## **APPENDIX K - Worksheets**

The following pages provide worksheets to assist in calculating various SAR related problems.

Worksheet 1: Coastal Search Planning

Worksheet 2: Maritime Area
Worksheet 3: Land Area
Land Area
Search Radius
Worksheet 5: Sector Search
Worksheet 6: Aircraft Allocation
Worksheet 7 Maritime Area
Maritime Area
Land Area
Aircraft Allocation
Maritime Allocation

Worksheet 8 Maritime Area (Searching from ship)

Worksheet 1: Maritime Plan	nning	I									
INCIDENT											
Search target (description):											
LKP (lat/long):											
@ Time (UTC):											
Hours of drift (a):											
SEA CURRENT											
Sea / tidal current/knots:					° (T)				knots		
Sea Current vector/distance:		0	(T)		knot	ts x			(a)hrs =		nm
SURFACE WIND and CALCULATION	OF WI	ND CURR	ENT								
Surface winds/knots		° (	Γ)		knots	W	ind ( - 3	Current Di 30° for LKI	vergence = P greater th	Reciprocal S nan 10° South	Surface Wind Latitude
Reciprocal of Surface Winds/Knots (b)		° (	T)		knots	- 30° T =			° (T)		knots
Wind current vector: (use reciprocal bearing and divergence (Figure I-1)		(;	a) hours	s x		knots (F	igur	e I-1) =		° (T)	nm
TARGET LEEWAY											
Leeway Angles (divergence) (Table I.1 or I.2):	Red	ciprocal S	urface	Wir	Wind (b) °(T)		±			°(T)	
Leeway vector: (LW)	LV	/ (L) -			° (T) L		L W (R)	+		° (T)	
Leeway speed: (knots) = (Multiplier x Wind Speed) ± Modifier (Table I.1 or I.2)	[	M	ultiplier	x Wind Speed =			]	±	Modifier=		
Leeway distance:	(Le	eway spee	ed	x (a)				hrs =		nm	
DRIFT ERROR											
Distance (L)			nm			Dista	nce (	(R)			nm
d <sub>e</sub> (L):(12.5 to 33% of Distance L)			nm			:(12.5 to 3	3% (	of Distance	e R)		nm
Distance nm Left/Right =	De = ]	de (L) + de	e (R) +	Dista 2	ance L/R]	_	[	De =			
FIX ERRORS											
Distress craft error (x): (Table J.1, J.2 o	r J.3)							nm			
Search craft error (y): (Table J.1, J.2 c	r J.3)							nm			
TOTAL ERROR (E)											
Total probable error (E): $E=\sqrt{(De^2+x^2+c^2)}$	+ y <sup>2</sup> )		E =								
SEARCH AREA		T									
Safety factor (circle) (fs)		1.1	1.6	6	2.0	2.3		2.5			
Search radius (E x fs)					n	m					
Search radius rounded up to whole figu	re:					m					
Search area:					n	m <sup>2</sup>					

	Appendix K – Wo	orksheets							
Incident Reference	Search an	d Rescue	ime)		oiled By/ .				
Search Platform .		Search Platform	TAS		Search O	oject			
MET Visibility	KM	Wind/	Kts			actor: Yes			
Search Height (		500 ft	1000 ft		1500 ft		00 ft		
Uncorrected Sweep		NM		NM	1	NM		NM	
Maritime: Weather ( ( <b>Fw</b> ) - <u>Table I-7</u>	Correction Factor								
Speed Correction F a) Aircraft searching from Table I-8 b) Searches by vest	g over water use <b>Fs</b>								
Fatigue Correction I	Factor ( <b>Ff)</b> if crew nificant fatigue enter								
Sweep Width Facto	r <b>W</b> = Wu.Fw.Fs.Ff								
Practical Track Spa	cing <b>S</b> (NM)								
Coverage Factor C	= W/S								
Probability of Detec	tion (POD)								
Search Area A (SQ	NM)								
Search Hours (T) R (V) T = A/VS	equired at 120 KTS								
		20 KTS (			(A = TVS	C = W		= W/C)	
A	SQ. NM S	NM	С		Р		%	FOR	SEARCH
B. Modified	SQ. NM S	d Track Spacing in Av	vailable Hours		Р		%	FOR	SEARCH
		nek Spacing in Availa			1		/0		OLANOIT

