

FINAL REPORT

OFFSHORE NAVIGATION (AUSTRALIA) PTY. LTD.

PROJECT 1419

FOR

PHILLIPS AUSTRALIAN OIL COMPANY

VICTORIA, AUSTRALIA

FEBRUARY 1983

W803

LOCATION HERMES #1

OIL and GAS DIVISION

2 3 SEP 1983

ADDENDUM NO. 1

FINAL REPORT OFFSHORE NAVIGATION (AUSTRALIA) PTY. LTD. PROJECT 1419

FOR PHILLIPS AUSTRALIAN OIL COMPANY

VICTORIA, AUSTRALIA
WELL LOCATION HERMES #1

FEBRUARY 1983

AVAILABLE IN WELL FILE

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I. INTRODUCTION

Offshore Navigation (Australia) Pty. Ltd.(ONA), under contract to Phillips Australian Oil Company (PHILLIPS), employed a Maxiran Radiopositioning System to position the Drilling Vessel (D/V) DIAMOND M EPOCH on a location that was designated by PHILLIPS as:

WELL LOCATION HERMES #1

The survey was conducted in Bass Strait, off the coast of Victoria, Australia. The well was located approximately 47 nautical miles southeast of Bairnsdale, Victoria.

The ONA base of operation was established at Bairnsdale on 9 February 1983.

II. FIELD OPERATIONS RECAP

The Maxiran system required to control this survey was stored in the area from a previous operation. Advance ONA personnel travelled to Bairnsdale on 7 February 1983 to prepare for the mobilization of the Maxiran system. All ONA personnel necessary for this survey were in the operational area by 8 February 1983.

The Maxiran system was calibrated on 10 February 1983 at Station Emerald (Offset). See "Maxiran Calibration" of this report for details.

On completion of the Maxiran calibration, the Maxiran base station equipment was transported to the three sites occupied to control the survey. Installation of the Maxiran base station equipment on these three sites was completed on 11 February 1983.

The ONA mobile operator and mobile equipment were transported via helicopter to the Drilling Vessel (D/V) DIAMOND M EPOCH on 10 February 1983, arriving on board

II. FIELD OPERATIONS RECAP (continued)

the rig at 1745 hours that date. Installation of the Maxiran mobile equipment on board the D/V DIAMOND M EPOCH was completed at 2000 hours 10 February 1983.

Moving of the D/V DIAMOND M EPOCH from its position at Well Location SELENE #1 was delayed due to weather. Towing of the D/V DIAMOND M EPOCH to Well Location HERMES #1 began at 1520 hours 13 February 1983. The D/V DIAMOND M EPOCH arrived in the location area, and the first anchor was dropped at 1755 hours 13 February. The anchors were secured, and spudding of the 30-inch casing began at 0650 hours 15 February. A preliminary Maxiran reading was obtained at 0300 hours 15 February 1983, prior to the beginning of the spudding operation.

The D/V DIAMOND M EPOCH had to move slightly off location due to difficulties being experienced in spudding. The 30-inch casing was set, and a final Maxiran reading was recorded at 1015 hours 18 February 1983.

II. FIELD OPERATIONS RECAP (continued)

The Maxiran system completed its assignment and was released at 1100 hours 18 February 1983. Dismantling of the Maxiran mobile and base stations was accomplished on 18 February 1983. All Maxiran equipment was stored in Welshpool, Victoria for the next survey.

The ONA mobile operator and three base operators were released from this survey on 19 February 1983. The ONA party chief was released on 20 February 1983.

III. GENERAL INFORMATION

A. Maxiran frequencies used were:

Mobile Transmitter

441 MHz

Base Transmitter

429 MHz

- B. Satisfactory radiotelephone communications were maintained between the Maxiran stations on the frequencies of 4637.5 and 7840.0 (SSB) kilocycles.
- C. The Maximan field data was turned over to the ONA of-fice in Perth, W.A. for final computation.
- D. Three Maxiran base station installations were provided by ONA for this survey.
- E. Three Maxiran base station sites were occupied during this operation. They were:

STATION CAPE CONRAN

STATION NIGHTOUT

STATION SEACOMBE

III. GENERAL INFORMATION (continued)

- F. The maximum range observed by the Maxiran system during this survey was 175 kilometers.
- G. The Maxiran mobile equipment was checked daily for proper delay setting. The delay setting was determined by a Maxiran Calibration conducted on 10 February 1983.

IV. MAXIRAN CALIBRATION

The Maxiran system was calibrated on 10 February 1982, prior to the commencement of the Well Location HERMES #1 survey. For this calibration, the Maxiran system was transported to Station Emerald (Offset), and the equipment installed at two markers at this site. The Maxiran mobile equipment was installed at the Station Emerald (Offset) marker, and the Maxiran base station equipment was installed at the calibration marker. The computed slope range of 1102.00 meters between the two markers, used to calibrate the system, were derived from a survey conducted by M.A. Nicholas and Associates.

The following pages consist of the field report of this calibration.

MAXIRAN CALIBRATION REPORT

DATE: 10 FEB 1983 MOBILE STATION **BASE STATION** LOCATION: _OCATION: EMERALD HILL CALIBRATION EMERALD HILL OFFSET **OPERATOR:** OPERATOR: H. BRIDGES K-T nolloy UNIT MODEL SERIAL No. UNIT MODEL SERIAL No. JIO CODE MONITOR NMM- OIB **BEACON** NTL-01 041 RROGATOR **CONTROL BOX** NTM- 01 NLL-02 c50 077 **AMPLIFIER** MPLIFIER NTU -OL 073 NTU-02 033 AMPLIFIER P/S LIFIER P/S 038 Ncu-01 NCU -01 277 **PREAMP** REAMP 5A4-12 056 SAU -12 096 TYPE **LENGTH TYPE LENGTH** COAX 821 ANDLEWS 821 ANDREWS **TYPE HEIGHT TYPE** HEIGHT **ANTENNA** ENNA QUAD LPL'S QUAD LPL'S 10 FT. 10 FT. INPUT VOLTAGE NPUT VOLTAGE AC 117 V 117 V AC. REQUENCY TX. FREQUENCY RX. FREQUENCY RX. FREQUENCY **RX. GAIN SETTING SAIN SETTING** MAX WEATHER CONDITIONS VEATHER CONDITIONS OVERCAST CUERCAST

DB RVED RANGE IN CALIBRATE:	6.112	КМ	
COMPUTED SLANT RANGE:			
. IDBILE ZERO SETTING IS:	5010	KM	
DBSERVED RANGE IN OPERATE:	j·i0Z	КМ	TIME: 0900

SIGNED: K.J. Melloy.

