

# Appendix K: Worksheets

## Overview

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

<a href="#">Worksheet 1:</a>	Maritime Planning
<a href="#">Worksheet 2:</a>	Maritime Area (searching by aircraft)
<a href="#">Worksheet 3:</a>	Land Search Calculations
<a href="#">Worksheet 4:</a>	Search Radius
<a href="#">Worksheet 5:</a>	Sector Search
<a href="#">Worksheet 6:</a>	Aircraft Allocation
<a href="#">Worksheet 7:</a>	Maritime Allocation
<a href="#">Worksheet 8:</a>	Maritime Area (searching by vessel)

Worksheet 1: Maritime Planning			
<b>INCIDENT</b>			
Search target (description):			
LKP (lat/long):			
@ Time (UTC):			
Hours of drift (a):			
<b>SEA CURRENT</b>			
Sea / tidal current/knots:	° (T)		knots
Sea Current vector/distance:	° (T)	knots x (a)hrs =	nm
<b>SURFACE WIND and CALCULATION OF WIND CURRENT</b>			
Surface winds/knots	° (T)	knots	Wind Current Divergence = Reciprocal Surface Wind - 30° for LKP greater than 10° South 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 x	=	° (T) knots (Figure I-1) nm
<b>TARGET LEEWAY</b>			
Leeway Angles (divergence) (Table I.1 or I.2):	Reciprocal Surface Wind (b)	° (T)	± ° (T)
Leeway vector: (LW)	L W (L) -	° (T)	L W (R) + ° (T)
Leeway speed: (knots) = (Multiplier x Wind Speed) ± Modifier (Table I.1 or I.2)	[	Multiplier x Wind Speed =	] ± Modifier =
Leeway distance:	Leeway speed	x (a) hrs =	nm
<b>DRIFT ERROR</b>			
Distance (L)	nm	Distance (R)	nm
de (L):(12.5 to 33% of Distance L)	nm	de (R):(12.5 to 33% of Distance R)	nm
Distance Left/Right =	nm	De = $\frac{[de (L) + de (R) + Distance L/R]}{2}$	De =
<b>FIX ERRORS</b>			
Distress craft error (x): (Table J.1, J.2 or J.3)	nm		
Search craft error (y): (Table J.1, J.2 or J.3)	nm		
<b>TOTAL ERROR (E)</b>			
Total probable error (E): $E = \sqrt{(De^2 + x^2 + y^2)}$	E =		
<b>SEARCH AREA</b>			
Safety factor (circle) (fs)	1.1	1.6	2.0 2.3 2.5
Search radius (E x fs)	nm		
Search radius rounded up to whole figure:	nm		
Search area:	nm <sup>2</sup>		

<b>Incident Reference</b>	<b>Search and Rescue</b>		<b>Compiled By</b> .....	
	<b>Worksheet No. 2 Maritime Search by Aircraft</b>		<b>Date</b> ...../...../.....	
Search Platform: .....		Search Platform TAS: .....		Search Object: .....
MET Visibility: .....KM		Wind: ...../.....Kts		Fatigue Factor: Yes or No
<b>Search Height (AGL)</b>	<b>500 ft</b>	<b>1000 ft</b>	<b>1500 ft</b>	<b>2000ft</b>
Uncorrected Sweep Width (WU) - Tables I-3, I-4, I-5 (1), I-5(2), 1-6(1), 1-6(2)	.....NM	.....NM	.....NM	.....NM
Maritime: Weather Correction Fact (Fw) – Table I-7				
Speed Correction Factor (Fs) a) Aircraft searching over water use Fs from Table I-8 b) Searches by vessels enter 1.0				
Fatigue Correction Factor (Ff) if crew will be suffering significant fatigue enter 0.9, otherwise enter 1.0				
Sweep Width Factor $W = W_u.F_w.F_s.F_f$				
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 (.....) – (from Worksheet No. 6)				
A. Whole Area Calculated at a Search Height of ..... FT (A = TVS C = W/S S = W/C)				
A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
B. Modified Area at Calculated Track Spacing in Available Hours				
A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
C. Whole Area at Modified Track Spacing in Available Hours				
A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
D. Compromise Area and Modified Practical Track Spacing in Available Hours				
(i)				
A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
(ii)				
A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
(iii)				
A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
(iv)				
A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
Mark selected variables with *				

<b>Incident Reference</b>	<b>Search and Rescue</b>	<b>Compiled By</b> .....		
	<b>Worksheet No. 3 Land Search Calculations</b>	<b>Date</b> ...../...../.....		
Search Object: .....		Fatigue Factor: Yes or No		
MET Visibility: .....KM + 85		Vegetation: 15 - 60 60 - 85		
<b>Search Height (AGL)</b>	<b>500 ft</b>	<b>1000 ft</b>	<b>1500 ft</b>	<b>2000ft</b>
Uncorrected Sweep Width (WU) - Tables I-9	.....NM	.....NM	.....NM	.....NM
Searches overland: 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 $W = W_u.F_v.F_s.F_f$				
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 (.....) – (from Worksheet No. 6)				
A. Whole Area Calculated at a Search Height of ..... FT ( $A = TVS$ $C = W/S$ $S = W/C$ )				
A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
B. Modified Area at Calculated Track Spacing in Available Hours				
A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
C. Whole Area at Modified Track Spacing in Available Hours				
A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
D. Compromise Area and Modified Practical Track Spacing in Available Hours				
(i) A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
(ii) A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
(iii) A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
(iv) A .....SQ NM	S .....SQ NM		P .....%	FOR.....SEARCH
Mark selected variables with *				