Α.	Whole Area Calcula	ated a	t a Search Height of	١	$\dots$ FI $(A = IV)$	S = VV/S	S = VV/C	
Α	SQ. NM	S	NM	С	Р	%	FOR	SEARCH
В.	Modified Area at Cald	culated	Track Spacing in Ava	ilable Hour	S			
Α	SQ. NM	S	NM	С	Р	%	FOR	SEARCH
C.	Whole Area at Modifi	ed Tra	ck Spacing in Availabl	e Hours				
Α	SQ. NM	S	NM	C	P	%	FOR	SEARCH
D.	Compromise Area a	nd Mod	dified Practical Track S	Spacing in A	vailable Hours			
(i) A	SQ. NM	S	NM	С	Р	%	FOR	SEARCH
(ii) A	SQ. NM	S	NM	С	Р	%	FOR	SEARCH
(iii) A	SQ. NM	S	NM	С	Р	%	FOR	SEARCH
(iv) A	SQ. NM	S	NM	С	Р	%	FOR	SEARCH

Mark selected variables with \*

Incid	ent
Refe	rence

## **Search and Rescue**

Worksheet No. 3 (Land)

Compiled By	y
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Date ...... / ...... / ......

Search Object KM	·	Fatigue Factor: Yes or No Vegetation: 15-60 60-85 +85						
Search Height (AGL)	500 ft		1000 ft		1500 ft		2000 ft	
Uncorrected Sweep Width (Wu) - <u>Table I-9</u>		NM		NM		NM		NM
Searches over land: use Terrain/Vegetation Correction Factor (Fv) - Table I-10								
Fatigue Correction Factor (Ff) if crew will be suffering significant fatigue enter 0.9, Otherwise enter 1.0								
Sweep Width Factor W = Wu.Fv.Ff								
Practical Track Spacing S (NM)								
Coverage Factor C = W/S								
Probability of Detection (POD)								
Search Area A (SQ NM)								
Search Hours (T) Required at 120 KTS (V) T = A/VS								
Total Search Hours Available at 120 KTS (								
A. Whole Area Calculated at a Search Height of A SQ. NM S N		FT C	(A = TVS	C = W	/S S = W/		FOR	SEARCH
Modified Area at Calculated Track Spacing i	in Availa	able Hours						
A SQ. NM S N		С		Р		% I	FOR	SEARCH
C. Whole Area at Modified Track Spacing in Av	/ailable	Hours						
A SQ. NM S N	M	С		Р		% I	FOR	SEARCH
D. Compromise Area and Modified Practical T	rack Sp	pacing in Availa	able Hours					
(i) A SQ. NM S N	М	С		Р		% I	FOR	SEARCH
A SQ. NM S N	М	С		Р		% I	-OR	SEARCH
A SQ. NM S N	M (	С		Р		% I	FOR	SEARCH
A SQ. NM S N	Q. NM S NM C					% I	-OR	SEARCH
Mark selected variables with *								

Incident Reference	Search and Ro	ch and Rescue			Compiled By						
	Worksheet No	o. 4 (Searcl	n Radius)	Date /	/						
Reported Distress Posi	tion	1. Las	Positive Fix		Search No.		Distress Craft Callsign/Identity				
	. S		Reported Posn			puted UTC					
	. E		sed position			arch No					
Time	UTC	4. Nex	t Posn or Dest .			puted  Commenced UTC					
		Position	А		В	С	D				
Track distance since last Pos	sitive Fix	(Tr)									
Distress Craft Position Error	(Fix+10%Tr)	(x)									
Search Draft Navigation Erro	r	(y)	<u></u>	<u></u> <u></u>							
Probable Error of Position		(e)	\			V	V				
$e = \sqrt{x^2 + y^2}$											
Safety Factor for this search (1.1; 1.6; 2.0; 2.3; 2.5)	,	(fs)									
Search Radius (R) = (e) x	(fs)	(R)									
Rounded up Radius											

