

1. GENERAL INFORMATION

UNIT CONVERSION TABLE & FORMULAS

1nmi=1852m / 1000m=0.54nm | 1nmi=2025yds / 1000yds=0.49nm | 1m=3,28ft / 1ft=0.31m
 Time to Target=Distance+Speed*60 | Six Minute Rule: Distance(Yards/Meters) in 6/16min=Speed(kts)*200/500
 Periscope Optic Range Estimation: Range=Height/Length(@90°AOB)*1000+mrad

PERISCOPE TARGET COURSE ESTIMATION

1. If Bearing <180° then add 180°; If Bearing >180° then subtract 180°
2. If Bearing <180° and if Stbd aspect add AOB, if Port aspect subtract AOB
 If Bearing >180° and if Port aspect add AOB, if Stbd aspect subtract AOB
3. If >360° then subtract 360°

2. SUBMARINE LAUNCHED WEAPONS ADVANCED SETTINGS

TORPEDO SEARCH PATTERN SETTINGS

I: MK-48ADCAP, SPEARFISH

MODE 0 Straight/Circle, seeker cone begins Stbd Set: SNAKE/CIRCLE FLOOR 0100
 MODE 1 Straight/Circle, seeker cone begins Port Set: SNAKE/CIRCLE FLOOR 1100
 MODE 2 Straight, seeker cone straight ahead Set: SNAKE FLOOR 2100

II: UGST, DM2A4, BLACK SHARK

MODE 0 Port side Narrow Snake/Circle Set: SNAKE/CIRCLE FLOOR 0100
 MODE 1 Stbd side Narrow Snake/Circle Set: SNAKE/CIRCLE FLOOR 1100
 MODE 2 Port side Wide Snake/Circle Set: SNAKE/CIRCLE FLOOR 2100
 MODE 3 Stbd side Wide Snake/Circle Set: SNAKE/CIRCLE FLOOR 3100
 MODE 4 Straight Set: SNAKE/CIRCLE FLOOR 4100

TORPEDO ASW/ASuW TARGET DISCRIMINATION MODE SETTINGS

MK-48ADCAP, UGST, USET-80, TEST-71M, SPEARFISH, DM2A4, BLACK SHARK, F17M2, A184M3, YU-6
 MODE ASW&ASuW Set: CEILING 2m/9ft
 MODE ASuW Set: CEILING 3m/10ft
 MODE ASW Set: CEILING ≥4m/11ft

TORPEDO WAKE HOMING/PASSIVE HOMING TOGGLE SETTINGS

UGST, USET-80, TEST-71M, DM2A4, BLACK SHARK, F17M2, YU-6
 MODE Wake Homing Set: PASSIVE; DEPTH ≤10
 MODE Passive Set: PASSIVE; DEPTH ≥11

ROCKET TORPEDO SETTINGS

SHKVAL, BARRACUDA
 MODE 0 MAD Sensor Enable Set: DEPTH 0100
 MODE 1 Detonation at Specific Range Set: DEPTH 1100

SPECIAL UNIT SETTINGS

MG-74 KORUND
 MAX RANGE: 20nm @35kts / 40nm @1kts

I. AUTONOMOUS MODE:

MODE 1 Constant Course and Speed Set: SNAKE + ACTIVE
 MODE 2 Sprint and Drift Set: SNAKE + PASSIVE
 MODE 3 Circle Set: CIRCLE + ANY

SNAPSHOT BEARING: Transit Course
 RUN TO ENABLE: Range to Enable MODE
 DEPTH: Depth after MODE activation (NOT VALID: 0011, 0111, 0211, 0311, 0411, 0511)
 SPEED: Transit Speed
 CEILING: MODE Speed/Sprint Speed

II. WIRE GUIDED MODE:

DEPTH: Set MODE; VALID ONLY 0011, 0111, 0211, 0311, 0411, 0511
 CEILING: Upper Depth
 FLOOR: Lower Depth

SPEED CONTROL Button: PREENABLE Set: ACTIVE/PASSIVE Constant/Variable Speed	DEPTH & SONAR CONTROL Button: ENABLE
MODE 1: 05Kts (02Kts) / 03-08Kts (01-05Kts) MODE 2: 10Kts (05kts) / 10-17Kts (06-09Kts) MODE 3: 20Kts (10kts) / 20-29Kts (10-15Kts) MODE 4: 35KTS (17kts) / 35Kts (17Kts) MODE 5: 0Kts (0kts) / 0Kts (0Kts)	MODE 1: Move to Upper Depth MODE 2: Move to Lower Depth MODE 3: Activate Active Sonar MODE 4: Disable Active Sonar MODE 5: Return to launch Depth

