds of bombardments, attacks on merchant shipping or other offensive activities near the enemy coast. The forces involved can vary but are usually based on faster ships up to battle cruisers in strength. In these battles coastal artillery and patrol craft will help the defending player.

Convoy attack/defence: Attack or defence of a convoy, usually with cruiser forces.

At the start of the battle you will be presented with a screen with the mission and type of battle and a force estimate of enemy strength. You will usually have the option to accept or decline battle.

Some battles are unexpected battles where you will not have the option to decline the battle. The chance of unexpected battles is dependent on your intelligence efforts towards your opponent.

Declining a battle will cost victory points, and may cost prestige after several declined battles. There is a chance that the enemy will decline battle if they feel that they cannot send out a force with reasonable chances of victory.

If you accept a battle, you will be brought to the tactical resolution screen, which is similar to a SAI scenario. The ships at your disposal will be randomly selected from the ships in the area according to the size and type of battle.

Sometimes there will be an additional friendly AI controlled support force present. This can both be a blessing and a source of problems. Sometimes the support force will save your skin, sometimes it can charge ahead and be involved in battles you would want to avoid. *Some players dislike support forces as the support force can get themselves in trouble. If you do not want support forces, there is an option to disable them for the player side in preferences.*

Destroyers are small ships with limited range, and may sometimes miss a battle due to having to refuel. The chance for this is dependent on the distance to the nearest friendly base. You will be notified at the start of a battle that x number of destroyers have missed the battle due to distance to friendly base.

The majority of scenarios will start with manoeuvre controls locked and the fleets meeting shortly. In very rare cases, mostly if visibility drops sharply, the fleets may miss each other and the battle will be without contact between the fleets.

In coastal raids, there will be a large element of manoeuvre and finding (or avoiding) the enemy fleet.

The tactical battle system is almost a game in itself. See Tactical battles for more details.

After a battle, when you have finished studying the result, just close the battle screen to return to the main RTW screen.

Note: For players of RTW. In RTW2 the forces will often start farther apart in battles, to give meaning to air reconnaissance and air attacks. However, this means that if you do not have air assets, the proportion of battles without contact between the fleets will go up.

Blockade

To blockade a nation, you must have 110% of the enemy's naval strength in the build area of the enemy nation. Naval strength for this purpose is computed as a sum of all ships in the area, weighted by type. Some nations have their blockade strengths modified. For example, Britain has its blockade strength multiplied by 1.2 to account for its geographic position and its dominance in trade and finance while Russia has its blockade strength multiplied by 0.7 to

reflect its geographic position.

If you are a blockading nation in a war, you will earn a number of extra VP per month as long as the blockade is kept up. A blockaded nation will also suffer a higher risk of the unrest level going up, which can ultimately lead to revolution and defeat.

A blockaded nation will not be able to move ships out of its build area, except as raiders, which are subject to possible interception as they break through the blockade.

> **Tip:** *If you hover the mouse pointer over an area on the strategic map, you will see a summary of naval forces in the hint box. After the list of ship types for each nation is the total strength value in the area in parentheses. These are the values used to determine if a blockade exists. Note that to preserve fog of war, the values you see are before movement, ships might move during the turn and blockade is resolved after the move and any battles, but it should still be a pretty good indication*

Trade protection

While at war, each nation will be required to keep a number of ships on Trade protection. The number of ships required will be proportional to the fleet size and modified by the strength of the enemy submarine force. Ships on Trade protection are counted in one global pool, and their exact location is not important for fulfilling the requirement.

Ships assigned to trade protection will not normally be available for fleet operations. However, in non-home areas, any ship present might be used in battle.

DD and KE assigned to trade protection will be on ASW patrols or assigned as convoy escorts.

Cruisers assigned to trade protection will patrol against enemy raiders and provide heavy convoy escort.

The most cost effective ships for Trade protection are destroyers, corvettes and small armed merchant cruisers, but cruisers can be needed if raiders are about. Older destroyers no longer fit for fleet duty are an ideal candidate.

If you do not satisfy the Trade protection requirement, there will be a larger chance of enemy submarines sinking merchant ships and your prestige may suffer. Stronger patrols than required will hamper the operations of enemy submarines and increase the chance of sinking them. Also, the crew quality of patrolling ships will have an effect, so putting your worst crews on ASW patrol might not be profitable.

Ships on Trade protection may be present in defensive costal battles in the area where they are deployed, but will otherwise have a low chance of being involved in battles.

AMC:s can be used on trade protection patrols and if you have invented Q-ships, they can

surprise and sink enemy submarines.

Raiders

During war, you can send out ships as raiders to prey on enemy shipping. Raiders cannot be short range ships and are more effective if they have long range and relatively high speed. Generally, cruisers are ideal for this mission.

Raiders have best effect in areas where your opponent has possessions. Also all nations are affected by raiders in Northern Europe, as it is assumed that all nations are trading heavily with Europe.

Raiders run a risk of being intercepted by enemy trade route patrols and brought to battle. Note that a raider winning a battle but suffering significant damage might be forced to scuttle itself or seek internment in a neutral port.

There is a slight risk that raiders run out of fuel, especially if not long range or of large size, or suffer a mechanical breakdown. This can force them to be interned in neutral countries until the war is over.

AMC:s can be effective as raiders, despite relatively low speed, due to their ability to disguise themselves as normal merchantmen. A speed of at least 8 knots is required. Large fast AMC:s (fuel hungry liners) are however prone to running out of fuel. An AMC raider has a chance of deceiving and surprising an enemy intercepting ship, with the interception battle starting at short range and the intercepting ship surprised.

If you are blockaded, ships deployed as raiders may be engaged by enemy ships while breaking out to the trade routes.

Raiders have no effect if you are blockading the enemy (enemy merchant shipping is assumed to have been reduced to a minimum by the blockade).

Raiders contribute to mine warfare. It is assumed raiders with mines will lay them in suitable sea-lanes etc.

Anti submarine and mine warfare

Each ship has a rating for its capabilities in ASW and minesweeping. However, if the ship has a capability in both minesweeping and ASW, the ASW value will be reduced to reflect the fact that the ship has to divide its time between the various duties.

ASW warfare

Ship types capable of ASW warfare are DD, MS, CV and CVL. Ships capable of ASW warfare have an ASW rating. The ASW rating of a ship depends on displacement and installed equipment. All DD and small ships will automatically have a basic amount of depth charges when these are

invented. Additional ASW equipment, like increased storage of depth charges, K guns and ASW mortars, need to be added to the design and will cost weight.

The ASW value of CV and CVL will initially be low, but will increase with development of aerial depth charges and airborne radar.

AMC will have a limited ASW value during the early period (as Q-ships).

Mine warfare

Mines are represented in three ways in RTW2.

In tactical battles there will be a defensive minefield around all bases. You will see those of the enemy but not your own. The purpose of these is to prevent enemy ships from operating unrealistically close to enemy bases.

There will also be small minefields present in scenarios near enemy bases and coastal artillery positions. They will be more common the longer a war progresses. These minefields will be invisible until one of your ships hits a mine. Screening light ships will protect your heavy ships from these to an extent.

There is also operational mining carried out in the monthly turns. Ships equipped for mine laying will be assumed to carry out mining in the area they are deployed. Minelaying submarines will also contribute to operational mining. This mining is abstracted and will not show on the map, but will increase the risk of enemy ships falling victims to mines.

Ships equipped with minesweeping gear will contribute to a minesweeping value for each area. This value will be compared to enemy minelaying capabilities in the area to determine the risk of ships striking mines during operational movement and also influence the number of minefields during battles.

Invasions and amphibious operations
Each nation has an invasion range, expressed in nautical miles. This is the range from friendly ports that you can conduct an invasion. It is measured from the nearest friendly port to the nearest enemy port in the intended invasion target possession. If the range is greater than your invasion range, you cannot invade.

The invasion range is modified by advances in the tech area Amphibious operations. It is also increased for global naval powers and for nations with surprise attack ability during the first year of a war. It is lowered for blockaded nations.

Your current invasion range is shown in the lower left of the main screen. By pressing the invasion range button on the world map, you can see invasion range circles from your bases.

To start an invasion, you select an enemy possession within your invasion range, either by clicking on the possession flag on the map or via the possessions list to the left.

Once you have selected a target you should move naval forces into the area. For an invasion to take place you must have more strength in the area than the enemy, but there is also a random roll made each turn, so it may take a couple of months before the invasion is actually launched. The larger your naval superiority, the greater the chance of an invasion taking place.

Advances in amphibious capability will affect the chances of being able to carry out an invasion once you have selected an invasion target.

When the invasion takes place, you will have to fight a battle where you escort an invasion force of transports to the beaches. In an invasion battle, if the invader does not accomplish his objective of moving transport to the invasion point, there will be no invasion. Apart from fulfilling the objective, the invader must also score a minor or major victory in the battle.

The enemy nations will of course also have the capability to invade your possessions, in which case you will have to fight a defensive invasion battle.

After the initial invasion, there will battles in support of invasion. They are assumed to be naval operations over sea control around the invaded possession, much like what happened around Guadalcanal. There will not always be transports, but the result of the battle will affect events on land, i.e. the chance of your soldiers capturing the place or defending it.

Fuel Shortage

Nations without access to oil run a risk of suffering fuel shortages in wartime. The risk of fuel shortage occurring in a turn will increase the longer the duration of the war. If a nation is blockaded, the risk of fuel shortage will increase considerably.

In a turn with fuel shortage, there is a risk that ships will have ordered strategic moves cancelled or that they will be unable to take part in a battle. The larger the ship, the greater the risk of being affected.

Ships using coal fuel will never be affected by fuel shortages.

Winning or losing a war

Battles and other events will gain victory points. When one side has a substantial advantage, there will be chance for some kind of peace agreement. Peace agreements might entail the loss or gain of territory, simulated in the game by gaining or losing possessions, which will in turn affect your base national economy. They might also involve handing over ships to the victor or restrictions on the shipbuilding of the losing nation.

Wars might be lost by revolution if the unrest level goes too high. Wars lost in this way will lead to unusually harsh conditions. Thus, if you notice that your unrest level is going up, you are well advised to consider reining in military expenditure and consider some kind of social reforms. If that doesn't help, a negotiated peace is a lot better than revolution.

Peace

During a war there will be events relating to possible peace negotiations. Your answers to these will decide the chance for a peace and also the nature of that peace. In a victory, you may gain increased base resources, possessions or even ships from the enemy's fleet, depending on the magnitude of your victory. Conversely, if you lose a war, you may yourself lose some of the above.

When you win possessions, you will be presented with a list of enemy possessions to choose from, and the number of value points you can select. Unused points will gain a small increase in your base resources instead. You can decline to take any possessions at all and be satisfied with the base resource gain.

Hidden faults

Occasionally during a war you may receive a notification that combat reports indicate that some equipment may have serious deficiencies. You will be presented with some alternatives on how to remedy the situation. Depending on your choice, there is a chance every month that the problem has been resolved.

The effects of the faults are mostly self-explanatory, except for Cryptographic equipment. Faulty cryptographic equipment will affect the risk of friendly submarines being sunk, the risk of raiders being caught and the risk of unexpected battles.

Hidden faults are similar to but not the same as hidden flaws, which is a national attribute. Hidden faults can affect any nation, and new faults may even appear after a period of peace, just as some nations had problems with their torpedoes in WW2 despite having perfectly good torpedoes in WW1.

Tactical surface battles

The Map

The main window in the tactical battle screen will be largely taken up by a map of the battle area. Actually, the map shows the entire world, but we are only interested in the battle area.

The map shows your ships as coloured dots on higher zoom levels, and as ship graphics when you zoom in. The ships are shown in approximately double size, so the ships might look more crowded together than they actually are.

Aircraft will likewise show as small coloured dots on higher zoom levels and as aircraft when you zoom in.

Ships will be grouped together in divisions. Divisions are shown on the map with flags. A square flag means a division under the control of the player, a triangular flag means the division is under AI control.

You can zoom the map by clicking the + or - buttons on the toolbar. You can also click and drag a box on the map with the left mouse button to zoom in to a particular area of the map, or use the mouse wheel to zoom in and out.

To scroll the map, right click and drag on the map, this effectively rotates the earth. You can also scroll the map by using the A-S-D-W keys.

Clicking the Zoom to force button will zoom the map so that you see all your ships, and any spotted enemy ships.

The lock button will make the map follow the currently selected division.

You can show the sighting ranges visually or for radar, or weapon ranges by pressing the appropriate buttons on the toolbar.

There is also a button for fire lines. This will turn on lines for the selected division showing which ships your ships are firing on and which enemy ships are firing at them.

You can get details on friendly ships and divisions by right clicking on the ship or the division flag.

Info on enemy ships will be limited. You can hover the mouse pointer over a ship to get additional info, and you can right click on an enemy ship to bring up information about the ship class from a simulated Jane's Fighting Ships, provided the class is identified.

It is possible to show an inset with an enlarged view of the current ship by pressing the show enlarged view button on the toolbar. This can be very handy for checking if all guns are bearing, or if you just want to keep an eye on your flagship.

The ship displayed will shift when a popup is shown, but it is possible to lock the inset view to the current ship.

If you pause the game and move the mouse cursor over an aircraft, an enlarged view of that aircraft or squadron will be shown in the inset view. This might be useful if you want to check on which aircraft it is and what it is doing without zooming the map in.

When a battle scenario is finished, you can use the track chart button on the toolbar to display a track chart of the action.

The Order of Battle tab

The Order of battle tab lists all your ships and shows how they are organised. Each side will have one or more forces, which are divided into divisions which contain the ships. You can expand the forces and divisions to see your ships.

As the ships are damaged, they will get stars beside their names in the tree, one star is light damage, two stars is medium damage and three stars is heavy damage. There will be a short annotation on any aircraft the ship is carrying after the name.

Most objects in the OOB tree can be right clicked for further functionality, for example finding them on the map or seeing detailed info on forces, ships or divisions.

A force may be computer controlled, which means that there are friendly forces over which you have no control and do not know exactly where they are. They will report sightings of enemy forces, but those reports will be fragmentary and subject to error. You cannot change the control of computer controlled forces, but you can change AI control of divisions in player controlled forces (see below)

The log

The log list on the log tab will list all important events taking place in the game. Events during the current turn will be in black, while events from the preceding turn will be shown in gray. Click on an event to locate the map to the ship causing or suffering the event. You can also right click most events related to friendly ships to get details on the ship.

Some events will be shown in differing colour or font to make them stand out. These are ships sinking, torpedo hits etc. Some events can also be made to pause the game or show a message box, subject to customization by the player. See under preferences.

All log entries are recorded in a total log that is available when you press the log button on the toolbar (the one with a book on it). In the log window, you can copy all entries to the clipboard with Ctrl+C and paste into Word or Word Pad. It is an RTF file so it will keep the formatting with colors and bold lines for hits etc. In this way, you can peruse the log after the battle or even save if for future reference.

The reports tab

The reports tab lists all reports on enemy activity that come from friendly non-player controlled forces or submarines. Click on a report to locate it on the map. Note that reports are randomized and subject to "fog of war", both as regards location and enemy strength.

The objectives tab

This lists all objectives for your side. Click on an objective to highlight its location on the map. See more on objectives under Victory and objectives.

Maneuvering your ships

Rule the Waves puts you in the place of the admiral. That means you will give orders to divisions of ships, not to single ships (unless they are alone in a division). RTW2 can be played in different realism modes that will give you a varying amount of control over your divisions (see Options below).

Divisions are shown on the map with flags. A square flag means a division under the control of the player, a triangular flag means the division is under AI control.

You can switch on and off AI control for a division by clicking the AI control checkbox (possibly restricted depending on realism level).

Tip: It can often be preferable to have smaller ships, destroyers for example, under AI control. In a big battle, that will let you focus your attention on the big ships. It will also insure against a division doing something stupid just because you have forgotten to give it orders. You can switch on and off AI control for divisions in your force at any time during play, subject to the realism level you have chosen.

There are a couple of ways to give orders to a division. You can right click on the division flag, which will bring up the division dialog.

The division dialog will show a list of the ships in the division, and their details. For further details on a ship, double click on its listing.

You can set the speed and course for the division. Clicking the arrow button by the course value will let you pick a direction from the map. The map will be shown and the cursor will be a cross. Left click on the map and the division will be given a course to the point you clicked.

It might seem logical to routinely set your divisions on maximum speed. Be aware that at maximum speed, following ships will not have any margin of speed to catch up, so this may result in stretched out formations. Also, some ships may suffer high speed vibration affecting gunnery when running at maximum speed. It is therefore recommended to set a speed a knot or two below maximum speed in combat, unless utmost speed is vital, for example in a pursuit situation.

