

DEPARTMENT OF THE NAVY OFFICE OF THE CHIEF OF NAVAL OPERATIONS WASHINGTON, D.C. 20350

OPNAVINST 3530.3B OP-32 JUL 1 6 1973

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OPNAV INSTRUCTION 3530.3B

From: Chief of Naval Operations

- Subj: Navigation Workbook and Standard Bearing Book
- Encl: (1) Facsimile of the U.S. Navy Navigation Workbook with instructions for usage
  - (2) Facsimile of the U.S. Navy Standard Bearing Book with instructions for usage.

1. <u>Purpose</u>. To promulgate changes to the Navigation Workbook (A which is the standard to be used by all ships of the U.S. Navy, except as noted in paragraph 5 below. Additionally, to inform addressees that no changes were made to the Standard U.S. Navy Bearing Book, which is currently used by all ships of the U.S. Navy.

2. Cancellation. OPNAV Instruction 3530.3A and OPNAV Forms (R 3530/1, 3530/1A through 1L (Rev. 7-71) of 5 May 1970.

3. Background.

a. The President signed the 1973 Navy Regulations on 26 February 1973. Certain regulatory articles from the 1948 Navy Regulations do not appear, but will be promulgated at a later date as CNO directives.

b. By OPNAVNOTE 5000., "Navy Regulations", CNO issued policy guidance pertaining to the retention of certain provisions of specified chapters and articles of the 1948 Navy Regulations until the subject changes could be made. One of the aforementioned articles is Article 0930, paragraph 1(d), which requires the navigator to "Maintain record books of all observations and computations made for the purpose of navigating the ship, with the results and dates involved. Such books shall form a part of the ship's official records."

c. To assist in providing standardized recording procedures and format to ensure the intent of the regulation, a Navigation Workbook and a Standard Bearing Book were developed for use by all U.S. Navy ships in 1970. The workbook and bearing book provided sufficient flexibility to permit the recording of all present methods of determining ships position. These books were developed by the U.S. Naval Academy as the best compromise of recommendations submitted by the fleets and training units.

- A) 4. <u>Review</u>. A review of the subject books by the fleets produced several changes to the computation strip forms which are used with the Navigation Workbook. Comments were also solicited concerning the concept of providing a set of longer, more complete strip forms to be used with a green record book in lieu of the Navigation Workbook. It was generally agreed that the workbook with revised forms be retained for use in the fleet, with the proviso that the green record book be authorized as a suitable substitute. The rationale is that the Navigation Workbook is considered a necessary guide for inexperienced navigators, while the experienced navigator might prefer a log with less format (green workbook). No changes to the Standard Bearing Book were noted.
- R) 5. Action. Enclosure (1) depicts the revised standard U.S. Navy Navigation Workbook format which is effective no later than 1 January 1974 with the proviso that commanding officers may authorize, in writing, the green record workbook as a substitute thereto. If so authorized, then the commanding officer will specifically cite in writing that the green workbook is the command's official Navigation Workbook. The U.S. Navy Standard Bearing Book depicted in enclosure (2) is to be used by all ships of the U.S. Navy.
- R) 6. Forms. "U.S. Navy Navigation Workbook," OPNAV 3530/1 and 30-44 and "U.S. Navy Standard Bearing Book," OPNAV Form 3530/2, will be requisitioned from the appropriate Cognizant "I" stock point as set forth in the current edition of NAVSUP Publication 2002.

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R. F. HOFFMANN By direction

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# U. S. NAVY NAVIGATION WORKBOOK

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U.S.S. \_\_\_\_\_

### PERIOD



OPNAV 3530/1 and 30 - 40 (Rev. 6-73)

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Enclosure (/)

#### NAVIGATION WORKBOOK

U.S. Navy Regulations require the navigator to "Maintain record books of all observations and computations made for the purpose of navigating the ship, with results and dates involved. Such books shall form a part of the ship's official records." This publication has been printed to meet a recognized need for a standard computation book. In addition to providing a standard record, the format is intended to provide optimum utility, economy and flexibility, by providing strip inserts to assist the navigator in the below computations: (Strip inserts, marked to size for cut out, are printed on the back pages of this book. An envelope, suitable for stowing inserts when not in use, is attached to the inside back cover.)

