

# IMPERIAL NAVY SHIP RECOGNITION MANUAL

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O.D. No. 3025C

**WARNING:** Disclosure of National Defense Secrets  
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and/or death.

**TOP SECRET**

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# How to use this Manual

This manual contains all the necessary information to plot a reasonably accurate torpedo trajectory verses a non maneuvering target without having to use complex mathematical formulas. **Every sub commander should make sure to have the most up-to-date copy before leaving port!**

While the stadimeter is still the best way to determine exact range of a target, the table above the target silhouette can be used to gauge a rough but quick range estimation. To use this table you count the number of vertical marks from the targets waterline to its mast. The Min/Max values determine what magnification you have set your periscope too (min for normal range, max for x2 zoom). **Note: This table only works with the periscope. The bridge mounted binoculars use a different magnification which isn't factored.**

To determine AOB, use the AOB table below the ship statistics. The vertical column is the number of vertical marks on the periscope while the horizontal marks are the number of horizontal marks on the periscope the target occupies. Remember when counting from the center of the crosshairs, double the number of counted horizontal marks. **Note: if the target's stern is pointed toward your boat, add 90 to your degree solution.**

Finally, speed is determined by placing the crosshairs of your periscope just in front of the bow of the target. Once the bow crosses the vertical line in your scope, start counting. Once the stern crosses the vertical line, stop. The number of seconds is then referenced on the right hand table to determine the targets speed. **Note: while this still works even at high AOB (when the target is pointed towards or away from you) the figures become less**

Since the use of tables limits the number of possible figures, all solutions will be slightly inaccurate. However using these tables is quick and for a slow, non-maneuvering target, suffices for an accurate enough targeting solution.

The Torpedo Spread chart measures the distance in front of or behind the calculated impact point when firing a spread of torpedos. To use the chart, reference the distance row against the target's range (in meters or yards, it does not matter) then reference the desired spread angle (in degrees) the resulting number is the number of meters or yards in front of, or behind, the calculated impact point. Reference the targets length to make sure the spread angle is appropriate (usually 1/3 to 1/2 the target's length is a good spread angle, that way at least one or two fish should impact the target)

# Yamato Class Battleship

<b>Class:</b>	Yamato		
<b>Type:</b>	Battleship		
<b>Tonnage:</b>	63,200		
<b>Speed:</b>	27.5 kts		
<b>Length:</b>	263.2 m		
<b>Height:</b>	43.5 m		
<b>Draft:</b>	10.9 m		
<b>AOB Ratio:</b>	6.05 : 1		
<b>C-Depth:</b>	6.1 m	(20.0 ft)	
<b>I-Depth:</b>	12.12 m	(39.8 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	22.24 s	23 kts
-	40 kts	-	31 kts	23.26 s	22 kts
-	39 kts	-	30 kts	24.36 s	21 kts
-	38 kts	-	29 kts	25.58 s	20 kts
-	37 kts	18.27 s	28 kts	26.93 s	19 kts
-	36 kts	18.95 s	27 kts	28.42 s	18 kts
-	35 kts	19.68 s	26 kts	30.1 s	17 kts
-	34 kts	20.46 s	25 kts	31.98 s	16 kts
-	33 kts	21.32 s	24 kts	34.11 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.2°	6.3°	9.5°	12.7°	16.0°	19.3°	22.7°	26.2°	29.7°	33.4°	37.3°	41.4°	45.7°	50.5°	55.7°	61.8°	69.5°	82.6°	####	####	####	####	####	####	####	####	####
	3.5	2.7°	5.4°	8.1°	10.9°	13.7°	16.5°	19.3°	22.2°	25.1°	28.2°	31.3°	34.5°	37.9°	41.4°	45.1°	49.1°	53.4°	58.2°	63.8°	70.8°	82.6°	####	####	####	####	####	####
	4.0	2.4°	4.7°	7.1°	9.5°	11.9°	14.4°	16.8°	19.3°	21.8°	24.4°	27.0°	29.7°	32.5°	35.3°	38.3°	41.4°	44.6°	48.1°	51.7°	55.7°	60.2°	65.4°	71.9°	82.6°	####	####	####
	4.5	2.1°	4.2°	6.3°	8.4°	10.6°	12.7°	14.9°	17.1°	19.3°	21.5°	23.8°	26.2°	28.5°	30.9°	33.4°	36.0°	38.6°	41.4°	44.3°	47.3°	50.5°	53.9°	57.6°	61.8°	66.7°	72.7°	82.6°
	5.0	1.9°	3.8°	5.7°	7.6°	9.5°	11.4°	13.4°	15.3°	17.3°	19.3°	21.3°	23.4°	25.4°	27.6°	29.7°	31.9°	34.2°	36.5°	38.9°	41.4°	44.0°	46.7°	49.5°	52.5°	55.7°	59.3°	63.2°
	5.5	1.7°	3.4°	5.2°	6.9°	8.6°	10.4°	12.1°	13.9°	15.7°	17.5°	19.3°	21.1°	23.0°	24.9°	26.8°	28.7°	30.7°	32.7°	34.8°	36.9°	39.1°	41.4°	43.7°	46.2°	48.7°	51.4°	54.2°
	6.0	1.6°	3.2°	4.7°	6.3°	7.9°	9.5°	11.1°	12.7°	14.4°	16.0°	17.6°	19.3°	21.0°	22.7°	24.4°	26.2°	27.9°	29.7°	31.6°	33.4°	35.3°	37.3°	39.3°	41.4°	43.5°	45.7°	48.1°
	6.5	1.5°	2.9°	4.4°	5.8°	7.3°	8.8°	10.3°	11.7°	13.2°	14.7°	16.2°	17.8°	19.3°	20.9°	22.4°	24.0°	25.6°	27.2°	28.9°	30.6°	32.3°	34.0°	35.8°	37.6°	39.5°	41.4°	43.4°
	7.0	1.4°	2.7°	4.1°	5.4°	6.8°	8.1°	9.5°	10.9°	12.3°	13.7°	15.1°	16.5°	17.9°	19.3°	20.7°	22.2°	23.7°	25.1°	26.7°	28.2°	29.7°	31.3°	32.9°	34.5°	36.2°	37.9°	39.6°
	7.5	1.3°	2.5°	3.8°	5.1°	6.3°	7.6°	8.9°	10.2°	11.4°	12.7°	14.0°	15.3°	16.6°	18.0°	19.3°	20.6°	22.0°	23.4°	24.8°	26.2°	27.6°	29.0°	30.5°	31.9°	33.4°	35.0°	36.5°
	8.0	1.2°	2.4°	3.6°	4.7°	5.9°	7.1°	8.3°	9.5°	10.7°	11.9°	13.1°	14.4°	15.6°	16.8°	18.1°	19.3°	20.6°	21.8°	23.1°	24.4°	25.7°	27.0°	28.4°	29.7°	31.1°	32.5°	33.9°

36.54 s	14 kts
39.36 s	13 kts
42.64 s	12 kts
46.51 s	11 kts
51.16 s	10 kts
56.85 s	9 kts
63.95 s	8 kts
73.09 s	7 kts
85.27 s	6 kts
102.32 s	5 kts
127.91 s	4 kts
170.54 s	3 kts
255.81 s	2 kts
511.62 s	1 kts

# Yamato Class Battleship

p.4

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,492m	9,969m	3	830m	3,323m	5	497m	1,994m	7	354m	1,424m
1.5	1,661m	6,646m	3.5	711m	2,848m	5.5	452m	1,812m	7.5	330m	1,329m
2	1,246m	4,985m	4	622m	2,492m	6	414m	1,661m	8	310m	1,246m
2.5	996m	3,988m	4.5	553m	2,215m	6.5	382m	1,533m	8.5	291m	1,172m

## Ship Recognition:



# Fuso Class Battleship

<b>Class:</b>	Fuso		
<b>Type:</b>	Battleship		
<b>Tonnage:</b>	34,300		
<b>Speed:</b>	24.7 kts		
<b>Length:</b>	212.7 m		
<b>Height:</b>	50.6 m		
<b>Draft:</b>	9.4 m		
<b>AOB Ratio:</b>	4.2 : 1		
<b>C-Depth:</b>	6.1 m	(20.0 ft)	
<b>I-Depth:</b>	10.62 m	(34.8 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	17.98 s	23 kts
-	40 kts	-	31 kts	18.79 s	22 kts
-	39 kts	-	30 kts	19.69 s	21 kts
-	38 kts	-	29 kts	20.67 s	20 kts
-	37 kts	-	28 kts	21.76 s	19 kts
-	36 kts	-	27 kts	22.97 s	18 kts
-	35 kts	-	26 kts	24.32 s	17 kts
-	34 kts	16.54 s	25 kts	25.84 s	16 kts
-	33 kts	17.23 s	24 kts	27.56 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.5°	9.1°	13.8°	18.5°	23.4°	28.4°	33.7°	39.4°	45.5°	52.5°	60.7°	72.1°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.9°	7.8°	11.8°	15.8°	19.9°	24.1°	28.4°	32.9°	37.7°	42.8°	48.4°	54.7°	62.1°	72.1°	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.4°	6.8°	10.3°	13.8°	17.3°	20.9°	24.6°	28.4°	32.4°	36.5°	40.9°	45.5°	50.6°	56.4°	63.1°	72.1°	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.0°	6.1°	9.1°	12.2°	15.3°	18.5°	21.7°	25.0°	28.4°	31.9°	35.6°	39.4°	43.4°	47.7°	52.5°	57.8°	64.0°	72.1°	####	####	####	####	####	####	####	####	####
	5.0	2.7°	5.5°	8.2°	11.0°	13.8°	16.6°	19.5°	22.4°	25.4°	28.4°	31.6°	34.8°	38.2°	41.8°	45.5°	49.6°	54.0°	58.9°	64.7°	72.1°	87.6°	####	####	####	####	####	####
	5.5	2.5°	5.0°	7.5°	10.0°	12.5°	15.0°	17.6°	20.2°	22.9°	25.6°	28.4°	31.3°	34.2°	37.3°	40.5°	43.8°	47.3°	51.1°	55.3°	59.9°	65.3°	72.1°	84.2°	####	####	####	####
	6.0	2.3°	4.5°	6.8°	9.1°	11.4°	13.8°	16.1°	18.5°	20.9°	23.4°	25.9°	28.4°	31.0°	33.7°	36.5°	39.4°	42.4°	45.5°	48.9°	52.5°	56.4°	60.7°	65.8°	72.1°	82.4°	####	####
	6.5	2.1°	4.2°	6.3°	8.4°	10.5°	12.7°	14.8°	17.0°	19.2°	21.5°	23.7°	26.1°	28.4°	30.8°	33.3°	35.8°	38.5°	41.2°	44.1°	47.1°	50.2°	53.6°	57.3°	61.4°	66.2°	72.1°	81.2°
	7.0	1.9°	3.9°	5.9°	7.8°	9.8°	11.8°	13.8°	15.8°	17.8°	19.9°	22.0°	24.1°	26.2°	28.4°	30.6°	32.9°	35.3°	37.7°	40.2°	42.8°	45.5°	48.4°	51.4°	54.7°	58.2°	62.1°	66.6°
	7.5	1.8°	3.6°	5.5°	7.3°	9.1°	11.0°	12.8°	14.7°	16.6°	18.5°	20.4°	22.4°	24.4°	26.4°	28.4°	30.5°	32.6°	34.8°	37.1°	39.4°	41.8°	44.3°	46.8°	49.6°	52.5°	55.6°	58.9°
	8.0	1.7°	3.4°	5.1°	6.8°	8.6°	10.3°	12.0°	13.8°	15.5°	17.3°	19.1°	20.9°	22.7°	24.6°	26.5°	28.4°	30.4°	32.4°	34.4°	36.5°	38.6°	40.9°	43.2°	45.5°	48.0°	50.6°	53.4°

29.53 s	14 kts
31.8 s	13 kts
34.45 s	12 kts
37.59 s	11 kts
41.35 s	10 kts
45.94 s	9 kts
51.68 s	8 kts
59.07 s	7 kts
68.91 s	6 kts
82.69 s	5 kts
103.36 s	4 kts
137.82 s	3 kts
206.73 s	2 kts
413.46 s	1 kts

# Fuso Class Battleship

p.6

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,899m	11,597m	3	966m	3,865m	5	578m	2,319m	7	412m	1,656m
1.5	1,932m	7,731m	3.5	827m	3,313m	5.5	526m	2,108m	7.5	384m	1,546m
2	1,449m	5,798m	4	724m	2,899m	6	481m	1,932m	8	360m	1,449m
2.5	1,159m	4,638m	4.5	643m	2,577m	6.5	444m	1,784m	8.5	339m	1,364m

## Ship Recognition:



# Kongo Class Battleship

<b>Class:</b>	Kongo		
<b>Type:</b>	Battleship		
<b>Tonnage:</b>	32,000		
<b>Speed:</b>	30.5 kts		
<b>Length:</b>	225.0 m		
<b>Height:</b>	43.0 m		
<b>Draft:</b>	9.8 m		
<b>AOB Ratio:</b>	5.23 : 1		
<b>C-Depth:</b>	6.1 m	(20.0 ft)	
<b>I-Depth:</b>	11.02 m	(36.2 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	19.02 s	23 kts
-	40 kts	14.11 s	31 kts	19.88 s	22 kts
-	39 kts	14.58 s	30 kts	20.83 s	21 kts
-	38 kts	15.08 s	29 kts	21.87 s	20 kts
-	37 kts	15.62 s	28 kts	23.02 s	19 kts
-	36 kts	16.2 s	27 kts	24.3 s	18 kts
-	35 kts	16.82 s	26 kts	25.73 s	17 kts
-	34 kts	17.49 s	25 kts	27.34 s	16 kts
-	33 kts	18.22 s	24 kts	29.16 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.7°	7.3°	11.0°	14.8°	18.6°	22.5°	26.5°	30.6°	35.0°	39.6°	44.5°	49.9°	55.9°	63.1°	72.9°	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.1°	6.3°	9.4°	12.6°	15.8°	19.1°	22.5°	25.9°	29.4°	33.1°	36.9°	40.9°	45.2°	49.9°	55.0°	60.9°	68.2°	79.4°	####	####	####	####	####	####	####	####	####
	4.0	2.7°	5.5°	8.2°	11.0°	13.8°	16.7°	19.5°	22.5°	25.5°	28.5°	31.7°	35.0°	38.4°	42.0°	45.8°	49.9°	54.3°	59.3°	65.2°	72.9°	####	####	####	####	####	####	####
	4.5	2.4°	4.9°	7.3°	9.8°	12.3°	14.8°	17.3°	19.9°	22.5°	25.1°	27.9°	30.6°	33.5°	36.5°	39.6°	42.8°	46.2°	49.9°	53.8°	58.1°	63.1°	69.1°	77.6°	####	####	####	####
	5.0	2.2°	4.4°	6.6°	8.8°	11.0°	13.3°	15.5°	17.8°	20.1°	22.5°	24.9°	27.3°	29.8°	32.4°	35.0°	37.7°	40.5°	43.5°	46.6°	49.9°	53.4°	57.2°	61.5°	66.5°	72.9°	83.6°	####
	5.5	2.0°	4.0°	6.0°	8.0°	10.0°	12.0°	14.1°	16.1°	18.2°	20.3°	22.5°	24.6°	26.9°	29.1°	31.4°	33.8°	36.2°	38.7°	41.3°	44.0°	46.9°	49.9°	53.1°	56.5°	60.3°	64.6°	69.7°
	6.0	1.8°	3.7°	5.5°	7.3°	9.2°	11.0°	12.9°	14.8°	16.7°	18.6°	20.5°	22.5°	24.5°	26.5°	28.5°	30.6°	32.8°	35.0°	37.2°	39.6°	42.0°	44.5°	47.1°	49.9°	52.8°	55.9°	59.3°
	6.5	1.7°	3.4°	5.1°	6.8°	8.5°	10.2°	11.9°	13.6°	15.3°	17.1°	18.9°	20.7°	22.5°	24.3°	26.2°	28.1°	30.0°	32.0°	34.0°	36.0°	38.1°	40.3°	42.6°	44.9°	47.3°	49.9°	52.5°
	7.0	1.6°	3.1°	4.7°	6.3°	7.8°	9.4°	11.0°	12.6°	14.2°	15.8°	17.5°	19.1°	20.8°	22.5°	24.2°	25.9°	27.7°	29.4°	31.2°	33.1°	35.0°	36.9°	38.9°	40.9°	43.0°	45.2°	47.5°
	7.5	1.5°	2.9°	4.4°	5.9°	7.3°	8.8°	10.3°	11.8°	13.3°	14.8°	16.3°	17.8°	19.3°	20.9°	22.5°	24.1°	25.7°	27.3°	29.0°	30.6°	32.4°	34.1°	35.9°	37.7°	39.6°	41.5°	43.5°
	8.0	1.4°	2.7°	4.1°	5.5°	6.9°	8.2°	9.6°	11.0°	12.4°	13.8°	15.2°	16.7°	18.1°	19.5°	21.0°	22.5°	24.0°	25.5°	27.0°	28.5°	30.1°	31.7°	33.3°	35.0°	36.7°	38.4°	40.2°

31.24 s	14 kts
33.64 s	13 kts
36.45 s	12 kts
39.76 s	11 kts
43.74 s	10 kts
48.6 s	9 kts
54.67 s	8 kts
62.48 s	7 kts
72.89 s	6 kts
87.47 s	5 kts
109.34 s	4 kts
145.79 s	3 kts
218.68 s	2 kts
437.37 s	1 kts



# Kongo Class Battleship

p.8

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,463m	9,855m	3	820m	3,285m	5	491m	1,971m	7	350m	1,407m
1.5	1,642m	6,570m	3.5	703m	2,815m	5.5	447m	1,791m	7.5	327m	1,314m
2	1,231m	4,927m	4	615m	2,463m	6	409m	1,642m	8	306m	1,231m
2.5	985m	3,942m	4.5	546m	2,190m	6.5	377m	1,516m	8.5	288m	1,159m

## Ship Recognition:



# Ise Class Battleship

<b>Class:</b>	Ise		
<b>Type:</b>	Battleship		
<b>Tonnage:</b>	31,250		
<b>Speed:</b>	23.5 kts		
<b>Length:</b>	205.5 m		
<b>Height:</b>	50.3 m		
<b>Draft:</b>	9.9 m		
<b>AOB Ratio:</b>	4.09 : 1		
<b>C-Depth:</b>	6.1 m	(20.0 ft)	
<b>I-Depth:</b>	11.12 m	(36.5 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	17.37 s	23 kts
-	40 kts	-	31 kts	18.16 s	22 kts
-	39 kts	-	30 kts	19.02 s	21 kts
-	38 kts	-	29 kts	19.97 s	20 kts
-	37 kts	-	28 kts	21.02 s	19 kts
-	36 kts	-	27 kts	22.19 s	18 kts
-	35 kts	-	26 kts	23.5 s	17 kts
-	34 kts	-	25 kts	24.97 s	16 kts
-	33 kts	16.64 s	24 kts	26.63 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.7°	9.4°	14.2°	19.0°	24.1°	29.3°	34.8°	40.7°	47.2°	54.7°	63.8°	78.3°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.0°	8.0°	12.1°	16.2°	20.5°	24.8°	29.3°	34.0°	39.0°	44.4°	50.3°	57.1°	65.4°	78.3°	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.5°	7.0°	10.6°	14.2°	17.8°	21.5°	25.4°	29.3°	33.4°	37.7°	42.3°	47.2°	52.7°	58.9°	66.6°	78.3°	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.1°	6.2°	9.4°	12.6°	15.8°	19.0°	22.4°	25.8°	29.3°	33.0°	36.7°	40.7°	45.0°	49.6°	54.7°	60.5°	67.6°	78.3°	####	####	####	####	####	####	####	####	####
	5.0	2.8°	5.6°	8.4°	11.3°	14.2°	17.1°	20.0°	23.1°	26.1°	29.3°	32.6°	36.0°	39.5°	43.3°	47.2°	51.6°	56.3°	61.8°	68.5°	78.3°	####	####	####	####	####	####	####
	5.5	2.6°	5.1°	7.7°	10.3°	12.9°	15.5°	18.2°	20.9°	23.6°	26.4°	29.3°	32.3°	35.3°	38.5°	41.9°	45.4°	49.2°	53.2°	57.7°	62.9°	69.2°	78.3°	####	####	####	####	####
	6.0	2.3°	4.7°	7.0°	9.4°	11.8°	14.2°	16.6°	19.0°	21.5°	24.1°	26.7°	29.3°	32.0°	34.8°	37.7°	40.7°	43.9°	47.2°	50.8°	54.7°	58.9°	63.8°	69.8°	78.3°	####	####	####
	6.5	2.2°	4.3°	6.5°	8.7°	10.9°	13.1°	15.3°	17.5°	19.8°	22.1°	24.5°	26.9°	29.3°	31.8°	34.4°	37.0°	39.8°	42.7°	45.7°	48.9°	52.3°	55.9°	60.0°	64.7°	70.3°	78.3°	####
	7.0	2.0°	4.0°	6.0°	8.0°	10.1°	12.1°	14.2°	16.2°	18.3°	20.5°	22.6°	24.8°	27.0°	29.3°	31.6°	34.0°	36.5°	39.0°	41.6°	44.4°	47.2°	50.3°	53.5°	57.1°	60.9°	65.4°	70.8°
	7.5	1.9°	3.7°	5.6°	7.5°	9.4°	11.3°	13.2°	15.1°	17.1°	19.0°	21.0°	23.1°	25.1°	27.2°	29.3°	31.5°	33.7°	36.0°	38.3°	40.7°	43.3°	45.9°	48.6°	51.6°	54.7°	58.1°	61.8°
	8.0	1.8°	3.5°	5.3°	7.0°	8.8°	10.6°	12.4°	14.2°	16.0°	17.8°	19.7°	21.5°	23.4°	25.4°	27.3°	29.3°	31.3°	33.4°	35.5°	37.7°	40.0°	42.3°	44.7°	47.2°	49.9°	52.7°	55.7°

28.53 s	14 kts
30.73 s	13 kts
33.29 s	12 kts
36.31 s	11 kts
39.95 s	10 kts
44.38 s	9 kts
49.93 s	8 kts
57.07 s	7 kts
66.58 s	6 kts
79.89 s	5 kts
99.87 s	4 kts
133.15 s	3 kts
199.73 s	2 kts
399.46 s	1 kts

# Ise Class Battleship

p.10

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,882m	11,528m	3	960m	3,842m	5	575m	2,305m	7	410m	1,646m
1.5	1,921m	7,685m	3.5	822m	3,293m	5.5	522m	2,096m	7.5	382m	1,537m
2	1,440m	5,764m	4	719m	2,882m	6	479m	1,921m	8	358m	1,440m
2.5	1,152m	4,611m	4.5	639m	2,561m	6.5	441m	1,773m	8.5	337m	1,356m

## Ship Recognition:



# Ise Conversion Class Battleship / Hybrid

<b>Class:</b>	Ise Conversion		
<b>Type:</b>	Battleship / Hybrid		
<b>Tonnage:</b>	33,800		
<b>Speed:</b>	25.6 kts		
<b>Length:</b>	220.0 m		
<b>Height:</b>	50.1 m		
<b>Draft:</b>	9.5 m		
<b>AOB Ratio:</b>	4.39 : 1		
<b>C-Depth:</b>	6.1 m	(20.0 ft)	
<b>I-Depth:</b>	10.72 m	(35.2 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	18.59 s	23 kts
-	40 kts	-	31 kts	19.44 s	22 kts
-	39 kts	-	30 kts	20.36 s	21 kts
-	38 kts	-	29 kts	21.38 s	20 kts
-	37 kts	-	28 kts	22.51 s	19 kts
-	36 kts	-	27 kts	23.76 s	18 kts
-	35 kts	16.45 s	26 kts	25.16 s	17 kts
-	34 kts	17.11 s	25 kts	26.73 s	16 kts
-	33 kts	17.82 s	24 kts	28.51 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.4°	8.7°	13.2°	17.7°	22.3°	27.1°	32.1°	37.4°	43.1°	49.4°	56.6°	65.6°	80.7°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.7°	7.5°	11.3°	15.1°	19.0°	23.0°	27.1°	31.4°	35.8°	40.6°	45.7°	51.3°	57.8°	65.6°	77.4°	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.3°	6.5°	9.8°	13.2°	16.5°	20.0°	23.5°	27.1°	30.8°	34.7°	38.8°	43.1°	47.7°	52.8°	58.6°	65.6°	75.4°	####	####	####	####	####	####	####	####	####	####
	4.5	2.9°	5.8°	8.7°	11.7°	14.7°	17.7°	20.7°	23.9°	27.1°	30.4°	33.8°	37.4°	41.1°	45.1°	49.4°	54.1°	59.4°	65.6°	74.1°	####	####	####	####	####	####	####	####
	5.0	2.6°	5.2°	7.9°	10.5°	13.2°	15.9°	18.6°	21.4°	24.2°	27.1°	30.1°	33.1°	36.3°	39.6°	43.1°	46.8°	50.7°	55.1°	59.9°	65.6°	73.0°	####	####	####	####	####	####
	5.5	2.4°	4.8°	7.1°	9.5°	11.9°	14.4°	16.8°	19.3°	21.9°	24.5°	27.1°	29.8°	32.6°	35.4°	38.4°	41.5°	44.7°	48.2°	51.9°	55.9°	60.4°	65.6°	72.2°	83.6°	####	####	####
	6.0	2.2°	4.4°	6.5°	8.7°	10.9°	13.2°	15.4°	17.7°	20.0°	22.3°	24.7°	27.1°	29.6°	32.1°	34.7°	37.4°	40.2°	43.1°	46.1°	49.4°	52.8°	56.6°	60.8°	65.6°	71.6°	80.7°	####
	6.5	2.0°	4.0°	6.0°	8.1°	10.1°	12.1°	14.2°	16.3°	18.4°	20.5°	22.7°	24.9°	27.1°	29.4°	31.7°	34.1°	36.6°	39.1°	41.7°	44.5°	47.4°	50.4°	53.7°	57.2°	61.1°	65.6°	71.1°
	7.0	1.9°	3.7°	5.6°	7.5°	9.4°	11.3°	13.2°	15.1°	17.0°	19.0°	21.0°	23.0°	25.0°	27.1°	29.2°	31.4°	33.6°	35.8°	38.2°	40.6°	43.1°	45.7°	48.4°	51.3°	54.4°	57.8°	61.4°
	7.5	1.7°	3.5°	5.2°	7.0°	8.7°	10.5°	12.3°	14.1°	15.9°	17.7°	19.5°	21.4°	23.2°	25.2°	27.1°	29.1°	31.1°	33.1°	35.2°	37.4°	39.6°	41.9°	44.3°	46.8°	49.4°	52.1°	55.1°
	8.0	1.6°	3.3°	4.9°	6.5°	8.2°	9.8°	11.5°	13.2°	14.8°	16.5°	18.2°	20.0°	21.7°	23.5°	25.3°	27.1°	28.9°	30.8°	32.7°	34.7°	36.7°	38.8°	40.9°	43.1°	45.4°	47.7°	50.2°

30.55 s	14 kts
32.9 s	13 kts
35.64 s	12 kts
38.88 s	11 kts
42.76 s	10 kts
47.52 s	9 kts
53.46 s	8 kts
61.09 s	7 kts
71.27 s	6 kts
85.53 s	5 kts
106.91 s	4 kts
142.55 s	3 kts
213.82 s	2 kts
427.65 s	1 kts

# Ise Conversion Class Battleship / Hybrid

p.12

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,870m	11,482m	3	956m	3,827m	5	573m	2,296m	7	408m	1,640m
1.5	1,913m	7,655m	3.5	819m	3,280m	5.5	520m	2,087m	7.5	381m	1,530m
2	1,435m	5,741m	4	716m	2,870m	6	477m	1,913m	8	356m	1,435m
2.5	1,147m	4,593m	4.5	637m	2,551m	6.5	440m	1,766m	8.5	335m	1,350m

## Ship Recognition:



# Taiho Class Carrier

<b>Class:</b>	Taiho		
<b>Type:</b>	Carrier		
<b>Tonnage:</b>	35,000		
<b>Speed:</b>	33.3 kts		
<b>Length:</b>	253.7 m		
<b>Height:</b>	45.3 m		
<b>Draft:</b>	9.5 m		
<b>AOB Ratio:</b>	5.6 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	10.72 m	(35.2 ft)	

Target Speed (in seconds)					
-	41 kts	15.41 s	32 kts	21.44 s	23 kts
-	40 kts	15.91 s	31 kts	22.42 s	22 kts
-	39 kts	16.44 s	30 kts	23.48 s	21 kts
-	38 kts	17.01 s	29 kts	24.66 s	20 kts
-	37 kts	17.61 s	28 kts	25.96 s	19 kts
-	36 kts	18.27 s	27 kts	27.4 s	18 kts
-	35 kts	18.97 s	26 kts	29.01 s	17 kts
14.5 s	34 kts	19.73 s	25 kts	30.82 s	16 kts
14.94 s	33 kts	20.55 s	24 kts	32.88 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.4°	6.8°	10.3°	13.8°	17.3°	20.9°	24.6°	28.4°	32.4°	36.5°	40.9°	45.6°	50.7°	56.4°	63.2°	72.2°	####	####	####	####	####	####	####	####	####	####	####
	3.5	2.9°	5.9°	8.8°	11.8°	14.8°	17.8°	20.9°	24.1°	27.3°	30.7°	34.1°	37.7°	41.5°	45.6°	49.9°	54.7°	60.1°	66.7°	75.8°	####	####	####	####	####	####	####	####
	4.0	2.6°	5.1°	7.7°	10.3°	12.9°	15.5°	18.2°	20.9°	23.7°	26.5°	29.4°	32.4°	35.5°	38.7°	42.0°	45.6°	49.4°	53.5°	58.0°	63.2°	69.6°	79.1°	####	####	####	####	####
	4.5	2.3°	4.6°	6.8°	9.1°	11.4°	13.8°	16.1°	18.5°	20.9°	23.4°	25.9°	28.4°	31.1°	33.7°	36.5°	39.4°	42.4°	45.6°	48.9°	52.5°	56.4°	60.8°	65.9°	72.2°	82.7°	####	####
	5.0	2.0°	4.1°	6.2°	8.2°	10.3°	12.4°	14.5°	16.6°	18.7°	20.9°	23.1°	25.4°	27.7°	30.0°	32.4°	34.8°	37.4°	40.0°	42.7°	45.6°	48.6°	51.8°	55.2°	59.0°	63.2°	68.2°	74.6°
	5.5	1.9°	3.7°	5.6°	7.5°	9.3°	11.2°	13.1°	15.1°	17.0°	18.9°	20.9°	22.9°	25.0°	27.0°	29.1°	31.3°	33.5°	35.8°	38.1°	40.5°	43.0°	45.6°	48.3°	51.2°	54.3°	57.6°	61.2°
	6.0	1.7°	3.4°	5.1°	6.8°	8.6°	10.3°	12.0°	13.8°	15.5°	17.3°	19.1°	20.9°	22.8°	24.6°	26.5°	28.4°	30.4°	32.4°	34.4°	36.5°	38.7°	40.9°	43.2°	45.6°	48.1°	50.7°	53.5°
	6.5	1.6°	3.1°	4.7°	6.3°	7.9°	9.5°	11.1°	12.7°	14.3°	15.9°	17.6°	19.2°	20.9°	22.6°	24.3°	26.1°	27.8°	29.6°	31.5°	33.3°	35.2°	37.2°	39.2°	41.2°	43.4°	45.6°	47.9°
	7.0	1.5°	2.9°	4.4°	5.9°	7.3°	8.8°	10.3°	11.8°	13.3°	14.8°	16.3°	17.8°	19.4°	20.9°	22.5°	24.1°	25.7°	27.3°	29.0°	30.7°	32.4°	34.1°	35.9°	37.7°	39.6°	41.5°	43.5°
	7.5	1.4°	2.7°	4.1°	5.5°	6.8°	8.2°	9.6°	11.0°	12.4°	13.8°	15.2°	16.6°	18.0°	19.5°	20.9°	22.4°	23.9°	25.4°	26.9°	28.4°	30.0°	31.6°	33.2°	34.8°	36.5°	38.2°	40.0°
	8.0	1.3°	2.6°	3.8°	5.1°	6.4°	7.7°	9.0°	10.3°	11.6°	12.9°	14.2°	15.5°	16.9°	18.2°	19.6°	20.9°	22.3°	23.7°	25.1°	26.5°	28.0°	29.4°	30.9°	32.4°	33.9°	35.5°	37.1°

