APPENDIX J - Probable Errors of Position

Probable Navigation Error of the Distressed Craft (x)

Initial Position Error (X) of the distressed craft and Search Craft Position Error (Y) are the estimated errors of position based on navigational accuracy of the distressed craft and of the search assets.

If the information on the means of navigation to be used by the distressed craft or by a search facility is available, the navigational fix errors listed in Table J.1 may be used for positions reported as navigational fixes.

Means of Navigation	Fix error (NM)
GPS	0.1 NM
Radar	1 NM
Visual fix (3 lines) *	1 NM
Celestial fix (3 lines) *	2 NM
Marine Radio Beacon	4 NM (3 beacon fix)
LORAN C	1 NM
INS	0.5 NM per flight hour without update
VOR	+ or - 3 DEG arc and 3% of distance or 0.5 NM radius, whichever is greater
TACAN	+ or - 3 DEG arc and 3% of distance or 0.5 NM radius, whichever is greater

Table J-1 Navigational fix errors

* Should be evaluated upward according to circumstances.

Note : Variation from IAMSAR for Tables J.2 and J.3, the National SAR Manual uses the values previously used by AusSAR because experience has shown it is more practicable to base fix errors on the navigation equipment carried in a craft.

The above values for Fix errors in Table J.1 are appropriate for the actual position of a distressed craft and/or search assets. An SMC should be aware that if the values in Table J.1, particularly that for GPS, are used to calculate a Total Probable Error of Position (E) for a Stage 3 search, particularly for a search over land or any search for an aircraft, the search area produced, because of its dimensions, may not be practical to use.

When designing a search area an SMC can always use his discretion, however to obtain a practical search area it is recommended that the fix errors in Tables J.2 or J.3 be utilised.

When the means of navigation used by the distressed craft or by a search asset is unknown or the SMC wishes to produce a practical search area for a Stage 3 search, the following Fix errors may be applied:

Type of Craft	Fix error
Ships, military submarines.,	5 NM radius
Aircraft navigated by a self contained navigation system	5 NM radius
Aircraft (other)	10 NM radius
Small craft, Submersibles	15 NM radius

Table J-2 Type of Craft

When the initially reported position of the distressed craft is based on dead reckoning (DR) or the search asset must use DR navigation, an additional error is assumed for the distance travelled since the last fix. The position error is the sum of the fix error plus the DR error (DRe) as shown in Table J-3.

Type of craft	DR error (DRe)
Ship, Submarine (Military)	The error of the last positive fix plus 5% of the distance from that fix
Aircraft	The error of the last positive fix plus 10% of the distance from that fix
Small craft, Submersibles	The error of the last positive fix plus 15% of the distance from that fix

Table J-3 Dead reckoning (DR) errors

The figures and factors shown in Tables J.1 to J.3 are minimum values and may be increased at the SMC's discretion should information be received indicating that the navigational accuracy of either the distressed or the search craft differs significantly from the accepted standard.

As an example, the 'x' factor for a missing two or more engined aircraft not using a self contained navigation system which reported at position 'A', but failed to report at position 'B' 200NM distant, would be, for 'A' 10NM, and for 'B', 10 + 20 = 30NM.

Should a pressurised aircraft suffer a major loss of cabin pressure when flying above the oxygen height the pilot will put the aircraft into a steep diving turn to bring the aircraft down to 10,000FT as quickly as possible. The possibility of this manoeuvre being made and the consequent diversion from track should be considered when constructing a probability area.

Probable Navigation Error of the Search Craft (y)

All search craft are expected to obtain frequent, and near continuous navigational fixes while conducting their search; therefore, only fix error is considered for search craft. Should it be necessary to navigate a search craft by DR in a search area, the RCC should be notified so that both fix and DR error can be taken into account in determining the 'y' factor. The figures selected in respect of a search craft will depend on the method of navigation to be used by the search craft. The figures in Tables J.1 to J.3 shall be taken as minimum values and may be increased at the discretion of the SMC