UUV

MAX. OPERATING TIME: 50min@3kts/10min@15kts, MAX. OPERATING DEPTH: 530m/1739ft

SNAPSHOT=Set Course
RUN TO ENABLE=Preset Distance to Sensor activation
SPEED=Preset cruise speed (3-15kts)
DEPTH=Preset search Depth
CEILING=Preset Depth change delay, true if value ≤5m/15ft
FLOOR=Search Speed Active Mode, true if set 20xx(xx=05-15knots)

MODE ACTIVE Set: ACTIVE CIRCLE
MODE ACTIVE&PASSIVE Set: ACTIVE SNAKE
MODE PASSIVE Set: PASSIVE SNAKE/CIRCLE

SUBROC TORPEDO SEARCH MODE SETTINGS

UUM-125, SS-N-27ASW, SS-N-16, SS-N-15, CY-1

MODE 1 Active below Layer Set: RUN TO ENABLE 00010
MODE 2 Active above Layer Set: RUN TO ENABLE 00110
MODE 3 Passive below Layer Set: RUN TO ENABLE 00210
MODE 4 Passive above Layer Set: RUN TO ENABLE 00310

UNDERWATER MISSILE SETTINGS

UGM-109D LAM, SS-N-27 LAM, SS-N-27 SIZZLER ASM, SS-N-21 LAM, SCALP LAM, CJ-10 LAM

Attack Waypoint Set: DESTRUCT RANGE 000X (Value 1-5[1-4 for ASM])

ASURA

High Cruise Set: DESTRUCT RANGE ≥44nm
Low Cruise Set: DESTRUCT RANGE ≤43nm (max Range: 43nm/80km)

3. ADVANCED SHIPBORNE / AIRBORNE TORPEDO & MISSILE SETTINGS

TORPEDO SEARCH PATTERN SETTINGS

Mk-54, MK-50, MK-46, APR-3E*, APR-2E*, MPT-1UE, L5, MU-90

	Imp.	Metric
MODE 0 Port side Narrow Snake/Circle	Set: SNAKE/CIRCLE FLOOR 01000	0100
MODE 1 Stbd side Narrow Snake/Circle	Set: SNAKE/CIRCLE FLOOR 11000	1100
MODE 2 Port side Wide Snake/Circle	Set: SNAKE/CIRCLE FLOOR 21000	2100
MODE 3 Stbd side Wide Snake/Circle	Set: SNAKE/CIRCLE FLOOR 31000	3100
MODE 4 Straight (MK-54, MK-50, MK-46)	Set: SNAKE/CIRCLE FLOOR 32555	5555
MODE 4 Straight (MPT-1, L5)	Set: SNAKE/CIRCLE FLOOR -	5555
MODE 4 Straight (MU-90)	Set: SNAKE/CIRCLE FLOOR -	9987
MODE HELIX SEARCH (APR-3E, APR-2E)	Set: RTE	≥0001

*APR-3E/APR-2E Circle Search Pattern ONLY; Set SNAKE=shallow spiral, Set CIRCLE=steep spiral.

SHIPBORNE MISSILE SETTINGS

SS-N-14, MILAS

MODE ASW Set: WAYPOINT "F" <5000m away from Ownship
MODE ASuW Set: WAYPOINT "F" >5000m away from Ownship

4. SHIPBOARD ADVANCED HELO CONTROL SETTINGS

MODE 1 Transit MAD, ESM, VISUAL search; Act/Pass search on last waypoint Set: W-W-W-W
Enable Auto Attack Mode Set: W-T-W-W

MODE 2 Transit MAD, ESM, VISUAL search; Act/Pass search on every waypoint Set: W-W-W-T
Enable Auto Attack Mode Set: W-T-W-T

MODE 3 Transit MAD, ESM, VISUAL search; Passive search on last waypoint Set: W-W-T-W
Enable Auto Attack Mode Set: W-T-T-W

MODE 4 Transit MAD, ESM, VISUAL search; Passive search on every waypoint Set: W-W-T-T
Enable Auto Attack Mode Set: W-T-T-T

