

RESOLUTION A.529(13)

*Adopted on 17 November 1983
Agenda item 10(b)*

ACCURACY STANDARDS FOR NAVIGATION

THE ASSEMBLY,

RECALLING Article 16(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations concerning maritime safety,

RECOGNIZING the need to provide guidance to Administrations on the standards of navigation accuracy for assessing position-fixing systems,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its forty-eighth session,

1. ADOPTS the navigation accuracy standards set out in the Annex to the present resolution;
2. RECOMMENDS Member Governments to use these accuracy standards as guidance when assessing the performance of position-fixing systems.

ANNEX

ACCURACY STANDARDS FOR NAVIGATION

1 INTRODUCTION

1.1 The objective is to provide guidance to Administrations on the standards of navigation accuracy for assessing position-fixing systems, in particular radio-navigation systems, including satellite systems. These standards do not apply to specialized activities such as offshore exploration or those performed by the hydrographic services.

1.2 The navigator needs to be able to determine his position at all times. This requires accurate position fixes and, where position fixes are not available continuously, a method of estimating the position between fixes which may be dead reckoning.

2 FACTORS AFFECTING ACCURACY REQUIREMENTS

2.1 Accuracy requirements depend upon various factors which include:

- .1 ship speed; and
- .2 distance from nearest navigational danger. A navigational danger is considered to be any recognized feature or charted feature or boundary which might present or encompass a hazard to the ship or prescribe a limit to navigation.

3 PHASES OF THE VOYAGE

3.1 The phases can be divided into:

- .1 harbour entrances and approaches and waters in which the freedom to manoeuvre is limited; and
- .2 other waters.

3.2 In the first phase navigation will be generally by visual observations, radar, echo sounder, etc. or by specialized electronic position-fixing system. Accuracy requirements will depend upon local circumstances. The division between the two phases is not precise and will depend upon local circumstances.

4 DEFINITION OF ACCURACY STANDARDS

4.1 The following table sets out the accuracy standards against which position-fixing systems can be assessed in respect of a ship proceeding at a speed of not more than 30 knots.

TABLE 1

Phase of the voyage	Order of accuracy
Harbour entrances, etc.	Depends on local circumstances
Other waters	4% of distance from danger with a maximum of 4 nautical miles

4.2 The accuracy a navigator can expect from using any system* depends on both the accuracy of the position fix given by the system, called the "system fix", and the time elapsed since the last system fix.

4.3 As the accuracy of the system fix involves both fixed and random errors, it can only be described in terms of probability. The 95% probability figure should be used to describe the accuracy of the system fix.

4.4 When assuming that a gyro-compass conforming to resolution A.424(XI) and a log and speed indicating device conforming to resolution A.478(XII) are used for dead reckoning, without correction related to previous system fixes, there is a relationship between the accuracy to be expected by the user, the accuracy of the system fixes and the maximum time interval between the system fixes. Such a relationship which takes account of errors normally to be expected in predicting the velocity of current, tidal stream and effect of wind is given in table 2 and figures 1 and 2 which are different presentations of the same data.

* The term "system" is intended to signify any means to derive a position fix.

TABLE 2

Minimum distance from danger (n.m.)	Accuracy required (n.m.)	Accuracy of position-fixing system (n.m.)					
		0	0.1	0.25	0.5	1	2
		Maximum allowable time <i>since</i> last fix (min)					
10	0.4	12	12	9	—	—	—
20	0.8	28	28	27	22	—	—
30	1.2	48	48	47	44	27	—
40	1.6	72	72	71	68	56	—
50	2.0	100	100	99	97	87	0
60	2.4	132	132	131	129	120	73
70	2.8	168	168	167	165	157	118
80	3.2	208	208	207	206	198	162
90	3.6	252	252	251	250	242	210
100	4.0	300	300	300	298	291	260

Example for use of the table:

To meet the navigational requirement of ships which are not expected to navigate less than 30 n.m. from danger, 1.2 n.m. would be the accuracy required, and could be achieved by a system which gives an accuracy of:

- 1 n.m. with fixes not separated by more than 27 min;
- 0.5 n.m. " " " " " " " " 44 min;
- 0.25 n.m. " " " " " " " " 47 min; or
- 0.1 n.m. " " " " " " " " 48 min.