35.23 s	14 kts
37.94 s	13 kts
41.1 s	12 kts
44.83 s	11 kts
49.32 s	10 kts
54.8 s	9 kts
61.64 s	8 kts
70.45 s	7 kts
82.19 s	6 kts
98.63 s	5 kts
123.29 s	4 kts
164.39 s	3 kts
246.58 s	2 kts
493.16 s	1 kts

# Taiho Class Carrier

p.14

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,595m	10,382m	3	864m	3,460m	5	518m	2,076m	7	369m	1,483m
1.5	1,730m	6,921m	3.5	741m	2,966m	5.5	470m	1,887m	7.5	344m	1,384m
2	1,297m	5,191m	4	648m	2,595m	6	431m	1,730m	8	322m	1,297m
2.5	1,038m	4,153m	4.5	576m	2,307m	6.5	398m	1,597m	8.5	303m	1,221m

## Ship Recognition:



# Shokaku Class Carrier

<b>Class:</b>	Shokaku		
<b>Type:</b>	Carrier		
<b>Tonnage:</b>	28,000		
<b>Speed:</b>	34.5 kts		
<b>Length:</b>	250.0 m		
<b>Height:</b>	31.4 m		
<b>Draft:</b>	8.6 m		
<b>AOB Ratio:</b>	7.96 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	9.82 m	(32.2 ft)	

Target Speed (in seconds)					
-	41 kts	15.19 s	32 kts	21.13 s	23 kts
-	40 kts	15.68 s	31 kts	22.09 s	22 kts
-	39 kts	16.2 s	30 kts	23.14 s	21 kts
-	38 kts	16.76 s	29 kts	24.3 s	20 kts
-	37 kts	17.36 s	28 kts	25.58 s	19 kts
-	36 kts	18.0 s	27 kts	27.0 s	18 kts
13.88 s	35 kts	18.69 s	26 kts	28.59 s	17 kts
14.29 s	34 kts	19.44 s	25 kts	30.37 s	16 kts
14.73 s	33 kts	20.25 s	24 kts	32.4 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	2.4°	4.8°	7.2°	9.6°	12.1°	14.5°	17.0°	19.6°	22.1°	24.8°	27.4°	30.2°	33.0°	35.9°	38.9°	42.1°	45.4°	48.9°	52.7°	56.9°	61.5°	67.1°	74.4°	####	####	####	####
	3.5	2.1°	4.1°	6.2°	8.3°	10.3°	12.4°	14.5°	16.7°	18.8°	21.0°	23.2°	25.5°	27.8°	30.2°	32.6°	35.0°	37.6°	40.2°	43.0°	45.9°	48.9°	52.1°	55.6°	59.5°	63.8°	68.9°	75.7°
	4.0	1.8°	3.6°	5.4°	7.2°	9.0°	10.9°	12.7°	14.5°	16.4°	18.3°	20.2°	22.1°	24.1°	26.1°	28.1°	30.2°	32.3°	34.4°	36.6°	38.9°	41.3°	43.7°	46.2°	48.9°	51.7°	54.7°	58.0°
	4.5	1.6°	3.2°	4.8°	6.4°	8.0°	9.6°	11.3°	12.9°	14.5°	16.2°	17.9°	19.6°	21.3°	23.0°	24.8°	26.5°	28.3°	30.2°	32.0°	33.9°	35.9°	37.9°	39.9°	42.1°	44.2°	46.5°	48.9°
	5.0	1.4°	2.9°	4.3°	5.8°	7.2°	8.7°	10.1°	11.6°	13.1°	14.5°	16.0°	17.5°	19.1°	20.6°	22.1°	23.7°	25.3°	26.9°	28.5°	30.2°	31.8°	33.5°	35.3°	37.1°	38.9°	40.8°	42.7°
	5.5	1.3°	2.6°	3.9°	5.2°	6.6°	7.9°	9.2°	10.5°	11.9°	13.2°	14.5°	15.9°	17.3°	18.6°	20.0°	21.4°	22.8°	24.3°	25.7°	27.2°	28.7°	30.2°	31.7°	33.2°	34.8°	36.4°	38.1°
	6.0	1.2°	2.4°	3.6°	4.8°	6.0°	7.2°	8.4°	9.6°	10.9°	12.1°	13.3°	14.5°	15.8°	17.0°	18.3°	19.6°	20.8°	22.1°	23.4°	24.8°	26.1°	27.4°	28.8°	30.2°	31.6°	33.0°	34.4°
	6.5	1.1°	2.2°	3.3°	4.4°	5.5°	6.7°	7.8°	8.9°	10.0°	11.1°	12.3°	13.4°	14.5°	15.7°	16.8°	18.0°	19.2°	20.4°	21.5°	22.7°	23.9°	25.2°	26.4°	27.6°	28.9°	30.2°	31.4°
	7.0	1.0°	2.1°	3.1°	4.1°	5.1°	6.2°	7.2°	8.3°	9.3°	10.3°	11.4°	12.4°	13.5°	14.5°	15.6°	16.7°	17.8°	18.8°	19.9°	21.0°	22.1°	23.2°	24.4°	25.5°	26.7°	27.8°	29.0°
	7.5	1.0°	1.9°	2.9°	3.8°	4.8°	5.8°	6.7°	7.7°	8.7°	9.6°	10.6°	11.6°	12.6°	13.6°	14.5°	15.5°	16.5°	17.5°	18.6°	19.6°	20.6°	21.6°	22.7°	23.7°	24.8°	25.8°	26.9°
	8.0	0.9°	1.8°	2.7°	3.6°	4.5°	5.4°	6.3°	7.2°	8.1°	9.0°	9.9°	10.9°	11.8°	12.7°	13.6°	14.5°	15.5°	16.4°	17.4°	18.3°	19.3°	20.2°	21.2°	22.1°	23.1°	24.1°	25.1°

34.71 s	14 kts
37.38 s	13 kts
40.5 s	12 kts
44.18 s	11 kts
48.6 s	10 kts
54.0 s	9 kts
60.75 s	8 kts
69.42 s	7 kts
80.99 s	6 kts
97.19 s	5 kts
121.49 s	4 kts
161.99 s	3 kts
242.98 s	2 kts
485.97 s	1 kts



# Shokaku Class Carrier

p.16

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,799m	7,196m	3	599m	2,399m	5	359m	1,439m	7	256m	1,028m
1.5	1,199m	4,797m	3.5	513m	2,056m	5.5	326m	1,308m	7.5	239m	959m
2	899m	3,598m	4	449m	1,799m	6	299m	1,199m	8	223m	899m
2.5	719m	2,878m	4.5	399m	1,599m	6.5	276m	1,107m	8.5	210m	846m

## Ship Recognition:



# Taiyo Class Carrier

<b>Class:</b>	Taiyo		
<b>Type:</b>	Carrier		
<b>Tonnage:</b>	17,830		
<b>Speed:</b>	21.0 kts		
<b>Length:</b>	180.1 m		
<b>Height:</b>	43.9 m		
<b>Draft:</b>	7.5 m		
<b>AOB Ratio:</b>	4.1 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	8.72 m	(28.6 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	16.67 s	21 kts
-	38 kts	-	29 kts	17.5 s	20 kts
-	37 kts	-	28 kts	18.43 s	19 kts
-	36 kts	-	27 kts	19.45 s	18 kts
-	35 kts	-	26 kts	20.59 s	17 kts
-	34 kts	-	25 kts	21.88 s	16 kts
-	33 kts	-	24 kts	23.34 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.7°	9.4°	14.1°	19.0°	24.0°	29.2°	34.7°	40.5°	47.0°	54.3°	63.3°	71.2°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.0°	8.0°	12.1°	16.2°	20.4°	24.7°	29.2°	33.9°	38.8°	44.1°	50.0°	56.7°	64.9°	71.2°	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.5°	7.0°	10.5°	14.1°	17.7°	21.4°	25.2°	29.2°	33.3°	37.5°	42.1°	47.0°	52.4°	58.6°	66.1°	71.2°	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.1°	6.2°	9.4°	12.5°	15.7°	19.0°	22.3°	25.7°	29.2°	32.8°	36.6°	40.5°	44.8°	49.3°	54.3°	60.1°	67.1°	71.2°	####	####	####	####	####	####	####	####	####
	5.0	2.8°	5.6°	8.4°	11.2°	14.1°	17.0°	20.0°	23.0°	26.0°	29.2°	32.4°	35.8°	39.3°	43.0°	47.0°	51.3°	56.0°	61.3°	67.9°	71.2°	####	####	####	####	####	####	####
	5.5	2.5°	5.1°	7.6°	10.2°	12.8°	15.4°	18.1°	20.8°	23.5°	26.3°	29.2°	32.1°	35.2°	38.3°	41.7°	45.2°	48.9°	52.9°	57.4°	62.4°	68.5°	71.2°	####	####	####	####	####
	6.0	2.3°	4.7°	7.0°	9.4°	11.7°	14.1°	16.5°	19.0°	21.4°	24.0°	26.5°	29.2°	31.9°	34.7°	37.5°	40.5°	43.7°	47.0°	50.5°	54.3°	58.6°	63.3°	69.1°	71.2°	####	####	####
	6.5	2.1°	4.3°	6.5°	8.6°	10.8°	13.0°	15.2°	17.5°	19.7°	22.0°	24.4°	26.7°	29.2°	31.7°	34.2°	36.9°	39.6°	42.5°	45.4°	48.6°	52.0°	55.6°	59.6°	64.2°	69.6°	71.2°	####
	7.0	2.0°	4.0°	6.0°	8.0°	10.0°	12.1°	14.1°	16.2°	18.3°	20.4°	22.5°	24.7°	26.9°	29.2°	31.5°	33.9°	36.3°	38.8°	41.4°	44.1°	47.0°	50.0°	53.2°	56.7°	60.5°	64.9°	70.1°
	7.5	1.9°	3.7°	5.6°	7.5°	9.4°	11.2°	13.2°	15.1°	17.0°	19.0°	20.9°	23.0°	25.0°	27.1°	29.2°	31.3°	33.5°	35.8°	38.1°	40.5°	43.0°	45.6°	48.4°	51.3°	54.3°	57.7°	61.3°
	8.0	1.7°	3.5°	5.2°	7.0°	8.8°	10.5°	12.3°	14.1°	15.9°	17.7°	19.6°	21.4°	23.3°	25.2°	27.2°	29.2°	31.2°	33.3°	35.4°	37.5°	39.8°	42.1°	44.5°	47.0°	49.6°	52.4°	55.4°

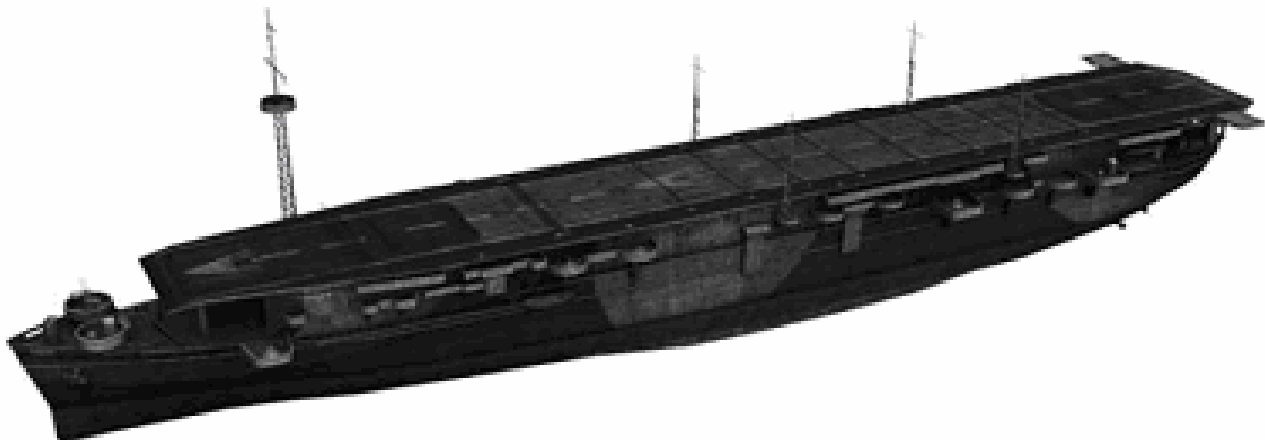
25.01 s	14 kts
26.93 s	13 kts
29.17 s	12 kts
31.83 s	11 kts
35.01 s	10 kts
38.9 s	9 kts
43.76 s	8 kts
50.01 s	7 kts
58.35 s	6 kts
70.02 s	5 kts
87.52 s	4 kts
116.7 s	3 kts
175.04 s	2 kts
350.09 s	1 kts

# Taiyo Class Carrier

p.18

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,515m	10,061m	3	838m	3,354m	5	502m	2,012m	7	358m	1,437m
1.5	1,676m	6,707m	3.5	718m	2,874m	5.5	456m	1,829m	7.5	333m	1,341m
2	1,257m	5,030m	4	628m	2,515m	6	418m	1,676m	8	312m	1,257m
2.5	1,005m	4,024m	4.5	558m	2,236m	6.5	385m	1,547m	8.5	294m	1,183m

## Ship Recognition:



# Hiryu Class Carrier

<b>Class:</b>	Hiryu		
<b>Type:</b>	Carrier		
<b>Tonnage:</b>	16,000		
<b>Speed:</b>	34.0 kts		
<b>Length:</b>	223.3 m		
<b>Height:</b>	35.2 m		
<b>Draft:</b>	7.5 m		
<b>AOB Ratio:</b>	6.34 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	8.72 m	(28.6 ft)	

Target Speed (in seconds)					
-	41 kts	13.56 s	32 kts	18.87 s	23 kts
-	40 kts	14.0 s	31 kts	19.73 s	22 kts
-	39 kts	14.47 s	30 kts	20.67 s	21 kts
-	38 kts	14.97 s	29 kts	21.7 s	20 kts
-	37 kts	15.5 s	28 kts	22.85 s	19 kts
-	36 kts	16.08 s	27 kts	24.11 s	18 kts
-	35 kts	16.69 s	26 kts	25.53 s	17 kts
12.77 s	34 kts	17.36 s	25 kts	27.13 s	16 kts
13.15 s	33 kts	18.09 s	24 kts	28.94 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.0°	6.0°	9.1°	12.1°	15.2°	18.4°	21.6°	24.9°	28.2°	31.7°	35.3°	39.1°	43.1°	47.4°	52.0°	57.2°	63.3°	71.1°	86.7°	####	####	####	####	####	####	####	####
	3.5	2.6°	5.2°	7.8°	10.4°	13.0°	15.7°	18.4°	21.1°	23.9°	26.8°	29.7°	32.7°	35.8°	39.1°	42.5°	46.1°	50.0°	54.2°	58.8°	64.3°	71.1°	82.2°	####	####	####	####	
	4.0	2.3°	4.5°	6.8°	9.1°	11.4°	13.7°	16.0°	18.4°	20.8°	23.2°	25.7°	28.2°	30.8°	33.5°	36.2°	39.1°	42.1°	45.2°	48.5°	52.0°	55.9°	60.1°	65.0°	71.1°	80.1°	####	####
	4.5	2.0°	4.0°	6.0°	8.1°	10.1°	12.1°	14.2°	16.3°	18.4°	20.5°	22.7°	24.9°	27.1°	29.4°	31.7°	34.1°	36.5°	39.1°	41.7°	44.5°	47.4°	50.4°	53.7°	57.2°	61.1°	65.6°	71.1°
	5.0	1.8°	3.6°	5.4°	7.2°	9.1°	10.9°	12.7°	14.6°	16.5°	18.4°	20.3°	22.2°	24.2°	26.2°	28.2°	30.3°	32.4°	34.6°	36.8°	39.1°	41.5°	43.9°	46.5°	49.2°	52.0°	55.1°	58.3°
	5.5	1.6°	3.3°	4.9°	6.6°	8.2°	9.9°	11.6°	13.3°	14.9°	16.7°	18.4°	20.1°	21.9°	23.7°	25.5°	27.3°	29.2°	31.1°	33.0°	35.0°	37.0°	39.1°	41.2°	43.5°	45.8°	48.2°	50.7°
	6.0	1.5°	3.0°	4.5°	6.0°	7.5°	9.1°	10.6°	12.1°	13.7°	15.2°	16.8°	18.4°	20.0°	21.6°	23.2°	24.9°	26.5°	28.2°	29.9°	31.7°	33.5°	35.3°	37.2°	39.1°	41.1°	43.1°	45.2°
	6.5	1.4°	2.8°	4.2°	5.6°	7.0°	8.4°	9.8°	11.2°	12.6°	14.0°	15.5°	16.9°	18.4°	19.8°	21.3°	22.8°	24.3°	25.9°	27.4°	29.0°	30.6°	32.2°	33.9°	35.6°	37.3°	39.1°	40.9°
	7.0	1.3°	2.6°	3.9°	5.2°	6.5°	7.8°	9.1°	10.4°	11.7°	13.0°	14.3°	15.7°	17.0°	18.4°	19.7°	21.1°	22.5°	23.9°	25.3°	26.8°	28.2°	29.7°	31.2°	32.7°	34.3°	35.8°	37.4°
	7.5	1.2°	2.4°	3.6°	4.8°	6.0°	7.2°	8.5°	9.7°	10.9°	12.1°	13.4°	14.6°	15.9°	17.1°	18.4°	19.7°	20.9°	22.2°	23.5°	24.9°	26.2°	27.5°	28.9°	30.3°	31.7°	33.1°	34.6°
	8.0	1.1°	2.3°	3.4°	4.5°	5.7°	6.8°	7.9°	9.1°	10.2°	11.4°	12.5°	13.7°	14.8°	16.0°	17.2°	18.4°	19.6°	20.8°	22.0°	23.2°	24.4°	25.7°	26.9°	28.2°	29.5°	30.8°	32.1°

31.0 s	14 kts
33.39 s	13 kts
36.17 s	12 kts
39.46 s	11 kts
43.41 s	10 kts
48.23 s	9 kts
54.26 s	8 kts
62.01 s	7 kts
72.34 s	6 kts
86.81 s	5 kts
108.52 s	4 kts
144.69 s	3 kts
217.03 s	2 kts
434.06 s	1 kts

# Hiryu Class Carrier

p.20

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,017m	8,067m	3	672m	2,689m	5	402m	1,613m	7	287m	1,152m
1.5	1,344m	5,378m	3.5	576m	2,305m	5.5	366m	1,466m	7.5	267m	1,075m
2	1,008m	4,034m	4	503m	2,017m	6	335m	1,344m	8	250m	1,008m
2.5	806m	3,227m	4.5	447m	1,792m	6.5	309m	1,241m	8.5	236m	949m

## Ship Recognition:



# Akitsu Maru Class Carrier

<b>Class:</b>	Akitsu Maru		
<b>Type:</b>	Carrier		
<b>Tonnage:</b>	11,800		
<b>Speed:</b>	20.0 kts		
<b>Length:</b>	143.75 m		
<b>Height:</b>	35.2 m		
<b>Draft:</b>	7.84 m		
<b>AOB Ratio:</b>	4.08 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	9.06 m	(29.7 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	13.97 s	20 kts
-	37 kts	-	28 kts	14.71 s	19 kts
-	36 kts	-	27 kts	15.52 s	18 kts
-	35 kts	-	26 kts	16.44 s	17 kts
-	34 kts	-	25 kts	17.46 s	16 kts
-	33 kts	-	24 kts	18.63 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.7°	9.4°	14.2°	19.1°	24.1°	29.3°	34.8°	40.8°	47.3°	54.7°	63.9°	78.4°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.0°	8.0°	12.1°	16.3°	20.5°	24.8°	29.3°	34.0°	39.0°	44.4°	50.3°	57.1°	65.4°	78.4°	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.5°	7.0°	10.6°	14.2°	17.8°	21.5°	25.4°	29.3°	33.4°	37.7°	42.3°	47.3°	52.7°	59.0°	66.7°	78.4°	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.1°	6.2°	9.4°	12.6°	15.8°	19.1°	22.4°	25.8°	29.3°	33.0°	36.8°	40.8°	45.0°	49.6°	54.7°	60.5°	67.7°	78.4°	####	####	####	####	####	####	####	####	####
	5.0	2.8°	5.6°	8.4°	11.3°	14.2°	17.1°	20.0°	23.1°	26.2°	29.3°	32.6°	36.0°	39.5°	43.3°	47.3°	51.6°	56.4°	61.8°	68.5°	78.4°	####	####	####	####	####	####	####
	5.5	2.6°	5.1°	7.7°	10.3°	12.9°	15.5°	18.2°	20.9°	23.6°	26.4°	29.3°	32.3°	35.4°	38.6°	41.9°	45.4°	49.2°	53.3°	57.8°	62.9°	69.2°	78.4°	####	####	####	####	####
	6.0	2.3°	4.7°	7.0°	9.4°	11.8°	14.2°	16.6°	19.1°	21.5°	24.1°	26.7°	29.3°	32.0°	34.8°	37.7°	40.8°	43.9°	47.3°	50.8°	54.7°	59.0°	63.9°	69.8°	78.4°	####	####	####
	6.5	2.2°	4.3°	6.5°	8.7°	10.9°	13.1°	15.3°	17.5°	19.8°	22.1°	24.5°	26.9°	29.3°	31.8°	34.4°	37.1°	39.8°	42.7°	45.7°	48.9°	52.3°	56.0°	60.1°	64.7°	70.4°	78.4°	####
	7.0	2.0°	4.0°	6.0°	8.0°	10.1°	12.1°	14.2°	16.3°	18.4°	20.5°	22.6°	24.8°	27.0°	29.3°	31.6°	34.0°	36.5°	39.0°	41.7°	44.4°	47.3°	50.3°	53.6°	57.1°	61.0°	65.4°	70.8°
	7.5	1.9°	3.7°	5.6°	7.5°	9.4°	11.3°	13.2°	15.1°	17.1°	19.1°	21.0°	23.1°	25.1°	27.2°	29.3°	31.5°	33.7°	36.0°	38.3°	40.8°	43.3°	45.9°	48.7°	51.6°	54.7°	58.1°	61.8°
	8.0	1.8°	3.5°	5.3°	7.0°	8.8°	10.6°	12.4°	14.2°	16.0°	17.8°	19.7°	21.5°	23.4°	25.4°	27.3°	29.3°	31.4°	33.4°	35.6°	37.7°	40.0°	42.3°	44.7°	47.3°	49.9°	52.7°	55.7°

19.96 s	14 kts
21.49 s	13 kts
23.29 s	12 kts
25.4 s	11 kts
27.94 s	10 kts
31.05 s	9 kts
34.93 s	8 kts
39.92 s	7 kts
46.57 s	6 kts
55.89 s	5 kts
69.86 s	4 kts
93.14 s	3 kts
139.72 s	2 kts
279.43 s	1 kts

# Akitsu Maru Class Carrier

p.22

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,017m	8,067m	3	672m	2,689m	5	402m	1,613m	7	287m	1,152m
1.5	1,344m	5,378m	3.5	576m	2,305m	5.5	366m	1,466m	7.5	267m	1,075m
2	1,008m	4,034m	4	503m	2,017m	6	335m	1,344m	8	250m	1,008m
2.5	806m	3,227m	4.5	447m	1,792m	6.5	309m	1,241m	8.5	236m	949m

## Ship Recognition:



# Takao Class Heavy Cruiser

<b>Class:</b>	Takao		
<b>Type:</b>	Heavy Cruiser		
<b>Tonnage:</b>	9,850		
<b>Speed:</b>	34.0 kts		
<b>Length:</b>	204.5 m		
<b>Height:</b>	36.3 m		
<b>Draft:</b>	5.1 m		
<b>AOB Ratio:</b>	5.63 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	6.32 m	(20.7 ft)	

Target Speed (in seconds)					
-	41 kts	12.42 s	32 kts	17.28 s	23 kts
-	40 kts	12.82 s	31 kts	18.07 s	22 kts
-	39 kts	13.25 s	30 kts	18.93 s	21 kts
-	38 kts	13.71 s	29 kts	19.88 s	20 kts
-	37 kts	14.2 s	28 kts	20.92 s	19 kts
-	36 kts	14.72 s	27 kts	22.08 s	18 kts
-	35 kts	15.29 s	26 kts	23.38 s	17 kts
11.69 s	34 kts	15.9 s	25 kts	24.84 s	16 kts
12.05 s	33 kts	16.56 s	24 kts	26.5 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.4°	6.8°	10.2°	13.7°	17.2°	20.8°	24.5°	28.3°	32.2°	36.3°	40.6°	45.2°	50.3°	55.9°	62.6°	71.2°	####	####	####	####	####	####	####	####	####	####	####
	3.5	2.9°	5.8°	8.8°	11.7°	14.7°	17.7°	20.8°	23.9°	27.2°	30.5°	33.9°	37.5°	41.2°	45.2°	49.5°	54.2°	59.6°	65.9°	74.5°	####	####	####	####	####	####	####	####
	4.0	2.5°	5.1°	7.7°	10.2°	12.8°	15.4°	18.1°	20.8°	23.5°	26.3°	29.2°	32.2°	35.2°	38.4°	41.7°	45.2°	49.0°	53.0°	57.5°	62.6°	68.7°	77.5°	####	####	####	####	####
	4.5	2.3°	4.5°	6.8°	9.1°	11.4°	13.7°	16.0°	18.4°	20.8°	23.2°	25.7°	28.3°	30.9°	33.5°	36.3°	39.1°	42.1°	45.2°	48.5°	52.1°	55.9°	60.2°	65.1°	71.2°	80.5°	####	####
	5.0	2.0°	4.1°	6.1°	8.2°	10.2°	12.3°	14.4°	16.5°	18.6°	20.8°	23.0°	25.2°	27.5°	29.8°	32.2°	34.6°	37.1°	39.7°	42.4°	45.2°	48.2°	51.4°	54.7°	58.4°	62.6°	67.4°	73.4°
	5.5	1.8°	3.7°	5.6°	7.4°	9.3°	11.2°	13.1°	15.0°	16.9°	18.8°	20.8°	22.8°	24.8°	26.9°	29.0°	31.1°	33.3°	35.5°	37.8°	40.2°	42.7°	45.2°	47.9°	50.8°	53.8°	57.0°	60.6°
	6.0	1.7°	3.4°	5.1°	6.8°	8.5°	10.2°	12.0°	13.7°	15.4°	17.2°	19.0°	20.8°	22.6°	24.5°	26.3°	28.3°	30.2°	32.2°	34.2°	36.3°	38.4°	40.6°	42.9°	45.2°	47.7°	50.3°	53.0°
	6.5	1.6°	3.1°	4.7°	6.3°	7.8°	9.4°	11.0°	12.6°	14.2°	15.8°	17.5°	19.1°	20.8°	22.5°	24.2°	25.9°	27.7°	29.4°	31.3°	33.1°	35.0°	36.9°	38.9°	41.0°	43.1°	45.2°	47.5°
	7.0	1.5°	2.9°	4.4°	5.8°	7.3°	8.8°	10.2°	11.7°	13.2°	14.7°	16.2°	17.7°	19.2°	20.8°	22.4°	23.9°	25.5°	27.2°	28.8°	30.5°	32.2°	33.9°	35.7°	37.5°	39.3°	41.2°	43.2°
	7.5	1.4°	2.7°	4.1°	5.4°	6.8°	8.2°	9.5°	10.9°	12.3°	13.7°	15.1°	16.5°	17.9°	19.4°	20.8°	22.3°	23.7°	25.2°	26.7°	28.3°	29.8°	31.4°	33.0°	34.6°	36.3°	38.0°	39.7°
	8.0	1.3°	2.5°	3.8°	5.1°	6.4°	7.7°	8.9°	10.2°	11.5°	12.8°	14.1°	15.4°	16.8°	18.1°	19.4°	20.8°	22.2°	23.5°	24.9°	26.3°	27.8°	29.2°	30.7°	32.2°	33.7°	35.2°	36.8°

28.39 s	14 kts
30.58 s	13 kts
33.13 s	12 kts
36.14 s	11 kts
39.75 s	10 kts
44.17 s	9 kts
49.69 s	8 kts
56.79 s	7 kts
66.25 s	6 kts
79.5 s	5 kts
99.38 s	4 kts
132.51 s	3 kts
198.76 s	2 kts
397.52 s	1 kts



# Takao Class Heavy Cruiser

p.24

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,080m	8,319m	3	693m	2,773m	5	415m	1,664m	7	296m	1,188m
1.5	1,386m	5,546m	3.5	593m	2,377m	5.5	377m	1,512m	7.5	276m	1,109m
2	1,039m	4,160m	4	519m	2,080m	6	345m	1,386m	8	258m	1,039m
2.5	831m	3,328m	4.5	461m	1,849m	6.5	319m	1,280m	8.5	243m	978m

## Ship Recognition:



# Maya Class Heavy Cruiser

<b>Class:</b>	Maya		
<b>Type:</b>	Heavy Cruiser		
<b>Tonnage:</b>	9,850		
<b>Speed:</b>	34.0 kts		
<b>Length:</b>	204.5 m		
<b>Height:</b>	36.3 m		
<b>Draft:</b>	5.1 m		
<b>AOB Ratio:</b>	5.63 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	6.32 m	(20.7 ft)	