MODE 5 Long Distant Radar Search; ALT: 10kft/4km Speed: 40kts Set: T-T-T-T
Set Speed: 84-90kts Set: T-W-T-T

MODE 6 Radar Search; ALT: 6.5kft/2km Speed: 50kts Set: T-T-T-W
Set Speed: 99-105kts Set: T-W-T-W

MODE 7 Radar Search; ALT: 3.2kft/1km Speed: 60kts Set: T-T-W-T
Set Speed: 113-120kts Set: T-W-W-T

MODE 8 Radar Search; ALT: 1.6kft/0.5km Speed: 65kts Set: T-T-W-W
Set Speed: 122-130kts Set: T-W-W-W

To Delete Helo Program, drag the FIRST Waypoint to the far end (220nm)

5. AIR DROPPED DEPTH BOMB AND MINE DEPTH SETTINGS

MK-11, PLAB-250, PLAB-500, WE-177	1000lb MINE	PMK-2
Surface Set: DEPTH 27m / 90ft Shallow Set: DEPTH 122m / 400ft Deep Set: DEPTH 305m / 1000ft Bottom Set: Depth 656m / 2152ft	Surface Set: DEPTH 27m / 90ft Shallow Set: DEPTH 122m / 400ft Max. Depth & Bottom Set: DEPTH 183m / 600ft	Surface Set: DEPTH 27m Shallow Set: DEPTH 122m Bottom Set: DEPTH 450m Max. Bottom Set: DEPTH 1000m

6. TORPEDO CAPABILITIES TABLES

SUBMARINE LAUNCHED TORPEDOS

	MK48 ADCAP	MK48 MOD4	MK48 MOD1	UGST	USET 80K	USET 80	TEST 71M	62-76	53-65M	53-65K	SHKVAL	SPEAR FISH	TIGER FISH	DM2A4	BARRA CUDA	BLACK SHARK	A184 M3	A184	F17 Mod2	Type89	Yu-6
ASW	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	x	x
ASuW	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
MD*	x			x	x	x	x					x		x		x	x		x		x
Act	x	x	x	x	x	x	x					x	x	x		x	x	x	x	x	x
Pass	x	x	x	x	x	x	x					x	x	x		x	x	x	x	x	x
Wake				x	x	x	x	x	x	x				x		x					x
MAD											x				x						
Wire	x	x	x	x			x					x	x	x		x	x	x	x	x	x
Snake			x	x	x	x	x					x	x			x	x	x	x	x	x
Circle	x	x	x	x	x	x	x					x	x	x		x	x	x	x	x	x
Strait	x	x		x				x	x	x	x	x		x	x	x					
TRL*	x	x	x	x	x	x	x					x		x		x	x	x	x	x	x
DRL*	x	x	x	x	x	x						x		x		x	x		x	x	x
VSD*	x	x		x			x					x		x		x			x		x
S1*	40-55	40-55	40-55	30-50	35-50	30-48	26-40	-	-	-	200	29-70	24-35	30-50	194	35-50	30-45	24/36	30-40	35-55	40-65
S1A*	55	55	55	50	50	48	40	-	-	-	-	70	35	50	-	50	45	36	40	55	65
S2*	40-45	40-45	40-45	30-35	35-40	30-35	26	35/50	40/70	45	-	29-35	24-29	30-35	-	35-40	30-35	24	30-35	35-40	40-45
S2A*	50	50	50	40	45	40	36	50	70	45	-	45	34	40	-	45	40	36	40	35	50
Range Max.S	21nm 42ky	17nm 34ky	14nm 28ky	17nm 31km	9nm 17km	7nm 14km	8nm 15km	27nm 50km	8nm 15km	10nm 19km	6nm 11km	13nm 23km	12nm 22km	21nm 38km	6nm 11km	16nm 30km	12nm 22km	9nm 17km	10nm 19km	15nm 28km	17nm 32km
Range Min.S	27nm 54ky	23nm 45ky	21nm 42ky	22nm 40km	12nm 22km	10nm 18km	14nm 25km	54nm 100km	12nm 22km	-	-	35nm 65km	19nm 35km	30nm 56km	-	27nm 50km	18nm 33km	13nm 25km	11nm 20km	21nm 39km	24nm 45km
Depth	2499ft 762m	2250ft 686m	2099ft 640m	1689ft 515m	3280ft 1000m	3280ft 1000m	1312ft 400m	1722ft 480m	1007ft 307m	722ft 220m	1430ft 436m	2953ft 900m	1450ft 442m	1500ft 457m	984ft 300m	2706ft 825m	1968ft 600m	1640ft 500m	1968ft 600m	2099ft 640m	1968ft 600m