#### **CELESTIAL SIGHTS and LORAN**

Place proper Computation Strip beside a blank column, and align so that entries will correspond with information on strip. Insure name of celestial body or "LORAN" is entered at top, and that the Fix is entered for appropriate celestial sights or LORAN LOPs.

#### AZIMUTH, LAN, SUNRISE/SUNSET, TIDES, CURRENTS, etc.

Place proper Computation Strip beside a blank column. Insure top of column is labeled to identify the type of computation.

#### MODIFICATION OF COMPUTATION STRIPS

This workbook is to serve navigators, and strip forms may be used to suit individual preference. Note: Any modified strip form is to become an official part of this record.

#### NAVIGATOR'S SIGNATURE

Space is provided at the bottom of each page for required signature of the navigator.

OPNAV 3530/30 (4-73) H.O. 229 NAUT ALM	OPNAV 3530/31 (4-73) H.O. 229 AIR ALM	OPNAV 3530/32 (4-73) H.O. 249 VOL. I NAUT ALM	OPNAV 3530/33 (4-73) H.O. 249 VOL. I AIR ALM	OPNAV 3530/34 (4-73) LAT. BY POLARIS NAUT ALM
Body	Body	Body	Body	Body POLARIS
GMT	GMT	GMT	GMT	GMT
IC	IC	IC	IC	IC
D	D	D	D	D
Sum	R	Sum	R	Sum
hs	SD	hs	SD	hs
ha	P, in A,	ha		ha
Alt Corr	Total Corr	Alt Corr	Total Corr	Alt Corr
Add'l Corr Moon HP/Corr	hs	Add'l Corr	hs	Add'l Corr
Ho	Но	Но	Но	Но
GHA (h)	GHA (h, 10's of min)	GHAγ (h)	GHAγ (h, 10m)	GHAγ (h)
Incre. (m/s)	Incre. (m/s)	Incre. (m/s)	Incre. (m/s)	Incre. (m/s)
v/v Corr SHA	SHA	Total GHAγ	Total GHA $\gamma$	Total GHAY
Total GHA	Total GHA	± 360°	± 360°	± 360°
± 360°	± 360°	aλ (+E,W)	aλ (+E,W)	DRλ (+E, _W)
aλ (+E, -W)	aλ (+E,W)	LHAY	LHAY	LHAγ
LHA	LHA	a LAT	a LAT	<b>0</b> 6
Tab Dec	Tab Dec	Нс	Нс	a1
d# / d Corr	d#/d Corr	Но	Но	a2
True Dec	True Dec	3	a	Sum
a LAT Same Contrary	a LAT Same Contrary	Zn	Zn	1° 00' ()
Dec Inc / d	Dec Inc / d	P and N Corr	P and N Corr	Total Corr
Tens / DSD	Tens / DSD			Но
Units / DSD Corr	Units / DSD Corr	Fix Lat	Fix Lat	LAT
Total Corr	Total Corr	Long	Long	Time
Hc (Tab)	Hc (Tab)	Fix Time	Fix Time	
Hc (Comp)	Hc (Comp)			
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Zn	Zn	· · · · · · · · · · · · · · · · · · ·		
Fix Lat	Fix Lat			
Long	Long			
Fix Time	Fix Time			
Sounding	Sounding	Sounding	Sounding	Sounding
Signature	Signature	Signature	Signature	Signature

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Enclosure (1)