Extended high speed cruising carries a risk of engine damage: If the speed is above 16 knots for battleships and 18 knots for battle cruisers and cruisers, there is a slight chance for engine damage. The risk of for engine damage is greater for ships with engines that prioritize speed, and smaller for reliable engines. High speed will also exhaust the stokers in coal fired ships. Thus, it is a good idea not to zip about at maximum speed unless you really need to get somewhere fast.

Formations

The formation of the division will affect how the ships deploy.

Line ahead means all ships will follow the division flagship. Very common formation, especially for heavier ships, as it maximises firepower and will avoid putting ships in the line of fire of each other.

Line abreast means the ships will form up on the flagship in a line abreast. Usually only used at the start of a scenario to account for spread out deployments.

Search line is a specialized formation, like line abreast but with much larger intervals between ships. Typically used by a lone squadron trying to find an enemy force.

Screen means the ships will spread out to cover an arc in front of the lead division. Used by ships having the role of scout or screen (see below).

Formations other than line ahead have a risk of ships getting separated from the division, especially at night or in poor visibility.

Division role

You can select the role for the division. This will affect how the AI will handle the division:

Independent divisions will not care about other friendly divisions, but they will generally maneuver in relation to the force flagship. Cruisers will usually range ahead, while battleships and carriers will stay behind the fore flagship. They will act according to their own judgement when enemy ships are in sight.

Core divisions will follow their lead division. Typically used for battleship divisions in the main line of battle.

Support divisions will follow some distance behind the supported division or on the disengaged side and endeavour to stay out of the line of fire. Typically used for destroyers supporting a battleship or cruiser division. Supporting destroyers will launch torpedo attacks or counterattacks on enemy destroyers when they deem it appropriate.

Scout divisions will place themselves a considerable distance in front of their lead division, and spread out their ships. Typically used for light cruisers scouting for a heavier force.

Screen divisions will form a screen a short distance in front of the lead division. Typically used for light cruisers or destroyers screening heavier ships. Also used for antiaircraft screens.

Patrol divisions will patrol around their objective. Used for patrolling coastal forces etc, usually not under player control. However, it might be useful to put a player controlled division on patrol if you want it to loiter and patrol in an area while you concentrate on other areas.

Note that all roles are not available to all ship types, to reflect historical practice. For example, you cannot place a battleship-division on scout. Neither can you place a destroyer division on scout. If you think this is odd, it is to reflect historical usage of destroyers during much of the period covered. WW1 destroyers were small and had poor means of navigation and

communication, which precluded their use in scouting.

Lead division is the division that all the above will relate too. All divisions will have a lead division except independent divisions.

The division dialog. This destroyer division is supporting a heavy cruiser division.

The turn together check box makes it possible to order a division in line ahead to turn together if you for example want to turn away quickly from the enemy or a torpedo attack or similar.

The Division dialog can also be accessed by right clicking on a division in the OOB tree and selecting status from the popup menu. Similarly, ships can be inspected in the same way. It is also possible to center the map on a division or ship if you cannot find them.

There is also a quick way to give orders by using the box in the lower left corner of the main screen. If a division is selected, you can simply enter a course or a speed, or press the arrow button to pick a course from the map.

Lastly, an ultra-quick way to change course for a division is to hold down shift and click on the map with the division selected. That will change its course to head for the clicked point.

If you control + click on the map, that will give the selected division a new course to that point. It will also start the game and run it until the division has reached that point.

Targeting

Your digital gunnery officers will normally handle targeting. However, unless you are playing at Admiral's mode you can set targets yourself for divisions that are not AI-controlled.

If you set a target manually for a division or ship on automatic targeting, it will shoot at that target until the target is out of range or cannot be seen. It will then revert to automatic mode. Note that this might mean that a more important target will be ignored. If you give manual targeting orders, you must also pay constant attention to what your ships are firing at.

If you set a division on manual mode, it is entirely up to the player to select targets. If a target is out of range or not visible, the ship will simply stop shooting. This means that constant player supervision is recommended if you put a division on manual targeting.

In the division dialog, you can also order a division to hold fire for 10 minutes or indefinitely, and to abstain from launching torpedoes, if you are playing at Rear Admiral's or Captain's mode. Note that ships given hold fire orders might end up being pummelled by the enemy without shooting back, so as with manual targeting, you will have to pay careful attention to what's happening,

Secondary batteries and torpedoes will always have automatic targeting. Occasionally, you might see secondary batteries not firing at targets well in range. The reason is most often that there is already a substantial number of ships firing at the target, and further guns firing will just complicate observation and lower accuracy, so your digital gunnery officer has decided to hold fire.

Running the game

The game handles battles in one minute turns, but in many cases the game can run several one minute turns in sequence, creating a real time effect. The ships are animated to create a smooth movement, but everything actually happens in the minute turns. The turn button will play a single one minute turn. Run 5 will run the game 5 minutes, and just Run will run the game until something happens which will cause the game to pause, or turn or pause is pressed (or the P key). The game can be run for a variable number of minutes by pressing the number keys, i.e. pressing 7 will run the game for 7 minutes.

The events that will pause the game automatically are configurable under preferences.

You can adjust the game speed with the game speed control on the toolbar. Speed varies from very fast, which will have game minutes passing by at the rate of several minutes per real life second, down to real time. Normal speed equals roughly one game minute per real life second (varying slightly with computer performance).

If you are playing at slow speeds and press P to pause the game, it will take some time for the game to pause until the current minute is played out. In the mean time, the text "Pause pending" will be shown in the display.

The game will revert to normal if on a faster setting whenever an enemy ship is sighted. You can thus safely up the speed when no enemy is in sight.

There is a checkbox labelled FA in the toolbar. Checking this will cause the game to run at the fastest possible rate until a pause evet occurs. This is useful when you want to finish a scenario, or when searching for the enemy.

Hits and damage

Hits will be shown in the event log. Hits on your own ships will be detailed as to location and the part of armor hit. An asterisk * after the hit denotes that the hit penetrated armour. Hits that do not penetrate armour will cause no or very slight damage.

Armour types are:
B Belt: The main belt armour
BE Belt extended: Upper strakes of belt armour or armour protecting the ends of the ship.
D Deck: The main armour deck of the ship.
DE Deck extended: Corresponds to BE above.
T Turret: Main gun turret.
TT Turret top: Roof of main gun turret.
SEC Secondary gun armour.
CT Conning tower.

The range at which the ship is hit will influence whether belt or deck armour is hit, with deck hits being more frequent at longer ranges.

Ships take structural damage either as structure damage or flotation damage. Flotation damage will affect the speed of the ship and will eventually sink the ship. Structure damage is not

directly dangerous to the ship, but extensive structure damage will affect gunnery and damage control. Note that the term superstructure in the game also applies to damage to the upper part of the hull, while hull damage applies to those parts of the hull that are close to the water.

In addition all individual main turrets can take damage. *Turrets* can either be destroyed, which is permanent, or disabled, which might be fixed by the crew. Even non penetrating hits can disable a turret, the chance being dependent on the shell size. Turrets can also jam from mechanical failures which are similar in effect to being disabled. A penetrating turret hit might trigger an ammunition flash fire, which might either destroy the ship or burn out two turrets. The risk of this happening is dependent on nationality modifiers, which vary over time.

Engine room hits will in most cases affect the speed of the ship.

Waterline hits or *torpedo* hits can cause progressive flooding, which will gradually cause flotation damage. Damage control will try to limit flooding. The chance of reducing flooding will increase if the ship is at lower speed. Going at high speed with extensive flooding can risk the ship.

When ships sink, they will not just turn turtle and disappear. A ship will be in sinking state for up to several hours. Sinking ships might be targeted by your gunnery officers, and there is no way you can be sure if an enemy ship is sinking or just badly damaged. This is to recreate the conditions under which real admirals had to make decisions.

In the ship details window, you can get a list of all the hits that ship has received, with hit location and if it is a critical hit etc. If a hit has a ## mark, it means the hit was made while the ship was already sinking. During play, you will not see the firing ship name. After the scenario is over, you can see exactly which ship scored which hit.

When a ship is sunk and the enemy is not too close and friendly light ships are close, you will get a question if you want to detach a ship to pick up survivors. Picking up survivors earns victory points (regardless of which side they are from, sea battles are supposed to be chivalrous affairs and besides, enemy prisoners are good for propaganda).

Hit Locations:

    a.   Near miss: Might cause flotation damage to unarmoured ships or knock out guns on light ships or unarmoured secondary or tertiary guns.

b. Turret: Can destroy or disable the turret. A penetrating turret hit can cause a catastrophic flash fire.

c. Hull hit: Will cause flotation damage

d. Engine room: Will affect speed and might cause flotation damage

e. Superstructure: Causes superstructure damage and might damage unarmoured secondary or tertiary guns.

f. Torpedo tubes: Will knock out torpedo tubes and there is a slight chance of an explosion which might cause further damage. Hits on underwater torpedo tubes might cause bad flooding.

g. Secondary battery: Can destroy secondary guns

h. Critical hits: Include rudder damage, catastrophic machinery damage, magazine hits, fire control, conning tower and bridge hits, electric system damage and bad waterline hits. Might also cause any mines carried to explode, with catastrophic effects.

Most hits have a possibility of causing some additional superstructure damage

Some hits on unarmoured locations will be pass-through hits that don't explode. Such hits will cause minimal damage.

Torpedo hits will cause massive flotation damage and might cause progressive flooding. They might also damage machinery or knock out turrets.

Note that both gunnery and torpedo hits on enemy ships are somewhat over-reported, just as they were historically. This is all the more true about bomb hits and air launched torpedoes. Pilots are an optimistic breed.

Fires

As ships accumulate damage, fires may break out. The risk of fires varies according to ship type, with TR, AMC, AV, CA and B being the ship types most susceptible to fires. All aircraft carriers are also highly susceptible to fires.

Initially, fires don't do much damage; they may either spread or be successfully fought by damage control. Large fires will eat away at the superstructure points of the ship, and might lead to other damage control being hindered or rate of fire affected, or even the ship stopping firing as gun crews and damage control personnel concentrate on fighting the fire. Fire level will be indicated in the ship details window, and also noted in the map popups. A really bad fire that cannot be put out might force abandonment of the ship.

A ship on fire will produce more smoke, contributing more to obscuring lines of fire. A ship on fire will be easier to spot (but not identify) at night.

Gunnery

A lot of factors affect the gunnery of the ships in the simulation. Gunnery accuracy depends on:

Crew quality
Fire control
Firing ship turning
Target ship turning
Previous salvo on target
Sea state
Smoke interference
Damage to firing ship
Range
More than one ship firing on the target
Target evading
Dusk (*firing eastwards in dusk or westwards at dawn is penalised*)
Glare (*firing within 45 degrees of the sun within one hour of sunset or sunrise, provided weather is clear or partly cloudy*).

To sum it up, to obtain the best result from your ships gunnery, keep a straight course with as many guns as possible bearing, and make sure your smoke is not blowing towards the enemy.

Rate of fire (ROF) is dependent on:

Crew quality
Firing ship turning
Sea state

Smoke interference
Damage to firing ship
Firing ship on fire
Range
Technology

Normally, ships will fire deliberate fire, but once a ship has a straddle or hit, it will go to rapid fire with both higher ROF and hit chances until it fails to straddle.

Ships low on ammo will fire more slowly and be more selective about targets to conserve ammo. Your digital fire control officers will also use ammo for heavy guns sparingly when firing at light ships at long range.

Ships firing at a new target will be ranging and fire more slowly and with less accuracy until they have found the range.

Real sustained rate of fire was in practice seldom more than one round per gun per minute for heavy guns, and often less. This is in marked contrast to the theoretical technical ROF given in various gun data tables, which many people take as gospel.

A lot of factors influence the real ROF like visibility, need to observe and correct fire, sea state etc. Then there are rather frequent mechanical failures where one gun will miss a couple of salvos before fixing the problem.

Torpedoes

Torpedo firing is normally automated in the game, and torpedoes will be launched by your virtual torpedo officers when a suitable target is in range. Note that underwater torpedo tubes cannot be fired at a speed higher than 25 knots.

If you order a Flotilla attack (see below) your destroyers will be much more likely to launch torpedoes.

In captain's mode (see Preferences below) torpedoes can be fired manually.

Weather and visibility

Visibility will change with the weather. The weather has two parameters that are to a large extent interdependent, sea state and precipitation. These will be shown in the lower right hand corner of the map. The precipitation level will also be shown as a graphic on the toolbar.

Sea state really expresses the wind force, and is given as in the Beaufort scale. Stormy weather will lower visibility and affect the gunnery of ships, with small ships suffering the most. It might also cause badly damaged ships to founder. Torpedo accuracy and reliability will also be affected by heavy seas. Heavy seas will also limit the speeds of ships, again with lighter ships suffering most.

Precipitation level simulates fog, mist, rain and snow. Mist and rain/snow will lower visibility ranges, sometimes severely.

Stormy weather will make fog much less likely, while it will increase the risk of rain.

Smoke

Smoke is simulated in the game in several ways.

Funnel smoke will degrade gunnery when firing through it, regardless of which ship the smoke is coming from, except normal funnel smoke from the target ship.

Destroyers and light cruisers can lay smokescreens. *Order this in the division screen.* A smokescreen can be laid for a maximum of 5 minutes. After that, a ship has to wait 20 minutes before it can lay a smokescreen again, as extensive smoke generation will foul the boilers. Smokescreens are not fully opaque, but will affect gunnery through it to a larger extent than normal funnel smoke. A smokescreen will affect all gunfire through it, even against the laying ship.

Smoke floats can be deployed by light cruisers in nations having them. Smoke floats will both block line of sight in their densest area, and cause similar effects to funnel smoke. Smoke floats can be ordered manually in captain's mode, and will be deployed when the carrying ships deem it necessary on other realism levels, generally when the carrying ships or their lead division is disengaging. Each light cruiser will have between 3 and 5 smoke floats.

Accumulated smoke from many ships moving at high speed and firing guns in a confined area will eventually lower the sighting range for all ships in the area.

Smoke will tend to disperse faster and cause less visibility effect the stronger the wind is.

Minefields

Minefields can be of two types, 'friendly' minefields and suspected enemy minefields. Ships will automatically attempt to avoid both types. In addition, there might be unknown enemy minefields which will come as an unpleasant surprise.

There is a chance that a mine strike will be reported as a torpedo attack, as there was historically often doubt about if the ship had been hit by a torpedo or a mine.

Land targets

Land targets are similar to ships except that they cannot move. They are typically either unarmed bombardment targets or coastal batteries. They will be targeted just as if they were ships (though ships will not fire torpedoes at them). Some scenarios will have destruction of land targets as an objective.

Submarines

Submarines will be deployed on the map and can attack ships that come nearby. They will also report sightings of enemy ships, but usually with a substantial delay, as the sub will most likely be forced to dive and stay submerged for a considerable time after an encounter.

Nearby destroyers will protect larger ships from submarine attack. They will make it harder for the sub to attack and more likely that the sub will be spotted before it can attack. There is a possibility that a surface ship will sink the submarine.

Submarine operations are affected by weather. If the weather is too calm, the submarine will be spotted more easily, and attacks will be harder. If the seas state is too violent the sub cannot keep attack depth and observation will be difficult.

Early submarines were also notoriously unreliable and hard to control and integrate into other

naval operations. To reflect this, each submarine has a reliability rating that roughly determines how large a percentage of time the submarine will be able to scan for targets.

There were frequent examples of sightings of imaginary submarines and torpedo tracks that sometimes had a profound impact on operations. This is simulated in the game by sightings of non-existent submarines.

It might be a good idea to stay out of areas where friendly submarines are operating with your surface ships, as there is a risk of mistaken identity with potentially embarrassing results.

Preferences

There are settings for the level of detail in most reports, as well as what is shown on the game map. It is also possible to select what events will pause the game.

In addition, the player can chose between one of three realism levels.

<u>Admiral's mode:</u> The ultimate in realism. The player can only give orders to the lead divisions of each force. Other divisions can be controlled only by selecting their role. No manual targeting is allowed. If you want to experience the limitations of early 20th century fleet command, this is how you should play.

<u>Rear admiral's mode:</u> The player can put any divisions in his force on manual or AI control as long as they are within sight of the force flagship. The player can give target orders to divisions. Victory points will be reduced by 10%.

<u>Captain's mode:</u> The player can put any divisions in his force on manual or AI control. The player can give target orders to divisions or ships. Victory points will be reduced by 20%.