* MD=Mode Discrimination, Torpedo can toggle between ASW,ASuW and ASW+ASuW mode; TRL=Torpedo Reattack Logic; DLR=Decoy Recognition Logic; VSD=Variable Search Depth; S1=Speed Range & Active Search Speed Range; S1A=Active Attack Speed; S2=Passive Search Speed Range; S2A=Passive Attack Speed

SHIP, AIR, SUBROC & LEGACY SUBMARINE LAUNCHED TORPEDOS

	Mk-54	Mk-50	Mk-46	APR-3	APR-2	MPT-1UE	UMGT-1	AT-2UM	L5	MU-90	MK-37 MOD0	Mk-37 MOD1	MK-37C	SET-53M	SEAT-60M	SET-65 (Yu-3)
ASW	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ASuW	x						x	x		x		x	x		x	(x)
Act	x	x	x	x	x	x	x	x	x	x	1	1	x		x	x
Pass	x	x	x	x	x	x	x	x	x	x	1	1	x	x	x	x
Wire													x 2	x		
Snake	x	x	x				x	x	x	x	x	x	x	x	x	x
Circle	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Strait	x	x	x				x			x						
Helix				x	x											
TRL		x	x						x	x			x			
DRL										x			x			
S1	30-50	35-55	30-45	35	35	30-45	25-41	23-40	20-35	29-50	17-26	16-24	20-33	-	35-43	30-40
S1A	50	55	45	65	62	45	41	40	35	50	17-26	16-24	33	-	43	40
S2	30-35	35-40	30-35	35	35	30-35	N/A	23-28	20-25	29-34	-	-	20-25	29	N/A	30-35
S2A	40	45	40	65	62	40	N/A	33	30	39	-	-	30	29	N/A	40
Range Max.S	7nm 14ky	5nm 10ky	4.5nm 9ky	1.8nm 3.3km	1.6nm 3km	5.6nm 10km	4.9nm 9km	4.5 10.5km	3.8nm 7km	6nm 11km	4.9nm 9.9ky	3.9nm 7.8ky	10nm 20ky	8nm 14km	7nm 13km	6nm 11km
Range Min.S	9nm 18ky	7nm 14ky	6nm 12ky	2.9nm 5.5km	2.3nm 4.3km	8nm 15km	7nm 13km	5.6nm 8km	5nm 9km	12nm 23km	11.3nm 22.8ky	8.9nm 18ky	19nm 38ky	-	8.5nm 15.7km	8nm 15km
Depth	1722ft 525m	3608ft 1200m	1500ft 457m	2624ft 800m	2148ft 655m	2325ft 717m	1640ft 500m	1312ft 400m	1640ft 500m	3280ft 1000m	990ft 300m	990ft 300m	990ft 300m	656ft 200m	984m 300m	1433ft 437m

1 MK-37 MOD0/1 Passive search only, active search only in terminal attack phase.
2 MK-37 MOD1 Wire-guidance only in PREENABLE mode.

7. SUBMARINE LAUNCHED MISSILE / MINE / UNDERWATER SPECIAL FORCES RANGE AND LAUNCH DEPTH TABLE

COMBAT DIVERS	4mm @3kts 7.4km	131ft 40m
SIRENA	8mm @5kts 14.8km	40m
Mk-8 SDV	7mm @8kts 14ky	187ft
SMDM	10mm @42kts 18km	220m
Mk-60	N/A	2998ft 914m
SIAM	8.6mm @20kts 16km	354ft 109m
CY-1	15mm 27km	40-50m
SS-N-15	19mm 35km	40-60m
SS-N-16	54mm 100km	40-150m
SS-N-27 ASW	27mm 50km	14-100m
UUM-44	30mm 61ky	150ft
UUM-125B	35mm 71ky	150ft
CJ-10	810mm	40-50m
SCALP	542mm	4m
SS-N-21	1620mm	40-60m
SS-N-27 LAM	1350mm	14-100m
UGM-109D	1400mm	150ft
C-802	65mm 120km	40-50m
IDAS	12mm 22km	11-25m
EXOCET	35mm 64km	50m
ASURA	81mm 150km	50m
SS-N-19	300mm 566km	20-60m
SS-N-22	65mm 120km	20-40m
SS-N-27 CLUB	162mm 300km	14-100m
SS-N-27 SIZZLER	120mm 222km	14-100m
UGM-84	70mm 141ky	150ft 46m
UGM-109B	250mm 506ky	150ft