OPNAV 3530/35 (4-73) LAN	OPNAV 3530/36 (4-73) AZIM BY H.Ö. 229	OPNAV 3530/37 (4-73) LORAN (A)	OPNAV 3530/38 (4-73) SUNSET/RISE TWILIGHT/LHA $\gamma$	OPNAV 3530/39 (4-73) MOONSET/RISE NAUT ALM
DRλ	Body	Time	DR Lat	DR Lat
STD Meridian	GMT	Rate	Tab Interval	TABLE I:
dλ (arc)	GHA (h)	TG/TS	Lat interval	Tab Interval
dλ (time)	Incre (m/s)	Sys Corr	Lat Diff	Lat Interval
I MT Mer Pass	Total GHA	Ts Corr	Corr Table I	Lat Diff
ZT I AN (1st Est.)	± 360 <sup>°</sup>	Tg	Tab LMT	Corr Table I
	 DRλ (+E, _W)	Тар Т	Corr LMT	Tab LMT
	1 HA	Tg - T	DRY	LMT
	Tab Dec	Δ	STD Mer	DRX
dA (arc)		 ∆ Corr	dλ (arc)	TABLE II:
	True Dec	Lat/Long	dλ (time)	Tab LMT Today
LMT Mer Pass	DR Lat	Tab Lat/Long	LMT	LMT preceding
ZT LAN (2nd est)	Same Contrary		ZT (1st est)	Time Diff
LAT BY LAN:	Tab Z		Ber DB	Time Corr
ZT LAN (OBS)	Dec Inc/Z Diff	Corr Lat/Long		
ZD	Dec Corr	Plot Lat		
GMT	Lat Inc/Z Diff	Long	dA (arc)	
Tab Dec	Lat Corr		dλ (time)	
d# / d Corr	LHA Inc/Z Diff	Δ	LMT	GMT
True Dec	LHA Corr	∆Corr	ZT (2nd est.)	ZD (Reversed)
IC	Dec Corr	Lat/Long	ZD	ZT (1st est)
D	Lat Corr	Tab Lat/Long	GMT	
Sum	Total Corr	∆Corr	GHAγ (h)	Rev DRA
hs	Tab Z	Corr Lat/Long	Incre (m/s)	λ arc to time
ha	Exact Z	Plot Lat	Total GHAγ	GMT
Alt Corr	Exact Zn	Long	DRA (+E, -W)	ZD (Reversed)
Ho	Gyro Brg		LHAY	ZT (2nd est)
89° 60'	Gyro Error	Fix Lat	± 360°	
HO ()		Long	Body/Alt/Zn	
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Enclosure (1)