- 1. All equipment will be allowed to warm up for at least 30 minutes prior to calibrating.
- 2. All readings entered hereon will be final readings for the item in question, not preliminary or intermediate readings.
- 3. Each report will be complete in itself. Do not refer to other reports for information.
- 4. Use the reverse side of this report for any additional comments deemed necessary or advisable for completeness and clarity.

MAXIRAN CALIBRATION REPORT

DATE: 10 FEG 1963

i i	MOBILE	STATION			BASE S	TATION		
CATION: E	MERAL	D HILL	OFFIET	LOCATION: E	ne RALD	HILL	CALIBRATION	
PERATOR:		MOLLE	•	OPERATOR:		1065		
UNIT		DEL	SERIAL No.	UNIT	1	DEL	SERIAL No.	
ONLTOR	NmM	-018	041	BEACON	NTL	-01	FOCE CODE	
TROGATOR	NTM.	- 1	050	CONTROL BOX	NCL.		277	
MPLIFIER	NTU		073	AMPLIFIER	NTU	NTU-02		
MILIFIER P/S	Neu		038	AMPLIFIER P/S	NCU-01		677	
REAMP	54 u		05 b	PREAMP	SAU	-12	OGL	
		YPE	LENGTH	COAX	TYPE		LENGTH	
O/EK	ANDREWS .		821	T COAX	ANDCEWS		b'	
		/PE	HEIGHT	ANTENNA	TY	/PE	HEIGHT	
NIENNA	QUAL	LFL'S	10 FT.	ANTENNA		LfL's	10 FT.	
IP ⊞ T VOLTAGE	1		V A.C.	INPUT VOLTAGE		117 V AC		
X REQUENCY			MHn	TX. FREQUENCY	TX. FREQUENCY		429 MHz	
X_EREQUENCY			7 MHn	RX. FREQUENCY		441 MMg		
X SAIN SETTING	3)1~	RX. GAIN SETTING		. MAX		
			CAST	WEATHER CONDI	TIONS	016	RLAST.	
				-				
_								

FOOR TO NON EXISTANT SIG. NOT TO BE USED.

OB ERVED RANGE IN CALIBRATE:	6-1/2	KM			
COMPUTED SLANT RANGE:	1.102	KM			
DBILE ZERO SETTING IS:					
OBSERVED RANGE IN OPERATE:	1-102	KM	TIME:	0910	

SIGNED:

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MAXIRAN CALIBRATION REPORT

						DATE:	10 FEB & 3	
·	MOBILE	STATION		BASE STATION				
LOCATION: EN	NERALD	HILL	CFFSET	LOCATION:	EMER	ALD HIL	L CALIBOATION	
SPERATOR:		MWLLCY		OPERATOR:		DGES.		
UNIT	1	DEL	SERIAL No.	UNIT	<u> </u>	MODEL SERIA		
MONITOR	NMM	- C1B	CHI	BEACON	.VTL	-01	OL7 CODE 3	
INTERROGATOR	NTM	-	050	CONTROL BOX	NCL.		077	
AMPLIFIER	NTU		c73	AMPLIFIER	NTU.		033	
AN LIFIER P/S	Neu		038	AMPLIFIER P/S	Neu-		רדט	
PREAMP	SAU		056	PREAMP	SAU.	•	096	
co x	1	YPE	LENGTH	COAX	_	/PE	LENGTH	
	.A~9	ર પ્રસ્થા	£2'		AND	にきいら	82 FT	
		YPE	HEIGHT			/PE	HEIGHT	
ANENNA	QUAD	LPLS	KFT	ANTENNA	QUAD LPL'S		10 FT.	
INPUT VOLTAGE			7 V AC	INPUT VOLTAGE	* * * * * * * * * * * * * * * * * * * *		7 V A.c.	
TX FREQUENCY			41 MHy	TX. FREQUENCY	QUENCY		429 11 Hy	
3X. FREQUENCY			-29 MHz	RX. FREQUENCY		,		
RX GAIN SETTING			MIN	RX. GAIN SETTING	3		· MAX	
WEATHER CONDIT	WEATHER CONDITIONS OF ERCAST		WEATHER CONDIT	TIONS		RCAST.		
		• •	W. C.					
		,						
:		<u> </u>		Ш				

DBERVED RANGE IN CALIBRATE:	6.112	KM	
COMPUTED SLANT RANGE:			
IDBILE ZERO SETTING IS:	5010	KM	
OBSERVED RANGE IN OPERATE:	8-102	KM	TIME: 0425

SIGNED: M. M. May

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MAXIRAN CALIBRATION REPORT

				,		DATE:	o fer 37	
	MOBILE	STATION			BASE S	STATION		
-OCATION: EM	ERALD	HILL C	offiset	LOCATION: E	n ERAL:) HILL	CALIBRATION	
OPERATOR:		MOLLOY		OPERATOR:	H. BRIZ			
UNIT	МО	DEL	SERIAL No.	UNIT	МС	DEL	SERIAL No.	
::tONITOR	NMA	1-013	041	BEACON	NTI	L - 01	*015 CODE 3	
RROGATOR	NTA	1-01	050	CONTROL BOX	NCL	-02	077	
AMPLIFIER	NTL	1-02	2 דרט	AMPLIFIER	NTI	1-02	c33	
AN LIFIER P/S	ver	1-01	038	AMPLIFIER P/S	N C	u - 01	077	
PREAMP	SAu	-12	056	PREAMP	SA	u -12	०५ ६	
co x	Т	YPE	LENGTH	COAX	T	YPE	LENGTH	
	AND	cews	82'		AND	cens	82'	
	T	/PE	HEIGHT	ANTENNA	T	YPE	HEIGHT	
AN ENNA	QuA	LIL'S	10 FT	ANTENNA	QUAD	LPL'S	DFT.	
NPLIT VOLTAGE	T	117	V A.C.	INPUT VOLTAGE		11-	7V AC	
TX		44	1 MHm	TX. FREQUENCY	TX. FREQUENCY		429 1143	
RX. FREQUENCY		42	-9 MHz	RX. FREQUENCY	Y U4		41 H2	
RX GAIN SETTING	· ·		nw '	RX. GAIN SETTING		A ×		
VEATHER CONDIT	IONS	00	ERCAST	WEATHER CONDITIONS OVE			RLAST	
-								
AGE F	RUBLEM	- use	IN EMERGEN	et.				
DB RVED RANGE	IN CALIB	RATE:		6.112	KM			
COMPUTED SLANT	RANGE:		•	1.102	КМ			
BBILE ZERO SE	ETTING IS:			5010	KM			
				1.102		IME: OC	737	
NOTES BEG	CARDING	CALIBRA	SIGNED:	K.J. Ax	lly			
INDIES REC	JULIANO	CALIBRA	THOM I HOULDONE	. . .				