Target Speed (in seconds)					
-	41 kts	12.42 s	32 kts	17.28 s	23 kts
-	40 kts	12.82 s	31 kts	18.07 s	22 kts
-	39 kts	13.25 s	30 kts	18.93 s	21 kts
-	38 kts	13.71 s	29 kts	19.88 s	20 kts
-	37 kts	14.2 s	28 kts	20.92 s	19 kts
-	36 kts	14.72 s	27 kts	22.08 s	18 kts
-	35 kts	15.29 s	26 kts	23.38 s	17 kts
11.69 s	34 kts	15.9 s	25 kts	24.84 s	16 kts
12.05 s	33 kts	16.56 s	24 kts	26.5 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.4°	6.8°	10.2°	13.7°	17.2°	20.8°	24.5°	28.3°	32.2°	36.3°	40.6°	45.2°	50.3°	55.9°	62.6°	71.2°	####	####	####	####	####	####	####	####	####	####	####
	3.5	2.9°	5.8°	8.8°	11.7°	14.7°	17.7°	20.8°	23.9°	27.2°	30.5°	33.9°	37.5°	41.2°	45.2°	49.5°	54.2°	59.6°	65.9°	74.5°	####	####	####	####	####	####	####	####
	4.0	2.5°	5.1°	7.7°	10.2°	12.8°	15.4°	18.1°	20.8°	23.5°	26.3°	29.2°	32.2°	35.2°	38.4°	41.7°	45.2°	49.0°	53.0°	57.5°	62.6°	68.7°	77.5°	####	####	####	####	####
	4.5	2.3°	4.5°	6.8°	9.1°	11.4°	13.7°	16.0°	18.4°	20.8°	23.2°	25.7°	28.3°	30.9°	33.5°	36.3°	39.1°	42.1°	45.2°	48.5°	52.1°	55.9°	60.2°	65.1°	71.2°	80.5°	####	####
	5.0	2.0°	4.1°	6.1°	8.2°	10.2°	12.3°	14.4°	16.5°	18.6°	20.8°	23.0°	25.2°	27.5°	29.8°	32.2°	34.6°	37.1°	39.7°	42.4°	45.2°	48.2°	51.4°	54.7°	58.4°	62.6°	67.4°	73.4°
	5.5	1.8°	3.7°	5.6°	7.4°	9.3°	11.2°	13.1°	15.0°	16.9°	18.8°	20.8°	22.8°	24.8°	26.9°	29.0°	31.1°	33.3°	35.5°	37.8°	40.2°	42.7°	45.2°	47.9°	50.8°	53.8°	57.0°	60.6°
	6.0	1.7°	3.4°	5.1°	6.8°	8.5°	10.2°	12.0°	13.7°	15.4°	17.2°	19.0°	20.8°	22.6°	24.5°	26.3°	28.3°	30.2°	32.2°	34.2°	36.3°	38.4°	40.6°	42.9°	45.2°	47.7°	50.3°	53.0°
	6.5	1.6°	3.1°	4.7°	6.3°	7.8°	9.4°	11.0°	12.6°	14.2°	15.8°	17.5°	19.1°	20.8°	22.5°	24.2°	25.9°	27.7°	29.4°	31.3°	33.1°	35.0°	36.9°	38.9°	41.0°	43.1°	45.2°	47.5°
	7.0	1.5°	2.9°	4.4°	5.8°	7.3°	8.8°	10.2°	11.7°	13.2°	14.7°	16.2°	17.7°	19.2°	20.8°	22.4°	23.9°	25.5°	27.2°	28.8°	30.5°	32.2°	33.9°	35.7°	37.5°	39.3°	41.2°	43.2°
	7.5	1.4°	2.7°	4.1°	5.4°	6.8°	8.2°	9.5°	10.9°	12.3°	13.7°	15.1°	16.5°	17.9°	19.4°	20.8°	22.3°	23.7°	25.2°	26.7°	28.3°	29.8°	31.4°	33.0°	34.6°	36.3°	38.0°	39.7°
	8.0	1.3°	2.5°	3.8°	5.1°	6.4°	7.7°	8.9°	10.2°	11.5°	12.8°	14.1°	15.4°	16.8°	18.1°	19.4°	20.8°	22.2°	23.5°	24.9°	26.3°	27.8°	29.2°	30.7°	32.2°	33.7°	35.2°	36.8°

28.39 s	14 kts
30.58 s	13 kts
33.13 s	12 kts
36.14 s	11 kts
39.75 s	10 kts
44.17 s	9 kts
49.69 s	8 kts
56.79 s	7 kts
66.25 s	6 kts
79.5 s	5 kts
99.38 s	4 kts
132.51 s	3 kts
198.76 s	2 kts
397.52 s	1 kts

# Maya Class Heavy Cruiser

p.26

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,080m	8,319m	3	693m	2,773m	5	415m	1,664m	7	296m	1,188m
1.5	1,386m	5,546m	3.5	593m	2,377m	5.5	377m	1,512m	7.5	276m	1,109m
2	1,039m	4,160m	4	519m	2,080m	6	345m	1,386m	8	258m	1,039m
2.5	831m	3,328m	4.5	461m	1,849m	6.5	319m	1,280m	8.5	243m	978m

## Ship Recognition:



# Mogami Class Heavy Cruiser

<b>Class:</b>	Mogami		
<b>Type:</b>	Heavy Cruiser		
<b>Tonnage:</b>	9,500		
<b>Speed:</b>	36.0 kts		
<b>Length:</b>	200.0 m		
<b>Height:</b>	34.6 m		
<b>Draft:</b>	4.4 m		
<b>AOB Ratio:</b>	5.78 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	5.62 m	(18.4 ft)	

Target Speed (in seconds)					
-	41 kts	12.15 s	32 kts	16.9 s	23 kts
-	40 kts	12.54 s	31 kts	17.67 s	22 kts
-	39 kts	12.96 s	30 kts	18.51 s	21 kts
-	38 kts	13.41 s	29 kts	19.44 s	20 kts
-	37 kts	13.88 s	28 kts	20.46 s	19 kts
10.8 s	36 kts	14.4 s	27 kts	21.6 s	18 kts
11.11 s	35 kts	14.95 s	26 kts	22.87 s	17 kts
11.43 s	34 kts	15.55 s	25 kts	24.3 s	16 kts
11.78 s	33 kts	16.2 s	24 kts	25.92 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.3°	6.6°	10.0°	13.3°	16.8°	20.2°	23.8°	27.5°	31.3°	35.2°	39.4°	43.8°	48.6°	53.8°	59.9°	67.3°	78.6°	####	####	####	####	####	####	####	####	####	####
	3.5	2.8°	5.7°	8.5°	11.4°	14.3°	17.3°	20.2°	23.3°	26.4°	29.6°	32.9°	36.4°	40.0°	43.8°	47.9°	52.3°	57.2°	62.8°	69.9°	81.3°	####	####	####	####	####	####	####
	4.0	2.5°	5.0°	7.5°	10.0°	12.5°	15.0°	17.6°	20.2°	22.9°	25.6°	28.4°	31.3°	34.2°	37.3°	40.4°	43.8°	47.3°	51.1°	55.3°	59.9°	65.3°	72.1°	84.1°	####	####	####	####
	4.5	2.2°	4.4°	6.6°	8.8°	11.1°	13.3°	15.6°	17.9°	20.2°	22.6°	25.0°	27.5°	30.0°	32.6°	35.2°	38.0°	40.8°	43.8°	46.9°	50.3°	53.8°	57.8°	62.2°	67.3°	74.0°	88.3°	####
	5.0	2.0°	4.0°	6.0°	8.0°	10.0°	12.0°	14.0°	16.1°	18.1°	20.2°	22.4°	24.5°	26.7°	29.0°	31.3°	33.6°	36.0°	38.5°	41.1°	43.8°	46.6°	49.6°	52.7°	56.1°	59.9°	64.1°	69.1°
	5.5	1.8°	3.6°	5.4°	7.2°	9.0°	10.9°	12.7°	14.6°	16.4°	18.3°	20.2°	22.2°	24.1°	26.1°	28.2°	30.2°	32.3°	34.5°	36.7°	39.0°	41.3°	43.8°	46.3°	49.0°	51.8°	54.9°	58.1°
	6.0	1.7°	3.3°	5.0°	6.6°	8.3°	10.0°	11.6°	13.3°	15.0°	16.8°	18.5°	20.2°	22.0°	23.8°	25.6°	27.5°	29.4°	31.3°	33.2°	35.2°	37.3°	39.4°	41.5°	43.8°	46.1°	48.6°	51.1°
	6.5	1.5°	3.1°	4.6°	6.1°	7.6°	9.2°	10.7°	12.3°	13.9°	15.4°	17.0°	18.6°	20.2°	21.9°	23.5°	25.2°	26.9°	28.6°	30.4°	32.2°	34.0°	35.8°	37.7°	39.7°	41.7°	43.8°	45.9°
	7.0	1.4°	2.8°	4.3°	5.7°	7.1°	8.5°	10.0°	11.4°	12.9°	14.3°	15.8°	17.3°	18.7°	20.2°	21.8°	23.3°	24.8°	26.4°	28.0°	29.6°	31.3°	32.9°	34.6°	36.4°	38.2°	40.0°	41.9°
	7.5	1.3°	2.6°	4.0°	5.3°	6.6°	8.0°	9.3°	10.6°	12.0°	13.3°	14.7°	16.1°	17.4°	18.8°	20.2°	21.7°	23.1°	24.5°	26.0°	27.5°	29.0°	30.5°	32.0°	33.6°	35.2°	36.9°	38.5°
	8.0	1.2°	2.5°	3.7°	5.0°	6.2°	7.5°	8.7°	10.0°	11.2°	12.5°	13.8°	15.0°	16.3°	17.6°	18.9°	20.2°	21.6°	22.9°	24.3°	25.6°	27.0°	28.4°	29.8°	31.3°	32.7°	34.2°	35.7°

27.77 s	14 kts
29.91 s	13 kts
32.4 s	12 kts
35.34 s	11 kts
38.88 s	10 kts
43.2 s	9 kts
48.6 s	8 kts
55.54 s	7 kts
64.8 s	6 kts
77.75 s	5 kts
97.19 s	4 kts
129.59 s	3 kts
194.39 s	2 kts
388.77 s	1 kts

# Mogami Class Heavy Cruiser

p.28

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,982m	7,930m	3	660m	2,643m	5	395m	1,586m	7	282m	1,132m
1.5	1,321m	5,286m	3.5	566m	2,265m	5.5	359m	1,441m	7.5	263m	1,057m
2	991m	3,965m	4	495m	1,982m	6	329m	1,321m	8	246m	991m
2.5	792m	3,172m	4.5	440m	1,762m	6.5	304m	1,220m	8.5	232m	932m

## Ship Recognition:



# Furutaka Class Heavy Cruiser

<b>Class:</b>	Furutaka		
<b>Type:</b>	Heavy Cruiser		
<b>Tonnage:</b>	7,100		
<b>Speed:</b>	33.0 kts		
<b>Length:</b>	188.0 m		
<b>Height:</b>	31.9 m		
<b>Draft:</b>	4.5 m		
<b>AOB Ratio:</b>	5.89 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	5.72 m	(18.8 ft)	

Target Speed (in seconds)					
-	41 kts	11.42 s	32 kts	15.89 s	23 kts
-	40 kts	11.79 s	31 kts	16.61 s	22 kts
-	39 kts	12.18 s	30 kts	17.4 s	21 kts
-	38 kts	12.6 s	29 kts	18.27 s	20 kts
-	37 kts	13.05 s	28 kts	19.23 s	19 kts
-	36 kts	13.54 s	27 kts	20.3 s	18 kts
-	35 kts	14.06 s	26 kts	21.5 s	17 kts
-	34 kts	14.62 s	25 kts	22.84 s	16 kts
11.07 s	33 kts	15.23 s	24 kts	24.36 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.2°	6.5°	9.8°	13.1°	16.4°	19.8°	23.3°	26.9°	30.6°	34.4°	38.5°	42.7°	47.3°	52.4°	58.0°	64.8°	74.1°	####	####	####	####	####	####	####	####	####	####
	3.5	2.8°	5.6°	8.4°	11.2°	14.0°	16.9°	19.8°	22.8°	25.9°	29.0°	32.2°	35.6°	39.1°	42.7°	46.7°	50.9°	55.5°	60.8°	67.1°	75.8°	####	####	####	####	####	####	####
	4.0	2.4°	4.9°	7.3°	9.8°	12.2°	14.7°	17.3°	19.8°	22.4°	25.1°	27.8°	30.6°	33.5°	36.4°	39.5°	42.7°	46.1°	49.8°	53.7°	58.0°	63.0°	68.9°	77.3°	####	####	####	####
	4.5	2.2°	4.3°	6.5°	8.7°	10.9°	13.1°	15.3°	17.6°	19.8°	22.2°	24.5°	26.9°	29.4°	31.9°	34.4°	37.1°	39.9°	42.7°	45.8°	49.0°	52.4°	56.1°	60.1°	64.8°	70.5°	78.6°	####
	5.0	1.9°	3.9°	5.8°	7.8°	9.8°	11.7°	13.7°	15.8°	17.8°	19.8°	21.9°	24.0°	26.2°	28.4°	30.6°	32.9°	35.2°	37.7°	40.1°	42.7°	45.5°	48.3°	51.3°	54.5°	58.0°	61.9°	66.4°
	5.5	1.8°	3.5°	5.3°	7.1°	8.9°	10.7°	12.5°	14.3°	16.1°	18.0°	19.8°	21.7°	23.6°	25.6°	27.6°	29.6°	31.6°	33.7°	35.9°	38.1°	40.4°	42.7°	45.2°	47.8°	50.5°	53.3°	56.4°
	6.0	1.6°	3.2°	4.9°	6.5°	8.1°	9.8°	11.4°	13.1°	14.7°	16.4°	18.1°	19.8°	21.6°	23.3°	25.1°	26.9°	28.7°	30.6°	32.5°	34.4°	36.4°	38.5°	40.6°	42.7°	45.0°	47.3°	49.8°
	6.5	1.5°	3.0°	4.5°	6.0°	7.5°	9.0°	10.5°	12.1°	13.6°	15.1°	16.7°	18.3°	19.8°	21.4°	23.1°	24.7°	26.3°	28.0°	29.7°	31.5°	33.2°	35.1°	36.9°	38.8°	40.7°	42.7°	44.8°
	7.0	1.4°	2.8°	4.2°	5.6°	7.0°	8.4°	9.8°	11.2°	12.6°	14.0°	15.5°	16.9°	18.4°	19.8°	21.3°	22.8°	24.3°	25.9°	27.4°	29.0°	30.6°	32.2°	33.9°	35.6°	37.3°	39.1°	40.9°
	7.5	1.3°	2.6°	3.9°	5.2°	6.5°	7.8°	9.1°	10.4°	11.7°	13.1°	14.4°	15.8°	17.1°	18.5°	19.8°	21.2°	22.6°	24.0°	25.5°	26.9°	28.4°	29.8°	31.4°	32.9°	34.4°	36.0°	37.7°
	8.0	1.2°	2.4°	3.6°	4.9°	6.1°	7.3°	8.5°	9.8°	11.0°	12.2°	13.5°	14.7°	16.0°	17.3°	18.6°	19.8°	21.1°	22.4°	23.8°	25.1°	26.4°	27.8°	29.2°	30.6°	32.0°	33.5°	34.9°

26.1 s	14 kts
28.11 s	13 kts
30.45 s	12 kts
33.22 s	11 kts
36.54 s	10 kts
40.61 s	9 kts
45.68 s	8 kts
52.21 s	7 kts
60.91 s	6 kts
73.09 s	5 kts
91.36 s	4 kts
121.82 s	3 kts
182.72 s	2 kts
365.45 s	1 kts

# Furutaka Class Heavy Cruiser

p.30

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,828m	7,311m	3	609m	2,437m	5	365m	1,462m	7	260m	1,044m
1.5	1,218m	4,874m	3.5	522m	2,089m	5.5	331m	1,329m	7.5	242m	974m
2	913m	3,655m	4	456m	1,828m	6	304m	1,218m	8	227m	913m
2.5	731m	2,924m	4.5	405m	1,624m	6.5	280m	1,124m	8.5	213m	860m

## Ship Recognition:



# Agano Class Light Cruiser

<b>Class:</b>	Agano		
<b>Type:</b>	Light Cruiser		
<b>Tonnage:</b>	6,652		
<b>Speed:</b>	35.0 kts		
<b>Length:</b>	174.5 m		
<b>Height:</b>	25.2 m		
<b>Draft:</b>	5.6 m		
<b>AOB Ratio:</b>	6.92 : 1		
<b>C-Depth:</b>	3.05 m	(10.0 ft)	
<b>I-Depth:</b>	6.82 m	(22.4 ft)	

Target Speed (in seconds)					
-	41 kts	10.6 s	32 kts	14.75 s	23 kts
-	40 kts	10.94 s	31 kts	15.42 s	22 kts
-	39 kts	11.31 s	30 kts	16.15 s	21 kts
-	38 kts	11.7 s	29 kts	16.96 s	20 kts
-	37 kts	12.11 s	28 kts	17.85 s	19 kts
-	36 kts	12.56 s	27 kts	18.84 s	18 kts
9.69 s	35 kts	13.05 s	26 kts	19.95 s	17 kts
9.98 s	34 kts	13.57 s	25 kts	21.2 s	16 kts
10.28 s	33 kts	14.13 s	24 kts	22.61 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	2.8°	5.5°	8.3°	11.1°	13.9°	16.8°	19.7°	22.6°	25.7°	28.8°	32.0°	35.3°	38.7°	42.4°	46.2°	50.4°	54.9°	60.1°	66.2°	74.3°	####	####	####	####	####	####	####
	3.5	2.4°	4.7°	7.1°	9.5°	11.9°	14.3°	16.8°	19.3°	21.8°	24.4°	27.0°	29.7°	32.4°	35.3°	38.2°	41.3°	44.5°	48.0°	51.6°	55.6°	60.1°	65.2°	71.6°	82.0°	####	####	####
	4.0	2.1°	4.1°	6.2°	8.3°	10.4°	12.5°	14.6°	16.8°	19.0°	21.2°	23.4°	25.7°	28.0°	30.4°	32.8°	35.3°	37.9°	40.5°	43.3°	46.2°	49.3°	52.6°	56.1°	60.1°	64.5°	69.8°	77.1°
	4.5	1.8°	3.7°	5.5°	7.4°	9.2°	11.1°	13.0°	14.9°	16.8°	18.7°	20.7°	22.6°	24.7°	26.7°	28.8°	30.9°	33.1°	35.3°	37.6°	39.9°	42.4°	44.9°	47.6°	50.4°	53.3°	56.6°	60.1°
	5.0	1.7°	3.3°	5.0°	6.6°	8.3°	10.0°	11.7°	13.4°	15.1°	16.8°	18.5°	20.3°	22.1°	23.9°	25.7°	27.5°	29.4°	31.3°	33.3°	35.3°	37.3°	39.5°	41.6°	43.9°	46.2°	48.7°	51.2°
	5.5	1.5°	3.0°	4.5°	6.0°	7.5°	9.1°	10.6°	12.1°	13.7°	15.2°	16.8°	18.4°	20.0°	21.6°	23.2°	24.8°	26.5°	28.2°	29.9°	31.7°	33.5°	35.3°	37.2°	39.1°	41.0°	43.1°	45.1°
	6.0	1.4°	2.8°	4.1°	5.5°	6.9°	8.3°	9.7°	11.1°	12.5°	13.9°	15.4°	16.8°	18.2°	19.7°	21.2°	22.6°	24.2°	25.7°	27.2°	28.8°	30.4°	32.0°	33.6°	35.3°	37.0°	38.7°	40.5°
	6.5	1.3°	2.5°	3.8°	5.1°	6.4°	7.7°	8.9°	10.2°	11.5°	12.8°	14.1°	15.5°	16.8°	18.1°	19.5°	20.8°	22.2°	23.6°	25.0°	26.4°	27.8°	29.3°	30.7°	32.2°	33.7°	35.3°	36.9°
	7.0	1.2°	2.4°	3.5°	4.7°	5.9°	7.1°	8.3°	9.5°	10.7°	11.9°	13.1°	14.3°	15.6°	16.8°	18.0°	19.3°	20.5°	21.8°	23.1°	24.4°	25.7°	27.0°	28.3°	29.7°	31.0°	32.4°	33.8°
	7.5	1.1°	2.2°	3.3°	4.4°	5.5°	6.6°	7.7°	8.9°	10.0°	11.1°	12.2°	13.4°	14.5°	15.6°	16.8°	17.9°	19.1°	20.3°	21.5°	22.6°	23.9°	25.1°	26.3°	27.5°	28.8°	30.0°	31.3°
	8.0	1.0°	2.1°	3.1°	4.1°	5.2°	6.2°	7.3°	8.3°	9.3°	10.4°	11.5°	12.5°	13.6°	14.6°	15.7°	16.8°	17.9°	19.0°	20.1°	21.2°	22.3°	23.4°	24.5°	25.7°	26.8°	28.0°	29.2°

24.23 s	14 kts
26.09 s	13 kts
28.27 s	12 kts
30.84 s	11 kts
33.92 s	10 kts
37.69 s	9 kts
42.4 s	8 kts
48.46 s	7 kts
56.53 s	6 kts
67.84 s	5 kts
84.8 s	4 kts
113.07 s	3 kts
169.6 s	2 kts
339.2 s	1 kts



# Agano Class Light Cruiser

p.32

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,444m	5,775m	3	481m	1,925m	5	288m	1,155m	7	205m	825m
1.5	962m	3,850m	3.5	412m	1,650m	5.5	262m	1,050m	7.5	191m	770m
2	722m	2,888m	4	360m	1,444m	6	240m	962m	8	179m	722m
2.5	577m	2,310m	4.5	320m	1,283m	6.5	221m	888m	8.5	169m	679m

## Ship Recognition:



# Naka Class Light Cruiser

<b>Class:</b>	Naka		
<b>Type:</b>	Light Cruiser		
<b>Tonnage:</b>	5,195		
<b>Speed:</b>	33.0 kts		
<b>Length:</b>	163.0 m		
<b>Height:</b>	31.8 m		
<b>Draft:</b>	4.6 m		
<b>AOB Ratio:</b>	5.13 : 1		
<b>C-Depth:</b>	3.05 m	(10.0 ft)	
<b>I-Depth:</b>	5.82 m	(19.1 ft)	

Target Speed (in seconds)					
-	41 kts	9.9 s	32 kts	13.78 s	23 kts
-	40 kts	10.22 s	31 kts	14.4 s	22 kts
-	39 kts	10.56 s	30 kts	15.09 s	21 kts
-	38 kts	10.93 s	29 kts	15.84 s	20 kts
-	37 kts	11.32 s	28 kts	16.68 s	19 kts
-	36 kts	11.74 s	27 kts	17.6 s	18 kts
-	35 kts	12.19 s	26 kts	18.64 s	17 kts
-	34 kts	12.67 s	25 kts	19.8 s	16 kts
9.6 s	33 kts	13.2 s	24 kts	21.12 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.7°	7.5°	11.3°	15.1°	19.0°	23.0°	27.1°	31.3°	35.8°	40.6°	45.7°	51.3°	57.7°	65.6°	77.3°	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.2°	6.4°	9.6°	12.9°	16.2°	19.5°	23.0°	26.5°	30.1°	33.9°	37.8°	42.0°	46.4°	51.3°	56.7°	63.1°	71.4°	####	####	####	####	####	####	####	####	####	####
	4.0	2.8°	5.6°	8.4°	11.3°	14.1°	17.0°	20.0°	23.0°	26.0°	29.2°	32.4°	35.8°	39.3°	43.1°	47.0°	51.3°	56.0°	61.4°	67.9°	77.3°	####	####	####	####	####	####	####
	4.5	2.5°	5.0°	7.5°	10.0°	12.5°	15.1°	17.7°	20.3°	23.0°	25.7°	28.5°	31.3°	34.3°	37.4°	40.6°	43.9°	47.5°	51.3°	55.5°	60.1°	65.6°	72.5°	85.7°	####	####	####	####
	5.0	2.2°	4.5°	6.7°	9.0°	11.3°	13.5°	15.9°	18.2°	20.6°	23.0°	25.4°	27.9°	30.5°	33.1°	35.8°	38.6°	41.6°	44.6°	47.8°	51.3°	55.0°	59.1°	63.8°	69.5°	77.3°	####	####
	5.5	2.0°	4.1°	6.1°	8.2°	10.2°	12.3°	14.4°	16.5°	18.6°	20.8°	23.0°	25.2°	27.5°	29.8°	32.1°	34.6°	37.1°	39.7°	42.4°	45.2°	48.2°	51.3°	54.7°	58.4°	62.5°	67.3°	73.3°
	6.0	1.9°	3.7°	5.6°	7.5°	9.4°	11.3°	13.2°	15.1°	17.0°	19.0°	21.0°	23.0°	25.0°	27.1°	29.2°	31.3°	33.6°	35.8°	38.2°	40.6°	43.1°	45.7°	48.4°	51.3°	54.4°	57.7°	61.4°
	6.5	1.7°	3.4°	5.2°	6.9°	8.6°	10.4°	12.1°	13.9°	15.7°	17.5°	19.3°	21.1°	23.0°	24.8°	26.8°	28.7°	30.7°	32.7°	34.8°	36.9°	39.1°	41.3°	43.7°	46.1°	48.6°	51.3°	54.1°
	7.0	1.6°	3.2°	4.8°	6.4°	8.0°	9.6°	11.3°	12.9°	14.5°	16.2°	17.9°	19.5°	21.2°	23.0°	24.7°	26.5°	28.3°	30.1°	32.0°	33.9°	35.8°	37.8°	39.9°	42.0°	44.2°	46.4°	48.8°
	7.5	1.5°	3.0°	4.5°	6.0°	7.5°	9.0°	10.5°	12.0°	13.5°	15.1°	16.6°	18.2°	19.8°	21.4°	23.0°	24.6°	26.2°	27.9°	29.6°	31.3°	33.1°	34.9°	36.7°	38.6°	40.6°	42.6°	44.6°
	8.0	1.4°	2.8°	4.2°	5.6°	7.0°	8.4°	9.8°	11.3°	12.7°	14.1°	15.6°	17.0°	18.5°	20.0°	21.5°	23.0°	24.5°	26.0°	27.6°	29.2°	30.8°	32.4°	34.1°	35.8°	37.6°	39.3°	41.2°

22.63 s	14 kts
24.37 s	13 kts
26.4 s	12 kts
28.8 s	11 kts
31.68 s	10 kts
35.21 s	9 kts
39.61 s	8 kts
45.26 s	7 kts
52.81 s	6 kts
63.37 s	5 kts
79.21 s	4 kts
105.62 s	3 kts
158.42 s	2 kts
316.85 s	1 kts

# Naka Class Light Cruiser

p.34

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,822m	7,288m	3	607m	2,429m	5	363m	1,457m	7	259m	1,041m
1.5	1,214m	4,859m	3.5	520m	2,082m	5.5	330m	1,325m	7.5	242m	971m
2	911m	3,644m	4	455m	1,822m	6	303m	1,214m	8	226m	911m
2.5	728m	2,915m	4.5	404m	1,619m	6.5	279m	1,121m	8.5	213m	857m

## Ship Recognition:



# Kuma Class Light Cruiser

<b>Class:</b>	Kuma		
<b>Type:</b>	Light Cruiser		
<b>Tonnage:</b>	5,100		
<b>Speed:</b>	33.0 kts		
<b>Length:</b>	163.0 m		
<b>Height:</b>	35.6 m		
<b>Draft:</b>	4.6 m		
<b>AOB Ratio:</b>	4.58 : 1		
<b>C-Depth:</b>	3.05 m	(10.0 ft)	
<b>I-Depth:</b>	5.82 m	(19.1 ft)	

Target Speed (in seconds)					
-	41 kts	9.9 s	32 kts	13.78 s	23 kts
-	40 kts	10.22 s	31 kts	14.4 s	22 kts
-	39 kts	10.56 s	30 kts	15.09 s	21 kts
-	38 kts	10.93 s	29 kts	15.84 s	20 kts
-	37 kts	11.32 s	28 kts	16.68 s	19 kts
-	36 kts	11.74 s	27 kts	17.6 s	18 kts
-	35 kts	12.19 s	26 kts	18.64 s	17 kts
-	34 kts	12.67 s	25 kts	19.8 s	16 kts
9.6 s	33 kts	13.2 s	24 kts	21.12 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.2°	8.4°	12.6°	16.9°	21.3°	25.9°	30.6°	35.6°	40.9°	46.7°	53.2°	60.9°	71.2°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.6°	7.2°	10.8°	14.5°	18.2°	22.0°	25.9°	29.9°	34.2°	38.6°	43.3°	48.5°	54.2°	60.9°	69.4°	86.8°	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.1°	6.3°	9.4°	12.6°	15.8°	19.1°	22.5°	25.9°	29.4°	33.1°	36.9°	40.9°	45.2°	49.9°	55.0°	60.9°	68.2°	79.4°	####	####	####	####	####	####	####	####	####
	4.5	2.8°	5.6°	8.4°	11.2°	14.0°	16.9°	19.9°	22.8°	25.9°	29.0°	32.3°	35.6°	39.1°	42.8°	46.7°	50.9°	55.6°	60.9°	67.2°	76.1°	####	####	####	####	####	####	####
	5.0	2.5°	5.0°	7.5°	10.1°	12.6°	15.2°	17.8°	20.5°	23.1°	25.9°	28.7°	31.6°	34.6°	37.7°	40.9°	44.3°	48.0°	51.8°	56.1°	60.9°	66.5°	73.9°	####	####	####	####	####
	5.5	2.3°	4.6°	6.8°	9.1°	11.5°	13.8°	16.1°	18.5°	20.9°	23.4°	25.9°	28.5°	31.1°	33.8°	36.6°	39.4°	42.5°	45.6°	49.0°	52.6°	56.5°	60.9°	66.0°	72.4°	83.1°	####	####
	6.0	2.1°	4.2°	6.3°	8.4°	10.5°	12.6°	14.8°	16.9°	19.1°	21.3°	23.6°	25.9°	28.2°	30.6°	33.1°	35.6°	38.2°	40.9°	43.8°	46.7°	49.9°	53.2°	56.8°	60.9°	65.5°	71.2°	79.4°
	6.5	1.9°	3.9°	5.8°	7.7°	9.7°	11.6°	13.6°	15.6°	17.6°	19.6°	21.7°	23.8°	25.9°	28.1°	30.3°	32.5°	34.8°	37.2°	39.7°	42.2°	44.9°	47.7°	50.6°	53.7°	57.1°	60.9°	65.1°
	7.0	1.8°	3.6°	5.4°	7.2°	9.0°	10.8°	12.6°	14.5°	16.3°	18.2°	20.1°	22.0°	23.9°	25.9°	27.9°	29.9°	32.0°	34.2°	36.4°	38.6°	40.9°	43.3°	45.9°	48.5°	51.3°	54.2°	57.4°
	7.5	1.7°	3.3°	5.0°	6.7°	8.4°	10.1°	11.8°	13.5°	15.2°	16.9°	18.7°	20.5°	22.2°	24.1°	25.9°	27.8°	29.7°	31.6°	33.6°	35.6°	37.7°	39.8°	42.0°	44.3°	46.7°	49.2°	51.8°
	8.0	1.6°	3.1°	4.7°	6.3°	7.8°	9.4°	11.0°	12.6°	14.2°	15.8°	17.5°	19.1°	20.8°	22.5°	24.2°	25.9°	27.7°	29.4°	31.2°	33.1°	35.0°	36.9°	38.9°	40.9°	43.0°	45.2°	47.5°

22.63 s	14 kts
24.37 s	13 kts
26.4 s	12 kts
28.8 s	11 kts
31.68 s	10 kts
35.21 s	9 kts
39.61 s	8 kts
45.26 s	7 kts
52.81 s	6 kts
63.37 s	5 kts
79.21 s	4 kts
105.62 s	3 kts
158.42 s	2 kts
316.85 s	1 kts

# Kuma Class Light Cruiser

p.36

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,040m	8,159m	3	679m	2,719m	5	407m	1,632m	7	290m	1,165m
1.5	1,360m	5,439m	3.5	582m	2,331m	5.5	370m	1,483m	7.5	270m	1,087m
2	1,019m	4,079m	4	509m	2,040m	6	339m	1,360m	8	253m	1,019m
2.5	815m	3,263m	4.5	452m	1,813m	6.5	312m	1,255m	8.5	238m	959m

## Ship Recognition:



# Akizuki Class Destroyer

<b>Class:</b>	Akizuki	
<b>Type:</b>	Destroyer	
<b>Tonnage:</b>	2,701	
<b>Speed:</b>	33.0 kts	
<b>Length:</b>	134.0 m	
<b>Height:</b>	22.8 m	
<b>Draft:</b>	4.1 m	
<b>AOB Ratio:</b>	5.88 : 1	
<b>C-Depth:</b>	1.83 m	(6.0 ft)
<b>I-Depth:</b>	5.32 m	(17.5 ft)