Note that some scenarios may have friendly forces that are not under player control. This is not affected by the realism setting.

Force orders

Especially under Admiral's mode, force orders offer a possibility to influence your whole force. Right click a force in the OOB tree to open the force orders dialog.

Flotilla attack: This orders a general destroyer attack. A flotilla attack is typically ordered to finish off a crippled enemy force or as a desperate move to cover a withdrawal. Note that the attack might take a few minutes to develop, as it takes time for orders to transmit and commanders to react.

To remind you that a flotilla attack order is in force, a black flag will be shown on the left in the main window (the black flag was historically used in some navies to indicate that a ship was making a torpedo attack).

A flotilla attack can be ordered either from the force screen or from the division dialog of the force flag division. Right clicking the black flag will cancel all flotilla attack orders. A flotilla attack order will lapse after 30 minutes with no enemy in sight.

Rally: This will raise force morale, making a battered force more likely to fight it out. Note that the effect will be temporary if your force has suffered heavy casualties or is low on ammo.

Disengage: This will lower force morale, causing subordinate divisions to tend to increase range or withdraw.

Change Lead division: You can also change the force lead division. This can only be done once in a scenario, to prevent misuse. It can be useful if playing on admiral's mode and you need to change direction of your whole force, or if you think some other division than the current lead division is more suited. This order is likely to cause some confusion in a large fleet until the new hierarchy sorts itself out.

Battle Turn Away: A nation that has developed this can also use Battle Turn Away, which works somewhat like changing force lead division, except that it will also change the order of ships within the divisions, with each ship doing a 180 degree turn. This manoeuvre is optimised to reverse course of the battle line. Even so, it is still liable to cause some confusion.

Ending the battle scenario

A battle scenario has a duration in minutes depending on the size and complexity of the scenario. Battle length will increase once aircraft come into play, to give time for initial search and positioning. When the time is up, the battle will end, unless ships are in sight or aircraft are in the air with a naval strike mission, in which the game can continue to up to twice the scenario length.

There will be 200 minutes of damage control after the battle is over, to allow for ongoing fires or flooding.

After the battle you will be presented with a screen with the battle results, where you can inspect damage to your or enemy ships.

There is a force end button if you want to force the end of a long battle that is already decided. This can be used when half the battle time has passed with a minimum of 400 minutes. Some conditions, like nearby enemy ships or airstrikes in the air, may prevent force battle end.

If you have heavily damaged ships or ships near enemy airbases, using force battle end may risk additional losses to your ships depending on their damage state and proximity to the enemy. You will be fully warned of these risks before accepting force battle end. Enemy ships afloat will all escape.

To try to force the end of a battle press the door button on the left of the toolbar.

To leave the battle screen, just close the main battle map window to get back to the strategic screen.

Battle scenario victory and objectives

The basic victory levels are dependent on points for damaging and sinking enemy ships. Sinking a ship gives substantially more points than just damaging it.

The player can sometimes have objectives for the scenario that give bonus points when completed. These can be of two types:

a. *Sink ships*: Points are awarded for sinking the specified numbers of enemy ships of the correct type. The ships must be sunk within 100 nautical miles of the objective.

b. *Reach objective*: Points are awarded for bringing the specified ships to the indicated location. All the required ships must be within 8000 yards of the location at the same time to trigger the objective.

To find the location of an objective, click on it in the objective list and the objective location will be shown on the map.

A side that has merchant ships on the map will receive bonus points for any surviving merchant ships after the battle.

Useful shortcuts on the battle map

There are a couple of shortcuts to change course. With a division selected:

Shift + left click on the map will change course for the selected division to the clicked location.

Ctrl + left click on the map will change course for the selected division to the clicked location and run the game until the division reaches that point (or some event pauses the game).

Also useful is the **> key** which will run the game 5 minutes if in contact with enemy or 60 minutes if not.

Starting a game

Starting a game and selecting a nation

When you start a new game, you will first select a nation for you to play. You can click the flags of the playable nations and see the main characteristics of the nation as well as their enemies. You can only play the AI, there is no human to human play.

You must also select a fleet size, which determines the size of your budget, and thus the size of your fleet. The size which most closely corresponds to real fleet sizes during the period is large or very large. Be aware however, that managing a big fleet with tens of battleships and several dozens of cruisers and destroyers will be a large administrative task. It is suggested that you play your first game with medium fleet size.

Playing minor naval nations like Austria-Hungary or Spain at small fleet setting can result in very limited resources for the player.

In addition to the budgetary differences, there are other advantages and disadvantages to the different nations that reflect historical factors. The nations also have research advantages in different areas and some bonus technologies that they will research easily. Great Britain has some advantages and disadvantages from its status as a global naval power. See national characteristics for details.

Options

There are a number of options for varying the game. In your first playthrough, you can leave these at their default settings, but in later games, you might want some more variability.

Variable technology This option varies technological development so that some technologies might become available earlier than historically, and others later. Note that when using this option some technological advances or lack of advances may appear to be illogical.

<u>Slow air development</u> This option will slow down the development of aircraft. This option is for those who love the period of the bug gun battleship, and don't want it to be spoiled by things like flying machines.

<u>AI advantage</u> This gives the AI opponent nations 10% stronger economy.

<u>Harsher peace deals</u> This will make peace deals more harsh. Losses and gains in territory will be larger, both when you win and when you lose a war.

<u>Research rate</u> Setting this to less than 100% will slow down all research proportionally for all nations. Like variable tech, some illogical developments may result from this.

<u>Historical resources</u> The starting resources is the game in 1900 are somewhat evened out. In reality, when starting in 1900, Great Britain would have an even larger budget and the smaller nations even smaller. If you want to play with the historical resources, you can select this option. Note that this will make the game harder for smaller nations.

<u>Treaty of Versailles</u> When starting in 1920, you can select to have this treaty in place when the games starts, limiting German shipbuilding.

<u>Other treaties</u> There is also an option to have the Washington naval treaty in effect when the game starts in 1920, or another random arms limitations treaty.

Your legacy fleet

There is an option to start the game in 1900 or 1920. When the game starts, there will be an existing legacy fleet.

If you start in 1900 you will have the option to let the existing fleet of your nation be automatically built, or you may choose to design and build the ships of the legacy fleet yourself. It is recommended that you start with an existing legacy fleet the first time you play the game, as building the legacy fleet can involve a lot of ship design, and it might be better to learn the design process gradually.

If you start in 1920, the legacy fleet will always be built automatically, as there would otherwise be too much scope for the player to tailor the existing fleet. Part of the challenge is working with the ships you inherit.

Building the legacy fleet

If you elect to build the legacy fleet yourself, you will get an amount of money as your starting funds, to be used for buying the ships existing at the start of the game. This will be done in two steps. In step one you will design and build existing ships. Then, in step 2, you will order ships that are under construction when the game begins. You can only keep a proportion of your starting funds for buying ships under construction. The majority must be spent on ships already

existing.

Ships under construction will be about 50% complete when the game starts, but you only pay 5% of their cost. This will in effect give you a 45% discount on these ships, which is potentially a big advantage. The downside is that completing these ships may tie up resources better used in research and building more modern ships.

Game Interface

Loading and saving a game

Games can be saved at any time from the main screen by pressing save game. The game will automatically be saved in the slot you selected for your game.

To load a game, go to the load game when starting RTW and select the slot you want to load.

You can also press continue in the start screen, which will load your last saved game.

Autosave

RTW will autosave after every month and at intervals according to preferences during battles. Thus, if something happens that causes you to exit without saving, game crash, power failure, whatever, you can always reload the latest autosave by selecting the game slot and pressing "Load autosave".

Sending a saved game

If you would want to send a saved game for some reason, you must zip up the entire folder of your game in the RTW\Save directory, for example RTW\Save\Save1 if you are using game slot 1. All the ship design files are needed to reload a saved game which is why the save file alone is not enough. A save is often useful for debugging if you encounter a specific serious bug and want to make a bug report.

The Ship list

Most commands affecting your ships can be made by right clicking a ship in the ship list. Here you can put ships in the reserve fleet or mothball them. You can also open the ship design or define its mission as a raider, and you can order ships to move to other areas.

Many commands work for a number of ships if you multi select ships in the ship list. For example, you can put multiple ships in reserve, or give movement orders to multiple ships at the same time. When multi selecting, use the normal windows actions like holding down shift or control to select in the list.

In the construction tab you can see your ships under construction. Right clicking ships here will give you choices for halting or speeding up construction.

The strategic map

Left click in any area or on a possession when the map is zoomed in a bit to get details.

Right drag to move the map.

Mouse wheel to zoom in.

Right click in the tree to the left for more map options.

Hovering the mouse over an area will give you a tool tip window with information about ships of all nations deployed in that area. Note that ships will move before combat, thus forces may have changed when a battle occurs. This is to preserve some fog of war.

An area where ground combat is in progress will be marked with a red border on the strategic map.

The map tree

The numbers after each area is:

Total player nation tonnage in area, adjusted for colonial service capability

Base points of player ships in area / Total player nation base capacity in area

Giving movement orders to your ships

From an area details dialog. Click on the 'Move ships' button to go to the move ships screen.

or

From the main window, right click a ship in the ship list and select 'Move ship' to go to the move ship screen with that ship selected

or

On the strategic map hold down the mouse button and drag from one map area to another and release.

or

With some ships selected press the M key to get a menu with areas to move the selected ships to.

Note that you give movement orders to your ships that are actually executed when you press 'Turn'.

Also, if giving orders to move to an area two or more areas away, the ships will pick their own route there, and the destination shown for them will be the next area on their route.

Aircraft

The following sections detail the use of aircraft in RTW2. Knowledge of the aircraft part is not necessary to play RTW up to 1920 or so. We recommend new players to stop reading here and start a game in 1900 and play for a while to get a feel for the game functions. When you get to a point in your game where aircraft start to appear, you can continue reading here.

General

In RTW2 you will be able to build and manage airbases and airship bases, design aircraft carriers, installing flight decks, catapults, armored hangars, flight deck armor and many types of AA weapons. You will be able to operate floatplanes from combat ships, issue virtual specifications for new aircraft designs, select designs for production, create and manage aircraft squadrons, and execute aerial searches and strikes during battles.

Airplane Types

Introduction

RTW2 simulates naval airplanes of 6 different roles. These are fighters, dive bombers, torpedo bombers, medium bombers, floatplane scouts and flying boats. Airships are also supported. Each type has its own set of restrictions that determine the types of strike missions available to the plane, the kinds of ordnance that can be carried and the type of base the plane can operate from. Below is a short description of each type.

Fighters

Fighters may fly combat air patrols (CAP) in which they will attempt to intercept and engage any attacking enemy squadrons. Fighters can execute bombing strikes if the specific model used by the squadron is capable of carrying bombs. Fighters will typically use a glide bombing attack when dropping bombs.

Fighters can fly escort missions to accompany and protect friendly bombers from attacks by the enemy CAP. To do this effectively the mission must be coordinated. Fighters on an escort mission that find no enemy fighter opposition can strafe the enemy ships. Fighters on aircraft carriers that are equipped with flight deck catapults may take off without the carrier needing to turn into the wind.

Dive bombers

Dive bombers may be assigned ground strike, naval strike and recon missions. Dive bombers will drop Semi-armor piecing (SAP) bombs with only moderate armor penetration ability until armor piercing (AP) bomb are developed through research. When attacking land targets they will carry general purpose (GP) bombs (roughly equivalent to HE rounds).

Dive bombers are very accurate at delivering their single bomb. The effectiveness of dive bombing can be improved by developing better techniques and equipment through research. When attacking, dive bombers are less vulnerable to enemy AA fire than torpedo bombers but more vulnerable than medium bombers.

A nation will not have access to dive bombers until they have developed the necessary technology through research. Occasionally an aircraft manufacturer will offer a dive bomber model to the player prior to the development of this technology. You will be able to use this aircraft model but you will not be able to develop additional dive bombers without the technology required.

Torpedo bombers

Torpedo bombers are the only carrier capable aircraft that can carry a torpedo, which is the most deadly ordnance that can be used by aircraft to attack a ship. TBs can also carry normal bombs and will drop them using a level bombing attack, a far less accurate technique than either dive bombing or torpedo bombing. TBs will use level bombing when attacking land targets.

Torpedo attacks are very accurate and become more accurate and more powerful as new technology is developed. However, torpedo bombers are very vulnerable to both AA fire and enemy fighters.

Torpedo bombers are developed much earlier than dive bombers or medium bombers and for a number of years will be the only type of aircraft that can effectively attack ships. They remain the most effective anti-ship aircraft throughout the game.

Medium bombers

Medium bombers can only operate from airbases, but they typically have very good range to attack ships far out to sea. MBs normally use level bombing when attacking ships or land targets. This technique, while quite effective against land targets, is the least effective bombing technique to use against ships. However, medium bombers proved to be quite flexible historically. MB bombing techniques can be researched that allow them to utilize the much more accurate (and dangerous to the MBs) method of skip bombing, though it is mainly useful against unarmored ships. Some MBs can be equipped with torpedoes after the technique is

researched. Late game technologies will allow some MBs to be armed with particularly deadly and accurate guided bombs.

The medium bomber as used for naval purposes took some time to mature and in RTW2 you will have to develop the necessary technology through research. Medium bombers make excellent recon planes in the absence of flying boats. The monthly maintenance fee for medium bombers is about 20% more than for single engine planes.

Late in the game it is possible to develop guided weapons. When this occurs medium bombers will be equipped with these weapons however only 30% of medium bomber squadrons will have guided weapons once they have been developed. This is to reflect the fact that these weapons were not very plentiful.

Flying boats

Flying boats are the premier recon planes and often have ranges that are 3 to 5 times longer than any carrier plane. Flying boats must be operated from an airbase. When available they will be chosen first by the AI when it is executing recon missions. Flying boats may also be selected for bombing missions against naval or ground targets. Flying boats use the level bombing technique though they are even less accurate than medium bombers.

Flying boats are one of the first plane types to be developed. Flying boats have a secondary use during the strategic turn - they will attack enemy submarines and sink them. Operating a large fleet of flying boats can help contain enemy submarines. The monthly maintenance fee for a flying boat is about 20% higher than for single engine planes.

Note: In later years of the game, the category flying boats also include other types of maritime patrol aircraft that were land based, like for example PB4Y Privateer, a version of the Liberator bomber.

Floatplane scouts

Floatplane scouts can operate from most ships larger than a destroyer. They can also operate from airbases where they are handled by the AI in the same manner as other aircraft.

To operate a floatplane from a ship, the ship must be designed by the player or AI to carry a floatplane. It is not necessary for the ship to have a catapult installed to operate floatplanes, however if a ship does not have a catapult installed the ship will need to come to a complete halt to launch the plane so it can crane the floatplane onto the sea to allow it to take off. A ship with a catapult may launch a floatplane without changing course or slowing down. Catapults are a technology that must be developed through research. Both catapults and planes must be added to the ship when it is designed or rebuilt.

All ships that recover a floatplane will need to slow down to 10 knots while the plane lands and is winched aboard.

While the primary role for a floatplane scout is search, later models may be equipped with bombs and can execute level bombing attacks, though with rather poor accuracy. They can be sent on both naval and ground strikes. The AI will take control of some floatplanes to use for search patterns but the player does have access to floatplanes that are on ships during battle and may use them for additional searches or for strikes if they can carry bombs.

The player does not allocate floatplanes to his ships manually. Rather, the game will automatically stock to capacity each ship that is equipped with floatplanes at the start of a battle. If you want your airbases to operate floatplanes you will have to allocate floatplane squadrons to them.

If ships that carry floatplanes are not equipped with a hangar, the aircraft will have lower serviceability. It is not unusual to see 50% of your floatplanes damaged at the battle's start. This is because floatplanes without a hangar were often stored in position on their catapult where they were exposed to the elements.

The Aircraft Types screen

You manage your active aircraft models and request the development of a new aircraft model on the AIRCRAFT TYPES screen. You access this screen by clicking on the "*Aircraft types*" button on the main screen.