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MAXIRAN CALIBRATION REPORT

~						DATE: /	o feb a	93	
	MOBILE	STATION		BASE STATION					
ONTION:	EMERAL	9 HILL	OFFSET	LOCATION:	MERAL	9 HILL	. CALIS	BRATION	
OPERATOR:		J. MOLI		OPERATOR:	H. BA	2,04=5			
UNIT	МО	DEL	SERIAL No.	UNIT	МО	MODEL		AL No.	
.1ONITOR	NMA	1-01B	041	BEACON	NTL	-01	¢36	CODE 5.	
NTRROGATOR	NTM		050	CONTROL BOX	NCL	-02	רט		
AMPLIFIER	ł	-02	<i>0</i> 73	AMPLIFIER	NTU	-or	03	3	
AMELIFIER P/S	Neu		038	AMPLIFIER P/S	NCI	1-01	רט	7	
PREAMP	sAu-	12	056	PREAMP	1	-12	1		
70 - V	TYPE		LENGTH	COAX	TY	/PE	LEN	NGTH	
	ANDREWS		£2'	SOAX	A~D	ew;	82	1	
,	Т	YPE	HEIGHT	ANTENNA	TY	PE	HE	IGHT	
AN ENNA	Qua	D LPL'S	10 5-7	ANTENNA	QuA	QUAD LPL'S		10 FT.	
NPUT VOLTAGE		ł	117 V AC	INPUT VOLTAGE		117 V A.C.			
TX FREQUENCY			441 MMm	TX. FREQUENCY		429 MHz			
RX. FREQUENCY		ŀ	+29 MHm	RX. FREQUENCY		441 MHm			
RX GAIN SETTING			MIN	RX. GAIN SETTING	RX. GAIN SETTING .		MAX		
		VERCAST	WEATHER CONDI	TIONS	0018	REAST	-		
				<u> </u>					

DBGERVED RANGE IN CALIBRATE:	6.112	КМ	
COMPUTED SLANT RANGE:			
MOBILE ZERO SETTING IS:	5010	KM	
DBSERVED RANGE IN OPERATE:	1.102	КМ	TIME: 0957

signed: K.J. Molly.

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MAXIRAN CALIBRATION REPORT

						DATE:	10 FEB 83		
	MOBILE	STATION			BASE	STATION			
ONTION: EA	1 ERALI	HILL	OFFSET	LOCATION: E	NERALD	HILL	CALIBRATION		
OPERATOR:		T. Mollo		OPERATOR:					
UNIT	МО	DEL	SERIAL No.	UNIT	МС	DEL	SERIAL No.		
.1ONITOR	NM.	m -01B	041	BEACON	NTL-) <u> </u>	364 CODE 5		
NT RROGATOR		n - 01	050	CONTROL BOX	NCL	-02	רוט		
AMPLIFIER	ĺ	(-02	673	AMPLIFIER	NTU	· - 02	553		
AMELIFIER P/S	Nev		038	AMPLIFIER P/S	Neu	-01	ררס		
PR AMP	5 Au	,	056	PREAMP	SAU	-12	096		
70 - V	Т	YPE	LENGTH	COAX	T	/PE	LENGTH		
COLX	ANDREWS		82'	. II	AM) cows	8 2'		
		YPE	HEIGHT	ANTENNA	TY	/PE	HEIGHT		
ANENNA	QuA	b rbs	10 FT.		Qu4D	LFL's	10 FT		
NPUT VOLTAGE		l	7 V AC	INPUT VOLTAGE			IT V. Ac.		
TX		41	+ 1 mm	TX. FREQUENCY		429 MHg			
RX. FREQUENCY			rg Mun	RX. FREQUENCY	RX. FREQUENCY		441 MHm		
RX GAIN SETTING		1	niw	RX. GAIN SETTING			MA ×		
NEATHER CONDIT	IONS	cve	REAST	WEATHER CONDI	TIONS	c	VERCAST		
		l				l			

DBSERVED RANGE IN CALIBRATE:	6.110	KM	
CO PUTED SLANT RANGE:			
MOBILE ZERO SETTING IS:	5010	KM	
DB ERVED RANGE IN OPERATE:	1.102	KM	TIME: 1010

SIGNED: H. J. Molloy.