Target Speed (in seconds)					
-	41 kts	8.14 s	32 kts	11.33 s	23 kts
-	40 kts	8.4 s	31 kts	11.84 s	22 kts
-	39 kts	8.68 s	30 kts	12.4 s	21 kts
-	38 kts	8.98 s	29 kts	13.02 s	20 kts
-	37 kts	9.3 s	28 kts	13.71 s	19 kts
-	36 kts	9.65 s	27 kts	14.47 s	18 kts
-	35 kts	10.02 s	26 kts	15.32 s	17 kts
-	34 kts	10.42 s	25 kts	16.28 s	16 kts
7.89 s	33 kts	10.85 s	24 kts	17.37 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.3°	6.5°	9.8°	13.1°	16.5°	19.9°	23.4°	27.0°	30.7°	34.6°	38.6°	42.9°	47.5°	52.6°	58.3°	65.2°	74.6°	####	####	####	####	####	####	####	####	####	####
	3.5	2.8°	5.6°	8.4°	11.2°	14.1°	17.0°	19.9°	22.9°	25.9°	29.1°	32.3°	35.7°	39.2°	42.9°	46.8°	51.1°	55.7°	61.1°	67.5°	76.5°	####	####	####	####	####	####	####
	4.0	2.4°	4.9°	7.3°	9.8°	12.3°	14.8°	17.3°	19.9°	22.5°	25.2°	27.9°	30.7°	33.6°	36.5°	39.6°	42.9°	46.3°	50.0°	53.9°	58.3°	63.3°	69.4°	78.1°	####	####	####	####
	4.5	2.2°	4.3°	6.5°	8.7°	10.9°	13.1°	15.3°	17.6°	19.9°	22.2°	24.6°	27.0°	29.4°	32.0°	34.6°	37.2°	40.0°	42.9°	45.9°	49.1°	52.6°	56.3°	60.4°	65.2°	71.0°	79.4°	####
	5.0	2.0°	3.9°	5.9°	7.8°	9.8°	11.8°	13.8°	15.8°	17.8°	19.9°	22.0°	24.1°	26.3°	28.5°	30.7°	33.0°	35.3°	37.8°	40.3°	42.9°	45.6°	48.5°	51.5°	54.8°	58.3°	62.2°	66.8°
	5.5	1.8°	3.5°	5.3°	7.1°	8.9°	10.7°	12.5°	14.3°	16.2°	18.0°	19.9°	21.8°	23.7°	25.7°	27.6°	29.7°	31.7°	33.8°	36.0°	38.2°	40.5°	42.9°	45.4°	47.9°	50.7°	53.5°	56.6°
	6.0	1.6°	3.3°	4.9°	6.5°	8.2°	9.8°	11.4°	13.1°	14.8°	16.5°	18.2°	19.9°	21.6°	23.4°	25.2°	27.0°	28.8°	30.7°	32.6°	34.6°	36.5°	38.6°	40.7°	42.9°	45.1°	47.5°	50.0°
	6.5	1.5°	3.0°	4.5°	6.0°	7.5°	9.0°	10.6°	12.1°	13.6°	15.2°	16.7°	18.3°	19.9°	21.5°	23.1°	24.8°	26.4°	28.1°	29.8°	31.6°	33.3°	35.2°	37.0°	38.9°	40.9°	42.9°	45.0°
	7.0	1.4°	2.8°	4.2°	5.6°	7.0°	8.4°	9.8°	11.2°	12.6°	14.1°	15.5°	17.0°	18.4°	19.9°	21.4°	22.9°	24.4°	25.9°	27.5°	29.1°	30.7°	32.3°	34.0°	35.7°	37.4°	39.2°	41.0°
	7.5	1.3°	2.6°	3.9°	5.2°	6.5°	7.8°	9.1°	10.5°	11.8°	13.1°	14.5°	15.8°	17.2°	18.5°	19.9°	21.3°	22.7°	24.1°	25.5°	27.0°	28.5°	29.9°	31.5°	33.0°	34.6°	36.1°	37.8°
	8.0	1.2°	2.4°	3.7°	4.9°	6.1°	7.3°	8.6°	9.8°	11.0°	12.3°	13.5°	14.8°	16.1°	17.3°	18.6°	19.9°	21.2°	22.5°	23.8°	25.2°	26.5°	27.9°	29.3°	30.7°	32.1°	33.6°	35.0°

18.61 s	14 kts
20.04 s	13 kts
21.71 s	12 kts
23.68 s	11 kts
26.05 s	10 kts
28.94 s	9 kts
32.56 s	8 kts
37.21 s	7 kts
43.41 s	6 kts
52.1 s	5 kts
65.12 s	4 kts
86.83 s	3 kts
130.24 s	2 kts
260.48 s	1 kts

# Akizuki Class Destroyer

p.38

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,306m	5,225m	3	435m	1,742m	5	261m	1,045m	7	186m	746m
1.5	871m	3,484m	3.5	373m	1,493m	5.5	237m	950m	7.5	173m	696m
2	653m	2,613m	4	326m	1,306m	6	217m	871m	8	162m	653m
2.5	522m	2,090m	4.5	290m	1,161m	6.5	200m	804m	8.5	153m	614m

## Ship Recognition:



# Fubuki Class Destroyer

<b>Class:</b>	Fubuki	
<b>Type:</b>	Destroyer	
<b>Tonnage:</b>	2,260	
<b>Speed:</b>	38.0 kts	
<b>Length:</b>	118.5 m	
<b>Height:</b>	21.16 m	
<b>Draft:</b>	3.2 m	
<b>AOB Ratio:</b>	5.6 : 1	
<b>C-Depth:</b>	1.83 m	(6.0 ft)
<b>I-Depth:</b>	4.42 m	(14.5 ft)

Target Speed (in seconds)					
-	41 kts	7.2 s	32 kts	10.02 s	23 kts
-	40 kts	7.43 s	31 kts	10.47 s	22 kts
-	39 kts	7.68 s	30 kts	10.97 s	21 kts
6.06 s	38 kts	7.94 s	29 kts	11.52 s	20 kts
6.23 s	37 kts	8.23 s	28 kts	12.12 s	19 kts
6.4 s	36 kts	8.53 s	27 kts	12.8 s	18 kts
6.58 s	35 kts	8.86 s	26 kts	13.55 s	17 kts
6.77 s	34 kts	9.21 s	25 kts	14.4 s	16 kts
6.98 s	33 kts	9.6 s	24 kts	15.36 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.4°	6.8°	10.3°	13.8°	17.3°	20.9°	24.6°	28.4°	32.4°	36.5°	40.9°	45.6°	50.7°	56.4°	63.2°	72.2°	####	####	####	####	####	####	####	####	####	####	####
	3.5	2.9°	5.9°	8.8°	11.8°	14.8°	17.8°	20.9°	24.1°	27.3°	30.7°	34.1°	37.8°	41.5°	45.6°	49.9°	54.7°	60.1°	66.7°	75.8°	####	####	####	####	####	####	####	####
	4.0	2.6°	5.1°	7.7°	10.3°	12.9°	15.5°	18.2°	20.9°	23.7°	26.5°	29.4°	32.4°	35.5°	38.7°	42.0°	45.6°	49.4°	53.5°	58.0°	63.2°	69.6°	79.1°	####	####	####	####	####
	4.5	2.3°	4.6°	6.8°	9.1°	11.4°	13.8°	16.1°	18.5°	20.9°	23.4°	25.9°	28.4°	31.1°	33.7°	36.5°	39.4°	42.4°	45.6°	48.9°	52.5°	56.4°	60.8°	65.9°	72.2°	82.8°	####	####
	5.0	2.0°	4.1°	6.2°	8.2°	10.3°	12.4°	14.5°	16.6°	18.7°	20.9°	23.1°	25.4°	27.7°	30.0°	32.4°	34.8°	37.4°	40.0°	42.7°	45.6°	48.6°	51.8°	55.2°	59.0°	63.2°	68.2°	74.6°
	5.5	1.9°	3.7°	5.6°	7.5°	9.3°	11.2°	13.1°	15.1°	17.0°	18.9°	20.9°	22.9°	25.0°	27.0°	29.1°	31.3°	33.5°	35.8°	38.1°	40.5°	43.0°	45.6°	48.3°	51.2°	54.3°	57.6°	61.2°
	6.0	1.7°	3.4°	5.1°	6.8°	8.6°	10.3°	12.0°	13.8°	15.5°	17.3°	19.1°	20.9°	22.8°	24.6°	26.5°	28.4°	30.4°	32.4°	34.4°	36.5°	38.7°	40.9°	43.2°	45.6°	48.1°	50.7°	53.5°
	6.5	1.6°	3.1°	4.7°	6.3°	7.9°	9.5°	11.1°	12.7°	14.3°	15.9°	17.6°	19.2°	20.9°	22.6°	24.3°	26.1°	27.8°	29.6°	31.5°	33.3°	35.2°	37.2°	39.2°	41.2°	43.4°	45.6°	47.9°
	7.0	1.5°	2.9°	4.4°	5.9°	7.3°	8.8°	10.3°	11.8°	13.3°	14.8°	16.3°	17.8°	19.4°	20.9°	22.5°	24.1°	25.7°	27.3°	29.0°	30.7°	32.4°	34.1°	35.9°	37.8°	39.6°	41.5°	43.5°
	7.5	1.4°	2.7°	4.1°	5.5°	6.8°	8.2°	9.6°	11.0°	12.4°	13.8°	15.2°	16.6°	18.0°	19.5°	20.9°	22.4°	23.9°	25.4°	26.9°	28.4°	30.0°	31.6°	33.2°	34.8°	36.5°	38.2°	40.0°
	8.0	1.3°	2.6°	3.8°	5.1°	6.4°	7.7°	9.0°	10.3°	11.6°	12.9°	14.2°	15.5°	16.9°	18.2°	19.6°	20.9°	22.3°	23.7°	25.1°	26.5°	28.0°	29.4°	30.9°	32.4°	33.9°	35.5°	37.1°

16.45 s	14 kts
17.72 s	13 kts
19.2 s	12 kts
20.94 s	11 kts
23.03 s	10 kts
25.59 s	9 kts
28.79 s	8 kts
32.91 s	7 kts
38.39 s	6 kts
46.07 s	5 kts
57.59 s	4 kts
76.78 s	3 kts
115.17 s	2 kts
230.35 s	1 kts



# Fubuki Class Destroyer

p.40

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,212m	4,849m	3	404m	1,616m	5	242m	970m	7	172m	693m
1.5	808m	3,233m	3.5	346m	1,385m	5.5	220m	882m	7.5	161m	646m
2	606m	2,425m	4	303m	1,212m	6	201m	808m	8	151m	606m
2.5	485m	1,940m	4.5	269m	1,078m	6.5	186m	746m	8.5	142m	570m

## Ship Recognition:



# Asashio Class Destroyer

<b>Class:</b>	Asashio		
<b>Type:</b>	Destroyer		
<b>Tonnage:</b>	1,961		
<b>Speed:</b>	35.0 kts		
<b>Length:</b>	118.3 m		
<b>Height:</b>	27.0 m		
<b>Draft:</b>	3.6 m		
<b>AOB Ratio:</b>	4.38 : 1		
<b>C-Depth:</b>	1.83 m	(6.0 ft)	
<b>I-Depth:</b>	4.82 m	(15.8 ft)	

Target Speed (in seconds)					
-	41 kts	7.19 s	32 kts	10.0 s	23 kts
-	40 kts	7.42 s	31 kts	10.45 s	22 kts
-	39 kts	7.67 s	30 kts	10.95 s	21 kts
-	38 kts	7.93 s	29 kts	11.5 s	20 kts
-	37 kts	8.21 s	28 kts	12.1 s	19 kts
-	36 kts	8.52 s	27 kts	12.78 s	18 kts
6.57 s	35 kts	8.84 s	26 kts	13.53 s	17 kts
6.76 s	34 kts	9.2 s	25 kts	14.37 s	16 kts
6.97 s	33 kts	9.58 s	24 kts	15.33 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.4°	8.8°	13.2°	17.7°	22.4°	27.2°	32.2°	37.5°	43.2°	49.5°	56.8°	65.9°	81.5°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.7°	7.5°	11.3°	15.1°	19.0°	23.0°	27.2°	31.4°	35.9°	40.7°	45.8°	51.5°	58.0°	65.9°	78.0°	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.3°	6.6°	9.9°	13.2°	16.6°	20.0°	23.5°	27.2°	30.9°	34.8°	38.9°	43.2°	47.9°	53.0°	58.9°	65.9°	75.9°	####	####	####	####	####	####	####	####	####	####
	4.5	2.9°	5.8°	8.8°	11.7°	14.7°	17.7°	20.8°	23.9°	27.2°	30.5°	33.9°	37.5°	41.2°	45.2°	49.5°	54.2°	59.6°	65.9°	74.5°	####	####	####	####	####	####	####	####
	5.0	2.6°	5.2°	7.9°	10.5°	13.2°	15.9°	18.6°	21.4°	24.3°	27.2°	30.1°	33.2°	36.4°	39.7°	43.2°	46.9°	50.9°	55.2°	60.1°	65.9°	73.5°	####	####	####	####	####	####
	5.5	2.4°	4.8°	7.2°	9.6°	12.0°	14.4°	16.9°	19.4°	21.9°	24.5°	27.2°	29.9°	32.6°	35.5°	38.5°	41.6°	44.9°	48.3°	52.0°	56.1°	60.6°	65.9°	72.6°	84.8°	####	####	####
	6.0	2.2°	4.4°	6.6°	8.8°	11.0°	13.2°	15.4°	17.7°	20.0°	22.4°	24.7°	27.2°	29.6°	32.2°	34.8°	37.5°	40.3°	43.2°	46.3°	49.5°	53.0°	56.8°	61.0°	65.9°	72.0°	81.5°	####
	6.5	2.0°	4.0°	6.0°	8.1°	10.1°	12.2°	14.2°	16.3°	18.4°	20.6°	22.7°	24.9°	27.2°	29.4°	31.8°	34.2°	36.6°	39.2°	41.8°	44.6°	47.5°	50.6°	53.9°	57.4°	61.4°	65.9°	71.4°
	7.0	1.9°	3.7°	5.6°	7.5°	9.4°	11.3°	13.2°	15.1°	17.1°	19.0°	21.0°	23.0°	25.1°	27.2°	29.3°	31.4°	33.7°	35.9°	38.3°	40.7°	43.2°	45.8°	48.6°	51.5°	54.6°	58.0°	61.7°
	7.5	1.7°	3.5°	5.2°	7.0°	8.8°	10.5°	12.3°	14.1°	15.9°	17.7°	19.6°	21.4°	23.3°	25.2°	27.2°	29.1°	31.2°	33.2°	35.3°	37.5°	39.7°	42.0°	44.4°	46.9°	49.5°	52.3°	55.2°
	8.0	1.6°	3.3°	4.9°	6.6°	8.2°	9.9°	11.5°	13.2°	14.9°	16.6°	18.3°	20.0°	21.8°	23.5°	25.3°	27.2°	29.0°	30.9°	32.8°	34.8°	36.8°	38.9°	41.0°	43.2°	45.5°	47.9°	50.4°

16.43 s	14 kts
17.69 s	13 kts
19.16 s	12 kts
20.91 s	11 kts
23.0 s	10 kts
25.55 s	9 kts
28.74 s	8 kts
32.85 s	7 kts
38.33 s	6 kts
45.99 s	5 kts
57.49 s	4 kts
76.65 s	3 kts
114.98 s	2 kts
229.96 s	1 kts

# Asashio Class Destroyer

p.42

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,547m	6,188m	3	515m	2,063m	5	309m	1,237m	7	220m	884m
1.5	1,031m	4,125m	3.5	441m	1,768m	5.5	280m	1,125m	7.5	205m	825m
2	773m	3,094m	4	386m	1,547m	6	257m	1,031m	8	192m	773m
2.5	618m	2,475m	4.5	343m	1,375m	6.5	237m	952m	8.5	181m	728m

## Ship Recognition:



# Shiratsuyu Class Destroyer

<b>Class:</b>	Shiratsuyu	
<b>Type:</b>	Destroyer	
<b>Tonnage:</b>	1,685	
<b>Speed:</b>	34.0 kts	
<b>Length:</b>	108.0 m	
<b>Height:</b>	21.9 m	
<b>Draft:</b>	3.5 m	
<b>AOB Ratio:</b>	4.93 : 1	
<b>C-Depth:</b>	1.83 m	(6.0 ft)
<b>I-Depth:</b>	4.72 m	(15.5 ft)

Target Speed (in seconds)					
-	41 kts	6.56 s	32 kts	9.13 s	23 kts
-	40 kts	6.77 s	31 kts	9.54 s	22 kts
-	39 kts	7.0 s	30 kts	10.0 s	21 kts
-	38 kts	7.24 s	29 kts	10.5 s	20 kts
-	37 kts	7.5 s	28 kts	11.05 s	19 kts
-	36 kts	7.78 s	27 kts	11.66 s	18 kts
-	35 kts	8.07 s	26 kts	12.35 s	17 kts
6.17 s	34 kts	8.4 s	25 kts	13.12 s	16 kts
6.36 s	33 kts	8.75 s	24 kts	14.0 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.9°	7.8°	11.7°	15.7°	19.8°	23.9°	28.2°	32.7°	37.5°	42.5°	48.0°	54.2°	61.5°	71.1°	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.3°	6.7°	10.0°	13.4°	16.8°	20.3°	23.9°	27.6°	31.4°	35.4°	39.6°	44.0°	48.9°	54.2°	60.3°	68.0°	80.0°	####	####	####	####	####	####	####	####	####	####
	4.0	2.9°	5.8°	8.7°	11.7°	14.7°	17.7°	20.8°	23.9°	27.1°	30.5°	33.9°	37.5°	41.2°	45.2°	49.5°	54.2°	59.5°	65.9°	74.4°	####	####	####	####	####	####	####	####
	4.5	2.6°	5.2°	7.8°	10.4°	13.0°	15.7°	18.4°	21.1°	23.9°	26.8°	29.7°	32.7°	35.9°	39.1°	42.5°	46.1°	50.0°	54.2°	58.9°	64.3°	71.1°	82.5°	####	####	####	####	####
	5.0	2.3°	4.7°	7.0°	9.3°	11.7°	14.1°	16.5°	18.9°	21.4°	23.9°	26.5°	29.1°	31.8°	34.6°	37.5°	40.5°	43.6°	46.9°	50.4°	54.2°	58.4°	63.2°	68.9°	76.7°	####	####	####
	5.5	2.1°	4.2°	6.4°	8.5°	10.6°	12.8°	15.0°	17.2°	19.4°	21.6°	23.9°	26.3°	28.6°	31.1°	33.6°	36.1°	38.8°	41.6°	44.5°	47.5°	50.7°	54.2°	58.0°	62.2°	67.2°	73.5°	84.5°
	6.0	1.9°	3.9°	5.8°	7.8°	9.7°	11.7°	13.7°	15.7°	17.7°	19.8°	21.8°	23.9°	26.1°	28.2°	30.5°	32.7°	35.1°	37.5°	40.0°	42.5°	45.2°	48.0°	51.0°	54.2°	57.7°	61.5°	65.9°
	6.5	1.8°	3.6°	5.4°	7.2°	9.0°	10.8°	12.6°	14.5°	16.3°	18.2°	20.1°	22.0°	23.9°	25.9°	27.9°	29.9°	32.0°	34.2°	36.4°	38.6°	40.9°	43.3°	45.9°	48.5°	51.3°	54.2°	57.4°
	7.0	1.7°	3.3°	5.0°	6.7°	8.3°	10.0°	11.7°	13.4°	15.1°	16.8°	18.6°	20.3°	22.1°	23.9°	25.8°	27.6°	29.5°	31.4°	33.4°	35.4°	37.5°	39.6°	41.8°	44.0°	46.4°	48.9°	51.5°
	7.5	1.5°	3.1°	4.7°	6.2°	7.8°	9.3°	10.9°	12.5°	14.1°	15.7°	17.3°	18.9°	20.6°	22.2°	23.9°	25.6°	27.4°	29.1°	30.9°	32.7°	34.6°	36.5°	38.5°	40.5°	42.5°	44.7°	46.9°
	8.0	1.5°	2.9°	4.4°	5.8°	7.3°	8.7°	10.2°	11.7°	13.2°	14.7°	16.2°	17.7°	19.2°	20.8°	22.3°	23.9°	25.5°	27.1°	28.8°	30.5°	32.2°	33.9°	35.7°	37.5°	39.3°	41.2°	43.2°

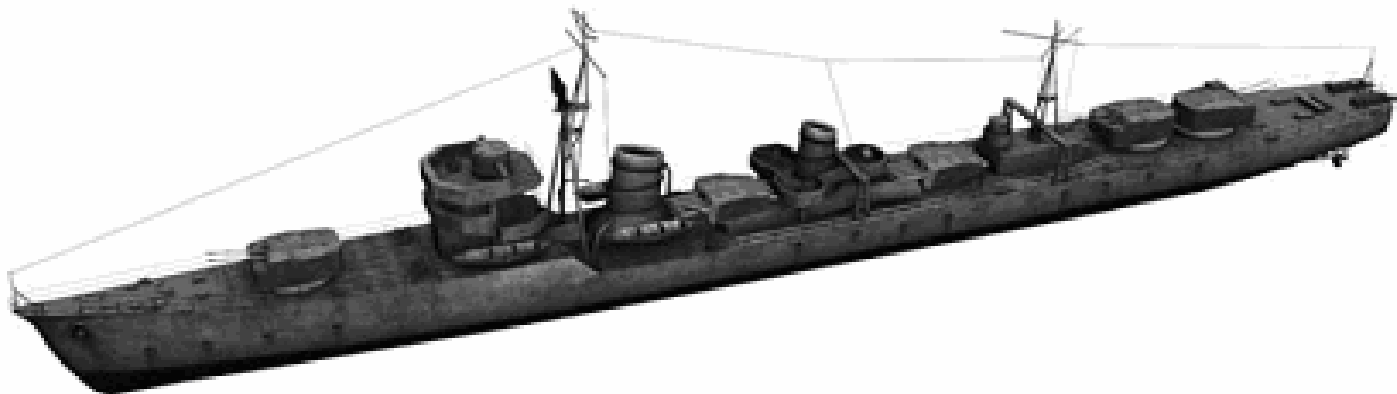
15.0 s	14 kts
16.15 s	13 kts
17.49 s	12 kts
19.09 s	11 kts
20.99 s	10 kts
23.33 s	9 kts
26.24 s	8 kts
29.99 s	7 kts
34.99 s	6 kts
41.99 s	5 kts
52.48 s	4 kts
69.98 s	3 kts
104.97 s	2 kts
209.94 s	1 kts

# Shiratsuyu Class Destroyer

p.44

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,255m	5,019m	3	418m	1,673m	5	250m	1,004m	7	178m	717m
1.5	836m	3,346m	3.5	358m	1,434m	5.5	227m	912m	7.5	166m	669m
2	627m	2,509m	4	313m	1,255m	6	208m	836m	8	156m	627m
2.5	502m	2,008m	4.5	278m	1,115m	6.5	192m	772m	8.5	147m	590m

## Ship Recognition:



# Mutsuki Class Destroyer

<b>Class:</b>	Mutsuki		
<b>Type:</b>	Destroyer		
<b>Tonnage:</b>	1,313		
<b>Speed:</b>	37.0 kts		
<b>Length:</b>	102.4 m		
<b>Height:</b>	23.6 m		
<b>Draft:</b>	3.6 m		
<b>AOB Ratio:</b>	4.34 : 1		
<b>C-Depth:</b>	1.83 m	(6.0 ft)	
<b>I-Depth:</b>	4.82 m	(15.8 ft)	

Target Speed (in seconds)					
-	41 kts	6.22 s	32 kts	8.65 s	23 kts
-	40 kts	6.42 s	31 kts	9.05 s	22 kts
-	39 kts	6.64 s	30 kts	9.48 s	21 kts
-	38 kts	6.86 s	29 kts	9.95 s	20 kts
5.38 s	37 kts	7.11 s	28 kts	10.48 s	19 kts
5.53 s	36 kts	7.37 s	27 kts	11.06 s	18 kts
5.69 s	35 kts	7.66 s	26 kts	11.71 s	17 kts
5.85 s	34 kts	7.96 s	25 kts	12.44 s	16 kts
6.03 s	33 kts	8.29 s	24 kts	13.27 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.4°	8.8°	13.3°	17.9°	22.6°	27.4°	32.5°	37.9°	43.7°	50.2°	57.7°	67.2°	87.1°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.8°	7.6°	11.4°	15.3°	19.2°	23.3°	27.4°	31.8°	36.3°	41.2°	46.4°	52.2°	58.9°	67.2°	81.0°	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.3°	6.6°	10.0°	13.3°	16.7°	20.2°	23.8°	27.4°	31.2°	35.2°	39.3°	43.7°	48.5°	53.8°	59.8°	67.2°	78.4°	####	####	####	####	####	####	####	####	####	####
	4.5	2.9°	5.9°	8.8°	11.8°	14.8°	17.9°	21.0°	24.2°	27.4°	30.8°	34.3°	37.9°	41.7°	45.8°	50.2°	55.0°	60.5°	67.2°	76.7°	####	####	####	####	####	####	####	####
	5.0	2.6°	5.3°	7.9°	10.6°	13.3°	16.1°	18.8°	21.6°	24.5°	27.4°	30.5°	33.6°	36.8°	40.2°	43.7°	47.5°	51.6°	56.1°	61.1°	67.2°	75.5°	####	####	####	####	####	####
	5.5	2.4°	4.8°	7.2°	9.6°	12.1°	14.6°	17.1°	19.6°	22.2°	24.8°	27.4°	30.2°	33.0°	35.9°	38.9°	42.1°	45.4°	49.0°	52.8°	56.9°	61.6°	67.2°	74.5°	####	####	####	####
	6.0	2.2°	4.4°	6.6°	8.8°	11.1°	13.3°	15.6°	17.9°	20.2°	22.6°	25.0°	27.4°	30.0°	32.5°	35.2°	37.9°	40.8°	43.7°	46.9°	50.2°	53.8°	57.7°	62.1°	67.2°	73.8°	87.1°	####
	6.5	2.0°	4.1°	6.1°	8.2°	10.2°	12.3°	14.4°	16.5°	18.6°	20.8°	23.0°	25.2°	27.4°	29.8°	32.1°	34.6°	37.1°	39.7°	42.4°	45.2°	48.1°	51.3°	54.6°	58.3°	62.4°	67.2°	73.2°
	7.0	1.9°	3.8°	5.7°	7.6°	9.5°	11.4°	13.3°	15.3°	17.2°	19.2°	21.2°	23.3°	25.3°	27.4°	29.6°	31.8°	34.0°	36.3°	38.7°	41.2°	43.7°	46.4°	49.2°	52.2°	55.4°	58.9°	62.7°
	7.5	1.8°	3.5°	5.3°	7.1°	8.8°	10.6°	12.4°	14.2°	16.1°	17.9°	19.8°	21.6°	23.5°	25.5°	27.4°	29.5°	31.5°	33.6°	35.7°	37.9°	40.2°	42.5°	45.0°	47.5°	50.2°	53.0°	56.1°
	8.0	1.7°	3.3°	5.0°	6.6°	8.3°	10.0°	11.6°	13.3°	15.0°	16.7°	18.5°	20.2°	22.0°	23.8°	25.6°	27.4°	29.3°	31.2°	33.2°	35.2°	37.2°	39.3°	41.5°	43.7°	46.1°	48.5°	51.1°

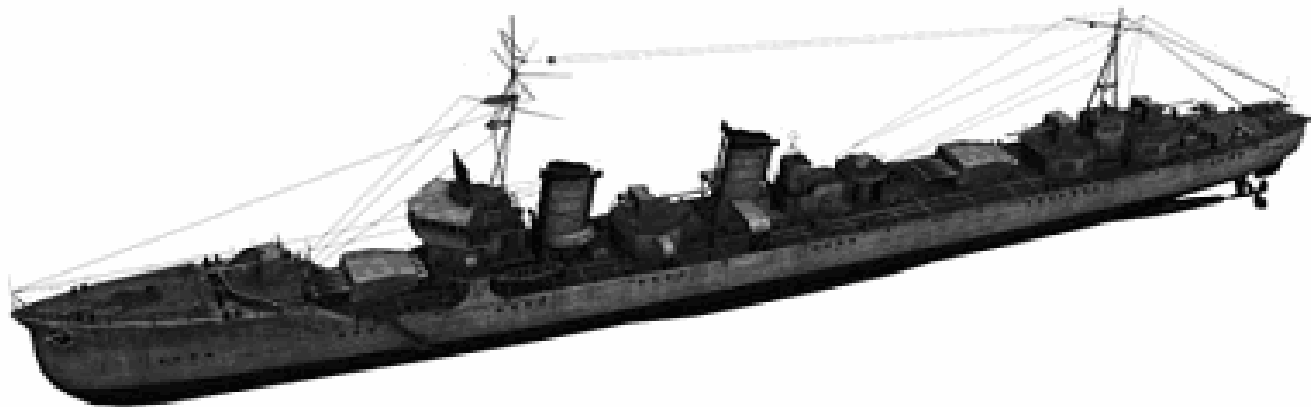
14.22 s	14 kts
15.31 s	13 kts
16.59 s	12 kts
18.1 s	11 kts
19.91 s	10 kts
22.12 s	9 kts
24.88 s	8 kts
28.44 s	7 kts
33.18 s	6 kts
39.81 s	5 kts
49.76 s	4 kts
66.35 s	3 kts
99.53 s	2 kts
199.05 s	1 kts

# Mutsuki Class Destroyer

p.46

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,352m	5,409m	3	450m	1,803m	5	270m	1,082m	7	192m	772m
1.5	901m	3,606m	3.5	386m	1,545m	5.5	245m	983m	7.5	179m	721m
2	676m	2,704m	4	337m	1,352m	6	225m	901m	8	168m	676m
2.5	541m	2,163m	4.5	300m	1,202m	6.5	207m	832m	8.5	158m	636m

## Ship Recognition:



# Minekaze Class Destroyer

<b>Class:</b>	Minekaze	
<b>Type:</b>	Destroyer	
<b>Tonnage:</b>	1,215	
<b>Speed:</b>	34.0 kts	
<b>Length:</b>	102.5 m	
<b>Height:</b>	21.3 m	
<b>Draft:</b>	2.9 m	
<b>AOB Ratio:</b>	4.81 : 1	
<b>C-Depth:</b>	1.83 m	(6.0 ft)
<b>I-Depth:</b>	4.12 m	(13.5 ft)