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LottionLattionZTGM7GM7TreeTimeZDICGMA (M)Ref SuFaf SuGMTDIncer (m)NY Time DITSue NetwSue Par'Sue NetwSue NetwWY Time DITSue NetwSue NetwNSue NetwWW Time DITMax Sue NetwTS CarNNWW Time DITMax Sue NetwTS CarNNMax Sue NetwTo PaiARC CarLink GarLink GarMax Sue NetwTO PaiMax GarLink GarLink GarMax Sue NetwTO PaiGMC InformTable CarMax Sue NetwTo PaiGMC InformSale CarMax Sue NetwDiffGarGMA InformTable CarMM/LW Time DITFixed DirDiffGMC InformTable CarMM/LW Time DITFixed DirDiffGarGMA InformMM/LW Time DITFixed DirDiffGarSale CarMM/LW Time DITFixed DirDiffGarSale CarMM/LW Time DITFixed DirCarSale CarTable CarMM/LW Time DITFixed DirCarSale CarTable CarMM/LW Time DITFixed DirCarSale CarTable CarMM/LW Time DITSale CarDirt LarCarTable CarMM/LW Time DITSale CarDirt LarCarTable CarMM/LW Time DITSale CarDirt LarCarTable CarMM TableCarCarSa	Date	Date	Date	Body	Body
TeneTimeZ0ICGMA [N]Ref SuRef SuGMT0Incor (n/u)MM Tume DiffTime DoffSure NameSure ParisSumTotal ChildMM Tume DiffTotal ControlTotal ControlNameDBA (FerrerLM Tume DiffTotal ControlTotal ControlNameDBA (FerrerLM Tume DiffMac CorrentTotal ControlNameDBA (FerrerLW HD DiffMac CorrentTotal ControlAll CorrUIALW HD DiffMac CorrentTotal ControlAll CorrIt in ControlMark SuFlood DirTotalDiffGMA (Inform)Sile ControlMark SuFlood DirTotalTotal ControlTotal ControlSile ControlMark SuFlood DirTotal ControlTotal ControlTotal ControlMark SuFlood DirCorrInter InfolTotal ControlMark SuSile Alter TorreTotal ControlTotal ControlTotal ControlMark SuSile Alter TorreTotal ControlSile ControlTotal ControlMark SuSile Alter TorreTotal ControlSile ControlTotal ControlMark SuSile Alter TorreTotal ControlSile ControlSile Control </td <td>Location</td> <td>Location</td> <td>ZT</td> <td>GMT</td> <td>GMT</td>	Location	Location	ZT	GMT	GMT
Ref Su Ref Su GMT D Incre (m/g)   NM Trae DH See Kaue Sin Par Sum Taus GHA   LW Tree DH Mac Extern Sin Par Sum Taus GHA   LW Tree DH Mac Extern TS Corr In San Su   LW Tree DH Mac Extern Total Corr In San Su   LW HE DH Mar Extern Total Corr In DRA (E., w)   LW HE DH Mar Extern TOP Li AddT Corr LHA   Mar Extern TAB Ho Corr Index (MCarr) Index (MCarr)   Mar Extern TA Mar Extern Total Corr AddT Corr Tota Doc   MMYLW Time DH Flead Dir DH GHA (In) d#/ corr Tota Doc   MMYLW Time DH Flead Dir Lu/Long three In// Tota Doc Total Corr   MMYLW Time DH San State Tree Dir Lu/Long Total GHA Total Corr   MMYLW Time DH San State Total Corr - San Total GHA Total Corr   MMYLW Time DH Tam DST Corr - San Total GHA Lu D/// Corr   Mot State San State San State San State Total Corr   Mot State San State	Time	Time	ZD	IC	GHA (h)
HM Time Diff     Saw Name     Saw Par     Sam     Total Difk       LM Time Diff     Mac Content     TS Cor     N     1 340°       LM Ho Diff     Content     TS Cor     N     1 340°       LW Ho Diff     Mac Floot     Leve Court     An Cor     LHA       LW HO Diff     Mac Floot     Leve Court     An Cor     LHA       Mac Bits     TAB     No     To Dec     Mac Floot       Mark Bits     TAB     No     To Dec     To Dec       Mark Diff     Floot Dir     Diff     GM Corr     Staff Corr     Staff Corr       Mark Numm     Floot Dir     Diff     GM Corr     Staff Corr     Staff Corr       Mark Numm     Floot Dir     Diff     Corr     Staff Corr     Staff Corr       Mark Numm     Staff Som	Ref Sta	Ref Sta	GMT	D	Incre (m/s)
LW Turn Diff     Tam Diff     Tab Gar     In     530 <sup>°</sup> HW HI Diff     Const Gar     Na     DRN 145, -49     DRN 145, -49       LW HI Diff     Wei Reso     Lee Gout     An Gar     LHA       LW HI Diff     Wei Reso     To Pici     Addi Gar     LHA       Mer Sa     To Pici     Addi Gar     I.     Addi Gar       Mer Sa     Flood Dir     Dire     OHA     Mark Diff     Tab Dec       Mer Mark     Flood Dir     Increa InfN     Trab Dec     Mark Diff     Trab Dec       Mer Mark     Ref Sa     Exel Long     Safe Corr     Safe Corr     Dire Long     Tab Lat       Mer KW With     Ref Sa     Ref Sa     Tab Lat     Corr     450 <sup>°</sup> Let Dir     Let Dire Preson       Mer KW With     Safe Sa War Trans     Por Let     Da/refWI     Let Dir     Let Dire Preson     Tab Let Dire Preson     Tab Let Dire Preson     Let Dire P	HW Time Diff	Time Diff Slack Water	Sta Pair	Sum	Total GHA
HH DH     Lew H DH     Test Ger     he     DBA (+E, -W)       LW H DH     Mar God     Law Count     An Cor     LHA       Mar DM     Mar God     Law Count     And Cor     LHA       Mar DM     Mar God     TG Post     And Corr     I       Mar DM     Faco     TG Post     And Corr     I       MM/LW Time     Faco Dr     DM     GHA JN     d# / a Corr       MM/LW Time     Faco Dr     Inore (m/h)     d# / a Corr     DR Law Corr       MM/LW Time     Sab Stare     Final DFI     Corr     Sab Stare     OR Law Corr       MM/LW Time     Sab Stare     Time DFI     Corr     - sab0 <sup>2</sup> Tab Lar       MM/LW HI     Sab Stare     Sab Stare     Time DFI     Corr     - sab0 <sup>2</sup> Tab Lar       MM/LW HI     Sab Stare     Sab Stare     Time DFI     Corr     - sab0 <sup>2</sup> Tab Lar       MM/LW HI     Sab Stare     Time DFI     Corr     - sab0 <sup>2</sup> Tab Lar       Duration Fare     Sab Stare     Time DFI     Law Corr	LW Time Diff	Time Diff Max Current	TS Corr	hs	± 360°