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MAXIRAN CALIBRATION REPORT

-						DATE: /	OFEB	83		
	MOBILE	STATION			BASE S	TATION				
LOCATION:	MERN	D HILL	OFFSET	LOCATION:	3MERAL	D HILL	CALL	529TION		
OPERATOR:		MOLLO		OPERATOR:		1060				
UNIT	МО	DEL	SERIAL No.	UNIT		DEL	SE	RIAL No.		
MONITOR	NM	m-01B	041	BEACON	NTL.	-01	036	CODE 5		
NTRROGATOR	WIM	-01	००५	CONTROL BOX	wel.	-02	ى ص	רר		
AMPLIFIER	1	1-02	073	AMPLIFIER	NTU	-02	c	33		
AM LIFIER P/S	ł	u -01	038	AMPLIFIER P/S	Neu			NCU-01		77
PREAMP	SAU	-12	056	PREAMP	sau	-12	0	96		
200	TYPE		LENGTH	COAX	TY	TYPE		ENGTH.		
COLX	ANDROWS		82	JOAN	ANDROWS		Ç	257		
	T	YPE	HEIGHT	ANTENNA	TY	PE.	ŀ	HEIGHT		
AN ENNA	QUA	O LPL'S	10 FT.	ANTENNA	Rum	s ipi's	16) F-T.		
NPUT VOLTAGE		117	VA.C.	INPUT VOLTAGE		- 11	7 / 1	٠ د .		
TX REQUENCY		i4 4 1	MHn	TX. FREQUENCY	TX. FREQUENCY		429 MHz			
RX. FREQUENCY		l	1 MKm	RX. FREQUENCY				H-3		
RX GAIN SETTING		1	12	RX. GAIN SETTIN	G		nax	-,		
YEATHER CONDITIONS CUERCAST		WEATHER CONDITIONS OVEREAST								

DBERVED RANGE IN CALIBRATE:	6·1/2 K	M
COMPUTED SLANT RANGE:		M
I DBILE ZERO SETTING IS:	5010 K	M
DBSERVED RANGE IN OPERATE:	1.102 K	M TIME: 1035

signed: X f. Ally.

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V. WELL LOCATION INFORMATION

The following information pertains to the positioning of the D/V DIAMOND M EPOCH on Well Location HERMES #1.

Coordinates of the desired location were obtained from PHILLIPS as:

Latitude $38^{\circ}36'08".55$ S N = 5,726,533 meters Longitude $148^{\circ}17'.54".19$ E = 613,059 meters

The D/V DIAMOND M EPOCH was secured on location, and the 30-inch casing was set the morning of 18 February 1983. The following final Maxiran ranges were recorded at 1015 hours 18 February 1983, with the Maxiran mobile equipment installed on board the rig:

Sta. Cape conran to mobile antenna 95.934 kilometers
Sta. Nightout to mobile antenna 163.334 kilometers
Sta. Seacombe to mobile antenna 89.557 kilometers

At the time these final Maxiran ranges were recorded, the drill stem was 28 meters, at a bearing of 107° True, from the Maxiran mobile antenna.

V. WELL LOCATION INFORMATION (continued)

FINAL COMPUTED COORDINATES - WELL LOCATION HERMES #1: (Drill stem)

Latitude 38°36'08".02 S N = 5,726,549 meters Longitude 148°17'54".28 E E = 613,061 meters Least square adjusted tie = .074 meter From desired to final position = 16.56 m. @ 007.336° True

The final coordinates of the drill stem were derived by applying a propagation factor of .999932, and the reported offset and bearing, to the final Maxiran ranges recorded.

Coordinates of the desired and final position are expressed in the Universal Transverse Mercator Projection, Australian National Spheroid of Reference, Zone 55, Central Meridian 147° East, AUSTRALIAN GEODETIC DATUM.

VI. BASIC CONTROL

Coordinates of the three Maxiran base stations, occupied to control this survey, were obtained from the ONA Basic Control files. Coordinates of Station Emerald (Offset), occupied to calibrate the Maxiran system, was obtained from a M.A. Nicholas and Associates survey.

Universal Transverse Mercator Projection Australian National Spheroid Zone 55 Central Meridian 147° East AUSTRALIAN GEODETIC DATUM

STATION CAPE CONRAN:

Latitude $37^{\circ}48'28''42 \text{ S}$ N = 5,814,075 meters Longitude $148^{\circ}43''46'''98 \text{ E}$ E = 652,266 meters Elevation 43 meters

STATION NIGHTOUT:

Latitude $38^{\circ}54'29".93 \text{ S}$ N = 5,693,244 metersLongitude $146^{\circ}27'.37".03 \text{ E}$ E = 453,205 metersElevation 229 meters

STATION SEACOMBE:

Latitude $38^{\circ}07'58".47 \text{ S}$ N = 5,779,291 metersLongitude $147^{\circ}27'51".55 \text{ E}$ E = 540,692 metersElevation 28 meters

VI. BASIC CONTROL

STATION EMERALD (OFFSET):

Latitude $37^{\circ}48'48''60 \text{ S}$ N = 5,814,632 metersLongitude $147^{\circ}42'00''03 \text{ E}$ E = 561,615 metersElevation 70 meters

OFFSHORE NAVIGATION LAUSTRALIA PTY. LTD.

VII. PERSONNEL

NAME POSITION

Bridges, H. Party Chief

Molloy, K. Mobile Operator

Dunn, P. Base Operator

Hassett, B. Base Operator

Russell, D. Base Operator

VIII. DISTRIBUTION

Phillips Australian Oil Company 23rd Floor, City Centre Tower 48 St. Georges Terrace Perth, W.A. 6000 AUSTRALIA

Attention: Mr. R.F.C. Chase

Four copies

Offshore Navigation, Inc. Post Office Box 23504 Harahan, Louisiana 70183 U.S.A.

Two copies

Offshore Navigation (Australia) Pty. Ltd. Post Office Box 291 Cloverdale, W.A. 6105 AUSTRALIA

One copy

STATION: CAPE CONRAN

LOCATED:

Station Cape Conran is located on the southeastern corner of Gippsland, Victoria, Australia, approximately 34 kilometers southeast of Orbost.

The station site is located at the highest lookout in the area. The terrain is fairly flat, and covered with small 1-foot high bush. The open sea is approximately one-half mile from the station.

ACCESS:

From Orbost, follow the road through Marlo, a small built up area 15 kilometers from Orbost. Drive 18 kilometers past Marlo to a fork in the Turn right at this fork, and drive on a road. gravel road for approximately one kilometer to a sand track on the left. This track will be seen before reaching a boat ramp and lighthouse. Turn left onto this sand track to a round about. You will notice two galvanized pipes inside the This identifies the station site. round about. This track to the station is a small narrow sand track, and has been used as a stopping place for tourists due to it being the highest lookout in the area.

MARKER:

The station marker consists of a brass plate at ground level. The two galvanized pipes, which protrude 2 feet above ground level, are on either side of the marker. The brass plate is inscribed "GEODETIC SURVEY VICTORIA - TRIANGULA-TION STATION".