8. SHIPBORNE / AIRBORNE MISSILE RANGE AND TARGET TABLE

	SM-1MR	AIM-9	AGM-64E	AGM-84E	AGM-84H	AGM-88	AGM-114	AGM-119B	SA-N-9	SS-N-14	SS-N-25	SS-N-X-26	Kh-65	9M120	Aster-30	MARTE-ER	MILAS ASuW	MILAS ASW
Air	x	x							x					x	x			
Surf	x		x	x		x	x	x	x	x	x	x	x	x		x	x	
Sub										x								x
Land			x		x	x	x						x	x				
Range	21nm 42ky	9.7nm 18km	12nm 24ky	150nm 303ky	155nm 314ky	33nm 67ky	4.9nm 9.9ky	22nm 44ky	8nm 15km	30nm 55km	70nm 130km	161nm 298km	1620nm 3000km	5.3nm 10.2km	54nm 100km	52nm 96km	81nm 150km	32nm 60km

9. NARROWBAND SONAR FREQUENCY TABLE

1. Type	2. Tonnage	3. Propulsion																																	
		Vessels	Torpedos	≥41000t	35000-40999t	25000-34999t	21000-24999t	18000-20999t	15000-17999t	12000-14999t	9000-11999t	6000-8999t	3000-5999t	2000-2999t	1000-1999t	500-999t	≤499t	Surf. Steam	Sub. Nuke	Sub. Diesel	Surf. Diesel	Sub. Airp	CODOG	CODAG	CODAG	Gas Turbine	Torp. Gas.	Torp. HRP	Torp. Elec.	Pump Jet Surf.	ACTUV	Pump Jet Sub.	APR/Shkval	DSRV	
		50/60 Hz	55/65 Hz	100 Hz	115 Hz	130 Hz	145 Hz	160 Hz	175 Hz	190 Hz	205 Hz	220 Hz	235 Hz	250 Hz	265 Hz	280 Hz	295 Hz	310 Hz	325 Hz	340 Hz	355 Hz	370 Hz	385 Hz	400 Hz	415 Hz	430 Hz	445 Hz	460 Hz	475 Hz	490 Hz	505 Hz	520 Hz	535 Hz	550 Hz	565 Hz

10. SONOBUOYS TABLE

BUOY TYPE	ACOUSTIC TYPE	FREQUENCY	MAX. RANGE	LIFESPAN	SHALLOW DEPTH	DEEP DEPTH
VLAD	PASS	0-100Hz	20nm 40.5ky	4 Hrs	600ft	1200ft
RGB 75	PASS	0-100Hz	20nm 37km	4 Hrs	100m	400m
DIFAR	PASS	75-2400Hz	65nm 132ky	2 Hrs	90ft	400ft
RGB 25	PASS	75-2400Hz	65nm 120km	2 Hrs	20m	200m
DICASS	PASS	0-2400Hz	6.5nm 13.2ky	2 Hrs	90ft	800ft
RGB 55	PASS	0-2400Hz	6.5nm 12km	2 Hrs	20m	200m
DICASS	ACT	10000Hz	7.4nm 14.9ky	2 Hrs	90ft	800ft
RGB 55	ACT	8000Hz	5.4nm 10km	2 Hrs	20m	200m

11. ADDITIONAL SUBMARINE LAUNCHED WEAPON SETTINGS

UNDERWATER LAUNCHED MISSILE SETTINGS

SS-N-19

MODE 0 Aim at priority targets in Battle Group
 MODE 1 Aim at random targets in Battle Group
 MODE 2 Aim at single target
 MODE 3 Aim at unique class
 MODE 4 Aim at unique ship

Set: DESTRICT RANGE 0050
 Set: DESTRICT RANGE 1050
 Set: DESTRICT RANGE 2050
 Set: DESTRICT RANGE 3XXX (XXX Set Class ID)
 Set: DESTRICT RANGE 4XXX (XXX Set Ship ID)