LW HD Drff     We Reio Mar Food     Leve Court     Att Corr     LUFA       Mar Sine Mar Sine Mill W Time     Ver Reio Mar Sine Mar Sine Mill W Time     TAB     Moo     Tab Dec       Mar Sine Mill W Time     TAB     Moo     Tab Dec     1       Mar Sine Mill W Time Drff     Flood Dir     Drff     GHA (h)     def / c Corr       Mar Sine Mill W Time Drff     Flood Dir     Drff     GHA (h)     def / c Corr       Mar Sine Mill W Time Drff     Flood Dir     Drff     GHA (h)     def / c Corr       Mar Sine Mill W Time     Flood Dir     Let/Long     Self Corr     Drff Corr       Mar Sine Mill W Time     Flood Sine Sine Sine Mill Corr	HW Ht Diff		Total Corr	ha	DRλ (+E, –W)
Ve Reice Max Stab     TG Pion     Mater Corr Mecon BP/Corr     I       Ref Sur MW/LW Time     TAB     Ho     Tab Dec       MW/LW Time     Field Dir     Dift     GHA (h)     dB/ / Corr       Sub Sur MW/LW Time     Exb Dir     Innor (m/s)     True Dec       MW/LW Time     Exb Dir     Innor (m/s)     True Dec       MW/LW Time     Exb Dir     Lar/Long     W/V Corr StA     DR Les Correr       Ref Sur MV/LW Hit     Sue Weier Time     Tab Lar/Long     Total GHA     Tab Az       MW/LW Hit     Sue Weier Time     Piol Lat     A/ (4E, -W)     Lar Diff/Az Diff       MW/LW Hit     Sue Weier Time     Piol Lat     A/ (4E, -W)     Lar Diff/Az Diff       Duret on Fail     Corrent Time     1     Tab 1a     Tab 1a       Duret on Fail     Corrent Time     1     Tab 1a     Tab 1a       Time Fin Near     Tab Lar/Long     Tab Dirf 2a     Lar/Long     Tab 2a       Marce of Sta Max Corrent Time     Corrent Tab 2a     Lar/Long     Tab 1a     Dar/Staf 2a       Mare Of Sta Max Corrent Time     Corrent Tab 2a<	LW Ht Diff	Vel Ratio Max Flood	Lane Count	Alt Corr	LHA
International MAXW Trans Diff     Face Face Face Face Face Face Face Face		Vel Ratio Max Etb	TG Plot	Add'l Corr Moon HP/Corr	t
MY/LW Time     Flood Dr     Drff     GHA (h)     d#/d Corr       Sb Star WY/LW Time     Ebb Dir     Inore (m/s)     Trole Dec       Sh Star WY/LW Time     Ebb Dir     Let/Long     SH/r Corr     DR Lat Some Some symptom       Art Star WY/LW H     Set Star WY/LW H     Set Star WY/LW H     Trie Drff     Corr     4.300 <sup>°</sup> Tab Lat       MY/LW HD Drff     Time Drff     Corr     4.300 <sup>°</sup> Tab Lat       Sb Star WY/LW HD Star     Local Star WY/LW H     Local Star Ker Were Time     Pot Lat     a.\(16, -wf)     Lat Drff/Az Drff       Durstion Figin     Corr Star Ker Star WY/LW H     Local Star Ker Star	Ref Sta HW/LW Time		ТАВ	Но	Tab Dec
Sub Sun InV/LW Turne     Ebb Dir     Ince Let/Long     Ince (m/s)     True Dec Will & Corr       Me / Sen W/L W H1     See K Weer Turne     Tab Lat/Long     Total GIA     Tab Az       Me / Sen W/L W H1     See K Weer Turne     Tab Lat/Long     Total GIA     Tab Az       Me / Lin K Long     Total GIA     Tab Az     Tab Lat       Me //L W H1     Turne Dirl     Corr     4.300°     Tab Lat       Sub Sig Me //L W H1     Turne Dirl     Long     L1A     Lat Dirl/Az Dirl       Durnion Figil     Corrent Time     1     Tab 1     Tab 1       Durnion Figil     Corrent Time     1     Tab 1     Tab 1       Durnion Figil     Corrent Time     1     Tab 1     Tab 1       Time Fin Near Time Fin Near Corrent Time     Tab Lat/Long     d#// d Corr     Tab Dec       Me / Sta Max Corrent Vier     Corr     Tab Lat/Long     d#// d Corr     Tab Dec       Corr Table 3     Ref Sta Max Corrent Vier     Corr     True Dec     Tab Dec       Corr Table 3     Ref Sta Max Corrent Vier     Long     Dec Dirl/Az Dirl     Dirl/Az Dirl </td <td>HW/LW Time Diff</td> <td>Flood Dir</td> <td>Diff</td> <td>GHA (h)</td> <td>d# / d Corr</td>	HW/LW Time Diff	Flood Dir	Diff	GHA (h)	d# / d Corr
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Ref Siz HW/LW H1 Ref Siz Sick Wer Time Tab Lat/Long Total GMA Tab Az   IW/LW H1 Sick Wer Time Corr + 380" Tab Lat   IW/LW H1 Drff Time Drff Corr + 380" Tab Lat   IW/LW H2 Drff Corr + 380" Tab Lat   IW/LW H2 Drff Corr + 380" Tab Lat   IW/LW H2 Corr Size Max Jack Ex Max Lat Drff/Az Drff   IW/LW H3 Sick Wer Time Pot Lat Ja / réW) Lat Drff/Az Drff   Duration Fail Ref Size Max Long LHA Lat Corr   Duration Fail Corrent Time Tab Lat/Long Tab Dac tDrff/Az Drff   Reng of Tide Corrent Time Tab Lat/Long df/ d Corr tDorr   Reng of Tide Corrent Time Tab Lat/Long Df/ d Corr tDorr   Reng of Tide Corrent Time Corrent Time Dec Drff / d Corr Dre Drff / Az Drff   Corr Table 3 Corrent Yat Phot Lat 214 Tab Dw/a Lat Dec Drff / Az Drff   Corrent Yat Dec Long Dac Drff Dec Corr Dre Drff / Az Drff   Dayth of Waser Corrent Yat Corrent Ad Lat Corre   Dayth of Waser Local Siz Max Corre	HW/LW line			v#/ v Corr	DB L at Same
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Enclosure (1)