Four permanent star stakes, driven to ground level, are at this site. The star stakes are located 10 meters, at a bearing of 010°, 12 meters, at a bearing of 105°, 17 meters, at a bearing of 205°, and 12 meters, at a bearing of 285°, from the station marker.

STATION: CAPE CONRAN (continued)

GENERAL: Food, fuel and water can be obtained in Orbost, Bairnsdale, or Marlo. If camping equipment needs to be purchased, it is best to make this purchase in Bairnsdale.

This station site can become very cold during the winter months.

A 30-foot tower was erected at this station, the minimum height required to clear surrounding obstructions. Clear vista is from 180° to 270°. Star stakes were used to secure the tower.

The station site is located on Crown land. Permission to occupy the site must be obtained from Crown Land and Survey Department, Bairnsdale, Mr. Jim Bennett, telephone 051-523975

ELEVATION: 43 meters

SKETCH: See next page.

UTM PROJECTION, AUSTRALIAN NATIONAL SPHEROID ZONE 55, C.M. 147° EAST -----A.G.D.

Lat. $37^{\circ}48^{\circ}28^{\circ}42$ S N = 5,814,075 meters Long. $148^{\circ}43^{\circ}46^{\circ}98$ E = 652,266 meters

> OFFSKORE NAVIGATION (AUSTRALIA) PRY, LTD.

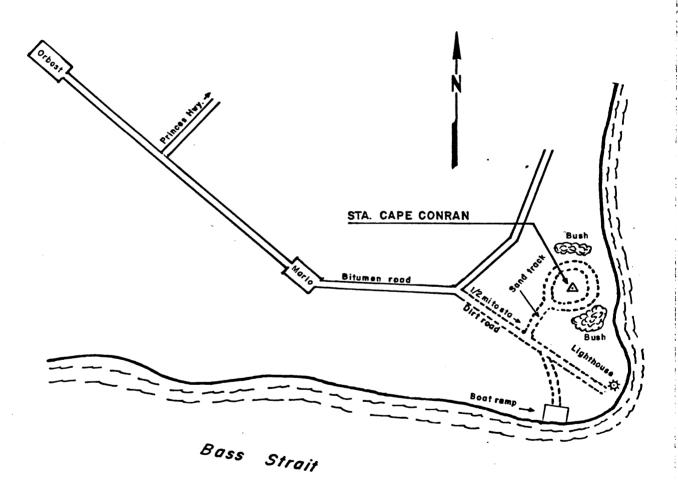
STA. CAPE CONRAN — AUSTRALIA

LAT. 37º48'28.42 \$ LONG. 148°43'46"98 E

N 5,814,075 meters E 652,266 meters

ELEV. 43 meters

UTM PROJ. -----AUST. NAT. SPHEROID



11/82/1419

OFFSHORE NAVIGATION LAUSTRALIA) PTV. LTD. STATION: NIGHTOUT

MARKER:

LOCATED: Station Nightout is located in the northeast corner of Wilsons Promontory, Victoria, Australia.

The station site is located on the summit of a hill. The marker is surrounded by a few small rocks and 18-inch high scrub. The hill slopes away on all sides. There are hills of less elevation to the south, east, and northeast of the station. The Verever Ranges are about 5 kilometers away, and Mount Roundback is about 1.5 kilometers north-northwest of the station. Sealers Cove is about 11 kilometers from the station, at a bearing of 175° to 180°.

ACCESS: Access to this station is by helicopter only.
All vehicular traffic is prohibited in this area. The helicopter transported personnel and equipment from Welshpool to the site. The area at the station site is fairly flat with a slight slope to the west and is quite suitable for helicopter landing.

The station marker consists of a brass Department of Lands and Surveys Triangulation marker, set in a 6-inch square block of concrete that is flush with the ground. Two 1-1/2-inch galvanized iron pipes, standing 24 inches high, are set on either side of the marker. The pipes are painted blue and orange. See Sketch for references to this marker.

Food, fuel, water, and food is available in Welshpool.

A 35-foot tower was erected at this site. A minimum tower height of 10 feet would be required to clear surrounding obstructions. Clear vista is from 030° to 165°. Star stakes were used to secure the tower.

OFFSHORE NAVIGATION (AUSTRAMA) PTY, LTP. STATION: NIGHTOUT (continued)

The station site is on land that is owned by the National Parks, Victoria. Permission to occupy the station must be obtained from the Director of National Parks, Mr. Don Saunders, 240-250 Victoria Parade, Melbourne, telephone 03-6514111. The Wilsons Promotory contact is Mr. Ray Leivers of National Parks, Wilsons Promotory (South Gippsland), telephone 822796. A \$1000.00 bond had to be submitted to the National Parks to occupy the station.

ELEVATION: 229 meters

SKETCH: See next page.

UTM PROJECTION, AUSTRALIAN NATIONAL SPHEROID ZONE 55, C.M. 147° EAST ----A.G.D.

Lat. $38^{\circ}54'29".93$ S N = 5,693,244 meters Long. $146^{\circ}27'37".03$ E E = 453,205 meters

OFFSHORE NAVIGATION (AUSTRALIA) PTY. LTD.

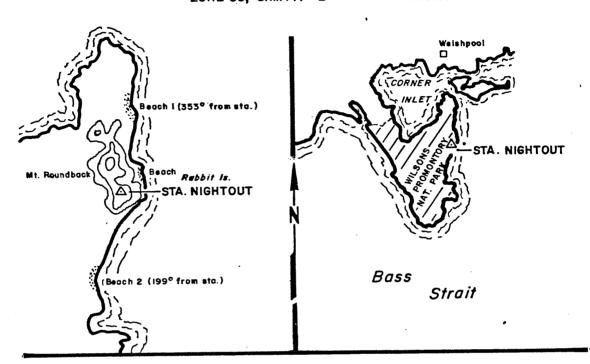
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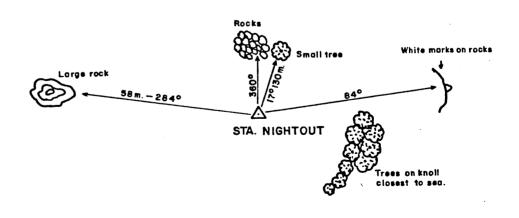
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LAT. 38°54'29"93 S LONG. 146°27'37".03 E N 5, 693, 244 meters E 453, 205 meters

ELEV. 229 meters

UTM PROJ. ——AUST. NAT. SPHEROID ZONE 55, C.M. 147° E ——A.G.D.