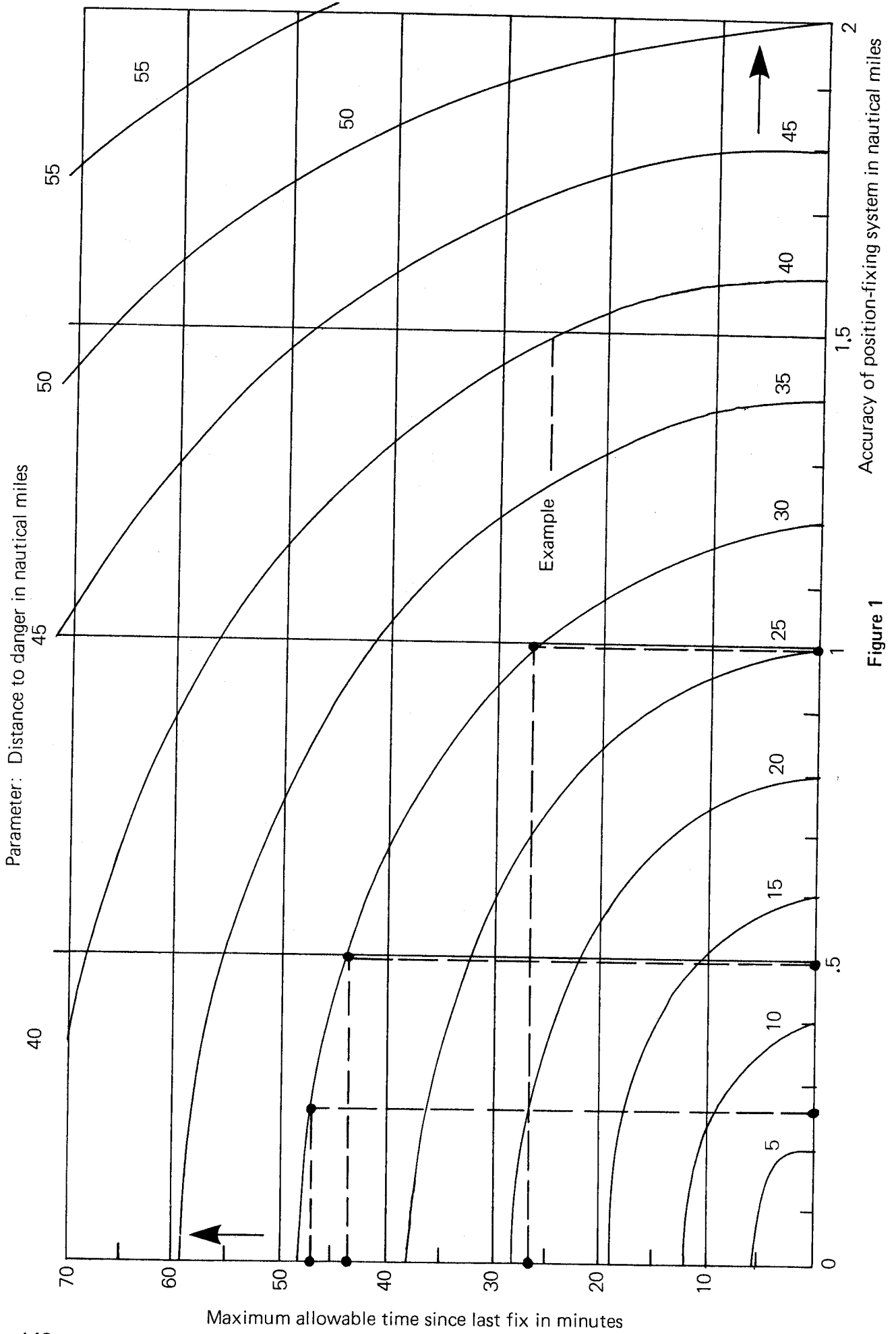


Figure 1