Name	Role	Year	Max speed	Cruise s...	Rng lt	Rng med	Rng hvy	Firepo...	Mane...	Toug...	Lt bomb	Med bomb	Hvy bomb	Torpe...	Carrier	Floatplane
De Havilland Gannet	Flying boat	1919	79	60	204	140	103	3	3	6	-	1 x 130 lb	1 x 300 lb	-	No	No
Gloster Gauntlet	Torpedo bomber	1919	100	64	105	76	58	1	3	5	1 x 250 lb	1 x 500 lb	1 x 1000 lb	H	Yes	No
Westland Walrus B	Floatplane scout	1920	92	77	93	83	77	3	5	5	-	-	1 x 250 lb	-	No	Yes
Bristol Barracuda B	Fighter	1920	127	67	71	49	36	2	10	5	-	-	-	-	Yes	No
Avro Roc	Flying boat	1921	77	59	155	106	78	3	3	9	-	1 x 130 lb	1 x 300 lb	-	No	No
Gloster Gladiator	Floatplane scout	1921	103	84	112	100	94	2	7	5	-	-	1 x 250 lb	-	No	Yes

Compare all aircraft of role [   ] ▼ X   [Request proposals for new aircraft]   ☐ Show obsolete types

The aircraft types screen

The AIRCRAFT TYPES screen provides a detailed view of your aircraft models. It allows you to filter the view in various ways and can be used to view the known characteristics of enemy aircraft. You also use this screen to request new aircraft models. This process is covered in the **Aircraft Procurement** section.)

Below is a description of the most important values in the aircraft types screen.

Name

The model name is used to identify a specific model of aircraft. Aircraft manufacturers can improve existing aircraft models after they are put into service. When this occurs the same model name will be used but with a letter suffix appended to indicate this is a new improved version of the original model.

Role

The aircraft role will regulate its basic attributes, the type of possible missions it can fly, the type of ordnance that may be carried, and the kind of base the aircraft may operate from.

Maximum Speed

Maximum speed is primarily a combat attribute. Maximum speed is only used in air to air combat and when making a bombing attack. Maximum speed is one of the attributes that contributes to the combat value of the aircraft. High speed will also serve to protect planes that are making bombing runs by making it more difficult to hit them with anti-aircraft fire. Speed is given in knots.

Cruise speed

This is the speed used when the aircraft is moving around the map. Aircraft with light load will move slightly faster and aircraft with heavy load slightly slower.

Rng lt, Rng Med and Rng hvy

These values provide the combat range for the plane given an equivalent bomb load. That is, if a heavy loadout (Hvy bomb) is to be carried then the plane will be limited to the "Rng hvy" range. Ranges are given in nautical miles.

Firepower

This is a rating of the type of weaponry carried by the plane. For most bombers it represents the defensive weaponry of the plane.

> **Designer's notes:** *Up to about 1930 firepower was quite limited by the light construction of most biplanes. Weaponry during this period seldom varied from nation to nation and from one model of plane to the next. If you are looking to maximize your combat ability during this time you might want to look at attributes other than firepower. When monoplanes begin to enter production firepower becomes much more varied and may be a useful attribute to emphasize.*

Maneuver

This attribute represents the ability of the plane to execute effective combat maneuvers particularly during air to air combat. A maneuver value that is substantially higher than the

plane's opponent in air to air combat will make the plane more likely to win the combat. A high maneuver value will also be of benefit in reducing damage from AA.

Toughness

This value represents how much damage, from air to air combat or from AA fire, that a plane can take before it is rendered unable to complete its mission – that is, the point at which it is considered "damaged" or destroyed.

Lt bomb, Med bomb and Hvy bomb

These ratings show the size and quantity of bombs that the plane can carry when ordered to carry a specific ordnance loadout. The category of bomb: SAP, AP or GP (semi armor piercing, armor piercing or general purpose) that the plane will carry is determined by the type of strike mission the plane is flying.

Carrier and Floatplane columns

These columns indicate if the plane is capable of being based on a carrier or if it is a floatplane, which can be loaded on most large warships.

Reliability

This is a rating of how likely this plane type will break down either before battle begins or during the battle, usually while landing the plane. Reliability is not readily apparent when a plane model first enters production and its actual reliability rating is revealed only after it has been operational for some time. From time to time you may get opinions from air units on the reliability of aircraft.

Prior to each battle a certain percentage of planes are placed in a damaged state to start the battle. Squadrons equipped with planes that have lower reliability are more likely to suffer damage during this pre-battle phase and will start the battle below strength. Planes damaged in this way may be repaired and put back into operation during the course of the battle.

Obsolete

This column describes if a plane is obsolete. A plane will become obsolete after a certain amount of time has passed since it was introduced. This is an automatic process that the game handles. A plane will not become obsolete in this manner if it is the only model of that role possessed by the player.

If obsolete models are assigned to squadrons when the model is marked as obsolete, the game will replace the obsolete planes with a more modern plane of the same type. This is not an instantaneous process, so obsolete models may remain in service for a few months after they've

been marked as obsolete. You may even enter battle with obsolete models on board your carriers.

The player may also mark planes as obsolete or remove a plane from obsolescence. You do this by right clicking on the model's line in the AIRCRAFT TYPES screen and selecting "*Obsolete*". This is a toggle control, so selecting "*Obsolete*" for a model that is already marked as obsolete will remove it from obsolescence.

> **Designer's note:** *By using the obsolete function you can exert some control over which of your plane models will be used to populate your active squadrons. You can mark planes as obsolete to clear the way for newer, more effective models. You can also use the function to keep older but more effective models active by marking any newer but inferior models as obsolete when they enter production. In this way you can keep active only those models that you find most useful.*

Comparing Aircraft

The "*Compare all aircraft of role*" drop down list at the bottom of the AIRCRAFT TYPES screen allows you to compare all known attributes of your own planes and the enemy's planes of a specific type (Torpedo bombers, for instance). When you select a role from the drop down list the list of planes in the display will change to show all of the planes of that type that are currently active in the game (excludes obsolete models) . This includes both friendly and enemy planes, however many attributes of enemy planes will often be unknown. Spying and combat experience will increase knowledge about the capabilities of enemy aircraft. Note that not all the known capabilities are shown in the spy or combat experience message due to lack of space. More may be shown in the compare aircraft list.

If you have toggled on the "*Show obsolete types*" checkbox *prior* to selecting a model type to examine, the planes displayed will include every plane of that type that has been produced in the game.

You can sometimes license produce aircraft from other nations. This can be done if you are allied with that nation or if you are playing a nation that is not among the top half of nations in resources and the tension with the nation you want to buy a license from is four or less. Note that you will not receive new models of the license produced aircraft for free, you have to buy an additional license.

The request proposals for new aircraft button

The "*Request proposals for new aircraft button*" will open the AIRCRAFT REQUIREMENTS screen and allows you to request new aircraft. This feature is covered in the next section: **Aircraft Procurement**.

Aircraft Procurement

Procurement Overview

To obtain a new aircraft model you will issue a request for proposals for the new plane, specifying the role of the plane (fighter, dive bomber, etc.) and your two preferred characteristics. You submit the request and wait for national aircraft manufacturers to provide prototypes.

When the prototypes are presented you select one of the prototypes to put into production, or you can reject all of them. After a further wait while the prototype's kinks are worked out, the aircraft is put into production. At this point your air units will automatically start equipping with the new aircraft.

There are other ways you can get new aircraft models. An aircraft manufacturer may develop a new model on their own and offer it to you. As with other prototypes you can accept or reject their offering. In addition, aircraft manufacturers will continue to work on existing models and will occasionally offer an improved model of an existing plane to you.

> **Designer's note:** _The RTW2 aircraft procurement system replicates, in broad terms, the historical process that navies went through to direct the development of new aircraft and procure those aircraft from aircraft manufacturing firms. Historically, navies would issue specifications that listed aircraft attributes that they would require for the new aircraft, such as maximum speed, bomb load, landing characteristics, etc. Aircraft manufacturers would try to match or exceed those specifications. Generally, several manufacturers would build prototypes that would then compete to obtain approval from the navy. The navy would put the prototypes through a series of trials and either reject all prototypes or accept one. The winning manufacturer would get a contract to put their plane into production for the navy._

Issuing a Request for Proposals

To request proposals for a new aircraft model, you first open the AIRCRAFT TYPES screen. At the bottom of this screen you can click the "_Request proposals for new aircraft_" button. This will open the AIRCRAFT REQUIREMENT screen. On this screen you can set the type of plane proposals you are requesting as well as set your priorities for the new model.

You can only have one request for proposals active at a time. Proposals typically take several months to fulfill. This process is faster during war, and is also faster in the early period of the game.

You set the role you want proposals for in the "*Aircraft role*" drop down list. Some roles will need to be developed through research before they are available. Initially you will usually only have fighters and floatplane scouts.

You then stipulate certain aircraft attributes that you want to be emphasized in the proposals. You top priority can be set in the "*First priority*" dropdown list. The second most important attribute you would like to see emphasized is set in the "*Second priority*" drop down list.

For instance, you may want a very durable plane with the ability to carry heavy bomb loads. In this case, you would probably want to select "*Toughness*" as a first priority and *"Bomb load"* as the second priority.

You can select the same attribute twice, to indicate that this is really the top priority. Of course, prioritizing some traits come at a cost. Other attributes may be neglected.

Prototypes

After you are satisfied with your settings you click "*OK*". At this point you will have to wait several months while the aircraft manufacturers create prototypes of the planes. When they are ready you will be presented with three prototypes to examine. These prototypes are displayed using the same format as the AIRCRAFT TYPES screen so it is easy to see how they stack up against other planes. You will get to pick one of the three prototypes to put into production or you can reject them all.

If you accept a prototype it will appear in the AIRCRAFT TYPES screen with a (Dev) designation after its name. The plane is shown here purely as a reminder of the plane(s) you have under development; it will not be equipped by your squadrons until it enters production. At that point the (Dev) designation will be removed.

Unsolicited Aircraft Prototypes

Occasionally, a manufacturer will develop a new plane as a private venture. When this happens, you will be shown the planes attributes and asked if you want to put the plane into production. If you accept, you will need to pay a development fee and the plane will go into production after a few months. You are free to reject the model if you wish.

Updated Aircraft Models

Some aircraft manufacturers will continue to work on models that have been accepted for production. They will occasionally offer a new version of the same model with one or several improved attributes. Sometimes these advanced versions are very significant improvements over the original model, but they are always better in some way. When this occurs the improved version will have a letter appended to the end of the original model's name and it will be

treated as a completely different model. There may be several improved versions developed for a single model, each being designated by a higher letter.

Aircraft Type Names

The names of aircraft types are randomly taken from a list of aircraft types used by that nation. You can change the name manually by right clicking on the aircraft type and selecting change name.

> **Designer's note:** *We are of course aware that not all nations used letters to denote improved types. If you want to number improved types, or call them Mk II, you can always change the name of the aircraft type manually.*

Squadrons

Overview

The squadron is the basic air unit in RTW2. When you assign planes to an aircraft carrier or airbase you will do so by assigning squadrons. If you want to move aircraft from one carrier to another or to an airbase you will move a squadron. When you launch an air strike it will be by squadron.

When you create a squadron you will designate its role. Each squadron will have a single role and will equip with aircraft with that role.

During the strategic turn you can name your squadron, adjust the number of planes in the squadron, change the role of the squadron, move the squadron to another base or carrier or disband it entirely.

The game will automatically handle the process of populating your squadrons with aircraft models from those that you have currently available.

Each squadron is rated for the experience of its crews. Experience affects almost every action taken by a squadron during a battle.

Squadrons will gain experience with time and through combat experience. Changes to the squadron's composition, aircraft type and number and heavy losses in combat can decrease a squadron's experience rating.

Elite air units

If an air unit scores 10 air combat kills, or 10 bomb or torpedo hits on enemy ships, it will be accorded elite status. An elite unit will have a higher proficiency level that other air units, even in peacetime.

Carrier capable air units

Operating from an aircraft carrier requires special skills and training, not found in every air unit.

Air units can be created as carrier capable. Carrier capable units can be created on land or on carriers, but they cannot be converted later.

Carrier trained air units cannot number more than 120% of the air capacity of existing carriers in peacetime or 150% in wartime. This is reduced to 110% if using elite pilot training.

Carrier capable air units cost 150% of the maintenance of other air units.

The AIR GROUP MANAGEMENT **screen**

Squadrons are created, modified and moved in the **AIR GROUP MANAGEMENT** screen. This screen has two main panels. On the left is a list of all the airbases and carriers that your nation has available. When you select an aircraft carrier or airbase in the left panel, all of the aircraft squadrons at that base will be displayed in the right panel.

All	Role	Aircraft type	Name	Aircraft	Base	Score	Experience	Carr...	Maint...
Reserve	Flying boat	Avro Roc	716 Squadron	4/4	Airbase Singapore (A)	0/0/0	Poor	No	38
Naval air station Grimsby (20/20/20) (A)	Fighter	Bristol Barracuda B	717 Squadron	8/8	Airbase Singapore (A)	0/0/0	Poor	No	51
Naval air station Plymouth (20/20/20) (A)	Torpedo bomber	Gloster Gauntlet	718 Squadron	8/8	Airbase Singapore (A)	0/0/0	Poor	No	51

Airbase Valletta (17/20/20) (A)
Airbase Kota Bahru (20/20/20) (A)
Airbase Singapore (20/20/20) (A)

Select all

Total number of aircraft: 77 single engined airplanes, 20 multi engined airplanes, 0 floatplanes on ships, 0 airships   Authorized aircraft in carrier capable units: 0
Total aircraft ASW value: 8   Training capacity for carrier aircrew: 0

The air group management screen showing British air strength in the early 1920s

All

If you select "All" then all of your squadrons at every airbase, carrier and in the reserve will be displayed in the right panel.

The Reserve

The reserve has no physical presence in the game. Any squadron placed in reserve will continue to train and improve in experience but cannot be involved in any combat. There is no limit to the number of squadrons that can be placed in reserve. You will pay normal maintenance fees for aircraft in reserve.

You may right click on any selection in the left panel to bring up a menu with options to add an air unit or automatically fill the base with aircraft. These options are covered below.

How to Create a Squadron

To create a new squadron, right click on one of the airbases, the reserve, or a carrier in the left panel in the **AIR GROUP MANAGEMENT** screen. Select the "Add air unit" option. You will open a small dialog in which you pick the squadron role and set the initial number of aircraft for the squadron. Clicking OK will create the squadron. The squadron will start with an experience rating of Poor.

Auto add aircraft

When this option is selected the game will attempt to bring the base up to its maximum capacity. It will first add additional aircraft to any squadron that has fewer than 18 planes. If there are insufficient squadrons present to reach the maximum capacity it will create new squadrons.

The Right Panel

The right panel display information about each squadron at the selected base. You can drag and drop squadrons out of the right panel and drop them onto a different base in the left panel to move the squadron. The information in the panel may be sorted by clicking on any of the column headers. Here is a brief description of the right panel columns.

You can right click on any squadron to open a menu to change the name, number of aircraft or the role of the squadron.

How to move a squadron

You move a squadron using drag and drop. In the **AIR GROUP MANAGEMENT** screen you select the base that has the aircraft you want to move in the left panel. You then drag the squadron out of the right panel and drop it onto the destination base in the left panel.

How squadrons get their planes

When a new aircraft model is introduced and enters production the new models will begin to replace older models. This process is gradual and can take several months to complete. Plane models that are marked as obsolete will not be assigned to squadrons, but may remain in service until a replacement type is available.

If any of your bases are not at maximum capacity, the game will ask every six months if you would like to automatically add aircraft to your base. Answering yes to this option will cause your base to be filled to its maximum capacity with aircraft in a manner similar to that explained in the "Auto Add aircraft" section above.

Aircraft totals

At the bottom of the **AIR GROUP MANAGEMENT** screen the total number of naval aircraft operated by the nation is shown. This total includes all floatplanes on all ships. You can compare this figure to the "Naval aircraft" maintenance costs shown on the main screen.

Also in this area, the game displays the total aircraft ASW value.

The cost of aircraft

Each aircraft requires a monthly maintenance fee. The cost to maintain one single engine plane per month is 8,000. The cost to maintain each multi-engine plane is 10,000. You can track these costs on the main screen budget area in the "Naval aircraft" field. Aircraft maintenance fees are reduced by 20% during peacetime.

Aircraft Carriers

Designing Aircraft Carriers

The design and construction of aircraft carriers are regulated by advances in the research area "Shipboard aircraft operation". This area of research will not be immediately available but will be discovered in time. When you reach level 3 (Flight deck) you will be able to convert existing ships into CVLs (light aircraft carriers).

Additional research in this category will allow you to design CVLs from scratch, then convert existing ships into full size CVs. Finally you will be able to design and build CVs from scratch. The AI nations must go through the same process.