11/82/1419

OFFSHORE NAVIGATION _ (AUSTRALIA) PTV. LTD. STATION: SEACOMBE

LOCATED:

Station Seacombe is located approximately 12 kilometers south of the township of Lock Sport, Victoria, Australia. The station site is located on a small hill, with gently sloping sides. The ground at the station is hard packed sand. Plant life in the surrounding area consists of 10 to 15-foot high trees and brush. rounding country side is similar, with trees reaching a height of 25 to 30 feet. The land to the south, west, north, and northeast is flat to the horizon. Lake beds, approximately 1/4 mile in distance, can be seen to the southeast of the The lake beds lie in a strip of land known as "90-Mile Beach". The sea lies beyond this strip of land. "Ninety-Mile Beach" is rel-With the exception of the atively low land. rise on which the station is located, there seems to be no other feature in the area which can distinguish the site.

ACCESS:

From Yarram, Victoria, drive south on the Gippsland Highway to Sale. From Sale, continue south on the Gippsland Highway to Longford, a distance of 6 kilometers from Sale. On reaching the entrance to Longford, turn off towards Dutson and Golden Beach and drive 26 kilometers to a turnoff to the left signposted "Seacombe". Turn left onto this road and drive for approximately 12.5 kilometers on this road to a track on the right hand side of the road that is signposted "Trig Mark". This sign can be easily missed, as it is partly obscured by bush. Turn onto this track, and follow the track until you pass a cleared area for a pipe line. Go beyond this pipe line crossing to a point where another track will be seen on the right. turn right onto this steep track and follow it to its end and the station marker. A four-wheel drive vehicle is required to reach this station.

MARKER:

The station marker is located on a 10-foot diameter sand mound, approximately 3 feet above surrounding levels. The trig marker consists of

STATION: SEACOMBE (continued)

a 6-inch square block of concrete, with a 4-inch diameter bronze plaque embedded in its center. The bronze plaque is inscribed "GEODETIC SURVEY VICTORIA - 69/104 - TRIANGULATION STATION". A 10-foot high steel tubular quadrupod is located over the marker. Two 2-foot diameter black steel discs are mounted vertically on top of the quadrupod.

Four permanent star stakes are at this site. The star stakes are located 32 feet, at a bearing of 015°, 30 feet, at a bearing of 120°, 30 feet, at a bearing of 215°, and 35 feet, at a bearing of 310°, from the station marker.

GENERAL:

The town of Lock Sport is located northeast of the station, 10 kilometers away along the hard top road. This is a small town that caters to private boats. The town has a couple of gas stations, which also serve as local stores. The Shell Station, located at the entrance to Lock Sport, is probably the best station for supplies. In addition to fuel supplies, vegetables, canned and frozen foods, cooking gas, water, reading material, hardware and tools can be purchased at this station. The station is also equipped to perform minor vehicle repairs, including welding. There is also a post office and marina located in Lock Sport. No local labor could be found in the area.

The station site is located on the Gippsland Lakes National Park. Permission to occupy the site was obtained from Mr. Gordon Godsack of the National Parks, telephone 051-460278. A \$1000.00 bond was submitted to the National Park to occupy the station.

It is imperative that the site be kept clean. Garbage and old oil should be disposed of at the garbage dump, 2 kilometers from Lock Sport, and 8 kilometers from the turnoff to the site.

STATION: SEACOMBE (OFFSET) (continued)

Toilet facilities are available at Seacombe, 4.5 kilometers southwest of the site, and their use should be encouraged. The site area is also vulnerable to fire. The brush is dry and of an oily nature.

Flies, mosquitoes and sand flies are present at this station. Personnel are well advised to have a supply of repellant on hand. Warm clothing is a must, as nights at this site are very cold.

A 30-foot tower was erected at this site. A minimum height of 20 feet is required to clear surrounding obstructions. Clear vista is from 040° to 260°. Star stakes were used to secure the tower.

ELEVATION: 28 meters

SKETCH: See next page.

Coordinates of the station markers were obtained from a Department of Crown Lands and Survey, Victoria summary sheet.

UTM PROJECTION, AUSTRALIAN NATIONAL SPHEROID ZONE 55, C.M. 147° EAST - - A.G.D.

Lat. $38^{\circ}07^{\circ}59!47$ S N = 5,779,291 meters Long. $147^{\circ}27^{\circ}51!!55$ E = 540,692 meters

OFFSHORE MAVIGATION (AUSTRALIA) PTY. LTD.

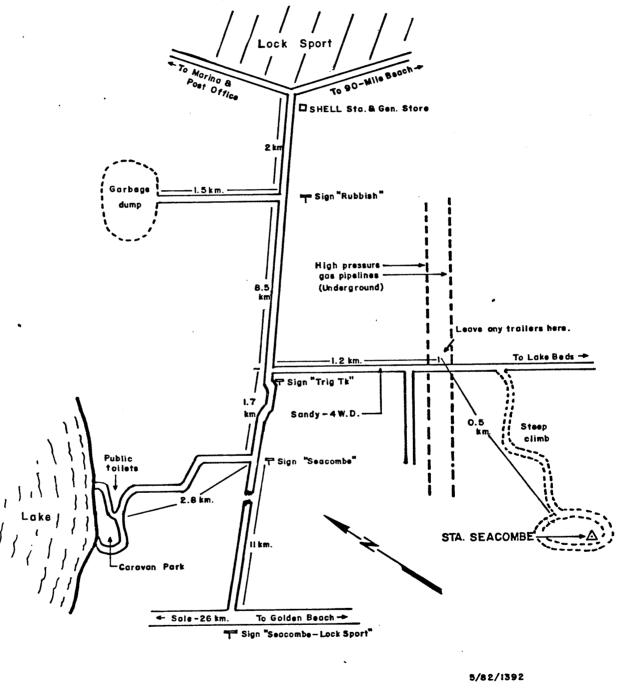
STA. SEACOMBE-

---AUSTRALIA

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UTM PROJECTION, AUST. NATIONAL SPHEROID ZONE 55 C.M. 147° E

AUSTRALIAN GEODETIC DATUM



OFFSHORE MAVIGATION (AUSTRALIA) PTY, LTD.