<b>Incident Reference</b>	<b>Search and Rescue</b> <b>Worksheet No. 4 Search Radius</b>		<b>Compiled By</b> .....		
		<b>Date</b> ..... / ..... / .....			
Reported Distress Position ..... S ..... E Time ..... UTC	Last Positive Fix ..... Last Reported Posn ..... Missed position ..... Next Posn or Dest .....		Search No. .... Radius Computed ..... For Search Commencing ..... UTC Previous Search No. .... Radius Computed ..... For Search Commenced ..... UTC	Distress Craft Callsign/Identity	
	<b>Position</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Track distance since last Positive Fix	(Tr)	.....	.....	.....	.....
Distress Craft Position Error (Fix+10%Tr)	(x)	.....	.....	.....	.....
Search Draft Navigation Error	(y)	.....	.....	.....	.....
Probable Error of Position  $e = \sqrt{x^2 + y^2}$	(e)	$\sqrt{\quad}$ ..... .....	$\sqrt{\quad}$ ..... .....	$\sqrt{\quad}$ ..... .....	$\sqrt{\quad}$ ..... .....
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		.....	.....	.....	.....

OR

<b>Incident Reference</b>		<b>Search and Rescue</b>			<b>Compiled By .....</b>			
		<b>Worksheet No. 5 Sector Search</b>			<b>Date ...../...../.....</b>			
SECTOR SEARCH CALCULATIONS: SPLASH POINT or DATUM ..... S / ..... E								
		RADIUS .....NM		.....C = W/MTS		<b>TRACK MILES AVAILABLE FROM WORKSHEET No 6</b> .....NM		
SEARCH HEIGHT (FT)	W	MTS	C	TRACK DISTANCE (D)	ANGULAR DISPLACEMENT (AD)	INITIAL TRACK (IT)	SUBSEQUENT TRACK ADJUSTMENT +/- (90 + AD/2)	POD
500								
1000								
1500								
2000								
		RADIUS .....NM		.....C = W/MTS		<b>TRACK MILES AVAILBLE .....NM</b>		
SEARCH HEIGHT (FT)	W	MTS	C	TRACK DISTANCE (D)	ANGULAR DISPLACEMENT (AD)	INITIAL TRACK (IT)	SUBSEQUENT TRACK ADJUSTMENT +/- (90 + AD/2)	POD
500								
1000								
1500								
2000								
		RADIUS .....NM		.....C = W/MTS		<b>TRACK MILES AVAILBLE .....NM</b>		
SEARCH HEIGHT (FT)	W	MTS	C	TRACK DISTANCE (D)	ANGULAR DISPLACEMENT (AD)	INITIAL TRACK (IT)	SUBSEQUENT TRACK ADJUSTMENT +/- (90 + AD/2)	POD
500								
1000								
1500								
2000								

<b>Incident Reference</b>		<b>Search and Rescue</b>					<b>AREA to be ALLOCATED</b>			<b>Compiled By .....</b>		
		<b>Worksheet No. 6 Aircraft Allocation</b>										
							_____ NM <sup>2</sup>			Date ..... / ..... / .....		
Sunrise ..... UTC		Sunset ..... UTC			FSL ..... UTC		-	LSL ..... UTC		=	TSL ..... TSL ..... Mins	
Remarks	ACFT Type	Time AVBL	DIST	TRANS TI's	ETA Area	Actual SCH HRS (ASH)	ETD Area	ASH less 15%	SCH TAS	AREA ALLOCATED		
	Callsign	TKOFF Time	TRANS TAS	ON SCH EDNCE				S	HRS (T) at 12 KTS (V)	A=TAS	Dim's Used	ALLOC Area (NM <sup>2</sup> )
										Cal Dim's	NR of Legs	
E/												
E/												
E/												
E/												
E/												
E/												
E/												

National Search and Rescue Manual



Incident Reference	Search and Rescue	Compiled By .....
	<b>Worksheet No. 8 - Maritime Area by Vessel</b>	Date ..... / ..... / .....

Search Platform .....	Search Object .....		
MET Visibility ..... KM	Wind ..... / ..... Kts	Fatigue Factor: Yes or No	
<b>Search Height (AGL)</b>	<b>Eye height 8 ft</b>	<b>Eye height 14 ft</b>	<b>MERSHIP</b>
Uncorrected Sweep Width (Wu) -Tables <a href="#">I-3</a> , <a href="#">I-4</a> ,	NM	NM	NM
Maritime: Weather Correction Factor (Fw) - <a href="#">Table I-7</a>			
Fatigue Correction Factor (Ff) if crew will be suffering significant fatigue enter 0.9, otherwise enter 1.0			
Sweep Width Factor W = Wu.Fw.Ff			
Practical Track Spacing S (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 Worksheet No.7)

A. Whole Area Calculated at a Search Height of ..... FT (A = TVS C = W/S S = W/C)

A	SQ. NM	S	NM	C	P	%	FOR SEARCH
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B. Modified Area at Calculated Track Spacing in Available Hours

A	SQ. NM	S	NM	C	P	%	FOR SEARCH
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C. Whole Area at Modified Track Spacing in Available Hours

A	SQ. NM	S	NM	C	P	%	FOR SEARCH
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D. Compromise Area and Modified Practical Track Spacing in Available Hours

(i) A	SQ. NM	S	NM	C	P	%	FOR SEARCH
(ii) A	SQ. NM	S	NM	C	P	%	FOR SEARCH
(iii) A	SQ. NM	S	NM	C	P	%	FOR SEARCH
(iv) A	SQ. NM	S	NM	C	P	%	FOR SEARCH

Mark selected variables with \*