Further ship design restrictions apply to the construction of carriers:

- The displacement for an aircraft carrier may not exceed 4 times the current research level in "Shipboard aircraft operation. CVLs may not exceed displacement of 16,000 tons and may carry no more than 34 planes.
- The first CV (not CVL) built by a nation must carry at least eight 8" guns if 20,000 tons or larger; otherwise, it needs to carry at least eight 6" guns.
- Purpose built carriers must have a flat deck on top of belt armor scheme.
- Aircraft faster than 120 knots will be restricted to light load if operating from a carrier with less than 10,000 tons displacement, unless the carrier has at least one catapult.
- Flight deck catapults (once researched) are limited to 2 on carriers until the angled flight deck is researched.
- CVs that carry more than 100 planes will be penalized with slower air operations, added costs, and excess weight required in the design.

> **Designers note**: *Through operational use during WWII the Americans discovered that carriers with very large air groups faced significant issues with the management of air operations.*

How to create a converted carrier

Once you have researched the appropriate techs you will be able to convert other ships into aircraft carriers.

CVL conversions

To convert an existing ship into a CVL (light aircraft carrier):

- You must start with a ship with a displacement under 16,000 tons.
- Use the right click "Open design for rebuild" option on the selected ship to open it in the SHIP DESIGN screen. .
- In the SHIP DESIGN screen on the "Flight installations, missiles" tab, check "Flight deck" and add at least 5 planes to the "Air capacity".
- Click on the "Check design" button and the game will ask if you want to convert the ship into a CVL.
- If you answer yes the game will convert the ship and you will see the "Ship type" field change to say CVL .

There will probably be other issues you will need to take care of to make the CVL completely viable, such as replacing engines to increase the ship's speed and removing centerline turrets.

CV conversions

To convert a ship into a CV:

The ship to be converted must start with a displacement that is within the player's current tonnage restriction for CVs (See the **Designing Carriers** section above).

- Use the right click "Open design for rebuild" option on the selected ship to open it in the SHIP DESIGN screen. .
- In the SHIP DESIGN screen on the "Flight installations, missiles" tab, check "Flight deck" and add at least 25 planes to the "Air capacity".
- Click on the "Check design" button and the game will ask if you want to convert the ship into a CV.
- If you answer yes the game will convert the ship and you will see the "Ship type" field change to say CV.

There will probably be other issues you will need to take care of to make the CV completely viable, such as replacing engines to increase the ship's speed and removing centerline turrets.

Carrier-specific design elements

Armored Deck and armored hangar sides

An armored deck may be installed on a carrier. An armored flight deck will increase a carrier's resistance to bombing attacks and plunging fire from surface attacks. To install an armored deck, you adjust the "Flight deck armour" spinner in the "Flight installations, missiles" tab of the Sʜɪᴘ ᴅᴇsɪɢɴ screen. As you adjust this spinner you will see the cost in weight in the field to the spinner's right. There will also be an added expense. A similar process is used to add hangar side armor to your ship design.

Flight Deck catapults

Flight deck catapults may be installed on any carrier after the technology has been researched. Note that this type of catapult has different effects and rules than the trainable catapults that are installed in surface ships. Flight deck catapults can only be installed on carriers. Flight deck catapults will increase the spot value of the carrier. Carriers with flight deck catapults do not need to turn into the wind when launching fighters on CAP or planes flying recon missions. The number of flight deck catapults that can be installed is limited to two unless "Angled flight deck" has been researched.

Edge elevators

Installing these will improve readying and spotting times and give a slight bonus to the spot value of the aircraft carrier.

Carrier-specific Superstructure Editor Modifications

Some changes have been made to the superstructure editor to accommodate the unique visual aspects of aircraft carriers. Secondary guns and casemate guns will not be displayed on aircraft carriers.

Carriers were often not symmetrical, so the ability to draw asymmetric shapes in the editor is supported. In addition, guns on carriers can be arranged in an asymmetric. Smokestacks may also be drawn off center.

Rebuilding Aircraft Carriers

There are a few considerations to keep in mind when rebuilding aircraft carriers. A large increase in the aircraft capacity will increase rebuild times. Any aircraft assigned to an aircraft carrier that is rebuilt will be frozen in experience. They are assumed to keep up their skills by training on some land airbase.

Aircraft Carriers in Battle

Battles that include aircraft carriers will generally have a longer duration than battles without carriers. Until a separate Carrier Force is researched, carriers will be deployed into their own

divisions attached to the Main Force. These carrier divisions and any screening divisions will often operate on their own, independent of the Main Force. They will try to maneuver a considerable distance to the rear of the main force.

If you have researched carrier force and there are two or more carriers in the region where the battle occurs, the carriers in the battle may be deployed in a separate Carrier Force. The player will have control over this force. With enough ships available it is possible for a nation to have a Main Force, a Scouting Force and a Carrier Force present in a battle.

In battle, aircraft carriers use special operating procedures that are quite different from other surface warships. When operating under AI control, aircraft carriers will try to keep their distance from the Main Force or from the force flagship in an attempt to avoid detection by enemy forces or a direct confrontation with enemy surface warships. Carrier divisions will generally operate between 20 and 50 nm behind the friendly leaders. They will often move to place the force flagship between themselves and the perceived location of the main enemy force.

There are also other carrier specific behaviors. A carrier that is launching a strike will always turn into the wind and go to its highest speed to launch its aircraft. A carrier will also always turn into the wind and use maximum speed when its planes are landing aboard. A carrier launching planes on search missions or on CAP missions will turn into the wind to launch its planes unless it is equipped with flight deck catapults. Carriers equipped with flight deck catapults will use their catapults when launching fighters on CAP or any plane executing a recon mission and will not need to turn into the wind. When these maneuvers occur the AI will take control of the carrier and the player will be unable to issue movement orders even if it appears that he has control of the division. If the carrier division was operating under player control prior to turning into the wind it will automatically return to it previously ordered movement direction and speed after launching or landing its planes.

Regardless of the maneuvers of the carrier divisions or how far they may be separated from the Main Force or their own Carrier Force flagship, the player (and AI) may always issue air operations orders to his planes(assuming weather permits). In other words, the player will always retain control of his air squadrons.

Carrier Division Roles

Carrier divisions are only able to have two roles assigned – Independent and Support. If the carrier division is assigned to the Main Force the role of "Independent" will cause the carrier to operate on its own and often far from the Main Force flagship. If a carrier division is assigned to a Carrier Force, a division with a role of "Independent" will attempt to remain within close proximity to the Carrier Force flagship. In both cases, the carrier turning into the wind to

operate aircraft may cause the carrier to move away from its preferred position relative to the flagship.

A role of "Support" will cause the carrier division to divide any CAP it puts up with the division that has been assigned as the "Lead formation", sending ½ of the fighters to protect the "Lead division". This is a way for a carrier to provide CAP for the main force.

Carrier damage

Carriers are more susceptible to superstructure hits than most surface warships and superstructure hits can be converted into hangar hits, which may also damage or destroy aircraft on board. Carriers will be more susceptible to damage and fire when there are readying planes on board.

A carrier that has more than 40% superstructure or flotation damage or is on fire may not operate aircraft. You will get a message to that effect.

Damage to a carrier will make air operations like readying and spotting slower.

If aircraft are out of fuel and unable to land on their carrier, they will ditch. Note: This is a simplification. In reality they would try to divert to other carriers or land bases, but in the scope of an RTW battle they would likely not take any further part in the battle.

Misc. Carrier information

- A carrier's operational status (Active, Reserve, etc.) can affect the experience rating of its air group.
- Flight deck catapults will increase a carrier's spot value and slightly reduce spot times.
- All CVs and CVLs have an intrinsic ASW value. This value is initially low but will increase as various technologies are researched, such as aerial depth charges and airborne radar.
- The research area "Shipboard aircraft operation" may not have its priority set to high until the nation has an operational aircraft carrier.

Seaplane Carriers

Seaplane carriers (AV) are warships designed to carry a load of floatplanes and operate those planes at sea. Seaplane carriers may only be equipped with floatplanes, they cannot carry wheeled aircraft. You will not be able to design seaplane carriers until you have reached level 1 in the research area "Shipboard aircraft operation". Seaplane carriers may be equipped with guns and torpedoes like other ships. There are no restrictions on the size of a seaplane carrier or the number of floatplanes it may carry.

A seaplane carrier (or any ship) may be equipped with a seaplane hangar. The cost of this installation will vary depending on the number of floatplanes carried. A seaplane hangar will increase the serviceability of aircraft on the ship.

You do not need to create floatplane squadrons and then assign them to a seaplane carrier. The game will automatically populate your seaplane carrier with floatplanes to whatever air capacity level you have installed during the design process.

Once invented, catapults may be installed on seaplane carriers. A ship that does not have a catapult must come to a complete halt to launch floatplanes. A ship equipped a catapult does not need to stop, slow down or turn into the wind to launch floatplanes. A ship recovering a floatplane after a mission will need to slow down to around 10 kts while the floatplane lands and is hoisted aboard the ship.

During battle, the floatplanes on a seaplane carrier (or any other ship) operate in almost identical ways to the operation of planes from an aircraft carrier. Using the SET UP STRIKE SCREEN, floatplanes may be assigned to CAP, ground or naval strikes or sent on recon missions. Floatplanes may not be assigned an escort mission.

AI nations will reduce the construction of AVs and their use in battle after about 1930.

Land based Air

Overview

Players and the AI can build Naval Air Stations and airbases to allow them to operate naval aircraft from land bases. There are specific locations provided on the map in which these facilities can be built, generally the same as your naval bases, though there are some locations that are airbases only. Naval Air Stations and airbases operate in an identical manner; NAS are simply airbases that exist in the national homeland. "Airbase" will be used from this point on to represent both.

Each airbase is rated for its maximum aircraft capacity. The capacity of a newly built airbase is 20 airplanes. The maximum aircraft capacity of an airbase is 100 on small and medium fleet size and 120 on larger fleet sizes. The larger airbases become available only after technological advances in Naval Aviation, Heavier than air. Aircraft capacity can be increased, up to the currently allowed maximum capacity, by paying to expand the airbase in increments of 20 planes per expansion

The player can select the air units on airbases, the number of aircraft their role. However, the AI controls air operations from land airbases during battles, with a moderate amount of pre-battle direction from the player.

During the strategic turn you as the player can modify air units, rename them, resize them or change their role. You can move them from one base to another base or even to and from a carrier, if the planes are carrier capable. The player does not have control of the specific type of aircraft operated by an air unit. Aircraft are replaced automatically when a new model becomes available, but at a random pace, so some units may be operating older types for a while.

Airbases can be in active or reserve status (not mothballed). Airbases in reserve will have fewer aircraft, and the experience of air units based there will not be as good as on active bases.

During battle, airbases are controlled by the AI. The player has no control beyond ordering a preference for land or naval targets at the start of a battle. The AI will follow your directions, but not slavishly. Airbases operate in a manner that is very similar to aircraft carriers and have almost identical restrictions and procedures. Airbases go through the same readying and spotting as on carriers and the same missions are available to each, though in contrast to carriers, the operations at land bases will always be handled by the AI.

Though land based air is controlled by the AI during battles, their squadrons are shown in the **AIR FORMATIONS** screen alongside the carrier based squadrons controlled by the player. On this display you can keep track of what the land based air is doing and watching each squadron being assigned missions and going through the many different statuses such as readying, taking off and attacking.

Carrier capable air units can operate out of either airbases or carriers interchangeably. Only airbases may operate medium bombers and flying boats. Floatplane scouts can operate from airbases, floatplane carriers or other ships equipped with floatplane facilities.

How to build an airbase

To build an airbase open the **MAP** tab and click on a possession. Click on "Build fortification" and then scroll down and select the "Airbase" option. Click the Location drop down and select the specific location to build the airbase. You will see the time required to build the airbase and various costs detailed. Click OK to start the build process. You can also accomplish this by clicking on the **Build Fort/Base** button on the main interface.

You can also go to the base overview tab and right click on an airbase to build or expand a base.

When the airbase is complete you will be notified and you will be asked if you'd like to automatically populate the base with aircraft. You can also do this manually at any time during a strategic turn. The new airbase will have an air capacity of 20.

How to expand an airbase

You expand an airbase on the **COASTAL FORTIFICATIONS** tab. After opening this tab, you will see a list of fortifications including your airbases. To expand an airbase right click on the airbase's line and select the "Expand base" option. If the base is not at the current maximum capacity for your navy you will see the status change to "E-4" or a similar number, which indicates the number of months before the expansion is complete. The" Costs" column will show a new monthly cost for the expansion. When the expansion is complete you will be notified and the airbase's capacity will increase by 20.

The maximum size for a nation's airbases is based on the current level of research achieved in the "Naval aviation, heavier than air" technology field.

As an alternative method you can use the **BASE OVERVIEW** tab on the main screen where all possessions and bases controlled by the player are listed. A simple right click on any location will allow you to build or expand multiple airbases airbase or improve multiple naval bases very quickly.

How to add or remove airplanes from an airbase

You add and remove squadrons from an airbase as explained under Air Procurement and Management section above.

Setting the target priority for airbases

Prior to the start of each battle the game will ask you to set the type of target you want your airbases to attack during the upcoming battle. The choice offered is normally between naval target or land target, and occasionally to focus on the objective. The AI will attempt to attack your preferred type of target but it may also attack other targets.

Airbase activity during a battle

Airbases will conduct extensive searches that utilize, by preference, flying boats, floatplane scouts, medium bombers and finally any other available planes. Generally they will select the most long ranged aircraft for searches. Flying boats are especially adept at long range searches over areas of the ocean that are suspected of containing enemy naval forces. Sighting reports from land based air searches will be available to the player, but with some delay.

Airbases will carry out attacks against land targets, typically other airbases, and against naval targets. To carry out an air strike the airbase goes through the same series of steps that the player goes through when preparing to launch a strike from a carrier.

Airbases will also put up CAP. In regions where airbases are within range of each other's bombers there will usually be a lively exchange of attacks as each side attempts to suppress the other's air power during a battle.

Airbases and ASW

Airbases serve to suppress and sink enemy submarines. The ASW value of an airbase depends on the number of flying boats stationed there, with each flying boat contributing to the overall ASW effort of your side during wartime.

Airbase Costs

The cost to build a new airbase is shown on the **BUILD COASTAL FORTIFICATION** screen when you select an airbase from the list of available fortifications. This screen will also show the monthly maintenance fee. The maintenance cost is the same for all airbases regardless of the airbase capacity. Airbases that are not in the homeland cost 20% more. Larger airbases cost more to maintain.

Automated restocking of planes

Every few strategic turns the game will offer to automatically fill your airbases or carriers with planes. If you accept this offer the airbase or carrier mentioned will have the number of planes in its squadrons increased until the carrier or base's capacity is reached. In some case if there are insufficient squadrons at the base or carrier the automated system will add squadrons to bring the base or carrier up to capacity. If you reject the offer the game will not make additional offers until several strategic turns have passed.

Airships

Airships in RTW2 represent rigid frame dirigibles that were primarily used for recon duties. The player will need to build airship bases from which his airships may operate. The player does not design or build individual airships.

Airships work much as other land based aircraft. They are primarily useful for long range scouting, and can fulfill that role when other long range aircraft are not yet developed. They will occasionally perform bombing attacks, but are relatively ineffective in this role.

Airship bases

Airships bases are built in a manner almost identical to airbases. An airship base may be built at any base location owned by the player. An airship base may be built in the same location as an airbase. Airship bases may not be expanded. They require a small maintenance fee each month. Airships are more expensive to maintain and more accident prone than other aircraft. They always have poor reliability.

Each airship base will support 8 airships. You do not design or build individual airships; they will be automatically generated by the game at each airship base. Airship capabilities will increase through research into the airship technology.

Airship obsolescence

After 1938 AI nations will no longer purchase airship bases.

Aircraft in tactical battles

Aircraft operations and weather

Light or heavy mist, low clouds and any type of precipitation will hinder air operations. Aircraft will not take off and any aircraft already in the air will return if the bad weather persists. Aircraft in the air will have lower chances of finding enemy ships and reduced accuracy in attacks. Aircraft landing in bad weather will suffer increased operational losses.

Heavy seas will stop floatplane operations and increase operational losses for all aircraft operating from ships.

The Air formations screen

The Air formations screen provides an overview and a detailed minute by minute description of the state and condition of your air squadrons. You can see the activities and states of all of your aircraft, even land-based aircraft that are controlled by the AI during a battle.

There are three checkboxes at the bottom of the AF that allow you to filter aircraft that are on recon or CAP missions (which are largely handled by the AI) or remove planes that are in an Unready state. This allows you to narrow the focus to the specific activity you are interested in, such as viewing only aircraft that are readying for or actively engaged in strikes.

Aircraft status

Air formations can be in different statuses during the course of a scenario. There are 11 different statuses for a squadron as described below.