Target Speed (in seconds)					
-	41 kts	6.23 s	32 kts	8.66 s	23 kts
-	40 kts	6.43 s	31 kts	9.06 s	22 kts
-	39 kts	6.64 s	30 kts	9.49 s	21 kts
-	38 kts	6.87 s	29 kts	9.96 s	20 kts
-	37 kts	7.12 s	28 kts	10.49 s	19 kts
-	36 kts	7.38 s	27 kts	11.07 s	18 kts
-	35 kts	7.66 s	26 kts	11.72 s	17 kts
5.86 s	34 kts	7.97 s	25 kts	12.45 s	16 kts
6.04 s	33 kts	8.3 s	24 kts	13.28 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.0°	8.0°	12.0°	16.1°	20.3°	24.6°	29.0°	33.7°	38.6°	43.8°	49.6°	56.2°	64.2°	75.9°	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.4°	6.8°	10.3°	13.7°	17.3°	20.9°	24.6°	28.4°	32.3°	36.4°	40.8°	45.4°	50.5°	56.2°	62.9°	71.8°	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.0°	6.0°	9.0°	12.0°	15.1°	18.2°	21.3°	24.6°	27.9°	31.3°	34.9°	38.6°	42.5°	46.7°	51.2°	56.2°	62.0°	69.2°	80.8°	####	####	####	####	####	####	####	####
	4.5	2.6°	5.3°	8.0°	10.6°	13.3°	16.1°	18.9°	21.7°	24.6°	27.5°	30.5°	33.7°	36.9°	40.3°	43.8°	47.6°	51.7°	56.2°	61.3°	67.5°	75.9°	####	####	####	####	####	####
	5.0	2.4°	4.8°	7.2°	9.6°	12.0°	14.4°	16.9°	19.4°	22.0°	24.6°	27.2°	29.9°	32.7°	35.6°	38.6°	41.7°	45.0°	48.4°	52.2°	56.2°	60.8°	66.1°	72.9°	85.9°	####	####	####
	5.5	2.2°	4.3°	6.5°	8.7°	10.9°	13.1°	15.3°	17.6°	19.9°	22.2°	24.6°	27.0°	29.4°	31.9°	34.5°	37.2°	40.0°	42.9°	45.9°	49.1°	52.5°	56.2°	60.3°	65.1°	70.8°	79.2°	####
	6.0	2.0°	4.0°	6.0°	8.0°	10.0°	12.0°	14.0°	16.1°	18.2°	20.3°	22.4°	24.6°	26.8°	29.0°	31.3°	33.7°	36.1°	38.6°	41.2°	43.8°	46.7°	49.6°	52.8°	56.2°	60.0°	64.2°	69.2°
	6.5	1.8°	3.7°	5.5°	7.3°	9.2°	11.1°	12.9°	14.8°	16.7°	18.6°	20.6°	22.6°	24.6°	26.6°	28.7°	30.8°	32.9°	35.1°	37.4°	39.7°	42.2°	44.7°	47.3°	50.1°	53.1°	56.2°	59.7°
	7.0	1.7°	3.4°	5.1°	6.8°	8.5°	10.3°	12.0°	13.7°	15.5°	17.3°	19.1°	20.9°	22.7°	24.6°	26.4°	28.4°	30.3°	32.3°	34.3°	36.4°	38.6°	40.8°	43.1°	45.4°	47.9°	50.5°	53.3°
	7.5	1.6°	3.2°	4.8°	6.4°	8.0°	9.6°	11.2°	12.8°	14.4°	16.1°	17.7°	19.4°	21.1°	22.8°	24.6°	26.3°	28.1°	29.9°	31.8°	33.7°	35.6°	37.6°	39.6°	41.7°	43.8°	46.1°	48.4°
	8.0	1.5°	3.0°	4.5°	6.0°	7.5°	9.0°	10.5°	12.0°	13.5°	15.1°	16.6°	18.2°	19.7°	21.3°	22.9°	24.6°	26.2°	27.9°	29.6°	31.3°	33.1°	34.9°	36.7°	38.6°	40.5°	42.5°	44.5°

14.23 s	14 kts
15.33 s	13 kts
16.6 s	12 kts
18.11 s	11 kts
19.92 s	10 kts
22.14 s	9 kts
24.91 s	8 kts
28.46 s	7 kts
33.21 s	6 kts
39.85 s	5 kts
49.81 s	4 kts
66.42 s	3 kts
99.62 s	2 kts
199.25 s	1 kts

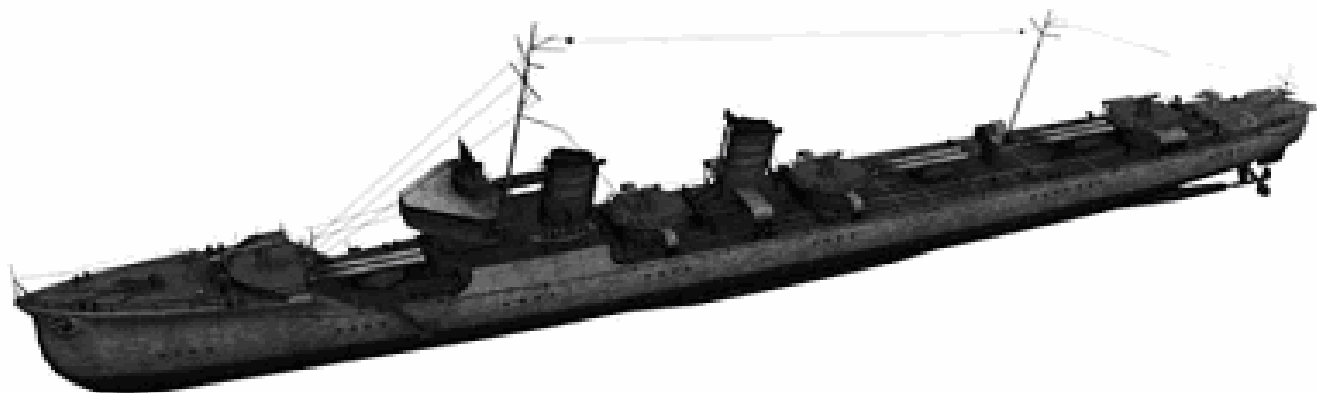


# Minekaze Class Destroyer

p.48

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,220m	4,882m	3	406m	1,627m	5	243m	976m	7	173m	697m
1.5	813m	3,254m	3.5	348m	1,395m	5.5	221m	887m	7.5	162m	651m
2	610m	2,441m	4	305m	1,220m	6	203m	813m	8	152m	610m
2.5	488m	1,953m	4.5	271m	1,085m	6.5	187m	751m	8.5	143m	574m

## Ship Recognition:



p.49 **Hakusika Maru Class Lg. Old Split SS Freighter**

<b>Class:</b>	Hakusika Maru		
<b>Type:</b>	Lg. Old Split SS Freight		
<b>Tonnage:</b>	8,150		
<b>Speed:</b>	12.0 kts		
<b>Length:</b>	135.6 m		
<b>Height:</b>	29.5 m		
<b>Draft:</b>	8.6 m		
<b>AOB Ratio:</b>	4.6 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	9.82 m	(32.2 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	-	16 kts
-	33 kts	-	24 kts	-	15 kts

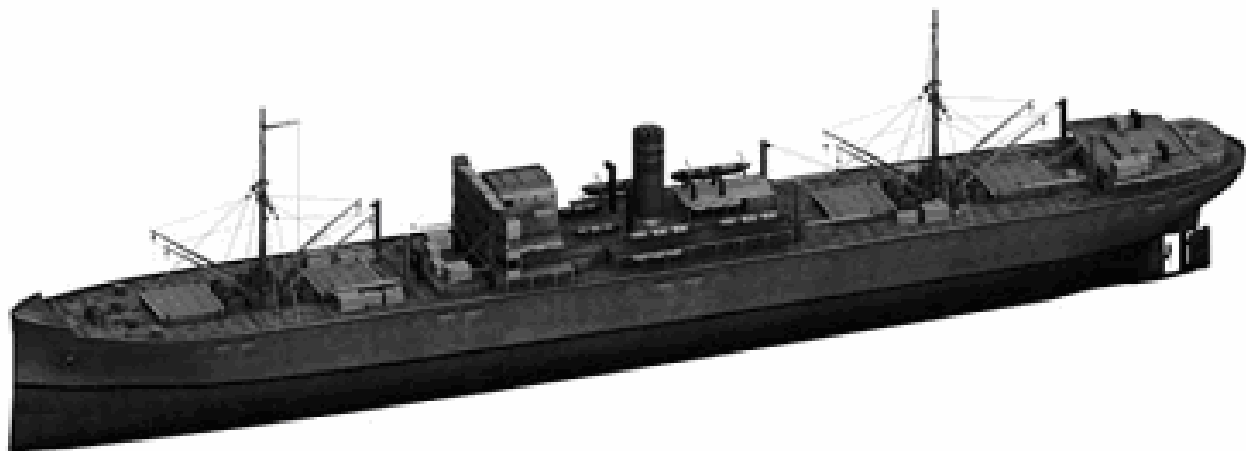
AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.2°	8.3°	12.6°	16.9°	21.3°	25.8°	30.5°	35.5°	40.7°	46.5°	52.9°	60.5°	70.5°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.6°	7.1°	10.7°	14.4°	18.1°	21.9°	25.8°	29.8°	34.0°	38.4°	43.1°	48.2°	53.9°	60.5°	68.8°	84.0°	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.1°	6.2°	9.4°	12.6°	15.8°	19.0°	22.4°	25.8°	29.3°	32.9°	36.7°	40.7°	45.0°	49.6°	54.7°	60.5°	67.6°	78.2°	####	####	####	####	####	####	####	####	####
	4.5	2.8°	5.5°	8.3°	11.2°	14.0°	16.9°	19.8°	22.8°	25.8°	28.9°	32.1°	35.5°	38.9°	42.6°	46.5°	50.7°	55.3°	60.5°	66.7°	75.2°	####	####	####	####	####	####	####
	5.0	2.5°	5.0°	7.5°	10.0°	12.6°	15.1°	17.7°	20.4°	23.1°	25.8°	28.6°	31.5°	34.4°	37.5°	40.7°	44.1°	47.7°	51.6°	55.8°	60.5°	66.0°	73.2°	####	####	####	####	####
	5.5	2.3°	4.5°	6.8°	9.1°	11.4°	13.7°	16.1°	18.4°	20.9°	23.3°	25.8°	28.3°	30.9°	33.6°	36.4°	39.3°	42.3°	45.4°	48.7°	52.3°	56.2°	60.5°	65.5°	71.7°	81.4°	####	####
	6.0	2.1°	4.2°	6.2°	8.3°	10.4°	12.6°	14.7°	16.9°	19.0°	21.3°	23.5°	25.8°	28.1°	30.5°	32.9°	35.5°	38.1°	40.7°	43.5°	46.5°	49.6°	52.9°	56.5°	60.5°	65.0°	70.5°	78.2°
	6.5	1.9°	3.8°	5.8°	7.7°	9.6°	11.6°	13.5°	15.5°	17.5°	19.6°	21.6°	23.7°	25.8°	27.9°	30.1°	32.4°	34.7°	37.0°	39.5°	42.0°	44.7°	47.4°	50.3°	53.4°	56.8°	60.5°	64.6°
	7.0	1.8°	3.6°	5.3°	7.1°	8.9°	10.7°	12.6°	14.4°	16.2°	18.1°	20.0°	21.9°	23.8°	25.8°	27.8°	29.8°	31.9°	34.0°	36.2°	38.4°	40.7°	43.1°	45.6°	48.2°	51.0°	53.9°	57.0°
	7.5	1.7°	3.3°	5.0°	6.7°	8.3°	10.0°	11.7°	13.4°	15.1°	16.9°	18.6°	20.4°	22.2°	24.0°	25.8°	27.7°	29.5°	31.5°	33.4°	35.5°	37.5°	39.7°	41.8°	44.1°	46.5°	49.0°	51.6°
	8.0	1.6°	3.1°	4.7°	6.2°	7.8°	9.4°	11.0°	12.6°	14.2°	15.8°	17.4°	19.0°	20.7°	22.4°	24.1°	25.8°	27.5°	29.3°	31.1°	32.9°	34.8°	36.7°	38.7°	40.7°	42.8°	45.0°	47.2°

-	14 kts
-	13 kts
21.97 s	12 kts
23.96 s	11 kts
26.36 s	10 kts
29.29 s	9 kts
32.95 s	8 kts
37.66 s	7 kts
43.93 s	6 kts
52.72 s	5 kts
65.9 s	4 kts
87.86 s	3 kts
131.79 s	2 kts
263.59 s	1 kts

# Hakusika Maru Class Lg. Old Split SS Freighter p.50

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,690m	6,761m	3	563m	2,254m	5	337m	1,352m	7	240m	966m
1.5	1,127m	4,507m	3.5	482m	1,932m	5.5	306m	1,229m	7.5	224m	901m
2	845m	3,380m	4	422m	1,690m	6	281m	1,127m	8	210m	845m
2.5	676m	2,704m	4.5	375m	1,502m	6.5	259m	1,040m	8.5	197m	795m

## Ship Recognition:



# Nagara Maru Class Lg. Composite SS Freighter

<b>Class:</b>	Nagara Maru	
<b>Type:</b>	Lg. Composite SS Freight	
<b>Tonnage:</b>	7,154	
<b>Speed:</b>	19.0 kts	
<b>Length:</b>	143.2 m	
<b>Height:</b>	36.5 m	
<b>Draft:</b>	8.3 m	
<b>AOB Ratio:</b>	3.92 : 1	
<b>C-Depth:</b>	3.66 m	(12.0 ft)
<b>I-Depth:</b>	9.52 m	(31.2 ft)

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	14.65 s	19 kts
-	36 kts	-	27 kts	15.46 s	18 kts
-	35 kts	-	26 kts	16.37 s	17 kts
-	34 kts	-	25 kts	17.4 s	16 kts
-	33 kts	-	24 kts	18.56 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.9°	9.8°	14.8°	19.9°	25.1°	30.6°	36.5°	42.8°	49.9°	58.2°	69.2°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.2°	8.4°	12.6°	16.9°	21.4°	25.9°	30.6°	35.6°	41.0°	46.7°	53.2°	60.9°	71.2°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.7°	7.3°	11.0°	14.8°	18.6°	22.5°	26.5°	30.6°	35.0°	39.6°	44.5°	49.9°	55.9°	63.1°	72.9°	####	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.2°	6.5°	9.8°	13.1°	16.5°	19.9°	23.4°	26.9°	30.6°	34.5°	38.5°	42.8°	47.4°	52.5°	58.2°	65.0°	74.3°	####	####	####	####	####	####	####	####	####	####
	5.0	2.9°	5.9°	8.8°	11.8°	14.8°	17.8°	20.9°	24.1°	27.3°	30.6°	34.1°	37.7°	41.5°	45.5°	49.9°	54.7°	60.1°	66.6°	75.6°	####	####	####	####	####	####	####	####
	5.5	2.7°	5.3°	8.0°	10.7°	13.4°	16.1°	18.9°	21.8°	24.7°	27.6°	30.6°	33.8°	37.0°	40.5°	44.0°	47.9°	52.0°	56.5°	61.7°	68.0°	76.7°	####	####	####	####	####	####
	6.0	2.4°	4.9°	7.3°	9.8°	12.3°	14.8°	17.3°	19.9°	22.5°	25.1°	27.9°	30.6°	33.5°	36.5°	39.6°	42.8°	46.2°	49.9°	53.8°	58.2°	63.1°	69.2°	77.7°	####	####	####	####
	6.5	2.2°	4.5°	6.8°	9.0°	11.3°	13.6°	15.9°	18.3°	20.7°	23.1°	25.6°	28.1°	30.6°	33.3°	36.0°	38.9°	41.8°	44.9°	48.2°	51.7°	55.4°	59.6°	64.4°	70.2°	78.6°	####	####
	7.0	2.1°	4.2°	6.3°	8.4°	10.5°	12.6°	14.8°	16.9°	19.1°	21.4°	23.6°	25.9°	28.3°	30.6°	33.1°	35.6°	38.2°	41.0°	43.8°	46.7°	49.9°	53.2°	56.9°	60.9°	65.5°	71.2°	79.5°
	7.5	1.9°	3.9°	5.9°	7.8°	9.8°	11.8°	13.8°	15.8°	17.8°	19.9°	22.0°	24.1°	26.2°	28.4°	30.6°	32.9°	35.3°	37.7°	40.2°	42.8°	45.5°	48.4°	51.4°	54.7°	58.2°	62.1°	66.6°
	8.0	1.8°	3.7°	5.5°	7.3°	9.2°	11.0°	12.9°	14.8°	16.7°	18.6°	20.5°	22.5°	24.5°	26.5°	28.5°	30.6°	32.8°	35.0°	37.3°	39.6°	42.0°	44.5°	47.1°	49.9°	52.8°	55.9°	59.3°

19.88 s	14 kts
21.41 s	13 kts
23.2 s	12 kts
25.31 s	11 kts
27.84 s	10 kts
30.93 s	9 kts
34.8 s	8 kts
39.77 s	7 kts
46.39 s	6 kts
55.67 s	5 kts
69.59 s	4 kts
92.79 s	3 kts
139.18 s	2 kts
278.36 s	1 kts

# Nagara Maru Class Lg. Composite SS Freighter

p.52

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,091m	8,365m	3	696m	2,788m	5	417m	1,673m	7	297m	1,195m
1.5	1,394m	5,577m	3.5	597m	2,390m	5.5	379m	1,521m	7.5	277m	1,115m
2	1,045m	4,182m	4	522m	2,091m	6	347m	1,394m	8	260m	1,045m
2.5	836m	3,346m	4.5	464m	1,859m	6.5	320m	1,287m	8.5	244m	984m

## Ship Recognition:



# Biyo Maru Class Med. Old Split SS Freighter

<b>Class:</b>	Biyo Maru	
<b>Type:</b>	Med. Old Split SS Freight	
<b>Tonnage:</b>	5,425	
<b>Speed:</b>	12.0 kts	
<b>Length:</b>	121.9 m	
<b>Height:</b>	30.0 m	
<b>Draft:</b>	7.9 m	
<b>AOB Ratio:</b>	4.06 : 1	
<b>C-Depth:</b>	3.66 m	(12.0 ft)
<b>I-Depth:</b>	9.12 m	(29.9 ft)

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	-	16 kts
-	33 kts	-	24 kts	-	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.7°	9.4°	14.2°	19.2°	24.2°	29.5°	35.0°	41.0°	47.6°	55.1°	64.5°	79.9°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.0°	8.1°	12.2°	16.3°	20.6°	25.0°	29.5°	34.2°	39.3°	44.7°	50.7°	57.5°	66.1°	79.9°	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.5°	7.1°	10.6°	14.2°	17.9°	21.7°	25.5°	29.5°	33.6°	38.0°	42.6°	47.6°	53.1°	59.5°	67.4°	79.9°	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.1°	6.3°	9.4°	12.6°	15.9°	19.2°	22.5°	25.9°	29.5°	33.2°	37.0°	41.0°	45.3°	50.0°	55.1°	61.0°	68.4°	79.9°	####	####	####	####	####	####	####	####	####
	5.0	2.8°	5.6°	8.5°	11.4°	14.2°	17.2°	20.2°	23.2°	26.3°	29.5°	32.8°	36.2°	39.8°	43.6°	47.6°	52.0°	56.8°	62.4°	69.3°	79.9°	####	####	####	####	####	####	####
	5.5	2.6°	5.1°	7.7°	10.3°	12.9°	15.6°	18.3°	21.0°	23.7°	26.6°	29.5°	32.5°	35.6°	38.8°	42.2°	45.7°	49.5°	53.7°	58.2°	63.5°	70.0°	79.9°	####	####	####	####	####
	6.0	2.4°	4.7°	7.1°	9.4°	11.8°	14.2°	16.7°	19.2°	21.7°	24.2°	26.8°	29.5°	32.2°	35.0°	38.0°	41.0°	44.2°	47.6°	51.2°	55.1°	59.5°	64.5°	70.6°	79.9°	####	####	####
	6.5	2.2°	4.3°	6.5°	8.7°	10.9°	13.1°	15.4°	17.6°	19.9°	22.2°	24.6°	27.0°	29.5°	32.0°	34.6°	37.3°	40.1°	43.0°	46.0°	49.2°	52.7°	56.4°	60.6°	65.3°	71.2°	79.9°	####
	7.0	2.0°	4.0°	6.1°	8.1°	10.1°	12.2°	14.2°	16.3°	18.4°	20.6°	22.8°	25.0°	27.2°	29.5°	31.8°	34.2°	36.7°	39.3°	41.9°	44.7°	47.6°	50.7°	54.0°	57.5°	61.5°	66.1°	71.7°
	7.5	1.9°	3.8°	5.6°	7.5°	9.4°	11.4°	13.3°	15.2°	17.2°	19.2°	21.2°	23.2°	25.3°	27.3°	29.5°	31.7°	33.9°	36.2°	38.6°	41.0°	43.6°	46.2°	49.0°	52.0°	55.1°	58.6°	62.4°
	8.0	1.8°	3.5°	5.3°	7.1°	8.8°	10.6°	12.4°	14.2°	16.1°	17.9°	19.8°	21.7°	23.6°	25.5°	27.5°	29.5°	31.5°	33.6°	35.8°	38.0°	40.2°	42.6°	45.0°	47.6°	50.3°	53.1°	56.2°

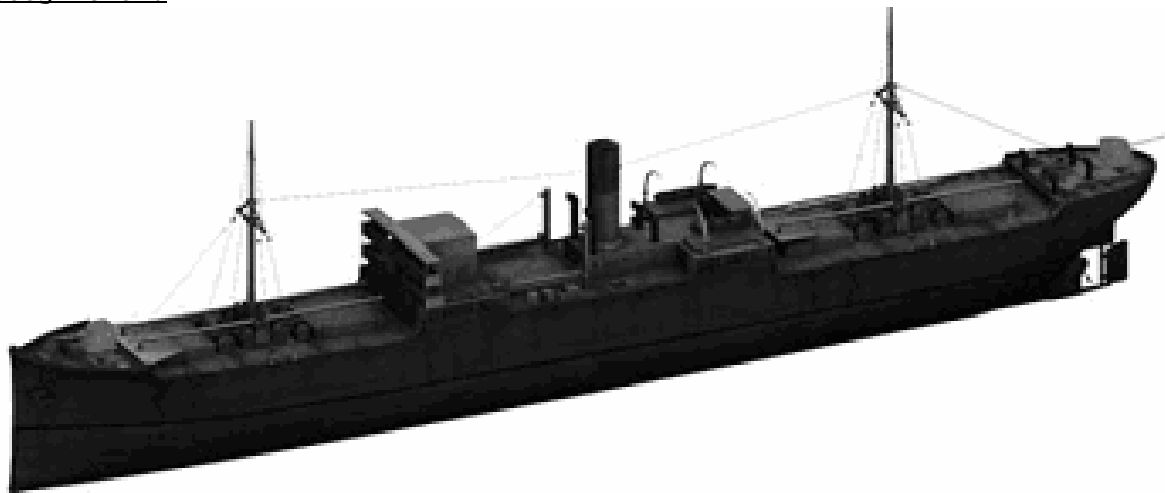
-	14 kts
-	13 kts
19.75 s	12 kts
21.54 s	11 kts
23.7 s	10 kts
26.33 s	9 kts
29.62 s	8 kts
33.85 s	7 kts
39.49 s	6 kts
47.39 s	5 kts
59.24 s	4 kts
78.99 s	3 kts
118.48 s	2 kts
236.96 s	1 kts

# Biyo Maru Class Med. Old Split SS Freighter

p.54

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,719m	6,875m	3	572m	2,292m	5	343m	1,375m	7	244m	982m
1.5	1,146m	4,584m	3.5	490m	1,964m	5.5	312m	1,250m	7.5	228m	916m
2	859m	3,438m	4	429m	1,719m	6	285m	1,146m	8	213m	859m
2.5	687m	2,750m	4.5	381m	1,528m	6.5	263m	1,057m	8.5	201m	809m

## Ship Recognition:



p.55 **Zinbu Maru Class Modern European Composite SS Freighter**

<b>Class:</b>	Zinbu Maru	
<b>Type:</b>	Modern European Composite	
<b>Tonnage:</b>	5,186	
<b>Speed:</b>	10.0 kts	
<b>Length:</b>	121.9 m	
<b>Height:</b>	28.4 m	
<b>Draft:</b>	7.6 m	
<b>AOB Ratio:</b>	4.29 : 1	
<b>C-Depth:</b>	3.66 m	(12.0 ft)
<b>I-Depth:</b>	8.82 m	(28.9 ft)

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	-	16 kts
-	33 kts	-	24 kts	-	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.5°	8.9°	13.5°	18.1°	22.8°	27.8°	32.9°	38.4°	44.3°	50.9°	58.7°	68.7°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.8°	7.7°	11.5°	15.4°	19.4°	23.5°	27.8°	32.2°	36.8°	41.7°	47.1°	53.0°	59.9°	68.7°	86.8°	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.3°	6.7°	10.1°	13.5°	16.9°	20.5°	24.1°	27.8°	31.6°	35.6°	39.8°	44.3°	49.2°	54.6°	60.9°	68.7°	82.0°	####	####	####	####	####	####	####	####	####	####
	4.5	3.0°	5.9°	8.9°	12.0°	15.0°	18.1°	21.2°	24.5°	27.8°	31.2°	34.7°	38.4°	42.3°	46.5°	50.9°	55.9°	61.7°	68.7°	79.6°	####	####	####	####	####	####	####	####
	5.0	2.7°	5.3°	8.0°	10.7°	13.5°	16.2°	19.0°	21.9°	24.8°	27.8°	30.8°	34.0°	37.3°	40.7°	44.3°	48.2°	52.4°	57.0°	62.3°	68.7°	78.1°	####	####	####	####	####	####
	5.5	2.4°	4.9°	7.3°	9.8°	12.2°	14.7°	17.2°	19.8°	22.4°	25.1°	27.8°	30.6°	33.4°	36.4°	39.4°	42.7°	46.1°	49.7°	53.6°	57.9°	62.8°	68.7°	77.0°	####	####	####	####
	6.0	2.2°	4.5°	6.7°	8.9°	11.2°	13.5°	15.8°	18.1°	20.5°	22.8°	25.3°	27.8°	30.3°	32.9°	35.6°	38.4°	41.3°	44.3°	47.5°	50.9°	54.6°	58.7°	63.3°	68.7°	76.1°	####	####
	6.5	2.1°	4.1°	6.2°	8.2°	10.3°	12.4°	14.5°	16.7°	18.8°	21.0°	23.2°	25.5°	27.8°	30.1°	32.5°	35.0°	37.5°	40.2°	42.9°	45.8°	48.8°	52.0°	55.5°	59.3°	63.6°	68.7°	75.4°
	7.0	1.9°	3.8°	5.7°	7.7°	9.6°	11.5°	13.5°	15.4°	17.4°	19.4°	21.5°	23.5°	25.6°	27.8°	29.9°	32.2°	34.5°	36.8°	39.2°	41.7°	44.3°	47.1°	50.0°	53.0°	56.3°	59.9°	64.0°
	7.5	1.8°	3.6°	5.3°	7.1°	8.9°	10.7°	12.6°	14.4°	16.2°	18.1°	20.0°	21.9°	23.8°	25.8°	27.8°	29.8°	31.9°	34.0°	36.2°	38.4°	40.7°	43.1°	45.6°	48.2°	50.9°	53.9°	57.0°
	8.0	1.7°	3.3°	5.0°	6.7°	8.4°	10.1°	11.8°	13.5°	15.2°	16.9°	18.7°	20.5°	22.2°	24.1°	25.9°	27.8°	29.7°	31.6°	33.6°	35.6°	37.7°	39.8°	42.1°	44.3°	46.7°	49.2°	51.8°

-	14 kts
-	13 kts
-	12 kts
-	11 kts
23.7 s	10 kts
26.33 s	9 kts
29.62 s	8 kts
33.85 s	7 kts
39.49 s	6 kts
47.39 s	5 kts
59.24 s	4 kts
78.99 s	3 kts
118.48 s	2 kts
236.96 s	1 kts



# Zinbu Maru Class Modern European Composite SS Freighter p.56

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,627m	6,509m	3	542m	2,169m	5	325m	1,302m	7	231m	930m
1.5	1,085m	4,339m	3.5	464m	1,860m	5.5	295m	1,183m	7.5	216m	868m
2	813m	3,254m	4	406m	1,627m	6	270m	1,085m	8	202m	813m
2.5	650m	2,603m	4.5	361m	1,446m	6.5	249m	1,001m	8.5	190m	765m

## Ship Recognition:



p.57 **Heito Maru Class Med. Modern Composite SS Freighter**

<b>Class:</b>	Heito Maru	
<b>Type:</b>	Med. Modern Composite SS	
<b>Tonnage:</b>	4,466	
<b>Speed:</b>	17.0 kts	
<b>Length:</b>	103.6 m	
<b>Height:</b>	26.2 m	
<b>Draft:</b>	7.0 m	
<b>AOB Ratio:</b>	3.95 : 1	
<b>C-Depth:</b>	3.66 m	(12.0 ft)
<b>I-Depth:</b>	8.22 m	(27.0 ft)

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	11.85 s	17 kts
-	34 kts	-	25 kts	12.59 s	16 kts
-	33 kts	-	24 kts	13.43 s	15 kts

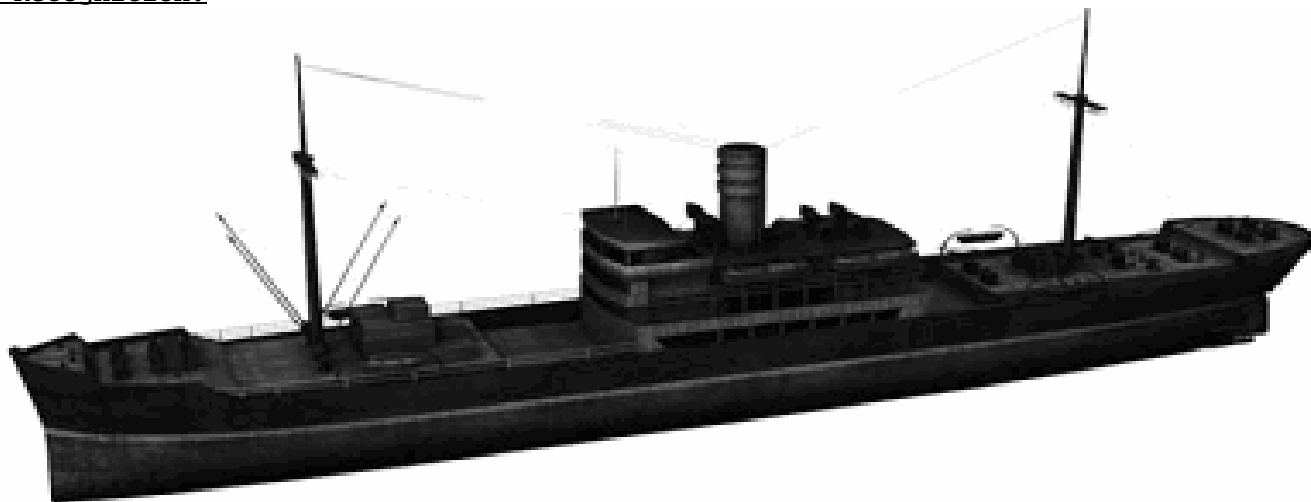
AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.8°	9.7°	14.6°	19.7°	24.9°	30.4°	36.2°	42.4°	49.3°	57.5°	68.0°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.1°	8.3°	12.5°	16.8°	21.2°	25.7°	30.4°	35.3°	40.6°	46.3°	52.6°	60.1°	69.9°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.6°	7.3°	10.9°	14.6°	18.4°	22.3°	26.3°	30.4°	34.7°	39.2°	44.1°	49.3°	55.3°	62.3°	71.5°	####	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.2°	6.5°	9.7°	13.0°	16.3°	19.7°	23.2°	26.7°	30.4°	34.2°	38.2°	42.4°	46.9°	51.9°	57.5°	64.1°	72.8°	####	####	####	####	####	####	####	####	####	####
	5.0	2.9°	5.8°	8.7°	11.7°	14.6°	17.7°	20.7°	23.9°	27.1°	30.4°	33.8°	37.4°	41.1°	45.1°	49.3°	54.0°	59.3°	65.6°	73.9°	####	####	####	####	####	####	####	####
	5.5	2.6°	5.3°	7.9°	10.6°	13.3°	16.0°	18.8°	21.6°	24.4°	27.4°	30.4°	33.5°	36.7°	40.1°	43.6°	47.4°	51.4°	55.9°	60.9°	66.9°	74.9°	####	####	####	####	####	####
	6.0	2.4°	4.8°	7.3°	9.7°	12.2°	14.6°	17.2°	19.7°	22.3°	24.9°	27.6°	30.4°	33.2°	36.2°	39.2°	42.4°	45.8°	49.3°	53.2°	57.5°	62.3°	68.0°	75.8°	####	####	####	####
	6.5	2.2°	4.5°	6.7°	9.0°	11.2°	13.5°	15.8°	18.1°	20.5°	22.9°	25.3°	27.8°	30.4°	33.0°	35.7°	38.5°	41.4°	44.5°	47.7°	51.1°	54.8°	58.9°	63.5°	69.0°	76.6°	####	####
	7.0	2.1°	4.1°	6.2°	8.3°	10.4°	12.5°	14.6°	16.8°	19.0°	21.2°	23.4°	25.7°	28.0°	30.4°	32.8°	35.3°	37.9°	40.6°	43.3°	46.3°	49.3°	52.6°	56.2°	60.1°	64.6°	69.9°	77.3°
	7.5	1.9°	3.9°	5.8°	7.8°	9.7°	11.7°	13.7°	15.6°	17.7°	19.7°	21.8°	23.9°	26.0°	28.2°	30.4°	32.7°	35.0°	37.4°	39.8°	42.4°	45.1°	47.9°	50.9°	54.0°	57.5°	61.2°	65.6°
	8.0	1.8°	3.6°	5.4°	7.3°	9.1°	10.9°	12.8°	14.6°	16.5°	18.4°	20.3°	22.3°	24.3°	26.3°	28.3°	30.4°	32.5°	34.7°	36.9°	39.2°	41.6°	44.1°	46.6°	49.3°	52.2°	55.3°	58.6°