Incident Reference	Sear	ch an	d Res	scue	Compiled By								
	Worl	ksheet	No. 5 (S	Sector Search)	Date /	/							
SECTOR SEA	ARCH C	ALCUL	ATIONS		SH POINT DATUM		S E	Ē					
RA	DIUS		NM	C = W/MT		TRACK MILES AVAILABLE FROM WORKSHEET No. 6NM							
SEARCH HEIGHT(FT)	W	MTS	С	TRACK DISTANCE (D)	ANGULAR DISPLACEMENT (AD)	INITIAL TRACK (IT)	SUBSEQUENT TRACK ADJUSTMENT +/- (90 + AD/2)	POD					
500													
1000													
1500													
2000													
RA	DIUS		NM	C = W/MT		MILES AVAILA	BLE						
SEARCH HEIGHT(FT)	W	MTS	С	TRACK DISTANCE (D)	ANGULAR DISPLACEMENT (AD)	INITIAL TRACK (IT)	SUBSEQUENT TRACK ADJUSTMENT +/- (90 + AD/2)	POD					
500													
1000													
1500													
2000													
RAI	DIUS	1	NM	C = W/MTS		MILES AVAILA	BLE						
SEARCH HEIGHT (FT)	W	MTS	С	TRACK DISTANCE (D)	ANGULAR DISPLACEMENT (AD)	INITIAL TRACK (IT)	SUBSEQUENT TRACK ADJUSTMENT +/- (90 + AD/2)	POD					
500				•									
1000													
1500													

Incident Re	eference	Sea	arch an	d Rescue				AREA to be ALLOCATED Compiled By							
			Wo	rksheet No. 6	(Aircraft All	ocation)		NM <sup>2</sup> Date /							
Sunrise		U	тс	Sunset	UTC		FSL	UTC - LSLUTC			ГС	= TSLMins			
Remarks	ACFT Ty	/pe	Time AVBL	DIST	TRANS Ti's	ETA	Actual SCH HRS	ETD	ASH	l less	SCH T		A=TVS	Dim's Used	ALLOC
	Callsig	n	TKOFF Time	TRANS TAS	ON SCH ENDCE	Area	(ASH)	Area		S	120 KTS	) at S (V)	Calc Dim's	NR of Legs	ALLOC Area (NM²)
E/															
E/															
E/															
E/															
E/															
E/															
E/															

## **Worksheet No. 7 (Maritime Allocation)**

INCIDENT REFERENCE	SE	SEARCH AND RESCUE WORKSHEET No. 7							COMPILE	D BY:		
				LL				NM <sup>2</sup>	DATE	/	/	
Sunrise UTC	Sunset	UTC	FSL		UT	c [	LSL		UTC	TSL	Hrs	Mins
Vessel Name	Vessel Type	Dist to Area	TI to Area	ETA	Actual	ETD		SCH Speed	A = -		A ALLOCATED	1 411.00
Callsign	Time AVBL	Speed	Search Time	Area	SCH HRS (ASH)	Area	15% S	Miles AVBL	A = Calc I		Dim's Used NR of Legs	ALLOC Area (NM2)
												_
								1				
								<u> </u>				
												-
							1	1				
												-

Incide	nt
Refere	nce

Search and Rescue	Compiled By
Worksheet No. 8	Date /

Search Platform	. Sea	arch Object				
MET Visibility KM	Wind/	Kts	Fatigue Factor:	Yes or No		
Search Height (AGL)	Eye height 8 ft	Eye height 14 ft	MERSHIP			
Uncorrected Sweep Width ( <b>Wu</b> ) -Tables <u>I-3</u> , <u>I-4</u> ,	NM	NM	NM			
Maritime: Weather Correction Factor (Fw) - Table I-7						
Fatigue Correction Factor ( <b>Ff</b> ) if crew will be suffering significant fatigue enter <b>0.9</b> , otherwise enter <b>1.0</b>						
Sweep Width Factor <b>W</b> = Wu.Fw.Ff						
Practical Track Spacing <b>S</b> (NM)						
Coverage Factor C = W/S						
Probability of Detection (POD)						
Search Area A (SQ NM)						
Search Hours (T) Required T = A/VS						
Total Search Hours Available (	) - (from Works	sheet No.7)				
A. Whole Area Calculated at a Sea	arch Height of NM	FT (A = TVS	C = W/S	%	FOR	SEARCH
A SQ. NM S  B. Modified Area at Calculated T		_	P	70	FUR	SEARCH
A SQ. NM S	NM	T C	P	%	FOR	SEARCH
				/0	FOR	SLARGIT
C. Whole Area at Modified Track	Spacing in Available Hou	ırs				
A SQ. NM S	NM	С	P	%	FOR	SEARCH
D. Compromise Area and Modifi	ed Practical Track Spacin	ng in Available Hours				
(i) A SQ. NM S	NM	С	Р	%	FOR	SEARCH
(ii) A SQ. NM S	NM	С	Р	%	FOR	SEARCH
(iii) A SQ. NM S	NM	С	Р	%	FOR	SEARCH
(iv) A SQ. NM S	NM	С	Р	%	FOR	SEARCH
Mark selected variables with *						