Unready –The squadron is stored on deck or in a hangar in an unfueled and unarmed state. Unready planes are not a significant danger to the ship if they are hit by a bomb.

Readying – The squadron is being armed and fueled in the hangar. This process can take some time. For sea based aircraft a mission and ordnance load for the squadron is generally selected by the player using the Air Strike screen before readying occurs, however the AI will also automatically ready some sea based planes for Recon and CAP missions. Land-based squadrons that are controlled by the AI go through the same process to prepare for a strike.

Ready – When each plane in a squadron has been fueled and armed the squadron is considered ready. In this state the squadron's planes, now completely fueled and armed, but still in the hangar are very susceptible to damage from enemy attacks. Readied aircraft substantially increase the risk of a fire if the carrier is hit. Ready squadrons may remain in a ready state indefinitely. Ready squadrons can be assigned to a strike at any time or they can be ordered to stand down, sending them back to the hangar to be disarmed and defueled.

Spotting – When a squadron is assigned to a strike its status will change from Ready to Spotting. Spotting represents the process of bringing each plane from the hangar up to the flight deck and positioning it on the deck in preparation for a takeoff. As part of the spotting process, engines are started and warmed up for some time before the planes can take off.

Note that sometimes aircraft will have to wait for a previous strike to take off before they can begin spotting. If a strike ordered to take off remains in ready state, this is probably the cause.

Spotted – Spotted status indicates that all of the planes in the squadron have been moved into position on deck, with their crew onboard and their engines warmed up. They are ready to take off and generally will begin taking off in the next turn.

Taking off – The squadron is taking off. This will take several minutes depending on the size of the squadron. When planes are taking off from a carrier it will normally turn into the wind. A carrier equipped with flight deck catapults can launch planes on search or CAP missions without turning into the wind.

Flying – Once the last plane in a squadron has taken off the squadron's status will change to Flying. For a squadron on a strike mission, its status will remain Flying until it locates a target and begins to initiate an attack. Squadrons on Search missions will have a Flying status until they reach the end of their search range. Planes flying CAP will have a Flying status until they are Landing.

Attacking – A Squadron that is about to attack or is currently attacking will show this status. Most attacks take several minutes to execute. See section titled **"The Air Strike Attack"** for more details.

Returning – After the last section of a squadron executing a strike has completed its attack, the squadron will assume a Returning status and fly back to its base. This status will also apply to scout planes returning from a search mission and occasionally for CAP planes returning from distant CAP coverage over a supported force.

Landing – Squadrons that reach their home base or carrier will begin landing. Landing can be a particularly hazardous activity and is where many operational accidents happen, especially in adverse weather or night conditions. A carrier will always turn into the wind when a squadron is landing. Floatplanes will cause their home ship to slow down to 10 kts while they are landing and being hoisted aboard.

Striking below – Immediately after a squadron has landed, the squadron's status will change to Striking Below as the carrier or airbase moves the planes to the hangar. Once the striking below process is completed the squadron status will change to Unready and it will be available for another mission.

Aerial Search

Carriers and airbases will conduct aerial searches during a battle, sending planes flying in specific patterns in an attempt to locate enemy ships and report that information to the player or AI. This process is semi-automated. The player will designate a section of the map that he wants to search for each force. The game will then automatically assign planes to execute the search using planes located on ships or airbases in that force.

Selected planes will fly out along vectors determined by the search pattern. If the searching plane sights enemy ships, it will send a sighting report back to the player or AI. The plane will continue along its flight path until it reaches the designated distance from the airbase or carrier. It will then do a short dogleg and then turn around and fly back to its base, continuing to search as it flies.

Setting up a search pattern

Before you can assign a search pattern to a force you must first select a force or airbase. To select an airbase you will need to open and select the force or airbase on the OOB tab. Right click to bring up the menu and select Search pattern.

ROUTINE AIR OPS screen

The **ROUTINE AIR OPS** screen provides several controls for setting the size and type of search to execute. In the "Search pattern" section of the screen are three spinner controls that let you set the width of the pattern to search and the maximum distance from the base that the searching planes will fly. As you adjust these spinners you will see the search pattern, which will be drawn in red on the map, move to reflect your changes.

The originating point of the search pattern is centered on the flagship of the selected force, but there may be ships that contribute planes to the search effort that are many miles from the flagship.

On this screen you can also select a "Two phase search". This type of search will send out an initial wave of searching planes and will follow it in a few minutes with a second wave of searching planes along the same vector. This technique must be developed through research before it can be used.

> **Designer note:** *The intent of a two phase search was to spot any ships that stray into the search pattern after the first plane has passed over the area. This technique was often used to allow the first wave of planes to "steal a march" by gaining some distance from the ship in the early dawn hours before there was enough light to effectively search.*

Once you are satisfied with your search parameters, click "OK" to set the pattern. The game will automatically assign the correct number of planes to search the pattern. The planes assigned to

a search mission may come from any ship in the force. The game will generally assign one plane to every 20 degree segment that needs to be searched.

Search Operational Issues

Search is not always reliable. Search planes are subject to the same operational failure issues as other warplanes. Floatplane scouts in particular are prone to mechanical failures. A plane aborted for mechanical reasons may not search all or any of its assigned segment. Planes on recon missions can also veer off course.

Planes assigned to recon missions by the game will always ready, spot and fly as solitary planes. Generally, the planes with the best range will be used for search.

Planes on recon missions may be attacked and damaged or shot down by enemy fighters if they are spotted. Planes on recon missions will not attack enemy ships, however they may attack enemy submarines they sight. Planes on recon mission do not engage in shadowing tactics; they will report a sighted force and then continue on their assigned course.

> **Designer's note:** *The player should pay attention to any attacks on his recon planes, which can provide vital clues to the location of enemy carriers.*

Floatplane search priority

You can find the checkbox for **"**Floatplane search priority" on the **DOCTRINE AND TRAINING** screen.

If the "Floatplane search priority" is checked, floatplane scouts will be used for recon missions from naval forces in preference to any other aircraft type. If there are insufficient floatplanes available then other plane types might be assigned to search missions. If this option is not checked then carrier planes will be preferred for search from carrier forces.

When Search is possible

The game will only execute one automated pattern search per day. If the battle is long enough a second automated pattern search will be executed in the afternoon. You cannot manually initiate a pattern search.

An automated pattern search will be initiated on turn 1 of any battle (unless it is near twilight or full dark), so it is critical to set each of your desired search patterns on turn 0 prior to running the first turn of the game. Changes after this point do not affect planes that have already been assigned to a Recon mission.

If the battle is long enough to enter a dawn period the game will execute another pattern search at dawn. You will want to make adjustments to the search parameters in advance of that happening.

Search as a strike mission

Players may also manually order planes to fly a recon mission using the same system he uses to order an airstrike. A recon mission can be flown by any plane type.

You would normally use just a single plane for a recon mission and but you may assign multiple planes to the same recon mission. Multiple planes will fly as a group but in every other way follow recon mission protocols.

The player will need to set a target location for a strike search. Once launched the search plane will fly directly to the target location and then turn around and return to its carrier.

Once ordered to launch a recon mission follows the normal strike procedure of spotting, take off and flying. You can create an ad hoc search pattern by launching several planes using a similar distribution pattern.

Sighting reports

A sighting report is a brief message that reports on the number and types of ships sighted, as well as the location of the force, the direction it is moving and its approximate speed. The report also includes the time of the sighting and the identity of the reporting source.

Any of the information mentioned above can be inaccurate in a sighting report.

There are three locations where you can find sighting reports, the **REPORTS** tab, the "Targets" drop down list on the **SET UP STRIKE** screen and on the battle map itself in the form of labeled icons.

The **REPORTS** tab shows a list of all sightings that have occurred in this battle. The sightings are arranged in chronological order of when the sighting was received with the most recent at the top.

Below is a typical sighting report followed by an explanation.

14 11:39 1 TR COURSE NNW – RECON #85

14 11:39 – The date and time that the sighting occurred (This is not the same as the time the sighting report was received, which is usually some time later.) The sighting time may not be available in which case 00:00 is shown instead.

1 TR – This is a description of the number and type of ships sighted.

Course NNW – This is a general description of the direction that the sighted force was moving at the time of the sighting. This information is also shown on the map in the form of a line drawn from the site of the sighting along the path that the force was moving when sighted.

Recon #85 – This shows the source of the sighting (may also be a submarine or AI controlled surface ship).

Delays

All sighting reports are more or less delayed. The delay is reduced by developing the CIC.

Combat Air Patrol (CAP)

Overview

In RTW2 CAP is largely handled by the game's AI. The player only has to set the strength of the CAP. Note that there is a downside to a strong CAP in that fewer fighters will be available for escort and offensive operations.

 The game will attempt to set an air operations schedule for the available fighters that will allow the task force to maintain a constant patrol over the task force. Fighters will remain aloft on patrol over the TF and then land to be refueled. Part of this process involves turning the carrier into the wind for most take offs and all landings. All of this is handled automatically by the game. Changes to the CAP settings in the course of a battle will take effect with some delay if existing CAP is already in the air.

Setting CAP levels

The controls for setting CAP are on the **ROUTINE AIR OPS** screen. This screen allows you to set the percentage of available fighters that will be devoted to CAP. There are 4 levels you can set ranging from Light to Maximum. A setting of Maximum will cause the carrier force to devote around 50% of the available fighters to CAP. This screen also allows you to set search parameters.

All carriers within a force will contribute fighters to the CAP mission,

CAP to supported divisions

If a carrier division is assigned the "support" role, it will fly distant CAP over the supported division, that is, the division set as Lead Formation. The carrier division will then begin to send fighters to the supported division and will attempt to maintain a constant CAP over that division.

Carrier divisions assigned a support role will hang back several nautical miles behind the supported division, in contrast to other ships with support role, which will tend to stick near to the supported division.

Distant CAP

A carrier division may be ordered to provide CAP to other divisions that are part of any force on the friendly side, for example a convoy. In the division screen you select a division in the 'Provide CAP to' dropdown list. This will be in addition to CAP provided to itself and a supported

division. Having a supporting carrier provide CAP to another division as well may exhaust the available fighters in that carrier division.

Note that floatplane divisions may also provide CAP using this function. Floatplane CAP is rather ineffective though, but it can be used as a measure of desperation, as the Japanese did for Guadalcanal-bound convoys.

Requesting CAP from land bases

One friendly division may request CAP from land bases (button in division screen). The nearest land base will try to send fighters to cover that division. This method of providing CAP is somewhat uncertain, as land and sea coordination was historically often less than perfect.

Other factors that affect CAP

If a nation has researched the **Flight deck catapults** technology the nation may install flight deck catapults. Once installed, this equipment will allow a carrier to launch fighters on CAP, and planes assigned to Recon missions, without the need to turn the carrier into the wind. Carriers will always turn into the wind to recover all planes.

There are several other procedural and technological advances that increase the effectiveness of CAP through research.

CAP and combat

The purpose of a combat air patrol is, of course, to protect ships and assets from aerial attack. Fighters assigned to CAP will patrol the general vicinity of the ship or base they have been ordered to protect. If enemy planes come within range of the CAP fighters the fighters will attempt to engage and destroy the enemy planes.

In the early years of aircraft CAP is rather ineffective at engaging incoming enemy aircraft. However, with technological progress, particularly in radar, CAP effectiveness will increase considerably.

Air to air battles can occur before or after the attacking planes complete their air to surface attacks. If the air to air engagement occurs prior to the attacking planes releasing their ordnance any results of the engagement will be applied before the attacking planes can drop their ordnance.

Air to air combats occur at the squadron level, that is, one squadron or section of a squadron is pitted against an enemy squadron or section. The results an air to air combat can range from no effect to damage of the plane to aborting the attack mission to outright destruction of enemy planes.

The results of an air to air combat can impact either the attacking planes or the defending planes. Each individual plane that is damaged, killed or aborted will be shown on a separate line in the log.

- No effect - If there is no effect from the combat then no air results will be shown.
- Damaged planes may attempt to attack the target but with reduced effectiveness. Damaged planes are more likely to crash and be destroyed upon landing.
- Destroyed planes – The plane (and maybe the pilot) is destroyed.
- Air combat will also inflict disruption on both attacker and defender. This will reduce their effectiveness in further air to air combat and their accuracy in attacks on ships.

CAP fuel and ammo

A fighter squadron can engage in several air to air combats before the squadron exhausts its ammo supply. More experienced squadrons are able to engage in more air to air engagements before running out of ammo. When a squadron runs out of ammo it will stop intercepting enemy planes and will land to rearm. Low fuel reserves will also cause a squadron to return to base and land. This will be more common for fighters flying distant CAP.

Setting Up an Air Strike

Synopsis

To set up an air strike you first access the **SET UP STRIKE** screen and select the ship division you want to use for the strike. This will show a list of available squadrons that are on ships assigned to that division and allow you to select and set up squadrons for a strike.

You can order a strike from either planes in an unready state or from a ready state. If you order unready planes on a strike, they will automatically first ready and then spot and take off. If you want to ready planes first, it will be a two step process.

If you order ready planes on a strike, the process will of course be much faster, but having ready planes aboard constitutes a fire hazard.

To order a strike or ready planes for a strike, select the squadron and set some parameters such as the type of mission planned, the number of planes to ready, and the bomb load that will be carried. When the squadron's settings are where you want them you press the "Ready strike" button if you want the planes to ready, and launch strike if you want them to ready and launch.

Accessing the Set up strike screen

You get to the **SET UP STRIKE** screen by clicking on the **AIRSTRIKE** button (a lightning bolt) in the rightmost row of buttons at the top of the battle screen.

Selecting the Ship Division

The first thing you will want to do is select the division of ships that carry the planes you want to use for your strike. You do this using the drop down **Source division** list in the lower left corner of the **Set up strike** screen. Note that divisions that are only carrying floatplanes will also be in the list.

Selecting and Adjusting Squadrons

You can change several squadron parameters prior to readying or launching a squadron on a mission. You can adjust the type of mission that will be flown, the number of planes from the squadron that will participate in the mission and you can change the type of bomb load that the squadron will carry. When you make these adjustments the squadron's line will be highlighted. This highlighting does not mean that the squadron is "selected". To "select" a squadron you must check the squadron's checkbox at the left end of the line. Only squadrons that are selected via their checkboxes will be acted on when you click the **Ready strike** or **Launch strike** buttons.

Spotting Value

Each carrier is assigned a spot value that represents the maximum number of planes that may be spotted on deck and launched efficiently as part of the same strike. You will find this value in the Spot column displayed in this format: 15/22, in which 15 is the number of planes currently assigned and 22 is the maximum that can be assigned. The spot value will change as you add or subtract planes. You may select any number of planes to send on the strike but the strike cannot exceed the carrier's spot value. If you assign more than the spot value, you will get a notification in the upper right corner of the **Set up Strike** screen that deckload is exceeded. You cannot launch a strike if it exceeds the carrier's spot value.

Changing the type of mission

You can set the type of mission for a squadron by right clicking on the section of the squadron's line that is under the **Mission** column heading. Available missions include Naval Strike, Ground Strike, Escort, and Recon. Each plane type will default to the most common mission for its type unless you change the mission. Some missions may not be available because the selected plane type cannot execute that type of mission.

Adjusting the number of planes that will fly the mission

To change the number of planes in this squadron that will be launched for this mission, right click on the section of the squadron's line that is centered below the **#** symbol. Planes that are not sent on the mission with the rest of the squadron will be spit off into a separate squadron section that must remain inactive on the carrier. These separated sections will get their own line

on the display. This ability will let you fine tune your strike to remain within the carrier's spotting value.

Setting the ordnance loadout

Most planes can carry bombs of some sort. You can select light, medium or heavy loadouts for bombs and for some plane types you can also select torpedoes. The actual bombs that these loadout levels represent will vary greatly between plane types and different models within a type. A heavy load for a fighter might be a 250 lb bomb, while a heavy load for a medium bomber might be two 1,000 lb bombs. For each squadron you can see what each of these loadout sizes represents on the right side of the SET UP STRIKE screen.

Range is strongly affected by the size of your plane's loadout. The combat range for your squadron, for each loadout, is listed just to the left of the bomb loads. Torpedoes can be either heavy or medium load, indicated by an "M" or "H" in the "Torpedo" column. The actual load requirement for a torpedo will vary depending on the performance of the aircraft type.

You can set your loadout (and your combat range) by right clicking on the section of the squadron's line that is centered under the LOADOUT label, then select a loadout for this squadron from the drop down list.