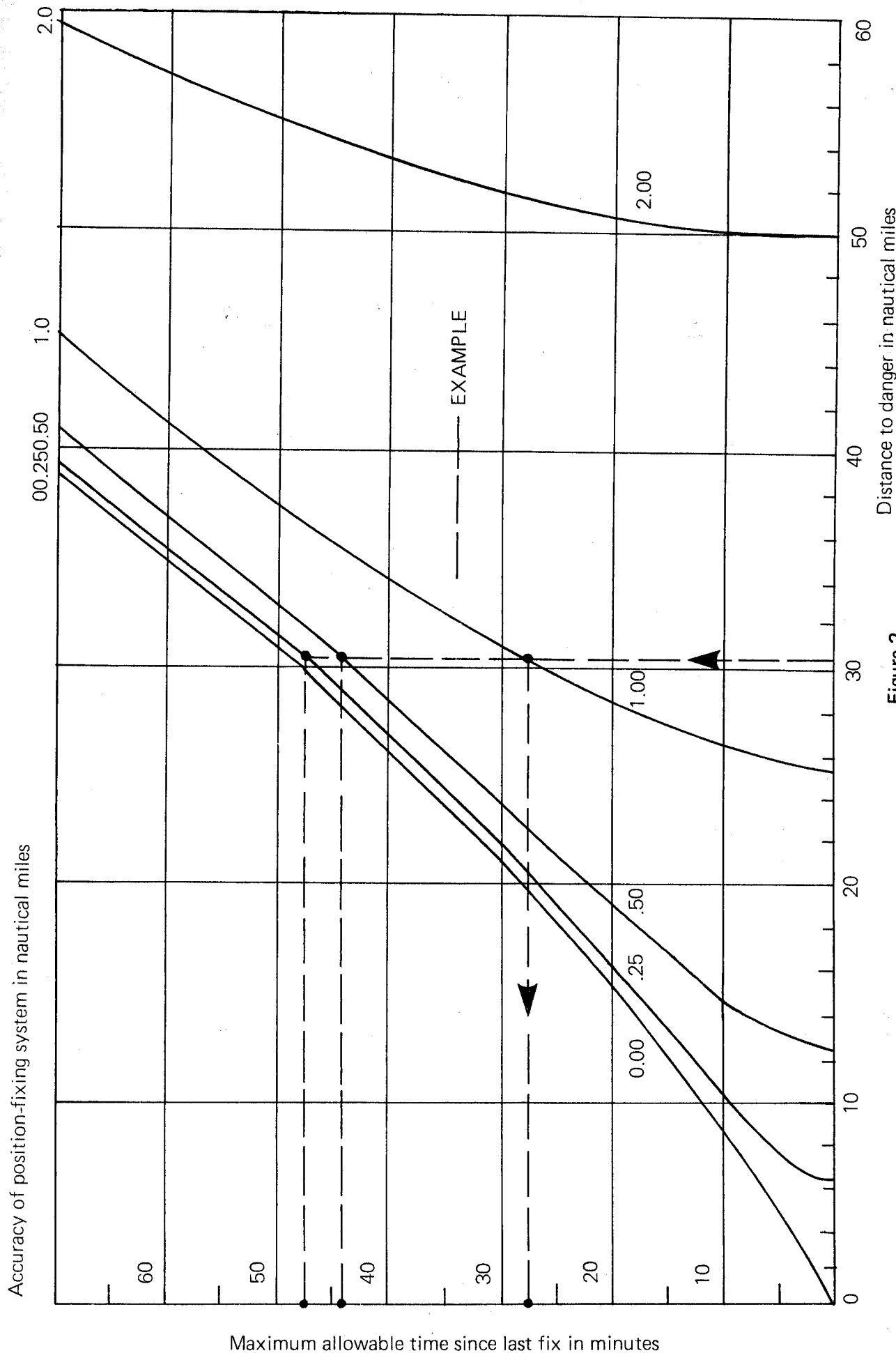


Figure 2