STATION: EMERALD (OFFSET)

LOCATED: Station Emerald (Offset) is located on Emerald Hill, approximately 9 kilometers northeast of

Bairnsdale, Victoria, Australia.

cation of the Offset marker.

ACCESS: From the Marlin Motel in Bairnsdale, travel east towards Lakes entrance. Set the vehicle's odometer to 0.00 kilometer at the bridge just outside of Bairnsdale. Drive to 1 kilometer and a fork. Take the left fork to Lakes Entrances, and turn left onto Cummins Road at 5.2 kilometers. Cummins Road will be seen just before a railroad crossing. Follow Cummins Road to 6.5 kilometers and a "T" junction. Turn left, and follow the road to a gate at 7.1 kilometers. Turn into this gate, and the station marker will be located along the fence line. This is the lo-

A calibration marker is also established at this site. This calibration marker is 1102.1 meters, at a bearing of 319° Magnetic, from the Offset marker.

To reach the calibration marker, remain on the road at 7.1 kilometers, and drive to a second "T" junction at 8.0 kilometers. Turn left at this junction, and follow this road to 8.8 kilometers, where a cow shed will be to the right of the road, and a gate on the left hand side. The calibration point is located near this gate. See Sketch for details.

MARKER: The offset marker consists of a 1-1/2-inch brass pipe set in concrete, with a galvanized plug.

The calibration marker consists of a star stake embedded in the ground, and set in concrete.

STATION: EMERALD (OFFSET) (continued)

GENERAL: All necessary supplies and labor are available in Bairnsdale.

This station was occupied during October 1982 only to calibrate the Maxiran system between the offset and calibration markers. A 10-foot tower was erected adjacent of the two markers for this calibration. Star stakes were used to secure the towers.

The station site and markers are on land owned by Mr. Paul Needham. Permission must be obtained from Mr. Needham to occupy the sites. His telephone number is 52-5347.

ELEVATION: 70 meters (Offset) marker

SKETCH: See next page.

Coordinates of the offset marker were obtained from a M.A. Nicholas and Associates summary sheet. No coordinates are published for the calibration marker.

UTM PROJECTION, AUSTRALIAN NATIONAL SPHEROID ZONE 55, C.M. 147° EAST - - A.G.D.

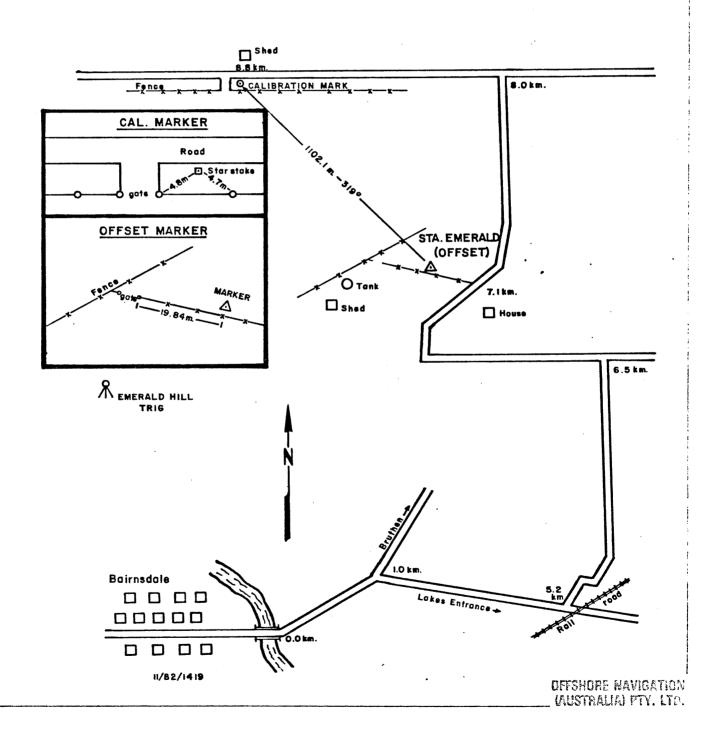
Lat. $37^{\circ}48'48".60 \text{ S}$ N = 5,814,632 meters Long. $147^{\circ}42'00".03 \text{ E}$ E = 561,615 meters

STA. EMERALD (OFFSET) ——AUSTRALIA

LAT. 37°48'48"60 \$ LONG. 147°42'00"03 E N 5,814,632 meters E 561,615 meters

ELEV. 70 meters

UTM PROJ. ——— AUST. NAT SPHEROID ZONE 55, C.M. 147° E ———— A.G.D.



WELL HERMES No. I ————AUSTRALIA

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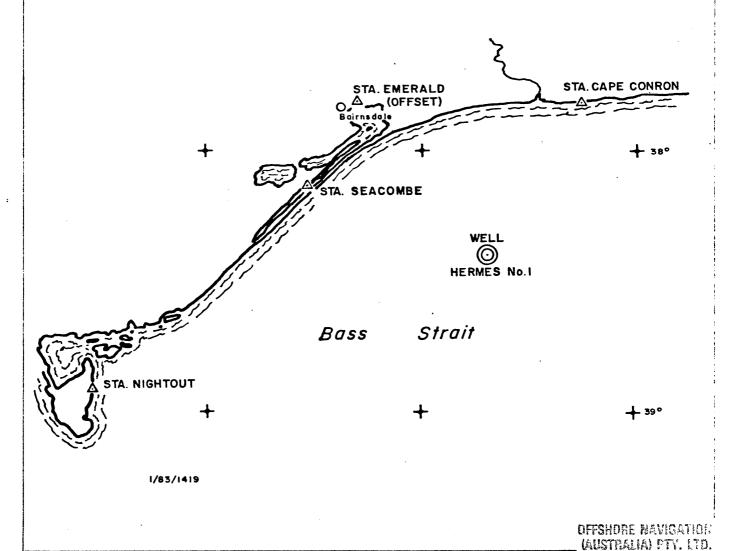
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ZONE 55, C.M. 147° E ——A. G. D.