14.38 s	14 kts
15.49 s	13 kts
16.78 s	12 kts
18.31 s	11 kts
20.14 s	10 kts
22.38 s	9 kts
25.17 s	8 kts
28.77 s	7 kts
33.56 s	6 kts
40.28 s	5 kts
50.35 s	4 kts
67.13 s	3 kts
100.69 s	2 kts
201.38 s	1 kts

# Heito Maru Class Med. Modern Composite SS Freighter p.58

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,501m	6,005m	3	500m	2,001m	5	299m	1,201m	7	213m	858m
1.5	1,001m	4,003m	3.5	428m	1,715m	5.5	272m	1,092m	7.5	199m	800m
2	750m	3,002m	4	375m	1,501m	6	249m	1,001m	8	186m	750m
2.5	600m	2,402m	4.5	333m	1,334m	6.5	230m	924m	8.5	175m	706m

## Ship Recognition:



# Akita Maru Class Med. Composite SS Freighter

<b>Class:</b>	Akita Maru	
<b>Type:</b>	Med. Composite SS Freight	
<b>Tonnage:</b>	4,070	
<b>Speed:</b>	13.5 kts	
<b>Length:</b>	108.8 m	
<b>Height:</b>	29.2 m	
<b>Draft:</b>	7.3 m	
<b>AOB Ratio:</b>	3.73 : 1	
<b>C-Depth:</b>	3.66 m	(12.0 ft)
<b>I-Depth:</b>	8.52 m	(28.0 ft)

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	-	16 kts
-	33 kts	-	24 kts	-	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	5.1°	10.3°	15.6°	21.0°	26.6°	32.5°	38.8°	45.7°	53.6°	63.5°	79.8°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.4°	8.8°	13.3°	17.9°	22.5°	27.4°	32.5°	37.8°	43.6°	50.1°	57.5°	67.0°	85.5°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.8°	7.7°	11.6°	15.6°	19.6°	23.7°	28.0°	32.5°	37.1°	42.1°	47.6°	53.6°	60.7°	69.9°	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.4°	6.9°	10.3°	13.8°	17.3°	21.0°	24.7°	28.5°	32.5°	36.6°	41.0°	45.7°	50.8°	56.6°	63.5°	72.6°	####	####	####	####	####	####	####	####	####	####	####
	5.0	3.1°	6.2°	9.3°	12.4°	15.6°	18.8°	22.1°	25.4°	28.9°	32.5°	36.2°	40.1°	44.3°	48.7°	53.6°	59.2°	65.9°	75.1°	####	####	####	####	####	####	####	####	####
	5.5	2.8°	5.6°	8.4°	11.3°	14.1°	17.0°	20.0°	23.0°	26.1°	29.2°	32.5°	35.8°	39.4°	43.1°	47.1°	51.3°	56.1°	61.4°	68.0°	77.4°	####	####	####	####	####	####	####
	6.0	2.6°	5.1°	7.7°	10.3°	12.9°	15.6°	18.2°	21.0°	23.7°	26.6°	29.5°	32.5°	35.6°	38.8°	42.1°	45.7°	49.5°	53.6°	58.2°	63.5°	69.9°	79.8°	####	####	####	####	####
	6.5	2.4°	4.7°	7.1°	9.5°	11.9°	14.3°	16.8°	19.3°	21.8°	24.4°	27.0°	29.7°	32.5°	35.3°	38.3°	41.3°	44.6°	48.0°	51.7°	55.7°	60.1°	65.3°	71.7°	82.3°	####	####	####
	7.0	2.2°	4.4°	6.6°	8.8°	11.1°	13.3°	15.6°	17.9°	20.2°	22.5°	24.9°	27.4°	29.9°	32.5°	35.1°	37.8°	40.7°	43.6°	46.8°	50.1°	53.6°	57.5°	61.9°	67.0°	73.4°	85.5°	####
	7.5	2.1°	4.1°	6.2°	8.2°	10.3°	12.4°	14.5°	16.6°	18.8°	21.0°	23.2°	25.4°	27.7°	30.1°	32.5°	34.9°	37.5°	40.1°	42.8°	45.7°	48.7°	51.9°	55.4°	59.2°	63.5°	68.5°	75.1°
	8.0	1.9°	3.8°	5.8°	7.7°	9.7°	11.6°	13.6°	15.6°	17.6°	19.6°	21.7°	23.7°	25.9°	28.0°	30.2°	32.5°	34.8°	37.1°	39.6°	42.1°	44.8°	47.6°	50.5°	53.6°	57.0°	60.7°	64.9°

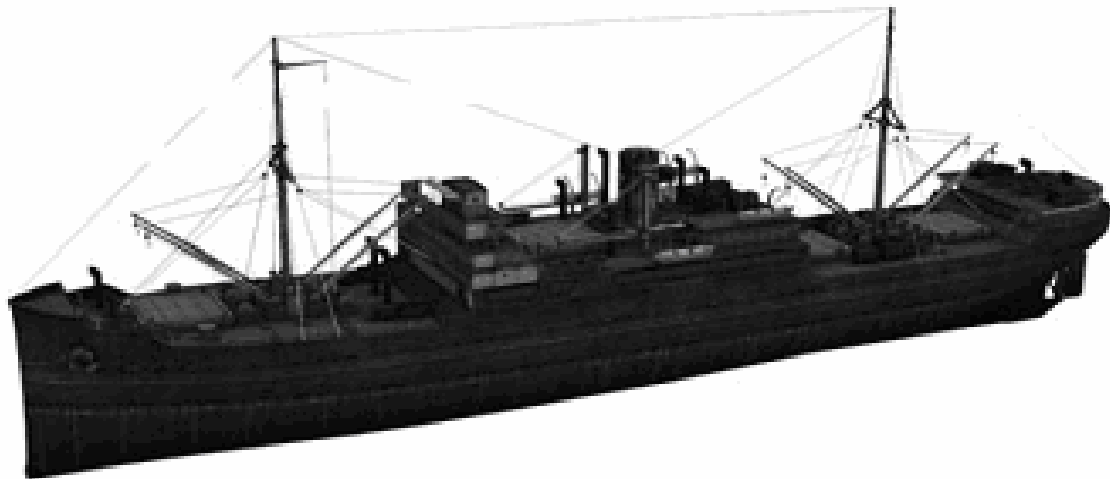
15.11 s	14 kts
16.27 s	13 kts
17.62 s	12 kts
19.23 s	11 kts
21.15 s	10 kts
23.5 s	9 kts
26.44 s	8 kts
30.21 s	7 kts
35.25 s	6 kts
42.3 s	5 kts
52.87 s	4 kts
70.5 s	3 kts
105.75 s	2 kts
211.49 s	1 kts

# Akita Maru Class Med. Composite SS Freighter

p.60

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,673m	6,692m	3	557m	2,231m	5	334m	1,338m	7	238m	956m
1.5	1,115m	4,461m	3.5	477m	1,912m	5.5	303m	1,217m	7.5	222m	892m
2	836m	3,346m	4	418m	1,673m	6	278m	1,115m	8	208m	836m
2.5	669m	2,677m	4.5	371m	1,487m	6.5	256m	1,029m	8.5	195m	787m

## Ship Recognition:



p.61 **Kinposan Maru Class Med. Modern Split SS Freighter**

<b>Class:</b>	Kinposan Maru		
<b>Type:</b>	Med. Modern Split SS Freighter		
<b>Tonnage:</b>	3,262		
<b>Speed:</b>	14.5 kts		
<b>Length:</b>	101.2 m		
<b>Height:</b>	27.5 m		
<b>Draft:</b>	6.4 m		
<b>AOB Ratio:</b>	3.68 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	7.62 m	(25.0 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	-	16 kts
-	33 kts	-	24 kts	13.11 s	15 kts

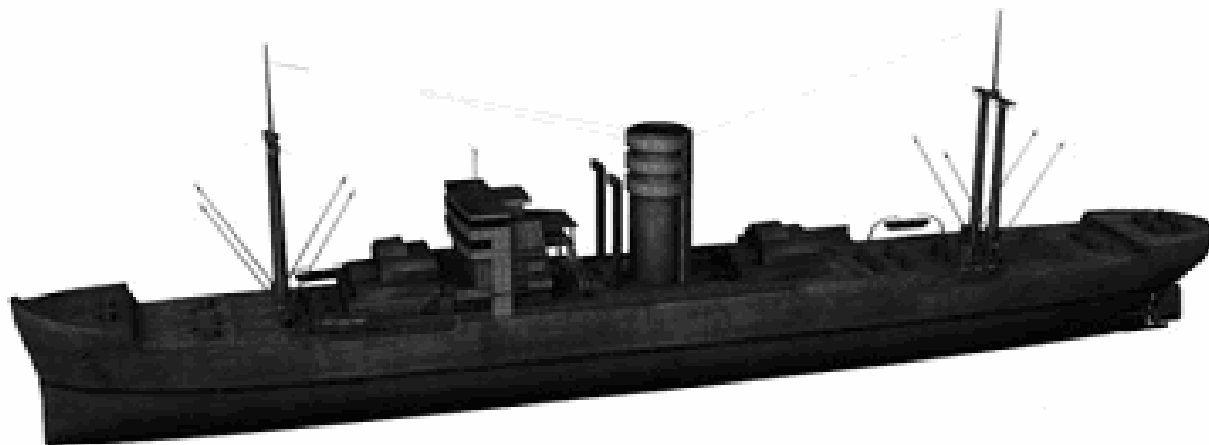
AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	5.2°	10.4°	15.8°	21.2°	26.9°	32.9°	39.4°	46.4°	54.6°	64.9°	85.1°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.5°	8.9°	13.5°	18.1°	22.8°	27.8°	32.9°	38.4°	44.3°	50.9°	58.7°	68.7°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.9°	7.8°	11.8°	15.8°	19.9°	24.1°	28.4°	32.9°	37.7°	42.8°	48.4°	54.6°	62.0°	72.0°	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.5°	6.9°	10.4°	14.0°	17.6°	21.2°	25.0°	28.9°	32.9°	37.1°	41.6°	46.4°	51.7°	57.7°	64.9°	75.1°	####	####	####	####	####	####	####	####	####	####	####
	5.0	3.1°	6.2°	9.4°	12.6°	15.8°	19.0°	22.4°	25.8°	29.3°	32.9°	36.7°	40.7°	45.0°	49.5°	54.6°	60.4°	67.5°	78.0°	####	####	####	####	####	####	####	####	####
	5.5	2.8°	5.7°	8.5°	11.4°	14.3°	17.2°	20.2°	23.3°	26.4°	29.6°	32.9°	36.4°	40.0°	43.8°	47.8°	52.2°	57.1°	62.8°	69.8°	81.2°	####	####	####	####	####	####	####
	6.0	2.6°	5.2°	7.8°	10.4°	13.1°	15.8°	18.5°	21.2°	24.1°	26.9°	29.9°	32.9°	36.1°	39.4°	42.8°	46.4°	50.3°	54.6°	59.4°	64.9°	72.0°	85.1°	####	####	####	####	####
	6.5	2.4°	4.8°	7.2°	9.6°	12.1°	14.5°	17.0°	19.5°	22.1°	24.7°	27.4°	30.1°	32.9°	35.8°	38.8°	42.0°	45.3°	48.8°	52.6°	56.7°	61.4°	66.9°	74.1°	####	####	####	####
	7.0	2.2°	4.5°	6.7°	8.9°	11.2°	13.5°	15.8°	18.1°	20.4°	22.8°	25.3°	27.8°	30.3°	32.9°	35.6°	38.4°	41.3°	44.3°	47.5°	50.9°	54.6°	58.7°	63.2°	68.7°	76.0°	####	####
	7.5	2.1°	4.2°	6.2°	8.3°	10.4°	12.6°	14.7°	16.8°	19.0°	21.2°	23.5°	25.8°	28.1°	30.5°	32.9°	35.4°	38.0°	40.7°	43.5°	46.4°	49.5°	52.9°	56.4°	60.4°	64.9°	70.4°	78.0°
	8.0	1.9°	3.9°	5.8°	7.8°	9.8°	11.8°	13.8°	15.8°	17.8°	19.9°	21.9°	24.1°	26.2°	28.4°	30.6°	32.9°	35.3°	37.7°	40.2°	42.8°	45.5°	48.4°	51.4°	54.6°	58.1°	62.0°	66.5°

14.05 s	14 kts
15.13 s	13 kts
16.39 s	12 kts
17.88 s	11 kts
19.67 s	10 kts
21.86 s	9 kts
24.59 s	8 kts
28.1 s	7 kts
32.79 s	6 kts
39.34 s	5 kts
49.18 s	4 kts
65.57 s	3 kts
98.36 s	2 kts
196.72 s	1 kts

# Kinposan Maru Class Med. Modern Split SS Freighter p.62

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,575m	6,302m	3	525m	2,101m	5	314m	1,260m	7	224m	900m
1.5	1,050m	4,202m	3.5	450m	1,801m	5.5	286m	1,146m	7.5	209m	840m
2	787m	3,151m	4	393m	1,575m	6	262m	1,050m	8	196m	787m
2.5	630m	2,521m	4.5	349m	1,400m	6.5	241m	969m	8.5	184m	741m

## Ship Recognition:



p.63 **Kasagisan Maru Class Sm. Old Split SS Freighter**

<b>Class:</b>	Kasagisan Maru	
<b>Type:</b>	Sm. Old Split SS Freight	
<b>Tonnage:</b>	2,427	
<b>Speed:</b>	12.0 kts	
<b>Length:</b>	86.8 m	
<b>Height:</b>	26.9 m	
<b>Draft:</b>	6.0 m	
<b>AOB Ratio:</b>	3.23 : 1	
<b>C-Depth:</b>	3.66 m	(12.0 ft)
<b>I-Depth:</b>	7.22 m	(23.7 ft)

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	-	16 kts
-	33 kts	-	24 kts	-	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	5.9°	11.9°	18.1°	24.4°	31.1°	38.3°	46.3°	55.7°	68.4°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	3.5	5.1°	10.2°	15.4°	20.7°	26.3°	32.1°	38.3°	45.1°	52.8°	62.3°	76.9°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	4.0	4.4°	8.9°	13.4°	18.1°	22.8°	27.7°	32.8°	38.3°	44.2°	50.8°	58.5°	68.4°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	4.5	3.9°	7.9°	11.9°	16.0°	20.1°	24.4°	28.8°	33.4°	38.3°	43.5°	49.2°	55.7°	63.5°	74.6°	###	###	###	###	###	###	###	###	###	###	###	###	###
	5.0	3.6°	7.1°	10.7°	14.4°	18.1°	21.8°	25.7°	29.7°	33.9°	38.3°	43.0°	48.1°	53.7°	60.2°	68.4°	82.6°	###	###	###	###	###	###	###	###	###	###	###
	5.5	3.2°	6.5°	9.7°	13.0°	16.4°	19.8°	23.2°	26.8°	30.5°	34.3°	38.3°	42.5°	47.1°	52.1°	57.7°	64.4°	73.3°	###	###	###	###	###	###	###	###	###	###
	6.0	3.0°	5.9°	8.9°	11.9°	15.0°	18.1°	21.2°	24.4°	27.7°	31.1°	34.6°	38.3°	42.2°	46.3°	50.8°	55.7°	61.4°	68.4°	78.9°	###	###	###	###	###	###	###	###
	6.5	2.7°	5.5°	8.2°	11.0°	13.8°	16.6°	19.5°	22.4°	25.4°	28.5°	31.6°	34.9°	38.3°	41.9°	45.7°	49.7°	54.1°	59.1°	64.9°	72.5°	###	###	###	###	###	###	###
	7.0	2.5°	5.1°	7.6°	10.2°	12.8°	15.4°	18.1°	20.7°	23.5°	26.3°	29.1°	32.1°	35.1°	38.3°	41.6°	45.1°	48.8°	52.8°	57.3°	62.3°	68.4°	76.9°	###	###	###	###	###
	7.5	2.4°	4.7°	7.1°	9.5°	11.9°	14.4°	16.8°	19.3°	21.8°	24.4°	27.0°	29.7°	32.5°	35.3°	38.3°	41.4°	44.6°	48.1°	51.7°	55.7°	60.2°	65.4°	71.9°	82.6°	###	###	###
	8.0	2.2°	4.4°	6.7°	8.9°	11.2°	13.4°	15.7°	18.1°	20.4°	22.8°	25.2°	27.7°	30.2°	32.8°	35.5°	38.3°	41.2°	44.2°	47.4°	50.8°	54.4°	58.5°	63.0°	68.4°	75.6°	###	###

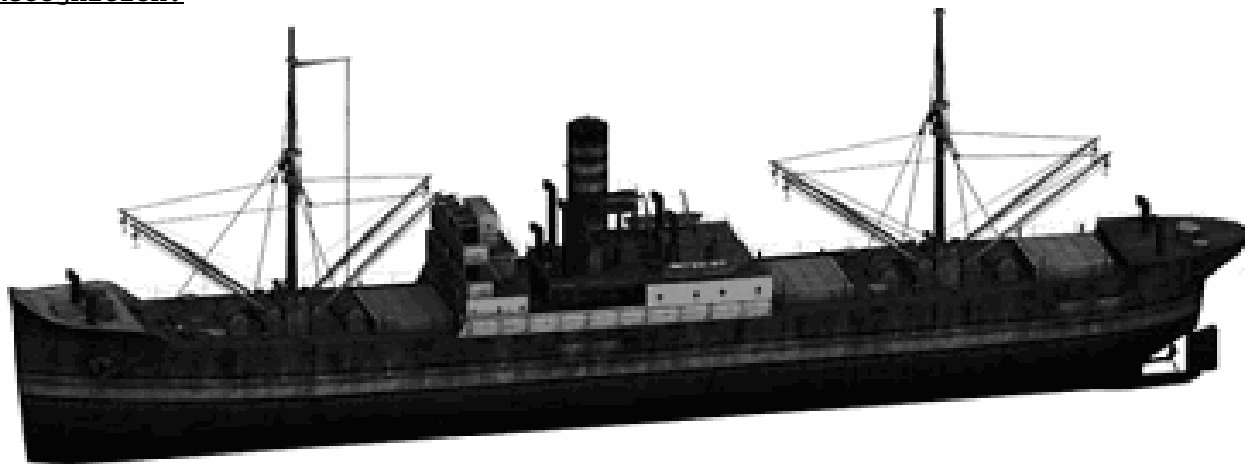
-	14 kts
-	13 kts
14.06 s	12 kts
15.34 s	11 kts
16.87 s	10 kts
18.75 s	9 kts
21.09 s	8 kts
24.1 s	7 kts
28.12 s	6 kts
33.75 s	5 kts
42.18 s	4 kts
56.24 s	3 kts
84.36 s	2 kts
168.73 s	1 kts



# Kasagisan Maru Class Sm. Old Split SS Freighter p.64

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,541m	6,165m	3	513m	2,055m	5	307m	1,233m	7	219m	880m
1.5	1,027m	4,110m	3.5	440m	1,761m	5.5	279m	1,121m	7.5	204m	822m
2	770m	3,082m	4	385m	1,541m	6	256m	1,027m	8	191m	770m
2.5	616m	2,466m	4.5	342m	1,370m	6.5	236m	948m	8.5	180m	725m

## Ship Recognition:



# Taihosan Maru Class Composite SS Freighter

<b>Class:</b>	Taihosan Maru		
<b>Type:</b>	Composite SS Freighter		
<b>Tonnage:</b>	1,805		
<b>Speed:</b>	13.0 kts		
<b>Length:</b>	80.7 m		
<b>Height:</b>	22.6 m		
<b>Draft:</b>	5.5 m		
<b>AOB Ratio:</b>	3.57 : 1		
<b>C-Depth:</b>	3.05 m	(10.0 ft)	
<b>I-Depth:</b>	6.72 m	(22.0 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	-	16 kts
-	33 kts	-	24 kts	-	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	5.4°	10.8°	16.3°	21.9°	27.8°	34.1°	40.8°	48.3°	57.2°	69.0°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.6°	9.2°	13.9°	18.7°	23.6°	28.7°	34.1°	39.8°	46.1°	53.1°	61.7°	73.8°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	4.0°	8.0°	12.1°	16.3°	20.5°	24.8°	29.3°	34.1°	39.1°	44.4°	50.4°	57.2°	65.5°	78.6°	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.6°	7.1°	10.8°	14.4°	18.1°	21.9°	25.8°	29.9°	34.1°	38.5°	43.2°	48.3°	54.0°	60.6°	69.0°	84.7°	####	####	####	####	####	####	####	####	####	####	####
	5.0	3.2°	6.4°	9.7°	12.9°	16.3°	19.6°	23.1°	26.6°	30.3°	34.1°	38.0°	42.2°	46.7°	51.6°	57.2°	63.7°	72.2°	####	####	####	####	####	####	####	####	####	####
	5.5	2.9°	5.8°	8.8°	11.8°	14.7°	17.8°	20.9°	24.0°	27.3°	30.6°	34.1°	37.7°	41.4°	45.5°	49.8°	54.6°	60.0°	66.4°	75.3°	####	####	####	####	####	####	####	####
	6.0	2.7°	5.4°	8.0°	10.8°	13.5°	16.3°	19.1°	21.9°	24.8°	27.8°	30.9°	34.1°	37.4°	40.8°	44.4°	48.3°	52.5°	57.2°	62.5°	69.0°	78.6°	####	####	####	####	####	####
	6.5	2.5°	4.9°	7.4°	9.9°	12.4°	15.0°	17.6°	20.2°	22.8°	25.5°	28.3°	31.1°	34.1°	37.1°	40.3°	43.6°	47.1°	50.9°	54.9°	59.5°	64.8°	71.4°	82.3°	####	####	####	####
	7.0	2.3°	4.6°	6.9°	9.2°	11.5°	13.9°	16.3°	18.7°	21.1°	23.6°	26.1°	28.7°	31.3°	34.1°	36.9°	39.8°	42.9°	46.1°	49.5°	53.1°	57.2°	61.7°	66.9°	73.8°	####	####	####
	7.5	2.1°	4.3°	6.4°	8.6°	10.8°	12.9°	15.2°	17.4°	19.6°	21.9°	24.3°	26.6°	29.0°	31.5°	34.1°	36.7°	39.4°	42.2°	45.2°	48.3°	51.6°	55.2°	59.2°	63.7°	69.0°	76.1°	####
	8.0	2.0°	4.0°	6.0°	8.0°	10.1°	12.1°	14.2°	16.3°	18.4°	20.5°	22.6°	24.8°	27.1°	29.3°	31.7°	34.1°	36.5°	39.1°	41.7°	44.4°	47.3°	50.4°	53.6°	57.2°	61.1°	65.5°	70.9°

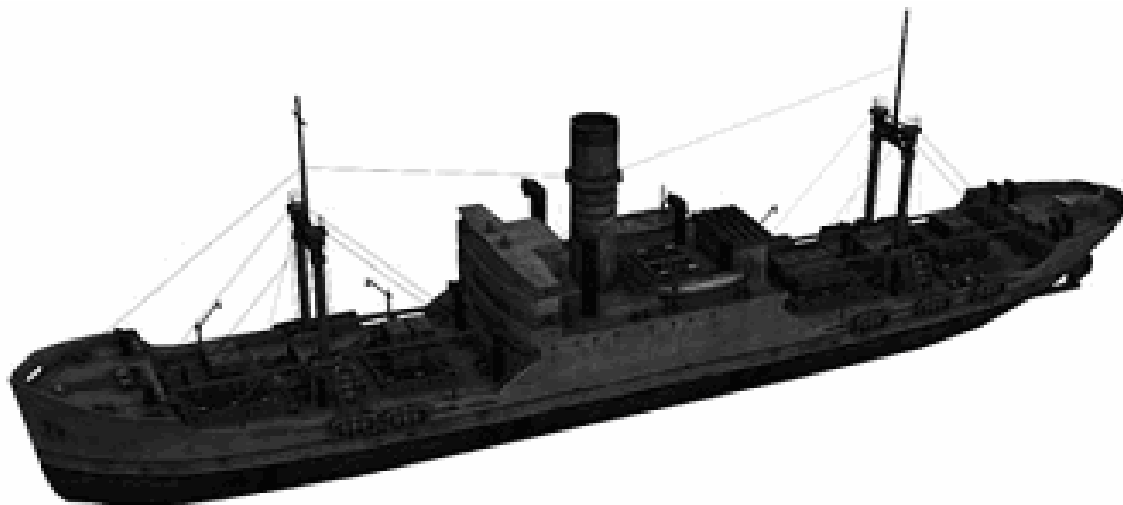
-	14 kts
12.07 s	13 kts
13.07 s	12 kts
14.26 s	11 kts
15.69 s	10 kts
17.43 s	9 kts
19.61 s	8 kts
22.41 s	7 kts
26.14 s	6 kts
31.37 s	5 kts
39.22 s	4 kts
52.29 s	3 kts
78.43 s	2 kts
156.87 s	1 kts

# Taihosan Maru Class Composite SS Freighter

p.66

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,295m	5,180m	3	431m	1,726m	5	258m	1,036m	7	184m	740m
1.5	863m	3,453m	3.5	370m	1,480m	5.5	235m	942m	7.5	172m	690m
2	647m	2,590m	4	323m	1,295m	6	215m	863m	8	161m	647m
2.5	518m	2,072m	4.5	287m	1,151m	6.5	198m	797m	8.5	151m	609m

## Ship Recognition:



# Nippon Maru Class Lg. Modern Tanker

<b>Class:</b>	Nippon Maru		
<b>Type:</b>	Lg. Modern Tanker		
<b>Tonnage:</b>	9,974		
<b>Speed:</b>	20.0 kts		
<b>Length:</b>	159.7 m		
<b>Height:</b>	28.9 m		
<b>Draft:</b>	9.0 m		
<b>AOB Ratio:</b>	5.53 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	10.22 m	(33.5 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	15.52 s	20 kts
-	37 kts	-	28 kts	16.34 s	19 kts
-	36 kts	-	27 kts	17.25 s	18 kts
-	35 kts	-	26 kts	18.26 s	17 kts
-	34 kts	-	25 kts	19.4 s	16 kts
-	33 kts	-	24 kts	20.7 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.5°	6.9°	10.4°	14.0°	17.6°	21.2°	25.0°	28.9°	32.9°	37.1°	41.6°	46.4°	51.6°	57.6°	64.8°	74.8°	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.0°	5.9°	8.9°	11.9°	15.0°	18.1°	21.2°	24.4°	27.7°	31.1°	34.7°	38.3°	42.2°	46.4°	50.9°	55.8°	61.5°	68.5°	79.2°	####	####	####	####	####	####	####	####
	4.0	2.6°	5.2°	7.8°	10.4°	13.1°	15.8°	18.5°	21.2°	24.0°	26.9°	29.8°	32.9°	36.0°	39.3°	42.7°	46.4°	50.3°	54.5°	59.3°	64.8°	71.8°	84.4°	####	####	####	####	####
	4.5	2.3°	4.6°	6.9°	9.3°	11.6°	14.0°	16.3°	18.8°	21.2°	23.7°	26.3°	28.9°	31.5°	34.3°	37.1°	40.0°	43.1°	46.4°	49.8°	53.5°	57.6°	62.2°	67.7°	74.8°	####	####	####
	5.0	2.1°	4.2°	6.2°	8.3°	10.4°	12.5°	14.7°	16.8°	19.0°	21.2°	23.5°	25.7°	28.1°	30.4°	32.9°	35.4°	38.0°	40.7°	43.4°	46.4°	49.5°	52.8°	56.3°	60.3°	64.8°	70.2°	77.7°
	5.5	1.9°	3.8°	5.7°	7.6°	9.5°	11.4°	13.3°	15.3°	17.2°	19.2°	21.2°	23.3°	25.3°	27.4°	29.6°	31.8°	34.0°	36.3°	38.7°	41.2°	43.7°	46.4°	49.2°	52.2°	55.3°	58.8°	62.7°
	6.0	1.7°	3.5°	5.2°	6.9°	8.7°	10.4°	12.2°	14.0°	15.8°	17.6°	19.4°	21.2°	23.1°	25.0°	26.9°	28.9°	30.8°	32.9°	35.0°	37.1°	39.3°	41.6°	43.9°	46.4°	48.9°	51.6°	54.5°
	6.5	1.6°	3.2°	4.8°	6.4°	8.0°	9.6°	11.2°	12.9°	14.5°	16.2°	17.8°	19.5°	21.2°	22.9°	24.7°	26.5°	28.2°	30.1°	31.9°	33.8°	35.8°	37.8°	39.8°	41.9°	44.1°	46.4°	48.7°
	7.0	1.5°	3.0°	4.4°	5.9°	7.4°	8.9°	10.4°	11.9°	13.5°	15.0°	16.5°	18.1°	19.6°	21.2°	22.8°	24.4°	26.1°	27.7°	29.4°	31.1°	32.9°	34.7°	36.5°	38.3°	40.3°	42.2°	44.3°
	7.5	1.4°	2.8°	4.2°	5.5°	6.9°	8.3°	9.7°	11.1°	12.5°	14.0°	15.4°	16.8°	18.3°	19.7°	21.2°	22.7°	24.2°	25.7°	27.3°	28.9°	30.4°	32.1°	33.7°	35.4°	37.1°	38.9°	40.7°
	8.0	1.3°	2.6°	3.9°	5.2°	6.5°	7.8°	9.1°	10.4°	11.7°	13.1°	14.4°	15.8°	17.1°	18.5°	19.8°	21.2°	22.6°	24.0°	25.5°	26.9°	28.4°	29.8°	31.4°	32.9°	34.4°	36.0°	37.6°

