APPENDIX K - Worksheets

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

Worksheet 1: Maritime Planning

INCIDENT	
Search target (description):	
LKP (lat/long):	
@ Time (UTC):	
Hours of drift (a):	

SEA CURRENT	
Sea / tidal current/knots:	$^{\circ}$ (T) knots
Sea Current vector/distance:	$^{\circ}$ (T) knots x (a)hrs = nm

SURFACE WIND and CALCULATION OF WIND CURRENT

		Wind Current Divergence = Reciprocal Surface Wind - 30° for LKP greater than 10° South Latitude
Surface winds/knots	$^{\circ}$ (T) knots	
Reciprocal of Surface Winds/Knots (b)	$^{\circ}$ (T) knots	- 30° T = $^{\circ}$ (T) knots
Wind current vector: (use reciprocal bearing and divergence (Figure I-1)	(a) hours x knots (Figure I-1) = $^{\circ}$ (T) nm	

TARGET LEEWAY

Leeway Angles (divergence) (Table I.1 or I.2):	Reciprocal Surface Wind (b) $^{\circ}$ (T)	± $^{\circ}$(T)
Leeway vector: (LW)	L W (L) - $^{\circ}$ (T)	L W (R) + $^{\circ}$ (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	

DRIFT ERROR

Distance (L)		nm	Distance (R)		nm
d_e (L):(12.5 to 33% of Distance L)		nm	d_e (R):(12.5 to 33% of Distance R)		nm
Distance Left/Right =	nm	De = [de (L) + de (R) + Distance L/R] / 2		De =	

FIX ERRORS

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

TOTAL ERROR (E)

Total probable error (E): $E = \sqrt{(De^2 + x^2 + y^2)}$	E =

SEARCH AREA

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^2

Incident Reference	**Search and Rescue** **Worksheet No. 2 (Maritime)**	Compiled By .... Date .... / .... / ....

Search Platform ……………………..   Search Platform TAS ……….   Search Object ....

MET Visibility .... KM   Wind .... /.......... Kts   Fatigue Factor: Yes or No

Search Height (AGL)	500 ft	1000 ft	1500 ft	2000 ft
Uncorrected Sweep Width (**Wu**) -Tables I-3, I-4, I-5 (1), I-5 (2), I-6 (1), I-6 (2)	NM	NM	NM	NM
Maritime: Weather Correction Factor (**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** = Wu**.**Fw**.**Fs**.**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 (...........................) - (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	NM	C		P	%	FOR	SEARCH

B.   Modified Area at Calculated Track Spacing in Available Hours

A	SQ. NM	S	NM	C		P	%	FOR	SEARCH

C.   Whole Area at Modified Track Spacing in Available Hours

A	SQ. NM	S	NM	C		P	%	FOR	SEARCH

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 *

Incident Reference	**Search and Rescue** **Worksheet No. 3 (Land)**	Compiled By .... Date .... / .... / ....

Search Object ....

MET Visibility .... KM

Fatigue Factor: Yes or No

Vegetation: 15-60   60-85   +85

	500 ft	1000 ft	1500 ft	2000 ft
Search Height (AGL)	500 ft	1000 ft	1500 ft	2000 ft
Uncorrected Sweep Width (Wu) - Table I-9	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 (...........................) - (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	NM	C		P	%	FOR	SEARCH

B.   Modified Area at Calculated Track Spacing in Available Hours

A	SQ. NM	S	NM	C		P	%	FOR	SEARCH

C.   Whole Area at Modified Track Spacing in Available Hours

A	SQ. NM	S	NM	C		P	%	FOR	SEARCH

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 *
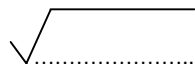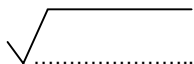
Incident Reference	**Search and Rescue** **Worksheet No. 4 (Search Radius)**	Compiled By .... Date .... / .... /	

| Reported Distress Position

………………………….. S

………………………….. E

Time …………………….. UTC | or | 1. Last Positive Fix ……….…………

2. Last Reported Posn …………………

3. Missed position ………………………

4. 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 |

	Position	A	B	C	D
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)	$\sqrt{}$ …………………... …………………...	$\sqrt{}$ …………………... …………………...	$\sqrt{}$ …………………... …………………...	$\sqrt{}$ …………………... …………………...
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	**Search and Rescue** **Worksheet No. 5 (Sector Search)**	Compiled By .... Date .... / .... / ....

SECTOR SEARCH CALCULATIONS: **SPLASH POINT** or DATUM .... S .... E

RADIUS .... NM	C = W/MTS	TRACK MILES AVAILABLE FROM WORKSHEET No. 6 ....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	TRACK MILES AVAILABLE ....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	TRACK MILES AVAILABLE ....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								

| Incident Reference | **Search and Rescue**

Worksheet No. 6 (Aircraft Allocation) | | | | | **AREA to be ALLOCATED**

_____NM ^{2} | | Compiled By ....

Date .... / .... / .... | | | | |

| Sunrise …………………..UTC | | | Sunset …………………UTC | | | FSL ………..UTC | **-** | LSL ………..UTC | **=** | TSL …..…Hrs………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		ALLOC Area (NM²)
	Callsign	TKOFF Time	TRANS TAS	ON SCH ENDCE				S	HRS (T) at 120 KTS (V)	A=TVS	Dim's Used	
										Calc Dim's	NR of Legs	
E/												
E/												
E/												
E/												
E/												
E/												
E/												

Worksheet No. 7 (Maritime Allocation)

INCIDENT REFERENCE	**SEARCH AND RESCUE WORKSHEET No. 7**					**AREA to be ALLOCATED**	COMPILED BY:			
	LL …………………………..					_____ NM²	DATE …….. / ……… / ………			

Sunrise ...………. UTC	Sunset …………UTC		FSL …………………UTC			LSL …………………UTC		TSL ………Hrs……….Mins		

Vessel Name	Vessel Type	Dist to Area	TI to Area	ETA Area	Actual SCH HRS (ASH)	ETD Area	ASH less 15%	SCH Speed	AREA ALLOCATED		
Callsign	Time AVBL	Speed	Search Time				S	Miles AVBL	A = TVS / Calc Dim's	Dim's Used / NR of Legs	ALLOC Area (NM2)

Incident Reference	**Search and Rescue** **Worksheet No. 8**	Compiled By .... Date .... / .... / ....

Search Platform ……………………..   Search 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 (**Wu**) -Tables **I-3**, **I-4**,	NM	NM	NM	
Maritime: Weather Correction Factor (**Fw**) - Table I-7				
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

B.   Modified Area at Calculated Track Spacing in Available Hours

A	SQ. NM	S	NM	C		P	%	FOR	SEARCH

C.   Whole Area at Modified Track Spacing in Available Hours

A	SQ. NM	S	NM	C		P	%	FOR	SEARCH

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 *