Selecting a target

Before you launch a strike you will want to select a target for the strike. There are two ways to do this on the SET UP STRIKE screen. In the upper left corner you will find a drop down list labeled TARGET. Opening this list will show all available enemy ship sightings, as well as ground facilities that can be targeted.

If you select one of the ship sightings you will taken to the map, centered on the sighting icon, which in most cases will also show a vector line indicating the last known direction in which the naval force was moving as well as an estimate of the distance the force was likely to have traveled since the sighing. This is presented as a vector line, with the length of the line representing the estimated position based on the sighting information. You can look at several sightings but only the last selected will be used as a target.

An alternative method for selecting a target allows you to pick any spot on the map. To do this you click on the small target button just to the right of the Range field. This will clear the screen to show the map. You can then click anywhere on the map. When you click, you will set the target location and the SET UP STRIKE screen will reappear.

IMPORTANT: If you want to attack a ground target you <u>must</u> select the ground target from the drop down target list. If you simply select a position near or at the ground target on the map the strike will likely not find the target.

Using either method will reset the **LOCATION** field to show the Lat Long coordinates for the target. It will also update the **RANGE (NM)** field to show the range to the target. Finally it will reset the **TIME AT TARGET** and **LANDING TIME** fields to show when your strike is estimated to reach the target and when the strike is expected to return to the ship. Both of these figures are estimates and based on everything going according to plan, so take that into consideration. These values reflect the current number of planes in the strike and whether it is coordinated, so changing those parameters can change the time at target and landing times. Landing at night can cause excessive operational losses so it is important to keep an eye on the landing time.

Coordinated strike

Selecting **THE COORDINATED STRIKE** checkbox at the top of the **SET UP STRIKE** screen will cause all of the selected squadrons to remain together during the flight to the target and they will execute a coordinated attack at the target. A coordinated attack will reduce the damage and disruption inflicted on the striking planes by the enemy AAA. It is also much more likely that escorting fighters will be able to protect the bombers in the raid from enemy fighters. However, it can take considerable time for the coordinated strike to form up over the carriers before moving off toward the target. In addition the strike will move at the speed of the slowest plane in the strike. Both of these restrictions will add considerable to time for the strike to reach the target and return to base.

Surprise air attack

Under some circumstances, you may be able to execute a surprise airstrike from your carriers on an enemy port. In a surprise attack, all airstrikes ordered on the first turn of the game only will skip the readying and spotting stages and take off immediately. Such airstrikes should pick a target location in or close to the enemy port.

The defender in a surprise attack will not fly CAP or recon until the enemy is spotted or they are attacked.

Action buttons

Ready Strike button

When preparing to ready one or more squadrons and you are satisfied with the settings for each squadron and have selected the squadrons by checking their checkboxes you can press the **READY STRIKE** button and the planes will be taken in hand for the readying process. Squadrons that are being readied will disappear from **THE SET UP STRIKE** screen. Once the readying process is

completed the planes will reappear in the Sᴇᴛ ᴜᴘ sᴛʀɪᴋᴇ screen and will be ready to spot for a strike.

Launch Strike button

After you are satisfied with the strike settings for the squadrons and its target, you can click the Lᴀᴜɴᴄʜ sᴛʀɪᴋᴇ button at the bottom of the screen. This will initiate the strike process. Squadrons that are being spotted for a strike will disappear from ᴛʜᴇ Sᴇᴛ ᴜᴘ sᴛʀɪᴋᴇ screen. Once the spotting process is completed the carrier will turn into the wind and the air strike will be automatically launched.

> *Designers note: Launching strikes directly involves less hassle and allows you to concentrate on other aspects of the battle. The downside of this method is that you must select the target at the beginning of the readying process, which means the target will have over an hour to move out of the targeted location before your strike arrives.*
>
> *Using the two step process of first readying and then launching involves more micromanagement, but also gives you more control, and more opportunity to react to new sightings or other developments.*

The Stand Down button

The stand down button can be used to send any selected ready squadrons back to the hangar where they will be unloaded and defueled and placed in an "unready" state.

Aircraft Data button

The Aɪʀᴄʀᴀғᴛ ᴅᴀᴛᴀ button will bring up the Aɪʀᴄʀᴀғᴛ ᴛʏᴘᴇs screen, allowing you to examine the statistics for each of your planes and some enemy planes. See the section on the **Aircraft Types** screen.

The Air Strike Attack

Overview

After a squadron is launched on a strike it will typically take a few minutes to form up, often moving in a direction that does not approach the enemy. This process can take longer if the squadron is part of a coordinated strike.

Once formed up the squadron will move off toward the target location at its cruise speed. The squadron will be visible to the player as a red dot on the map, or as a labeled airplane icon if the screen is zoomed in sufficiently. Squadrons are typically represented by a set of 3 plane icons, while a group with one or two planes will be shown with one or two airplane icons.

The location of a squadron is only approximately represented by the squadron's icon. The squadron may be concentrated together into a tight formation or it may have separated into individual sections while it is approaching the enemy or conducting an attack. The actual aircraft associated with a squadron may be spread over a large area and different sections of the squadron may, in fact, target and attack different ships.

Once it reaches the target location the squadron will search for enemy ships to attack. If it does not immediately find targets the squadron will initiate a search pattern in an attempt to locate the enemy. This search will continue until a target is found and attacked or until the squadron runs low on fuel and must return to base. The squadron will return if it risks a night landing.

When a squadron locates an enemy force to attack (or when enemy aircraft are approaching your ships) you will be informed of the impending attack by a billboard message.

This message often fires several minutes before the aerial attacks actually begin. Once this message appears you will be able to locate both the specific attacking squadron and the general location of the attack by accessing the **AIR FORMATIONS** screen. The attacking squadron's status will have been changed to read "Attacking". Double clicking on this squadron's line in the **AIR FORMATION** screen will center the map over the approximate location of the attacking squadron.

After the squadron closes on the target ship, which may take several minutes, the squadron will initiate an attack on the target as described below.

Air to air combat

If enemy fighters are in the air in the vicinity of the target of an air strike, air to air combat may take place. An air to air combat pits fighters on one side against enemy planes of any type on the other side. Air to air combat may occur before or after a bombing attack.

The following snippet shows two separate air to air attacks initiated by the same fighter squadron on CAP. You'll notice that the squadron's strength is 8 planes in the first combat, but it loses 2 planes to the enemy medium bombers in that fight, so has only 6 planes available when it engages a second medium bomber squadron 4 minutes later.

Unlike bombing attacks, in air to air combat, squadrons are not broken down into sections for the attack, rather the entirety of the fighter squadron that is present will engage an entire enemy squadron. A single fighter squadron can engage in multiple air to air combats over the course of an enemy strike.

An air to air combat is first announced in the log on one line and then the following lines will list any planes that have been damaged or shot down during the combat. Apart from losses, air to air combat will also cause disruption to the involved squadrons, which will adversely affect any

further air combat or bombing attacks. If no results follow the announcement of the attack then no planes have been damaged or shot down in the attack. Damaged and shot down planes can be monitored in the **AIR FORMATIONS** screen.

If a fighter that is carrying bombs is attacked it will jettison the bombs prior to the air to air engagement.

Aerial bombing attacks

An attack by aircraft is resolved in a series of attacks by individual sections of the squadron. For purposes of an attack a section can consist of 1 to 5 planes. This means that an air attack by a single squadron will typically play out over several game turns as each section executes its attack. When several squadrons are attacking there may be several section attacks displayed in the log in the same turn. Each attack will be resolved before the next section attack is displayed and resolved. A single squadron may initiate attacks against more than one enemy ship.

How air attacks are displayed in the Log

Attacks against naval targets and land targets follow the same procedure. The following snippet from the log shows a typical log display of an aerial attack; this one shows an attack against naval air station Le Havre which suffers one bomb hit from a section of torpedo bombers using level bombing. The details will be explained below.

Double clicking on the attacking planes will center the map on the location of the bombing attack.

Antiaircraft Artillery

As each squadron section attacks, the defending ship will first have a chance to fire at the section with its AAA. Each size of AAA - heavy, medium and light, fires separately and may have different effects on the attacking aircraft.

Anti-aircraft artillery is rated for two characteristics: "AA factor", which is essentially a measure of the strength or volume of the AA fire, and "Hit chance", which is the percentage chance that the AA fire will achieve a hit against an attacking plane.

The AA factor is calculated based on the number of AA guns of a particular size on the defending ship that are currently able to fire. Installing more AA guns while building or rebuilding the ship will increase this value. Taking superstructure hits during combat can reduce this value.

The AA hit chance has a base hit value that is modified by:

- Technology improvements
- Local weather conditions that affect visibility

91

- Night or twilight
- The type of ship firing (destroyers are not as stable gun platforms)
- The quality and quantity of the AA fire direction systems on the ships
  - The quality of the ship's crew
  - Superstructure damage may reduce the number of AA guns that can fire
  - The type of air attack being opposed (dive bombing, level bombing, etc.)
  - Quality of radar
  - Speed of attacking aircraft
  - AA disruption level of the ship

AAA fire may damage, destroy, abort or disrupt attacking aircraft. Any of these results will reduce the chance that the attacking squadron will achieve a hit. Damage, destruction and abort results will affect individual aircraft within the attacking section, while disruption effects are applied to the entire attacking section.

Destroyed planes do not execute a bomb attack and are marked as destroyed planes in the squadron. Aborted planes are not damaged but do not execute a bombing attack. Damaged planes may attempt an attack with reduced accuracy. Disruption applies to the entire section and reduces the accuracy of a bombing attack for all planes in the section. A higher level of disruption will affect accuracy more strongly. Disruption will be slowly recovered after the attack as the squadron reforms.

AAA will fire at any attacking aircraft (including friendly attacking planes) prior to the aircraft releasing their ordnance. Heavy AA fires first, followed by medium AA and finally light AA will fire.

Heavy AA from nearby ships may be added to the HAA value of the defending ship. Heavy AA may damage, destroy or abort attacking aircraft and will add to the disruption of the section.

Medium AA fires next, but only MAA from the defending ship may fire. As with HAA, medium AA may damage, destroy or abort individual attacking planes and also adds to the disruption of the section as a whole.

Following the calculation of MAA fire, the section may have disruption applied, which will reduce the accuracy of their bombing attacks.

Light AA will fire at aircraft attacking their own ship either before or after enemy aircraft release their ordnance, depending on a random roll compared to the speed of the aircraft. The faster the aircraft is, the larger the chance that light AA will fire after the aircraft has dropped its

ordnance. LAA will always inflict disruption before aircraft attack, even if their fire takes effect after the aircraft have attacked.

Squadron casualties from AAA fire will be shown in the **Air formations** screen.

Type 3 Super Heavy AA shells. Once these are developed, they can be used to give some AA capability to heavy (> 6 in) guns of ships. You select their use in the doctrine screen. Using super heavy AA shells will lower your available ammunition by 10%. To represent the doubtful value of these shells in the game, their effectiveness is randomized and highly variable from game to game.

Dropping ordnance

Immediately following the AAA defensive fire, any remaining aircraft in the attacking section will drop their ordnance. When the attacking section is dropping bombs, the hit chance for the bombs will be shown in the log. Any bomb hits will then be displayed in the log. Bomb hits are reported as impacting a type of ship, such as a CL. These reports may be inaccurate.

Types of bombing attacks

There are several types of bombing attacks supported in RTW2.

Dive bombing attacks may be executed only by dive bombers and are the most accurate type of bombing attack. Dive bombers will not be available until the technology for them has been researched.

Glide bombing attacks can be executed by fighters and torpedo bombers that are carrying bombs. Glide bombing is more accurate than level bombing but entails greater risks to the planes. Glide bombing must be researched first to be used.

Level bombing attacks can be carried out by medium bombers, scout floatplanes, patrol bombers with bombs, airships and torpedo bombers carrying bombs.

Skip bombing is a researched ability. Once researched, this method will greatly enhance the accuracy of medium bombers. While skip bombing is quite accurate it puts the attacking planes in more danger from AAA than a level bombing attack. It is also restricted to using HE bombs.

Torpedo bombing may be carried out by planes that can carry a torpedo. Typically this is limited to torpedo bombers but some models of medium bombers can also be equipped with torpedoes. Torpedo bombers are the earliest type of planes to be developed that can be used to attack ships. Torpedoes are more effective than bombs when attacking ships. The effectiveness of aerial torpedoes can be improved through research.

Guided bombs must be researched before becoming available. They may be carried by medium bombers. Guided bombs are very accurate and very powerful. Guided bombs will only be available to a limited number of squadrons in a battle, even if invented.

Kamikaze attack - Land based DB and TB will perform Kamikaze attacks if the war situation is bad and the nation has a fascist regime and possesses the Kamikaze trait. Kamikaze attacks are very accurate, but all planes that attack will be destroyed.

Bomb types

You may specify the size of the bomb load carried by your aircraft when you set up your airstrike but the type of mission being flown will determine the type of bomb that will be used. Until AP bombs are developed through research, aircraft performing a naval strike will load SAP bombs. After AP bombs are developed AP bombs will be carried rather than SAP bombs. AP bombs have greater armor penetration ability than SAP bombs, especially when dropped from a higher altitude, that is level bombers will have better penetration than dive bombers. GP bombs are used when attacking a land target. Near misses by bombs may cause hull damage.

Ships maneuver to avoid bombing attacks

The AI will take control of ships that are under air attack and maneuver them in an attempt to avoid bomb and torpedo hits. This applies to the player's ships, as well as those controlled by the AI.

Aerial torpedo attacks

Aerial torpedo attacks are slightly different than bomb attacks. The attacking torpedo plane section is attacked by AAA in a normal manner. The section drops torpedoes into the water and the torpedoes will move towards the target ship just like torpedoes launched by ships. Friendly air dropped torpedoes will not be visible on the map to the player, as this will give away information on the exact location of the attack.

The targeted ship will be maneuvered by the AI (or by the player himself) in an attempt to avoid the torpedoes. This means slower, less maneuverable targets are more likely to be hit, while smaller more agile targets such as destroyers are more difficult to hit. Targets that are dead in the water are quite easy to hit. If the torpedo misses the targeted ship there is still a chance it may hit a different ship.

Strafing attacks

Escorting fighters that find no enemy fighter opposition at the target location may execute a strafing attack on enemy ships. This attack will inflict AA disruption on the targeted ship, and thus reduce AA accuracy for subsequent attacks, and cause minor superstructure damage. The

chance of strafing attacks occurring is influenced by the firepower and experience of the fighters, thus later fighters are more likely to conduct strafing attacks as are more experienced squadrons.

Factors that affect the success of a bombing attack

- Type of bombing attack
- Pilot experience
- The type of naval vessel attacked
- Weather that reduces visibility
- Disruption and damage from AAA
- Twilight or night
- Technological developments
- The type of bomb used (affects penetration and damage, but not accuracy)

Return to base

Following the conclusion of an attack the attacking planes will form up and return to their home ship. Damaged aircraft will have a higher chance of crashing on landing.

Floatplane Scouts

Overview

Floatplanes scouts are handled slightly differently than other planes types in the game. They may be carried by surface warships or deployed at airbases. While used primarily for search, they may also be sent on strikes like other planes. There are some special rules governing the equipping and operation of floatplanes that are covered below.

Deploying floatplanes

The player does not use the **AIR GROUP MANAGEMENT** screen to assign floatplanes to ships. The game will automatically provide floatplanes and restock lost floatplanes for any ships that are designed to carry floatplanes. You will pay maintenance fees for these floatplanes.

Floatplanes may be deployed to land airbases. To do this you simply create a new floatplane squadron on the **AIR GROUP MANAGEMENT** screen and assign it to an airbase. The game will then use the floatplanes just like any other planes based at the airbase. When deployed at an airbase floatplane squadrons are identical to other airplane squadrons in every way.

Floatplanes cannot be deployed on carriers.

Floatplanes in Battle

During a battle, floatplanes on ships may be controlled via the SET UP STRIKE screen just like carrier planes. Floatplanes may be sent on any type of strike mission, though they are less effective than most naval planes at any mission other than recon.

You can monitor the activity of your floatplanes on the AIR FORMATIONS screen as with all other aircraft. Floatplanes will go through the same readying, spotting, take off process as other planes, but the actual activities being simulated are slightly different, which means that floatplanes will often be prepared and launched more quickly than carrier planes.