22.17 s	14 kts
23.88 s	13 kts
25.87 s	12 kts
28.22 s	11 kts
31.04 s	10 kts
34.49 s	9 kts
38.8 s	8 kts
44.35 s	7 kts
51.74 s	6 kts
62.09 s	5 kts
77.61 s	4 kts
103.48 s	3 kts
155.22 s	2 kts
310.43 s	1 kts

# Nippon Maru Class Lg. Modern Tanker

p.68

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,656m	6,623m	3	551m	2,208m	5	330m	1,324m	7	235m	946m
1.5	1,104m	4,416m	3.5	473m	1,892m	5.5	300m	1,204m	7.5	220m	883m
2	828m	3,312m	4	413m	1,656m	6	275m	1,104m	8	206m	828m
2.5	662m	2,649m	4.5	367m	1,472m	6.5	254m	1,019m	8.5	193m	779m

## Ship Recognition:



# Buzyun Maru Class Med. Old Tanker

<b>Class:</b>	Buzyun Maru		
<b>Type:</b>	Med. Old Tanker		
<b>Tonnage:</b>	4,804		
<b>Speed:</b>	11.0 kts		
<b>Length:</b>	113.1 m		
<b>Height:</b>	27.9 m		
<b>Draft:</b>	8.7 m		
<b>AOB Ratio:</b>	4.05 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	9.92 m	(32.5 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	-	16 kts
-	33 kts	-	24 kts	-	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.7°	9.5°	14.3°	19.2°	24.3°	29.6°	35.1°	41.1°	47.7°	55.3°	64.8°	80.7°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.0°	8.1°	12.2°	16.4°	20.6°	25.0°	29.6°	34.3°	39.4°	44.8°	50.8°	57.8°	66.4°	80.7°	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.5°	7.1°	10.7°	14.3°	18.0°	21.7°	25.6°	29.6°	33.7°	38.1°	42.7°	47.7°	53.3°	59.7°	67.7°	80.7°	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.1°	6.3°	9.5°	12.7°	15.9°	19.2°	22.6°	26.0°	29.6°	33.2°	37.1°	41.1°	45.5°	50.1°	55.3°	61.3°	68.7°	80.7°	####	####	####	####	####	####	####	####	####
	5.0	2.8°	5.7°	8.5°	11.4°	14.3°	17.2°	20.2°	23.2°	26.4°	29.6°	32.9°	36.3°	39.9°	43.7°	47.7°	52.1°	57.0°	62.6°	69.6°	80.7°	####	####	####	####	####	####	####
	5.5	2.6°	5.1°	7.7°	10.3°	13.0°	15.6°	18.3°	21.0°	23.8°	26.6°	29.6°	32.6°	35.7°	38.9°	42.3°	45.9°	49.7°	53.8°	58.4°	63.8°	70.4°	80.7°	####	####	####	####	####
	6.0	2.4°	4.7°	7.1°	9.5°	11.9°	14.3°	16.7°	19.2°	21.7°	24.3°	26.9°	29.6°	32.3°	35.1°	38.1°	41.1°	44.3°	47.7°	51.4°	55.3°	59.7°	64.8°	71.0°	80.7°	####	####	####
	6.5	2.2°	4.4°	6.5°	8.7°	10.9°	13.2°	15.4°	17.7°	20.0°	22.3°	24.7°	27.1°	29.6°	32.1°	34.7°	37.4°	40.2°	43.1°	46.1°	49.4°	52.8°	56.6°	60.8°	65.6°	71.6°	80.7°	####
	7.0	2.0°	4.0°	6.1°	8.1°	10.1°	12.2°	14.3°	16.4°	18.5°	20.6°	22.8°	25.0°	27.3°	29.6°	31.9°	34.3°	36.8°	39.4°	42.0°	44.8°	47.7°	50.8°	54.1°	57.8°	61.8°	66.4°	72.1°
	7.5	1.9°	3.8°	5.7°	7.6°	9.5°	11.4°	13.3°	15.3°	17.2°	19.2°	21.2°	23.2°	25.3°	27.4°	29.6°	31.8°	34.0°	36.3°	38.7°	41.1°	43.7°	46.4°	49.2°	52.1°	55.3°	58.8°	62.6°
	8.0	1.8°	3.5°	5.3°	7.1°	8.9°	10.7°	12.5°	14.3°	16.1°	18.0°	19.8°	21.7°	23.6°	25.6°	27.6°	29.6°	31.6°	33.7°	35.9°	38.1°	40.4°	42.7°	45.2°	47.7°	50.4°	53.3°	56.4°

-	14 kts
-	13 kts
-	12 kts
19.99 s	11 kts
21.99 s	10 kts
24.43 s	9 kts
27.48 s	8 kts
31.41 s	7 kts
36.64 s	6 kts
43.97 s	5 kts
54.96 s	4 kts
73.28 s	3 kts
109.93 s	2 kts
219.85 s	1 kts

# Buzyun Maru Class Med. Old Tanker

p.70

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,598m	6,394m	3	532m	2,131m	5	319m	1,279m	7	227m	913m
1.5	1,065m	4,263m	3.5	456m	1,827m	5.5	290m	1,162m	7.5	212m	852m
2	799m	3,197m	4	399m	1,598m	6	265m	1,065m	8	199m	799m
2.5	639m	2,558m	4.5	355m	1,421m	6.5	245m	983m	8.5	187m	752m

## Ship Recognition:



# Haruna Maru Class Sm. Old Tanker

<b>Class:</b>	Haruna Maru		
<b>Type:</b>	Sm. Old Tanker		
<b>Tonnage:</b>	1,549		
<b>Speed:</b>	11.0 kts		
<b>Length:</b>	76.2 m		
<b>Height:</b>	19.7 m		
<b>Draft:</b>	5.2 m		
<b>AOB Ratio:</b>	3.87 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	6.42 m	(21.1 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	-	16 kts
-	33 kts	-	24 kts	-	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.9°	9.9°	15.0°	20.2°	25.5°	31.1°	37.1°	43.6°	50.9°	59.5°	71.4°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.2°	8.5°	12.8°	17.2°	21.7°	26.3°	31.1°	36.2°	41.7°	47.6°	54.3°	62.4°	73.8°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.7°	7.4°	11.2°	15.0°	18.9°	22.8°	26.9°	31.1°	35.6°	40.3°	45.3°	50.9°	57.2°	64.8°	75.8°	####	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.3°	6.6°	9.9°	13.3°	16.7°	20.2°	23.7°	27.4°	31.1°	35.1°	39.2°	43.6°	48.3°	53.5°	59.5°	66.8°	77.6°	####	####	####	####	####	####	####	####	####	####
	5.0	3.0°	5.9°	8.9°	11.9°	15.0°	18.1°	21.2°	24.4°	27.7°	31.1°	34.7°	38.4°	42.2°	46.4°	50.9°	55.8°	61.5°	68.5°	79.2°	####	####	####	####	####	####	####	####
	5.5	2.7°	5.4°	8.1°	10.8°	13.6°	16.4°	19.2°	22.1°	25.0°	28.0°	31.1°	34.3°	37.7°	41.2°	44.8°	48.8°	53.0°	57.8°	63.3°	70.1°	80.8°	####	####	####	####	####	####
	6.0	2.5°	4.9°	7.4°	9.9°	12.4°	15.0°	17.6°	20.2°	22.8°	25.5°	28.3°	31.1°	34.1°	37.1°	40.3°	43.6°	47.1°	50.9°	55.0°	59.5°	64.8°	71.4°	82.3°	####	####	####	####
	6.5	2.3°	4.6°	6.9°	9.2°	11.5°	13.8°	16.2°	18.6°	21.0°	23.4°	25.9°	28.5°	31.1°	33.8°	36.6°	39.5°	42.5°	45.7°	49.1°	52.7°	56.6°	61.0°	66.2°	72.7°	83.9°	####	####
	7.0	2.1°	4.2°	6.4°	8.5°	10.6°	12.8°	15.0°	17.2°	19.4°	21.7°	24.0°	26.3°	28.7°	31.1°	33.6°	36.2°	38.9°	41.7°	44.6°	47.6°	50.9°	54.3°	58.2°	62.4°	67.4°	73.8°	85.7°
	7.5	2.0°	4.0°	5.9°	7.9°	9.9°	11.9°	14.0°	16.0°	18.1°	20.2°	22.3°	24.4°	26.6°	28.9°	31.1°	33.5°	35.9°	38.4°	40.9°	43.6°	46.4°	49.3°	52.5°	55.8°	59.5°	63.7°	68.5°
	8.0	1.9°	3.7°	5.6°	7.4°	9.3°	11.2°	13.1°	15.0°	16.9°	18.9°	20.8°	22.8°	24.8°	26.9°	29.0°	31.1°	33.3°	35.6°	37.9°	40.3°	42.7°	45.3°	48.0°	50.9°	53.9°	57.2°	60.8°

-	14 kts
-	13 kts
-	12 kts
13.47 s	11 kts
14.81 s	10 kts
16.46 s	9 kts
18.52 s	8 kts
21.16 s	7 kts
24.69 s	6 kts
29.62 s	5 kts
37.03 s	4 kts
49.37 s	3 kts
74.06 s	2 kts
148.12 s	1 kts



# Haruna Maru Class Sm. Old Tanker

p.72

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,129m	4,515m	3	376m	1,505m	5	225m	903m	7	160m	645m
1.5	752m	3,010m	3.5	322m	1,290m	5.5	205m	821m	7.5	150m	602m
2	564m	2,257m	4	282m	1,129m	6	187m	752m	8	140m	564m
2.5	451m	1,806m	4.5	250m	1,003m	6.5	173m	694m	8.5	132m	531m

## Ship Recognition:



# Conte Verde Class European Built Liner

<b>Class:</b>	Conte Verde		
<b>Type:</b>	European Built Liner		
<b>Tonnage:</b>	18,765		
<b>Speed:</b>	21.0 kts		
<b>Length:</b>	173.7 m		
<b>Height:</b>	42.5 m		
<b>Draft:</b>	8.5 m		
<b>AOB Ratio:</b>	4.09 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	9.72 m	(31.9 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	16.08 s	21 kts
-	38 kts	-	29 kts	16.88 s	20 kts
-	37 kts	-	28 kts	17.77 s	19 kts
-	36 kts	-	27 kts	18.76 s	18 kts
-	35 kts	-	26 kts	19.86 s	17 kts
-	34 kts	-	25 kts	21.1 s	16 kts
-	33 kts	-	24 kts	22.51 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.7°	9.4°	14.2°	19.0°	24.1°	29.3°	34.8°	40.7°	47.2°	54.6°	63.8°	78.2°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.0°	8.0°	12.1°	16.2°	20.5°	24.8°	29.3°	34.0°	39.0°	44.4°	50.3°	57.0°	65.3°	78.2°	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.5°	7.0°	10.6°	14.2°	17.8°	21.5°	25.4°	29.3°	33.4°	37.7°	42.3°	47.2°	52.7°	58.9°	66.6°	78.2°	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.1°	6.2°	9.4°	12.6°	15.8°	19.0°	22.4°	25.8°	29.3°	32.9°	36.7°	40.7°	45.0°	49.6°	54.6°	60.5°	67.6°	78.2°	####	####	####	####	####	####	####	####	####
	5.0	2.8°	5.6°	8.4°	11.3°	14.2°	17.1°	20.0°	23.0°	26.1°	29.3°	32.6°	36.0°	39.5°	43.2°	47.2°	51.5°	56.3°	61.7°	68.4°	78.2°	####	####	####	####	####	####	####
	5.5	2.5°	5.1°	7.7°	10.3°	12.9°	15.5°	18.1°	20.8°	23.6°	26.4°	29.3°	32.3°	35.3°	38.5°	41.9°	45.4°	49.1°	53.2°	57.7°	62.8°	69.1°	78.2°	####	####	####	####	####
	6.0	2.3°	4.7°	7.0°	9.4°	11.8°	14.2°	16.6°	19.0°	21.5°	24.1°	26.7°	29.3°	32.0°	34.8°	37.7°	40.7°	43.9°	47.2°	50.8°	54.6°	58.9°	63.8°	69.7°	78.2°	####	####	####
	6.5	2.2°	4.3°	6.5°	8.7°	10.8°	13.1°	15.3°	17.5°	19.8°	22.1°	24.5°	26.9°	29.3°	31.8°	34.4°	37.0°	39.8°	42.7°	45.7°	48.8°	52.2°	55.9°	60.0°	64.6°	70.2°	78.2°	####
	7.0	2.0°	4.0°	6.0°	8.0°	10.1°	12.1°	14.2°	16.2°	18.3°	20.5°	22.6°	24.8°	27.0°	29.3°	31.6°	34.0°	36.5°	39.0°	41.6°	44.4°	47.2°	50.3°	53.5°	57.0°	60.9°	65.3°	70.7°
	7.5	1.9°	3.7°	5.6°	7.5°	9.4°	11.3°	13.2°	15.1°	17.1°	19.0°	21.0°	23.0°	25.1°	27.2°	29.3°	31.5°	33.7°	36.0°	38.3°	40.7°	43.2°	45.9°	48.6°	51.5°	54.6°	58.0°	61.7°
	8.0	1.8°	3.5°	5.3°	7.0°	8.8°	10.6°	12.4°	14.2°	16.0°	17.8°	19.7°	21.5°	23.4°	25.4°	27.3°	29.3°	31.3°	33.4°	35.5°	37.7°	40.0°	42.3°	44.7°	47.2°	49.9°	52.7°	55.7°

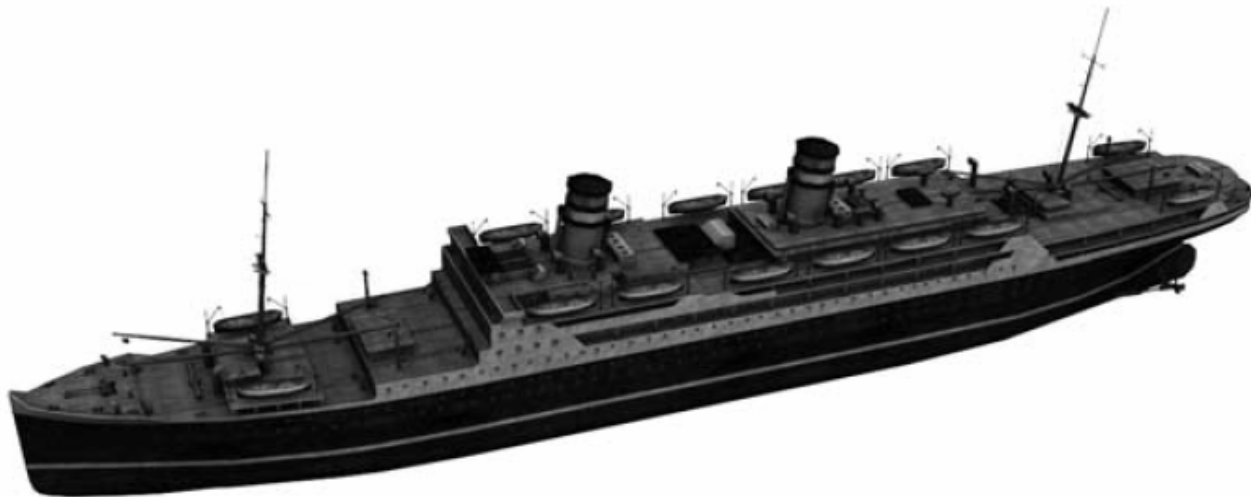
24.12 s	14 kts
25.97 s	13 kts
28.14 s	12 kts
30.7 s	11 kts
33.76 s	10 kts
37.52 s	9 kts
42.21 s	8 kts
48.24 s	7 kts
56.27 s	6 kts
67.53 s	5 kts
84.41 s	4 kts
112.55 s	3 kts
168.82 s	2 kts
337.65 s	1 kts

# Conte Verde Class European Built Liner

p.74

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,435m	9,740m	3	811m	3,247m	5	486m	1,948m	7	346m	1,391m
1.5	1,623m	6,493m	3.5	695m	2,783m	5.5	441m	1,771m	7.5	323m	1,298m
2	1,217m	4,870m	4	608m	2,435m	6	404m	1,623m	8	302m	1,217m
2.5	973m	3,896m	4.5	540m	2,164m	6.5	373m	1,498m	8.5	284m	1,145m

## Ship Recognition:



# Horai Maru Class Lg. Old Passenger Carrier

<b>Class:</b>	Horai Maru	
<b>Type:</b>	Lg. Old Passenger Carrier	
<b>Tonnage:</b>	9,192	
<b>Speed:</b>	17.0 kts	
<b>Length:</b>	137.4 m	
<b>Height:</b>	39.7 m	
<b>Draft:</b>	8.5 m	
<b>AOB Ratio:</b>	3.46 : 1	
<b>C-Depth:</b>	3.66 m	(12.0 ft)
<b>I-Depth:</b>	9.72 m	(31.9 ft)

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	15.71 s	17 kts
-	34 kts	-	25 kts	16.69 s	16 kts
-	33 kts	-	24 kts	17.81 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	5.5°	11.1°	16.8°	22.7°	28.8°	35.3°	42.4°	50.4°	60.1°	74.4°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.7°	9.5°	14.3°	19.3°	24.4°	29.7°	35.3°	41.3°	48.0°	55.6°	65.2°	82.2°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	4.1°	8.3°	12.5°	16.8°	21.2°	25.7°	30.4°	35.3°	40.5°	46.2°	52.6°	60.1°	69.9°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.7°	7.4°	11.1°	14.9°	18.7°	22.7°	26.7°	30.9°	35.3°	39.9°	44.9°	50.4°	56.6°	64.0°	74.4°	####	####	####	####	####	####	####	####	####	####	####	####
	5.0	3.3°	6.6°	10.0°	13.4°	16.8°	20.3°	23.9°	27.5°	31.3°	35.3°	39.5°	43.9°	48.7°	54.0°	60.1°	67.6°	79.2°	####	####	####	####	####	####	####	####	####	####
	5.5	3.0°	6.0°	9.1°	12.1°	15.2°	18.4°	21.6°	24.9°	28.2°	31.7°	35.3°	39.1°	43.1°	47.3°	52.0°	57.2°	63.3°	71.0°	86.5°	####	####	####	####	####	####	####	####
	6.0	2.8°	5.5°	8.3°	11.1°	13.9°	16.8°	19.7°	22.7°	25.7°	28.8°	32.0°	35.3°	38.8°	42.4°	46.2°	50.4°	55.0°	60.1°	66.2°	74.4°	####	####	####	####	####	####	####
	6.5	2.5°	5.1°	7.7°	10.2°	12.8°	15.5°	18.1°	20.8°	23.6°	26.4°	29.3°	32.2°	35.3°	38.5°	41.8°	45.3°	49.1°	53.1°	57.6°	62.8°	69.0°	77.9°	####	####	####	####	####
	7.0	2.4°	4.7°	7.1°	9.5°	11.9°	14.3°	16.8°	19.3°	21.8°	24.4°	27.0°	29.7°	32.5°	35.3°	38.3°	41.3°	44.6°	48.0°	51.7°	55.6°	60.1°	65.2°	71.7°	82.2°	####	####	####
	7.5	2.2°	4.4°	6.6°	8.9°	11.1°	13.4°	15.6°	18.0°	20.3°	22.7°	25.1°	27.5°	30.1°	32.6°	35.3°	38.1°	40.9°	43.9°	47.1°	50.4°	54.0°	57.9°	62.4°	67.6°	74.4°	####	####
	8.0	2.1°	4.1°	6.2°	8.3°	10.4°	12.5°	14.6°	16.8°	19.0°	21.2°	23.4°	25.7°	28.0°	30.4°	32.8°	35.3°	37.9°	40.5°	43.3°	46.2°	49.3°	52.6°	56.2°	60.1°	64.5°	69.9°	77.2°

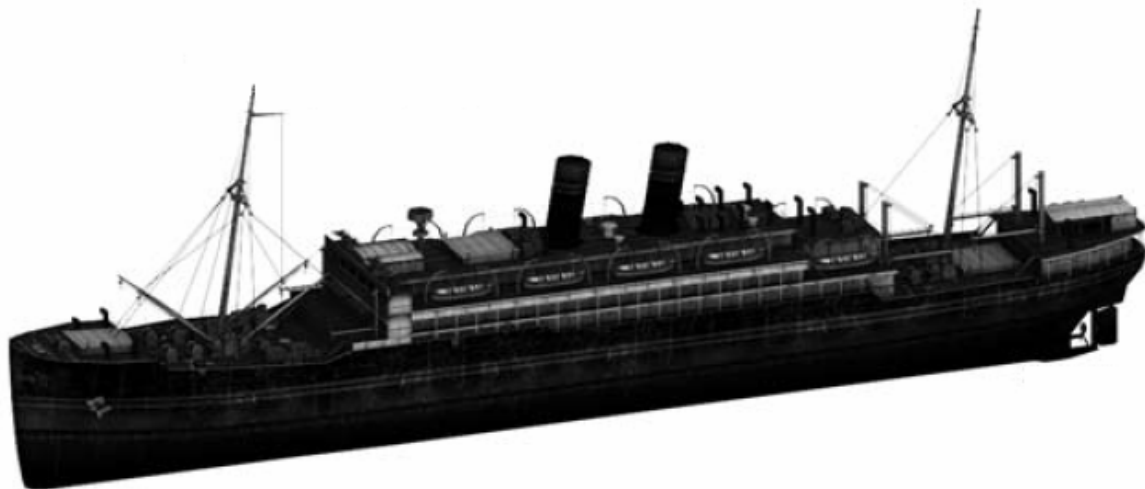
19.08 s	14 kts
20.55 s	13 kts
22.26 s	12 kts
24.28 s	11 kts
26.71 s	10 kts
29.68 s	9 kts
33.39 s	8 kts
38.16 s	7 kts
44.51 s	6 kts
53.42 s	5 kts
66.77 s	4 kts
89.03 s	3 kts
133.54 s	2 kts
267.09 s	1 kts

# Horai Maru Class Lg. Old Passenger Carrier

p.76

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	2,274m	9,099m	3	758m	3,033m	5	454m	1,819m	7	323m	1,299m
1.5	1,516m	6,066m	3.5	649m	2,599m	5.5	412m	1,654m	7.5	302m	1,213m
2	1,137m	4,549m	4	568m	2,274m	6	378m	1,516m	8	282m	1,137m
2.5	909m	3,639m	4.5	504m	2,022m	6.5	348m	1,399m	8.5	266m	1,070m

## Ship Recognition:



# Kiturin Maru Class Modern Passenger Liner

<b>Class:</b>	Kiturin Maru		
<b>Type:</b>	Modern Passenger Liner		
<b>Tonnage:</b>	6,783		
<b>Speed:</b>	18.5 kts		
<b>Length:</b>	130.1 m		
<b>Height:</b>	34.0 m		
<b>Draft:</b>	6.1 m		
<b>AOB Ratio:</b>	3.83 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	7.32 m	(24.0 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	13.31 s	19 kts
-	36 kts	-	27 kts	14.05 s	18 kts
-	35 kts	-	26 kts	14.88 s	17 kts
-	34 kts	-	25 kts	15.81 s	16 kts
-	33 kts	-	24 kts	16.86 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	5.0°	10.0°	15.1°	20.4°	25.8°	31.5°	37.6°	44.2°	51.6°	60.6°	73.4°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.3°	8.6°	12.9°	17.4°	21.9°	26.6°	31.5°	36.7°	42.2°	48.3°	55.2°	63.6°	76.1°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.7°	7.5°	11.3°	15.1°	19.1°	23.1°	27.2°	31.5°	36.0°	40.8°	45.9°	51.6°	58.1°	66.2°	78.5°	####	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.3°	6.7°	10.0°	13.4°	16.9°	20.4°	24.0°	27.7°	31.5°	35.5°	39.7°	44.2°	49.0°	54.4°	60.6°	68.3°	80.8°	####	####	####	####	####	####	####	####	####	####
	5.0	3.0°	6.0°	9.0°	12.1°	15.1°	18.3°	21.5°	24.7°	28.1°	31.5°	35.1°	38.8°	42.8°	47.0°	51.6°	56.7°	62.7°	70.2°	83.3°	####	####	####	####	####	####	####	####
	5.5	2.7°	5.5°	8.2°	11.0°	13.7°	16.6°	19.4°	22.3°	25.3°	28.4°	31.5°	34.8°	38.1°	41.7°	45.5°	49.5°	53.9°	58.8°	64.5°	71.9°	86.2°	####	####	####	####	####	####
	6.0	2.5°	5.0°	7.5°	10.0°	12.6°	15.1°	17.8°	20.4°	23.1°	25.8°	28.6°	31.5°	34.5°	37.6°	40.8°	44.2°	47.8°	51.6°	55.8°	60.6°	66.2°	73.4°	####	####	####	####	####
	6.5	2.3°	4.6°	6.9°	9.3°	11.6°	14.0°	16.3°	18.8°	21.2°	23.7°	26.2°	28.8°	31.5°	34.3°	37.1°	40.0°	43.1°	46.4°	49.8°	53.5°	57.6°	62.2°	67.6°	74.8°	####	####	####
	7.0	2.1°	4.3°	6.4°	8.6°	10.8°	12.9°	15.1°	17.4°	19.6°	21.9°	24.2°	26.6°	29.0°	31.5°	34.1°	36.7°	39.4°	42.2°	45.2°	48.3°	51.6°	55.2°	59.2°	63.6°	69.0°	76.1°	####
	7.5	2.0°	4.0°	6.0°	8.0°	10.0°	12.1°	14.1°	16.2°	18.3°	20.4°	22.5°	24.7°	26.9°	29.2°	31.5°	33.9°	36.3°	38.8°	41.5°	44.2°	47.0°	50.0°	53.3°	56.7°	60.6°	65.0°	70.2°
	8.0	1.9°	3.7°	5.6°	7.5°	9.4°	11.3°	13.2°	15.1°	17.1°	19.1°	21.1°	23.1°	25.1°	27.2°	29.3°	31.5°	33.7°	36.0°	38.4°	40.8°	43.3°	45.9°	48.7°	51.6°	54.8°	58.1°	61.9°

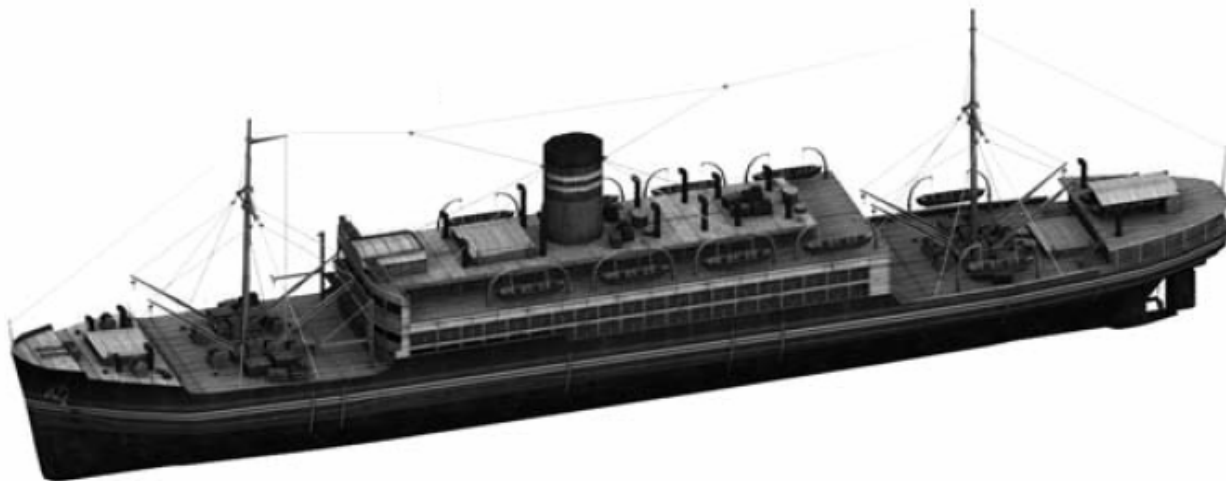
18.06 s	14 kts
19.45 s	13 kts
21.07 s	12 kts
22.99 s	11 kts
25.29 s	10 kts
28.1 s	9 kts
31.61 s	8 kts
36.13 s	7 kts
42.15 s	6 kts
50.58 s	5 kts
63.22 s	4 kts
84.3 s	3 kts
126.45 s	2 kts
252.9 s	1 kts

# Kiturin Maru Class Modern Passenger Liner

p.78

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,948m	7,792m	3	649m	2,597m	5	389m	1,558m	7	277m	1,113m
1.5	1,298m	5,195m	3.5	556m	2,226m	5.5	353m	1,416m	7.5	258m	1,039m
2	974m	3,896m	4	486m	1,948m	6	323m	1,298m	8	242m	974m
2.5	779m	3,117m	4.5	432m	1,731m	6.5	298m	1,198m	8.5	227m	916m

## Ship Recognition:



# Tyohei Maru Class Sm. Passenger Carrier

<b>Class:</b>	Tyohei Maru		
<b>Type:</b>	Sm. Passenger Carrier		
<b>Tonnage:</b>	1,713		
<b>Speed:</b>	13.0 kts		
<b>Length:</b>	79.2 m		
<b>Height:</b>	22.5 m		
<b>Draft:</b>	5.2 m		
<b>AOB Ratio:</b>	3.52 : 1		
<b>C-Depth:</b>	3.05 m	(10.0 ft)	
<b>I-Depth:</b>	6.42 m	(21.1 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	-	16 kts
-	33 kts	-	24 kts	-	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	5.4°	10.9°	16.5°	22.3°	28.3°	34.6°	41.5°	49.3°	58.5°	71.3°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	4.7°	9.3°	14.1°	18.9°	23.9°	29.1°	34.6°	40.5°	46.9°	54.3°	63.2°	76.9°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	4.1°	8.2°	12.3°	16.5°	20.8°	25.2°	29.8°	34.6°	39.7°	45.3°	51.4°	58.5°	67.4°	83.9°	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.5	3.6°	7.3°	10.9°	14.6°	18.4°	22.3°	26.2°	30.3°	34.6°	39.1°	44.0°	49.3°	55.2°	62.1°	71.3°	####	####	####	####	####	####	####	####	####	####	####	####
	5.0	3.3°	6.5°	9.8°	13.1°	16.5°	19.9°	23.4°	27.0°	30.8°	34.6°	38.7°	43.0°	47.6°	52.7°	58.5°	65.4°	75.0°	####	####	####	####	####	####	####	####	####	####
	5.5	3.0°	5.9°	8.9°	11.9°	15.0°	18.1°	21.2°	24.4°	27.7°	31.1°	34.6°	38.3°	42.2°	46.3°	50.8°	55.7°	61.4°	68.4°	78.9°	####	####	####	####	####	####	####	####
	6.0	2.7°	5.4°	8.2°	10.9°	13.7°	16.5°	19.4°	22.3°	25.2°	28.3°	31.4°	34.6°	38.0°	41.5°	45.3°	49.3°	53.6°	58.5°	64.1°	71.3°	83.9°	####	####	####	####	####	####
	6.5	2.5°	5.0°	7.5°	10.1°	12.6°	15.2°	17.8°	20.5°	23.2°	25.9°	28.7°	31.6°	34.6°	37.7°	41.0°	44.4°	48.0°	51.9°	56.1°	60.9°	66.6°	74.1°	####	####	####	####	####
	7.0	2.3°	4.7°	7.0°	9.3°	11.7°	14.1°	16.5°	18.9°	21.4°	23.9°	26.5°	29.1°	31.8°	34.6°	37.5°	40.5°	43.6°	46.9°	50.5°	54.3°	58.5°	63.2°	69.0°	76.9°	####	####	####
	7.5	2.2°	4.3°	6.5°	8.7°	10.9°	13.1°	15.4°	17.6°	19.9°	22.3°	24.6°	27.0°	29.5°	32.0°	34.6°	37.3°	40.1°	43.0°	46.0°	49.3°	52.7°	56.4°	60.6°	65.4°	71.3°	80.0°	####
	8.0	2.0°	4.1°	6.1°	8.2°	10.2°	12.3°	14.4°	16.5°	18.6°	20.8°	23.0°	25.2°	27.5°	29.8°	32.2°	34.6°	37.1°	39.7°	42.4°	45.3°	48.2°	51.4°	54.8°	58.5°	62.6°	67.4°	73.5°