OPNAVINST 3530.3B 5 MAY 1970

## U.S. NAVY STANDARD BEARING BOOK

## U.S.S.

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## PERIOD



Enclosure (2.)

S/N-0107-724-5200

OPNAV FORM 3530/2 (1-70)

#### STANDARD BEARING BOOK

U.S. Navy Regulations require that ships of the Navy maintain a bearing book. This publication has been printed to meet a recognized need for a standard bearing book. In addition to providing a standard record, the format is intended to provide optimum utility, economy, and flexibility, if information is recorded according to the following recommended rules:

1. At the head of column (1) the appropriate *date* should be entered on a separate line; and, thereafter, within the column for any changes of date.

2. Under the date, *times* are entered in column (1) for bearings recorded in either of the columns (2) through (6).

3. In columns (2) through (6), the structure (lighthouse, tower, tank, etc.) should be clearly identified at the head of each column; and, thereafter, within the column when observation changes to a new structure. Bearings are recorded in the appropriate columns corresponding to the recorded time. All bearings are visual by gyro compass, unless otherwise indicated.

4. Depths recorded in column (7) are depths under the keel by echo sounder, unless otherwise indicated.

5. Radar ranges and bearings, corresponding to a time indicated in column (1), may be recorded in either of the columns (2) through (6) by suitable notation.

6. If magnetic bearings are used the notation should identify such bearings and should include the compass error of the magnetic compass in use, for the particular heading at the time of observation.

7. Each page should be used until filled. *Erasures are not permitted*; draw a line through any mistake and rewrite the correct bearing so that both entries are still legible.

8. Upon relief, or when secured, the bearing recorder should sign his name across columns (2) through (6) immediately below the last entry.

Enclosure (2)

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OPNAV	FORM	3530/	2	(1-70)

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OPNAVINST 3530.3B 5 MAY 1970

	REC	CORD GYRO BE	ARINGS	
PLACE			GYRO ERROR	 
DATE TIME				DEPTH

Enclosure (2)

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OPNAVINST 3530.3.B Standard Bearing Book 5 MAY 1970 Opnav form 3530/2 (1-70)

GYRO ERROR	DEPTH
	DEPTH

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Enclosure (2)