If "Floatplane search" has been selected in the DOCTRINE SCREEN, floatplanes deployed on ships will automatically be used by used before other planes to conduct searches during battles. If there are not enough floatplanes to cover the search sector, other aircraft will be used. In the PREFERENCES screen under the "Floatplane launch" section there are three settings you can use to control how floatplanes are launched. Checking the "Automatic" option will make the use of floatplanes for search missions completely automatic, free of any intervention by the player. Alternately, you can have the game ask for permission before launching a search. If this is checked, then you will be asked for permission prior to every floatplane being launched on a search mission. If "Manual only" is checked the game will not use floatplanes for search missions unless you specifically assign such missions

Floatplanes will have a somewhat lower reliability for searches than carrier-launched aircraft. There might be cases where a floatplane launch is delayed and your search pattern may be incomplete.

Launching a floatplane

Ships with floatplanes that are not equipped with a catapult will come to a complete halt when launching the floatplane. (Such ships have to crane the floatplane onto the surface of the sea where the floatplane will take off normally.)

Ships that are equipped with a catapult may launch any floatplanes they carry without stopping or slowing down. There is no need for such ships to turn into the wind during a launch.

Landing a Floatplane

All ships that are recovering a floatplane after it has landed must slow down to 10 knots while the floatplane is recovered. This can take several minutes. In a battle situation in which the recovering ship is engaged in gunfire or being fired upon the game will ask for permission before slowing down to recover a floatplane.

Equipping Floatplanes and related equipment

When designing or rebuilding a ship you can equip most ships with one or more floatplanes, a floatplane hangar, and/or catapults. You install these features on the **SHIP DESIGN** screen, under the "*Flight installations, missiles*" tab.

To set the number of floatplanes you would like the ship to carry, use the spinners or manually type into the "*Air capacity*" field. When you build the ship it will be equipped with that number of floatplanes.

On the same tab, catapults may be installed by selecting the "Add" option under the "Catapults" section and selecting locations into which the catapults will be installed. Note that adding catapults will reduce the amount of topside capacity available for AAA weaponry. More catapults will increase the spot value of the ship, but more than two are seldom required.

On the same tab you can add a Seaplane hangar. The seaplane hangar will reduce the attrition that occurs in each squadron prior to the start of a battle. It is not uncommon to start a battle with 60% of your floatplanes damaged if they are on a ship that does not have a seaplane hangar.

Note that ships that carry floatplanes have a higher risk of fire due to the presence of flammable aviation gasoline and other aviation stores aboard.

Each class of ship has limitations on how many floatplanes may be carried.

- KEs cannot be equipped with floatplanes.
- CLs may carry no more than 4 floatplanes.
- CA and larger warships have no limit on the number of floatplanes that may be carried.
- AMC may carry up to two floatplanes.
- AV may carry any number of floatplanes.
- CVs and CVLs may not carry floatplanes.

Questions and Answers (Q&A)

How do I select torpedo type for my ships?

Torpedo quality is dependent on research. Your ships will always have the latest torpedoes that you have developed, and old ships will be automatically upgraded.

Why is there no oil in Borneo/Libya wherever?

The oil fields in the game are those that existed or came into production in the early years of the 20th century. Many well-known oilfields today were not discovered at the time of the game.

Why is not Grenada/Easter Island/Bali a possession in the game?

The possessions in the game are there to represent important pieces of territory for naval purposes or colonies that needed some form of naval presence. However, there is no attempt to include every island or minor colony in the game, that would just clutter up the map to no purpose, so a selection has been made where those that figured prominently one way or another has been included.

How do I break a blockade?

Blockade status depends on the force ratio in a nations build area. You must whittle down enemy strength or add more forces in your home area until the force ratio has changed enough.

Why is my force structure so idiotic? Why can't I select the ships I want for the battles?

The battle generator is made to put the player in various situations that can arise in real life. Real admirals seldom had the luxury of fighting with the ideal forces they would like to have. Some of the best ships might be in dockyard, off refueling or have suffered a mechanical breakdown. Somebody might have issued stupid orders or misleading intelligence might have sent ships off to where they are not available. There are lots of examples of the least modern ships in a navy having to fight battles, and that is what the game seeks to simulate.

One of the first things you must be aware of is that technical development in this era is fast. As the build times of ships are several years, this means that many ships will be obsolete by the time they are in service. This might be frustrating at first, but it affects your opponents as well. You will have to learn to live with it.

Once you have realized this, the temptation is to put off building new ships until you have researched better technology. The problem with that is that the Navy League or Kaiser will demand ships for national prestige, and a foreign policy crisis might arise much faster than ships are built, leaving you with insufficient forces. You must try to find a balance.

You should try to think of the role and context in your navy when designing a ship. Take cruisers for example. If you have a nation with widespread colonies and interests around the world, you might consider a colonial cruiser. This would be equipped for colonial service, it would probably be best to optimize engines for reliability, and you would want it to have long range. That will cost weight, so it probably won't be very fast, but, we'll get a sturdy workhorse that can show the flag in the colonies and still be useful when war comes to chase down raiders.

On the other hand, there might be a need for dedicated fleet cruiser as a scout for the battle fleet. High speed is desirable, of course, but we can live with cramped accommodation and short range, as it will only be operating in home waters. We can even be bold and optimize engines for performance, accepting the risk of the occasional breakdown. This is the opposite of the workhorse above. Here we have the temperamental racehorse, optimized for one mission, but sensitive and picky.

Yet another cruiser type might be the raider. We would want reliable engines to be able to operate for long time away from friendly bases, and long range is desirable. Speed should be enough to avoid heavy enemy patrolling ships, but we could build her strong enough to defeat what she cannot run from.

These considerations are similar for larger ships. If you are playing Austria-Hungary for example, you have no colonies and no interests outside the Mediterranean. You can go for smallish battleships with low range, cramped accommodation and low freeboard, thus saving weight to make them compact but capable. Keeping down the displacement keeps down costs, so you can build more of them, and you will hopefully be able to fight an opponent with far larger resources but with worldwide obligations that requires him to equip ships for service anywhere in the world.

There are some specialist ships that you should not neglect. The lowly 400 ton corvette is actually an essential unit in any

99

navy. It can patrol the coasts against submarines and its presence in an area will reduce the risks of mine strikes for larger ships. Having a decent number of small corvettes avoids having to use destroyers as ASW patrols, which could denude the battle fleet of destroyers.

Another ship to consider for nations with large colonial interests is the colonial gunboat. This will be a corvette with 1500 tons displacement or so, equipped for colonial service. This makes it good for fulfilling obligations to have tonnage on foreign stations, freeing up cruisers. If equipped with a couple of 5 or 6 inch guns, it can even be a deterrent to enemy raiding light cruisers.

Appendix 1: Ship type definitions used by the game

These are the definitions used by the game for defining ship types. Anything falling outside these parameters is considered an illegal ship type. The reason these type definitions must be enforced by the program is that the AI relies heavily on ship type for decision making. It also prevents players from building unrealistic ship designs.

These are the main definitions, but there are some exceptions in special cases.

Destroyer (DD)

Displacement less than 2000 and speed more than 19 knots. Must have torpedoes. It cannot be armoured.

Light Cruiser (CL)

Displacement larger than 2000 and less than 8000. Speed must be more than 16 knots and main gun calibre cannot be larger than 6 inches, unless it is a protected cruiser in which case it can have can have 8" twin mounts in the A and Y positions, or a single heavier gun in either the A or the Y position.

Predreadnought Battleship (B)

Displacement must be at least 5000 and it must have belt armour at least 6 inches. Main gun calibre must be larger than 6 inches. It cannot have more than 2 main turrets.

Armoured Cruiser (CA)

Displacement must be more than 4000 and speed greater than 19 knots. It must have more than 2 inches of belt armour but no more than 12 inches. Main guns must be at least 6 inches calibre and cannot be more than 11 inches.

Battlecruiser (BC)

Must have main gun calibre larger than 10 inches and speed more than 23 knots, or three main gun turrets and speed more than 21 knots. In some borderline cases armour thickness can be the difference between a BC and a BB. Speed requirement rises with time, as fast battleships develop.

Dreadnought battleship (BB)

Must have at least 3 main gun turrets, displacement over 8000 and belt armour of more than 6 inches. Main guns must be more than 10 inches.

Corvette (KE)

(this definition actually includes all kinds of minor combatants without torpedoes like

101

minesweepers or various escort ships).

Displacement less than 1800 and belt armour 2 inches or less. Gun calibre can be maximum of 5 inches. Cannot have torpedoes.

Corvettes of 500 tons displacement or smaller are assumed to be civilian trawlers and similar craft impressed for wartime duties. Small corvettes are fast to build but cannot be built in peacetime. They will be automatically sold off after a war, like AMCs.

Armed Merchant Cruiser (AMC)

Displacement more than 1700, no armour and gun calibre no more than 6 inches. AMCs cannot be built in peacetime and will be sold off after a war.

Appendix 2: Explanation of values used in ship design.

Below is a fuller explanation of how to use the ship designer and the meaning of the different data fields. Note that some features can only be used when researched.

Class name: A unique name that distinguishes the class. This is used as filename when saving the class.

Enemy class name: This is the name that the enemy will be told in scenarios. Generated by the program.

Misidentified class name: This is the name the enemy will be told if they have misidentified the ship. Generated by the program.

Displacement: Standard displacement of the ship in tons.

B: Belt armor in inches. Note. The program assumes that the belt is thickest in the center of the ship and thinner at the ends. It also assumes some extra protection for the magazines.
BE: Belt extended: Upper strakes of belt armour or armour protecting the ends of the ship.
D: Deck: The main armour deck of the ship.
DE: Deck extended: Corresponds to BE above.
T: Main gun turret and barbette armour.
TT: Turret top: Roof of main gun turret.
SEC: Secondary gun armour.
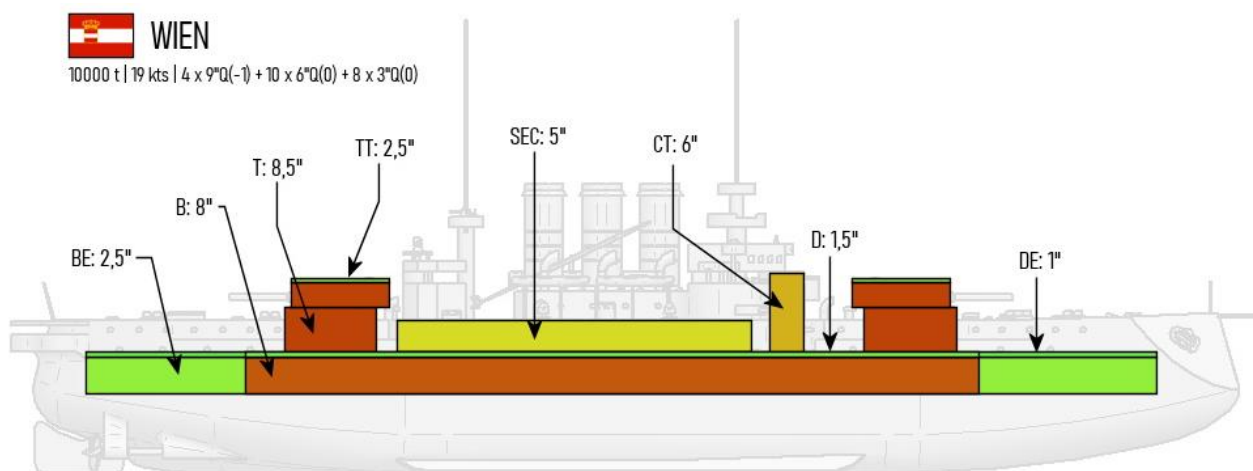**CT**: Conning tower armour.

Diagram explaining the locations of the various armour types. Diagram courtesy of forum member akosjaccik.

Belt coverage: Can be used to denote narrow belt in classes with narrow belt coverage.

Speed: is the maximum designed speed of the ship.

Torpedo defence: The level of torpedo protection the ship has.

Fire control: The fire control equipment. This is important for the gunnery accuracy of the ship, especially at long range.

Fire control positions: This is the number of fire control positions on the ship. The reason to have more is redundancy. Fire control positions are fragile and can be shot away.

Main gun calibre: Rounded to inches.

Increased elevation: Will give extra range to the main guns.

Gun quality: This is the gun quality of that calibre. It is given by your research and cannot be changed. A value of 5 means that you have not researched that calibre.

Cross deck fire: Check this if the guns of the wing turrets in positions F, G, K, or L should be capable of cross deck fire, like in for example the historical Indefatigable or Kaiser classes.

Main turrets: Main turrets are recorded individually. To add turrets, press 'add' and select position and number of guns in the turret. The positions available are determined by your research.

Secondary guns: are only recorded as to the total number. Note that they have a quality value, just like main guns. Secondary guns are assumed to be placed half on each side of the ship. Note that the graphic representation of the secondary guns is generalized. You can have an odd number of secondary guns. The graphics logic can't really handle odd numbers of secondaries, but any odd guns left over are assumed to be on the centerline by the gunnery logic.

Tertiary guns: As secondary guns above.

Torpedo tubes: This works much as the main turrets. You select the position and the number of tubes for the mount.

The ship graphic: Here you have a possibility of entering the looks of the ship. This is not necessary, the ship will work fine anyway, but it will look a lot better.

Funnels: Select if you want an oval funnel or round, then click on the button and on the ship. You do not have to worry about clicking on the middle of the ship; the program assumes all funnels are on the centerline, so it only takes account of where you click relative to the length of the ship.

Superstructure: Select if you want a line or a filled polygon. Then click on the button and then add points by left clicking on the ship. Right click when finished. You can only click on the left side of the ship, but the graphic will be mirrored so that it appears on the right side as well when you are finished. There can be a maximum of 12 points for each superstructure item.

Appendix 3: Instructions for using the ship picture generator

The ship side view generator is optional to use. It is a way of generating nice side views of your ships.

Select the set of ship elements you want to use. Originally there will be only one set, but graphically gifted players may make their own and add for example lighter or darker versions or even camouflaged sets.

First select the background you want and then the type of bow and stern etc and press "Generate". You can change your settings and redo the generation any number of times. When you are satisfied, go to the next tab to place superstructure and details. Note, you should not redo the hull generation once you have started placing details.

To place a ship element on the ship, click on the element and then move the mouse over the ship. Click again where you want to put the element. Ship elements should be placed in the order from left to right, that is start with masts, then decks, then superstructure and last accessories.

To fine tune placement, after moving it to the right area but before clicking on the ship picture, use arrow keys to move the element one pixel at a time, finish by pressing return.

Masts, decks and superstructure will be shown behind hull and turrets. That means that you can regulate the height of masts or superstructure by sinking them into the hull. Accessories will be shown in front of everything else. Use the deck panels under accessories to connect raised decks to barbettes, to make them show in front of the barbettes.

When you are finished, select use and exit and your picture will automatically be assigned to the selected ship class. You can check it by double clicking on the ship in the ship list.

The output is a bitmap that will be stored under the save directory of the current game. It will be named Classname + NationNumber + .bmp. If you want to make some adjustments or improvements to the finished picture, you can do so in any picture editor.

Appendix 4: Instructions for Creating an aircraft shape

You may replace the default aircraft drawings with your own drawings. To do this you will use the ship designer superstructure editor to draw the plane and then export the file with a specific file name. The game will then use your plane drawing rather than the default drawing. You can also draw a new shape for airships.

How to draw an aircraft shape

1. Open the **SHIP DESIGNER.**

2. Clear the top four levels of the superstructure editor.

3. Draw your plane using the top 4 layers of the editor (St1 to St4). Any lines drawn on layers 5 and 6 will not be exported.

4. When you are satisfied click the button labeled "EA".

5. In the "Save As" screen navigate to the "Data" directory. (By default this will be: C:\NWS\Rule the Waves 2\Data)

6. Give your plane a name as described below and save the file.

7. Close the **SHIP DESIGNER** without saving the design.

The game will now use your new aircraft drawing during battles.

> **Designer's note:** When drawing your aircraft you may want to first load an aircraft carrier for scale reference. The aircraft image will be drawn on the map at the same scale that ships are drawn. You can leave layers St5 and St6 intact for reference because these levels will not be exported.

How to name the aircraft shape file

The game will only recognize your new drawing if you name it correctly. You will need to name your aircraft shape drawing using these names.

> Fighter.acs
> Dive bomber.acs
> Torpedo bomber.acs
> Medium bomber.acs
> Floatplane scout.acs

Flying boat.acs
Airship.acs

Biplane versus monoplane

You may create aircraft drawings that represent biplanes and a separate set that represents monoplanes.

Starting in 1935 the game will load a different drawing if you append a "3" to the end of the file name. For example "Dive bomber.acs" will be used by the game until December 1934. In January 1935 the game will begin to use "Dive bomber3.acs". If there is no "Dive bomber3.acs", the game will continue to use the "Dive bomber.acs" file after 1935.