-	14 kts
11.84 s	13 kts
12.83 s	12 kts
14.0 s	11 kts
15.4 s	10 kts
17.11 s	9 kts
19.24 s	8 kts
21.99 s	7 kts
25.66 s	6 kts
30.79 s	5 kts
38.49 s	4 kts
51.32 s	3 kts
76.98 s	2 kts
153.95 s	1 kts

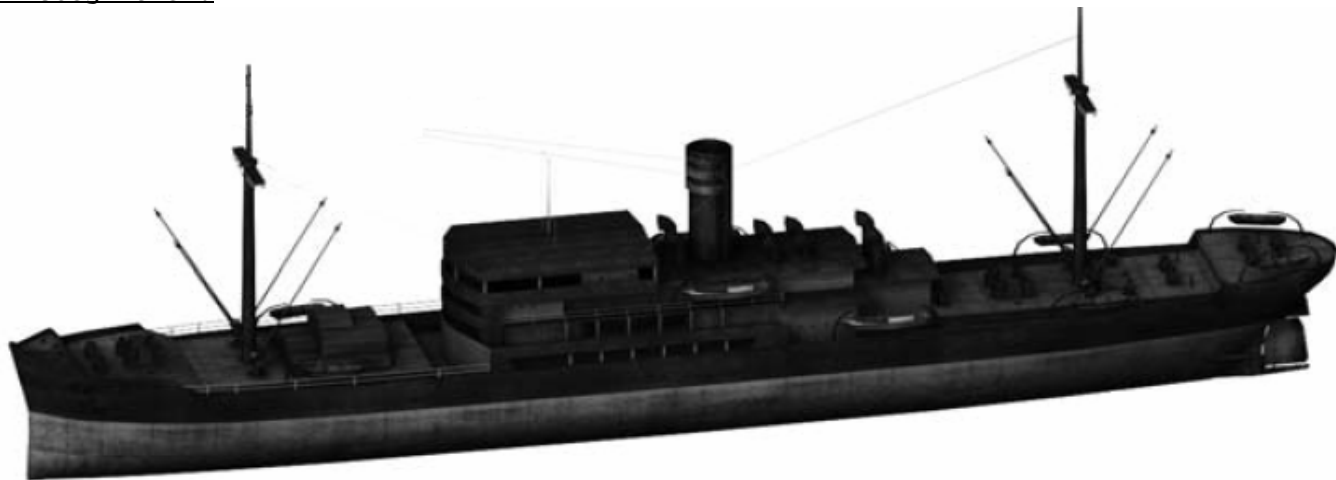


# Tyohei Maru Class Sm. Passenger Carrier

p.80

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,289m	5,157m	3	429m	1,719m	5	257m	1,031m	7	183m	736m
1.5	859m	3,438m	3.5	368m	1,473m	5.5	234m	937m	7.5	171m	687m
2	644m	2,578m	4	322m	1,289m	6	214m	859m	8	160m	644m
2.5	515m	2,063m	4.5	286m	1,146m	6.5	197m	793m	8.5	151m	606m

## Ship Recognition:



# No. 13 Class Minesweeper

<b>Class:</b>	No. 13	
<b>Type:</b>	Minesweeper	
<b>Tonnage:</b>	511	
<b>Speed:</b>	20.0 kts	
<b>Length:</b>	72.1 m	
<b>Height:</b>	25.5 m	
<b>Draft:</b>	1.85 m	
<b>AOB Ratio:</b>	2.83 : 1	
<b>C-Depth:</b>	1.83 m	(6.0 ft)
<b>I-Depth:</b>	3.07 m	(10.1 ft)

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	7.01 s	20 kts
-	37 kts	-	28 kts	7.38 s	19 kts
-	36 kts	-	27 kts	7.79 s	18 kts
-	35 kts	-	26 kts	8.24 s	17 kts
-	34 kts	-	25 kts	8.76 s	16 kts
-	33 kts	-	24 kts	9.34 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	6.8°	13.6°	20.7°	28.1°	36.1°	45.0°	55.6°	70.6°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	5.8°	11.7°	17.6°	23.8°	30.3°	37.3°	45.0°	53.9°	65.4°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	5.1°	10.2°	15.4°	20.7°	26.2°	32.0°	38.2°	45.0°	52.7°	62.2°	76.6°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	4.5	4.5°	9.0°	13.6°	18.3°	23.1°	28.1°	33.4°	39.0°	45.0°	51.8°	59.8°	70.6°	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	5.0	4.1°	8.1°	12.3°	16.4°	20.7°	25.1°	29.7°	34.5°	39.5°	45.0°	51.1°	58.1°	66.9°	82.0°	####	####	####	####	####	####	####	####	####	####	####	####	####
	5.5	3.7°	7.4°	11.1°	14.9°	18.8°	22.7°	26.8°	31.0°	35.4°	40.0°	45.0°	50.5°	56.7°	64.2°	74.7°	####	####	####	####	####	####	####	####	####	####	####	####
	6.0	3.4°	6.8°	10.2°	13.6°	17.1°	20.7°	24.4°	28.1°	32.0°	36.1°	40.4°	45.0°	50.0°	55.6°	62.2°	70.6°	####	####	####	####	####	####	####	####	####	####	####
	6.5	3.1°	6.2°	9.4°	12.6°	15.8°	19.1°	22.4°	25.8°	29.3°	33.0°	36.8°	40.8°	45.0°	49.6°	54.7°	60.5°	67.7°	78.4°	####	####	####	####	####	####	####	####	####
	7.0	2.9°	5.8°	8.7°	11.7°	14.6°	17.6°	20.7°	23.8°	27.0°	30.3°	33.8°	37.3°	41.1°	45.0°	49.3°	53.9°	59.2°	65.4°	73.7°	####	####	####	####	####	####	####	####
	7.5	2.7°	5.4°	8.1°	10.9°	13.6°	16.4°	19.3°	22.2°	25.1°	28.1°	31.2°	34.5°	37.8°	41.3°	45.0°	49.0°	53.3°	58.1°	63.6°	70.6°	82.0°	####	####	####	####	####	####
	8.0	2.5°	5.1°	7.6°	10.2°	12.8°	15.4°	18.0°	20.7°	23.4°	26.2°	29.1°	32.0°	35.1°	38.2°	41.5°	45.0°	48.7°	52.7°	57.1°	62.2°	68.2°	76.6°	####	####	####	####	####

10.01 s	14 kts
10.78 s	13 kts
11.68 s	12 kts
12.74 s	11 kts
14.02 s	10 kts
15.57 s	9 kts
17.52 s	8 kts
20.02 s	7 kts
23.36 s	6 kts
28.03 s	5 kts
35.04 s	4 kts
46.72 s	3 kts
70.08 s	2 kts
140.15 s	1 kts

# No. 13 Class Minesweeper

p.82

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,461m	5,844m	3	487m	1,948m	5	291m	1,169m	7	208m	835m
1.5	974m	3,896m	3.5	417m	1,670m	5.5	265m	1,062m	7.5	194m	779m
2	730m	2,922m	4	365m	1,461m	6	243m	974m	8	181m	730m
2.5	584m	2,338m	4.5	324m	1,299m	6.5	224m	899m	8.5	171m	687m

## Ship Recognition:



# Okinoshima Class Minelayer

<b>Class:</b>	Okinoshima		
<b>Type:</b>	Minelayer		
<b>Tonnage:</b>	4,400		
<b>Speed:</b>	20.0 kts		
<b>Length:</b>	123.4 m		
<b>Height:</b>	28.1 m		
<b>Draft:</b>	5.0 m		
<b>AOB Ratio:</b>	4.39 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	6.22 m	(20.4 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	11.99 s	20 kts
-	37 kts	-	28 kts	12.62 s	19 kts
-	36 kts	-	27 kts	13.33 s	18 kts
-	35 kts	-	26 kts	14.11 s	17 kts
-	34 kts	-	25 kts	14.99 s	16 kts
-	33 kts	-	24 kts	15.99 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	4.4°	8.7°	13.2°	17.7°	22.3°	27.1°	32.1°	37.4°	43.1°	49.4°	56.6°	65.6°	80.7°	####	####	####	####	####	####	####	####	####	####	####	####	####	####
	3.5	3.7°	7.5°	11.3°	15.1°	19.0°	23.0°	27.1°	31.4°	35.8°	40.6°	45.7°	51.3°	57.8°	65.6°	77.4°	####	####	####	####	####	####	####	####	####	####	####	####
	4.0	3.3°	6.5°	9.8°	13.2°	16.5°	20.0°	23.5°	27.1°	30.8°	34.7°	38.8°	43.1°	47.7°	52.8°	58.6°	65.6°	75.4°	####	####	####	####	####	####	####	####	####	####
	4.5	2.9°	5.8°	8.7°	11.7°	14.7°	17.7°	20.7°	23.9°	27.1°	30.4°	33.8°	37.4°	41.1°	45.1°	49.4°	54.1°	59.3°	65.6°	74.0°	####	####	####	####	####	####	####	####
	5.0	2.6°	5.2°	7.9°	10.5°	13.2°	15.9°	18.6°	21.4°	24.2°	27.1°	30.1°	33.1°	36.3°	39.6°	43.1°	46.8°	50.7°	55.1°	59.9°	65.6°	73.0°	####	####	####	####	####	####
	5.5	2.4°	4.7°	7.1°	9.5°	11.9°	14.4°	16.8°	19.3°	21.9°	24.5°	27.1°	29.8°	32.6°	35.4°	38.4°	41.5°	44.7°	48.2°	51.9°	55.9°	60.4°	65.6°	72.2°	83.5°	####	####	####
	6.0	2.2°	4.4°	6.5°	8.7°	10.9°	13.2°	15.4°	17.7°	20.0°	22.3°	24.7°	27.1°	29.6°	32.1°	34.7°	37.4°	40.2°	43.1°	46.1°	49.4°	52.8°	56.6°	60.8°	65.6°	71.6°	80.7°	####
	6.5	2.0°	4.0°	6.0°	8.1°	10.1°	12.1°	14.2°	16.3°	18.4°	20.5°	22.7°	24.9°	27.1°	29.4°	31.7°	34.1°	36.6°	39.1°	41.7°	44.5°	47.4°	50.4°	53.7°	57.2°	61.1°	65.6°	71.1°
	7.0	1.9°	3.7°	5.6°	7.5°	9.4°	11.3°	13.2°	15.1°	17.0°	19.0°	21.0°	23.0°	25.0°	27.1°	29.2°	31.4°	33.6°	35.8°	38.2°	40.6°	43.1°	45.7°	48.4°	51.3°	54.4°	57.8°	61.4°
	7.5	1.7°	3.5°	5.2°	7.0°	8.7°	10.5°	12.3°	14.1°	15.9°	17.7°	19.5°	21.4°	23.2°	25.2°	27.1°	29.1°	31.1°	33.1°	35.2°	37.4°	39.6°	41.9°	44.3°	46.8°	49.4°	52.1°	55.1°
	8.0	1.6°	3.3°	4.9°	6.5°	8.2°	9.8°	11.5°	13.2°	14.8°	16.5°	18.2°	20.0°	21.7°	23.5°	25.3°	27.1°	28.9°	30.8°	32.7°	34.7°	36.7°	38.8°	40.9°	43.1°	45.4°	47.7°	50.2°

17.13 s	14 kts
18.45 s	13 kts
19.99 s	12 kts
21.81 s	11 kts
23.99 s	10 kts
26.65 s	9 kts
29.98 s	8 kts
34.27 s	7 kts
39.98 s	6 kts
47.97 s	5 kts
59.97 s	4 kts
79.96 s	3 kts
119.94 s	2 kts
239.87 s	1 kts

# Okinoshima Class Minelayer

p.84

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,610m	6,440m	3	536m	2,147m	5	321m	1,288m	7	229m	920m
1.5	1,073m	4,293m	3.5	459m	1,840m	5.5	292m	1,171m	7.5	213m	858m
2	805m	3,220m	4	402m	1,610m	6	267m	1,073m	8	200m	805m
2.5	644m	2,576m	4.5	357m	1,431m	6.5	247m	991m	8.5	188m	757m

## Ship Recognition:



# Chitose Class Seaplane Tender

<b>Class:</b>	Chitose		
<b>Type:</b>	Seaplane Tender		
<b>Tonnage:</b>	11,200		
<b>Speed:</b>	28.9 kts		
<b>Length:</b>	192.5 m		
<b>Height:</b>	31.8 m		
<b>Draft:</b>	7.5 m		
<b>AOB Ratio:</b>	6.05 : 1		
<b>C-Depth:</b>	3.66 m	(12.0 ft)	
<b>I-Depth:</b>	8.72 m	(28.6 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	16.27 s	23 kts
-	40 kts	-	31 kts	17.01 s	22 kts
-	39 kts	-	30 kts	17.82 s	21 kts
-	38 kts	12.9 s	29 kts	18.71 s	20 kts
-	37 kts	13.36 s	28 kts	19.69 s	19 kts
-	36 kts	13.86 s	27 kts	20.79 s	18 kts
-	35 kts	14.39 s	26 kts	22.01 s	17 kts
-	34 kts	14.97 s	25 kts	23.39 s	16 kts
-	33 kts	15.59 s	24 kts	24.95 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	3.2°	6.3°	9.5°	12.7°	16.0°	19.3°	22.7°	26.1°	29.7°	33.4°	37.3°	41.4°	45.7°	50.4°	55.7°	61.8°	69.4°	82.4°	####	####	####	####	####	####	####	####	####
	3.5	2.7°	5.4°	8.1°	10.9°	13.7°	16.5°	19.3°	22.2°	25.1°	28.2°	31.3°	34.5°	37.8°	41.4°	45.1°	49.0°	53.4°	58.2°	63.7°	70.7°	82.4°	####	####	####	####	####	####
	4.0	2.4°	4.7°	7.1°	9.5°	11.9°	14.3°	16.8°	19.3°	21.8°	24.4°	27.0°	29.7°	32.5°	35.3°	38.3°	41.4°	44.6°	48.0°	51.7°	55.7°	60.1°	65.3°	71.8°	82.4°	####	####	####
	4.5	2.1°	4.2°	6.3°	8.4°	10.6°	12.7°	14.9°	17.1°	19.3°	21.5°	23.8°	26.1°	28.5°	30.9°	33.4°	36.0°	38.6°	41.4°	44.2°	47.2°	50.4°	53.9°	57.6°	61.8°	66.6°	72.6°	82.4°
	5.0	1.9°	3.8°	5.7°	7.6°	9.5°	11.4°	13.4°	15.3°	17.3°	19.3°	21.3°	23.4°	25.4°	27.6°	29.7°	31.9°	34.2°	36.5°	38.9°	41.4°	43.9°	46.6°	49.5°	52.5°	55.7°	59.2°	63.1°
	5.5	1.7°	3.4°	5.2°	6.9°	8.6°	10.4°	12.1°	13.9°	15.7°	17.5°	19.3°	21.1°	23.0°	24.9°	26.8°	28.7°	30.7°	32.7°	34.8°	36.9°	39.1°	41.4°	43.7°	46.1°	48.7°	51.3°	54.2°
	6.0	1.6°	3.2°	4.7°	6.3°	7.9°	9.5°	11.1°	12.7°	14.3°	16.0°	17.6°	19.3°	21.0°	22.7°	24.4°	26.1°	27.9°	29.7°	31.5°	33.4°	35.3°	37.3°	39.3°	41.4°	43.5°	45.7°	48.0°
	6.5	1.5°	2.9°	4.4°	5.8°	7.3°	8.8°	10.2°	11.7°	13.2°	14.7°	16.2°	17.8°	19.3°	20.8°	22.4°	24.0°	25.6°	27.2°	28.9°	30.6°	32.3°	34.0°	35.8°	37.6°	39.4°	41.4°	43.3°
	7.0	1.4°	2.7°	4.1°	5.4°	6.8°	8.1°	9.5°	10.9°	12.3°	13.7°	15.0°	16.5°	17.9°	19.3°	20.7°	22.2°	23.7°	25.1°	26.6°	28.2°	29.7°	31.3°	32.9°	34.5°	36.2°	37.8°	39.6°
	7.5	1.3°	2.5°	3.8°	5.1°	6.3°	7.6°	8.9°	10.1°	11.4°	12.7°	14.0°	15.3°	16.6°	18.0°	19.3°	20.6°	22.0°	23.4°	24.7°	26.1°	27.6°	29.0°	30.4°	31.9°	33.4°	34.9°	36.5°
	8.0	1.2°	2.4°	3.6°	4.7°	5.9°	7.1°	8.3°	9.5°	10.7°	11.9°	13.1°	14.3°	15.6°	16.8°	18.0°	19.3°	20.6°	21.8°	23.1°	24.4°	25.7°	27.0°	28.4°	29.7°	31.1°	32.5°	33.9°

26.73 s	14 kts
28.78 s	13 kts
31.18 s	12 kts
34.02 s	11 kts
37.42 s	10 kts
41.58 s	9 kts
46.77 s	8 kts
53.46 s	7 kts
62.37 s	6 kts
74.84 s	5 kts
93.55 s	4 kts
124.73 s	3 kts
187.1 s	2 kts
374.19 s	1 kts

# Chitose Class Seaplane Tender

p.86

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,822m	7,288m	3	607m	2,429m	5	363m	1,457m	7	259m	1,041m
1.5	1,214m	4,859m	3.5	520m	2,082m	5.5	330m	1,325m	7.5	242m	971m
2	911m	3,644m	4	455m	1,822m	6	303m	1,214m	8	226m	911m
2.5	728m	2,915m	4.5	404m	1,619m	6.5	279m	1,121m	8.5	213m	857m

## Ship Recognition:



# Atami Class Gunboat

<b>Class:</b>	Atami	
<b>Type:</b>	Gunboat	
<b>Tonnage:</b>	170	
<b>Speed:</b>	16.0 kts	
<b>Length:</b>	45.3 m	
<b>Height:</b>	19.8 m	
<b>Draft:</b>	1.4 m	
<b>AOB Ratio:</b>	2.29 : 1	
<b>C-Depth:</b>	1.83 m	(6.0 ft)
<b>I-Depth:</b>	2.62 m	(8.6 ft)

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	5.5 s	16 kts
-	33 kts	-	24 kts	5.87 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	8.4°	16.9°	25.9°	35.6°	46.8°	60.9°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	3.5	7.2°	14.5°	22.0°	30.0°	38.6°	48.5°	60.9°	87.5°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	4.0	6.3°	12.6°	19.1°	25.9°	33.1°	41.0°	49.9°	60.9°	79.6°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	4.5	5.6°	11.2°	16.9°	22.9°	29.1°	35.6°	42.8°	51.0°	60.9°	76.2°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	5.0	5.0°	10.1°	15.2°	20.5°	25.9°	31.6°	37.7°	44.4°	51.9°	60.9°	74.1°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	5.5	4.6°	9.1°	13.8°	18.5°	23.4°	28.5°	33.8°	39.5°	45.7°	52.6°	60.9°	72.5°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	6.0	4.2°	8.4°	12.6°	16.9°	21.4°	25.9°	30.7°	35.6°	41.0°	46.8°	53.3°	60.9°	71.3°	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	6.5	3.9°	7.7°	11.6°	15.6°	19.6°	23.8°	28.1°	32.5°	37.2°	42.3°	47.7°	53.8°	60.9°	70.3°	###	###	###	###	###	###	###	###	###	###	###	###	###
	7.0	3.6°	7.2°	10.8°	14.5°	18.2°	22.0°	25.9°	30.0°	34.2°	38.6°	43.4°	48.5°	54.3°	60.9°	69.5°	87.5°	###	###	###	###	###	###	###	###	###	###	###
	7.5	3.3°	6.7°	10.1°	13.5°	16.9°	20.5°	24.1°	27.8°	31.6°	35.6°	39.9°	44.4°	49.3°	54.7°	60.9°	68.8°	82.2°	###	###	###	###	###	###	###	###	###	###
	8.0	3.1°	6.3°	9.4°	12.6°	15.9°	19.1°	22.5°	25.9°	29.5°	33.1°	36.9°	41.0°	45.3°	49.9°	55.0°	60.9°	68.2°	79.6°	###	###	###	###	###	###	###	###	###

6.29 s	14 kts
6.77 s	13 kts
7.34 s	12 kts
8.01 s	11 kts
8.81 s	10 kts
9.78 s	9 kts
11.01 s	8 kts
12.58 s	7 kts
14.68 s	6 kts
17.61 s	5 kts
22.01 s	4 kts
29.35 s	3 kts
44.03 s	2 kts
88.06 s	1 kts



# Atami Class Gunboat

p.88

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,134m	4,538m	3	378m	1,513m	5	226m	907m	7	161m	648m
1.5	756m	3,025m	3.5	324m	1,296m	5.5	206m	825m	7.5	150m	605m
2	567m	2,269m	4	283m	1,134m	6	188m	756m	8	141m	567m
2.5	453m	1,815m	4.5	252m	1,008m	6.5	174m	698m	8.5	132m	534m

## Ship Recognition:



# Hira Class Gunboat

<b>Class:</b>	Hira		
<b>Type:</b>	Gunboat		
<b>Tonnage:</b>	305		
<b>Speed:</b>	16.0 kts		
<b>Length:</b>	56.0 m		
<b>Height:</b>	28.0 m		
<b>Draft:</b>	1.2 m		
<b>AOB Ratio:</b>	2.0 : 1		
<b>C-Depth:</b>	1.83 m	(6.0 ft)	
<b>I-Depth:</b>	2.42 m	(7.9 ft)	

Target Speed (in seconds)					
-	41 kts	-	32 kts	-	23 kts
-	40 kts	-	31 kts	-	22 kts
-	39 kts	-	30 kts	-	21 kts
-	38 kts	-	29 kts	-	20 kts
-	37 kts	-	28 kts	-	19 kts
-	36 kts	-	27 kts	-	18 kts
-	35 kts	-	26 kts	-	17 kts
-	34 kts	-	25 kts	6.8 s	16 kts
-	33 kts	-	24 kts	7.26 s	15 kts

AOB (target length in periscope marks)																												
Target Height		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	3.0	9.6°	19.5°	30.0°	41.8°	56.4°	90.0°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	3.5	8.2°	16.6°	25.4°	34.8°	45.6°	59.0°	90.0°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	4.0	7.2°	14.5°	22.0°	30.0°	38.7°	48.6°	61.0°	90.0°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	4.5	6.4°	12.8°	19.5°	26.4°	33.7°	41.8°	51.1°	62.7°	90.0°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	5.0	5.7°	11.5°	17.5°	23.6°	30.0°	36.9°	44.4°	53.1°	64.2°	90.0°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	5.5	5.2°	10.5°	15.8°	21.3°	27.0°	33.1°	39.5°	46.7°	54.9°	65.4°	90.0°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	6.0	4.8°	9.6°	14.5°	19.5°	24.6°	30.0°	35.7°	41.8°	48.6°	56.4°	66.4°	90.0°	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	6.5	4.4°	8.8°	13.3°	17.9°	22.6°	27.5°	32.6°	38.0°	43.8°	50.3°	57.8°	67.4°	90.0°	###	###	###	###	###	###	###	###	###	###	###	###	###	###
	7.0	4.1°	8.2°	12.4°	16.6°	20.9°	25.4°	30.0°	34.8°	40.0°	45.6°	51.8°	59.0°	68.2°	90.0°	###	###	###	###	###	###	###	###	###	###	###	###	###
	7.5	3.8°	7.7°	11.5°	15.5°	19.5°	23.6°	27.8°	32.2°	36.9°	41.8°	47.2°	53.1°	60.1°	69.0°	90.0°	###	###	###	###	###	###	###	###	###	###	###	###
	8.0	3.6°	7.2°	10.8°	14.5°	18.2°	22.0°	25.9°	30.0°	34.2°	38.7°	43.4°	48.6°	54.3°	61.0°	69.6°	90.0°	###	###	###	###	###	###	###	###	###	###	###

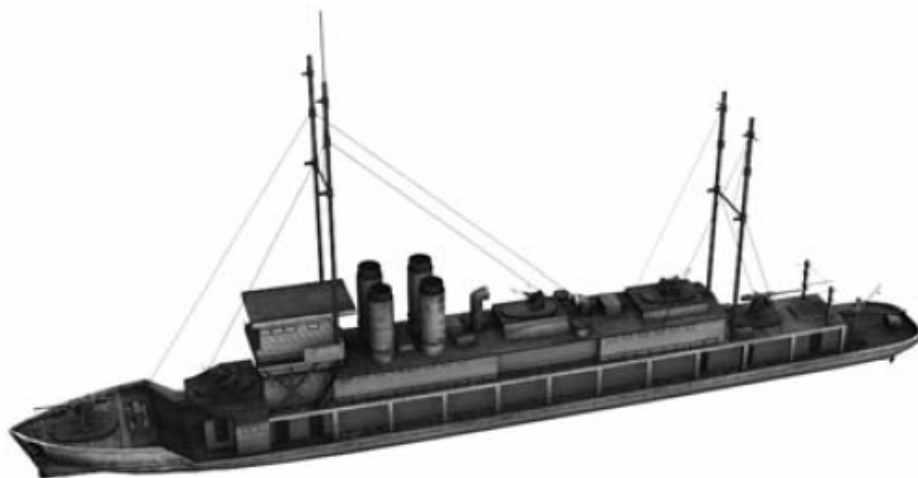
7.78 s	14 kts
8.37 s	13 kts
9.07 s	12 kts
9.9 s	11 kts
10.89 s	10 kts
12.1 s	9 kts
13.61 s	8 kts
15.55 s	7 kts
18.14 s	6 kts
21.77 s	5 kts
27.21 s	4 kts
36.29 s	3 kts
54.43 s	2 kts
108.86 s	1 kts

# Hira Class Gunboat

p.90

Range (Mast height in periscope marks)											
	Min	Max		Min	Max		Min	Max		Min	Max
1	1,604m	6,417m	3	534m	2,139m	5	320m	1,283m	7	228m	916m
1.5	1,069m	4,278m	3.5	458m	1,833m	5.5	291m	1,167m	7.5	213m	855m
2	802m	3,208m	4	400m	1,604m	6	266m	1,069m	8	199m	802m
2.5	641m	2,567m	4.5	356m	1,426m	6.5	246m	987m	8.5	187m	755m

## Ship Recognition:



Distance to Target (meters or yards)	3,000	52	105	157	210	262	315	368	422	475	529	583	638	693	748	804	860	917	975	1,033	1,092
	2,900	51	101	152	203	254	305	356	408	459	511	564	616	670	723	777	832	887	942	999	1,056
	2,800	49	98	147	196	245	294	344	394	443	494	544	595	646	698	750	803	856	910	964	1,019
	2,700	47	94	142	189	236	284	332	379	428	476	525	574	623	673	723	774	825	877	930	983
	2,600	45	91	136	182	227	273	319	365	412	458	505	553	600	648	697	746	795	845	895	946
	2,500	44	87	131	175	219	263	307	351	396	441	486	531	577	623	670	717	764	812	861	910
	2,400	42	84	126	168	210	252	295	337	380	423	467	510	554	598	643	688	734	780	826	874
	2,300	40	80	121	161	201	242	282	323	364	406	447	489	531	573	616	660	703	747	792	837
	2,200	38	77	115	154	192	231	270	309	348	388	428	468	508	549	589	631	673	715	758	801
	2,100	37	73	110	147	184	221	258	295	333	370	408	446	485	524	563	602	642	682	723	764
	2,000	35	70	105	140	175	210	246	281	317	353	389	425	462	499	536	573	611	650	689	728
	1,900	33	66	100	133	166	200	233	267	301	335	369	404	439	474	509	545	581	617	654	692
	1,800	31	63	94	126	157	189	221	253	285	317	350	383	416	449	482	516	550	585	620	655
	1,700	30	59	89	119	149	179	209	239	269	300	330	361	392	424	456	487	520	552	585	619
	1,600	28	56	84	112	140	168	196	225	253	282	311	340	369	399	429	459	489	520	551	582
	1,500	26	52	79	105	131	158	184	211	238	264	292	319	346	374	402	430	459	487	516	546
	1,400	24	49	73	98	122	147	172	197	222	247	272	298	323	349	375	401	428	455	482	510
	1,300	23	45	68	91	114	137	160	183	206	229	253	276	300	324	348	373	397	422	448	473
	1,200	21	42	63	84	105	126	147	169	190	212	233	255	277	299	322	344	367	390	413	437
	1,100	19	38	58	77	96	116	135	155	174	194	214	234	254	274	295	315	336	357	379	400
	1,000	17	35	52	70	87	105	123	141	158	176	194	213	231	249	268	287	306	325	344	364
	900	16	31	47	63	79	95	111	126	143	159	175	191	208	224	241	258	275	292	310	328
	800	14	28	42	56	70	84	98	112	127	141	156	170	185	199	214	229	245	260	275	291
	700	12	24	37	49	61	74	86	98	111	123	136	149	162	175	188	201	214	227	241	255
	600	10	21	31	42	52	63	74	84	95	106	117	128	139	150	161	172	183	195	207	218
	500	9	17	26	35	44	53	61	70	79	88	97	106	115	125	134	143	153	162	172	182
	400	7	14	21	28	35	42	49	56	63	71	78	85	92	100	107	115	122	130	138	146
	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	
Torpedo Spread (degrees)																					

## Note from the Author

This book was created due to a need to have quick access to constantly referenced information. When playing Silent Hunter 4, I found that much time was spent pausing the game to calculate out various figures (such as speed and AOB). While the various formulas provided by the game playing community were useful when dealing with manual targeting, they were slow and prone to human error.

What I wanted in a document was quick access to the data I needed with as little pause time as possible. What I found by playing Silent Hunter 4 was target solutions need only be accurate enough to get a torpedo and target to meet at the same place. I found that using tables of precalculated data I could obtain reasonably accurate targeting data without having to pause the game to recalculate the variables every few minutes.

The Imperial Navy Ship Recognition Manual has extensive data for all the ships available in the game. Numerous tables allow you to observe the target and obtain a firing solution in as little as a few seconds, all without having to compute complex mathematical calculations. I have also tried to make it as easy and intuitive to use as possible to make obtaining a firing solution even quicker.

The Imperial Navy Ship Recognition Manual is constantly being updated and refined. I would appreciate any assistance the fans of this document wish to offer. While much of this document is created through automatic formulas, but that is not to say there are no errors. If you see an error please send me an email at [centred@yahoo.com](mailto:centred@yahoo.com) or if you wish to obtain the most current version of this manual (or for any other reason!).

I hope this manual increases your enjoyment in playing this great game. Happy Hunting!

**Centred75**

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