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VICTORIA



APPENDIX A

DAILY OPERATIONS LOGS

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APPENDIX B

THE MAXIRAN RADIOPOSITIONING SYSTEM

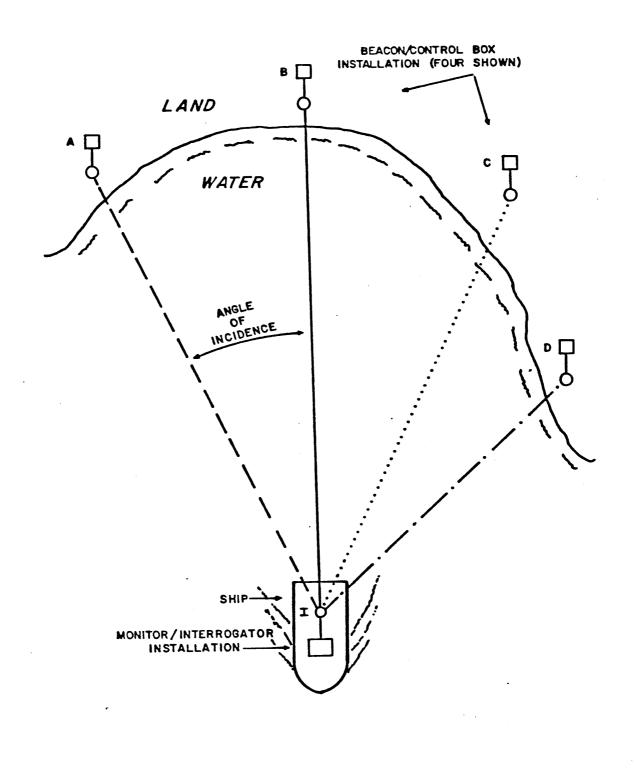
I. THE MAXIRAN RADIOPOSITIONING SYSTEM

The Maxiran Radiopositioning System is a precision electronic ranging system, capable of both manual and automatic tracking of range. It is especially useful for measuring distances across bodies of water.

The use of the Maxiran requires three or more electronic installations. For the purposes of this discussion, one of these installations is assumed to be aboard a ship (see Figure 1). This installation consists of the Maxiran Monitor and Interrogator. The other installations are located onshore. Each of these installations consist of a Maxiran Beacon and a Control Box. There are two or more of the Beacon Control Box installations situated at appropriate locations onshore.

In operation, the Monitor/Interrogator installation transmits a radio signal (containing a Beacon-Select code which addresses a selected Beacon) which is picked up by all of the Beacon/Control Box installations. Each Beacon decodes the received signal and decides whether the Beacon-Select code transmitted corresponds to that Beacon. If the Beacon-Select code is correct for a

FIGURE-I. TYPICAL MAXIRAN SYSTEM



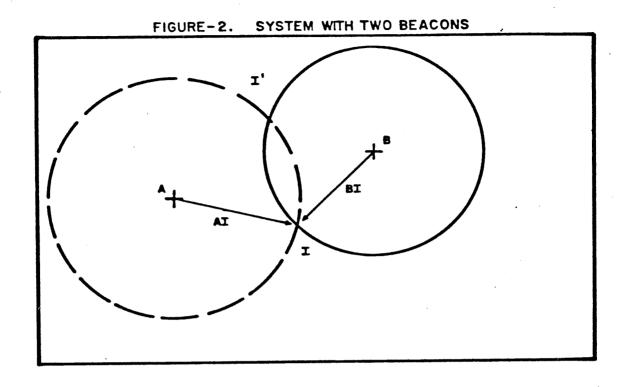
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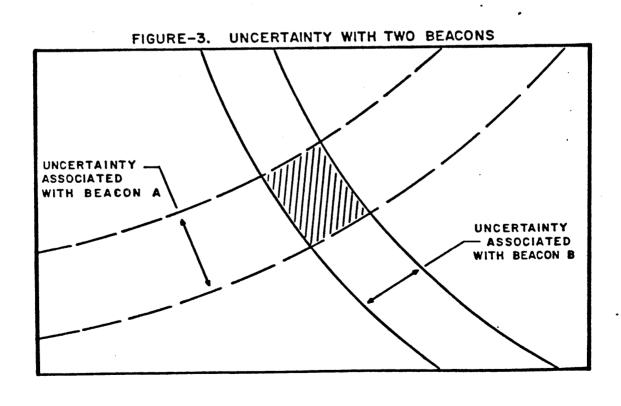
Beacon, it responds by transmitting a radio signal reply. The Monitor measures the amount of time elapsed between the Interrogator's transmission and the received reply sent by the Beacon. Since, for all practical purposes, radio signals travel at a known speed, the time elapsed between transmission and response is a measure of the distance the radio signal travelled. The elapsed time is converted by the Monitor into distance and then displayed. Knowing the location of the land stations and the current distance from the ship to each of them, the position of the ship can be readily calculated.

For the purposes of this discussion, let us first assume that only two Beacons are being utilized. They are the Beacons marked "A" and "B" in Figure 1. Since the distance from Beacon "A" to the Interrogator (call it distance Al), and the distance from Beacon "B" to the Interrogator (call it distance Bl) are now known (these distances are the distances displayed on the Monitor front panel), we can use some geometry to calculate the position of the ship with reference to Beacons "A" and "B".

As illustrated in Figure 2, the distances of Al and Bl define two intersecting circles, one with a radius of length Al centered about Beacon "A", the other with radius of length Bl centered about Beacon "B". The two circles intersect at two points (marked I and I' in Figure 2). Obviously, the ship can only be located at one of the points. Since point I' happens to be located on land, we can safely assume that the ship is located at Point I.

There is always some uncertainty associated with the exact measurements of the Beacons. This is illustrated in Figure 3. Figure 3 illustrates an enlarged view of the intersection of the circles shown in Figure 2. If the tolerance of the measurements of Beacon "B" is plusor-minus 5 meters, then the two solid lines in Figure 3 are 10 meters apart. The tolerance of the measurements of Beacon "A" should be the same as that of Beacon "B", but this is not always the case due to differences in geographical location. Under the above conditions, we only know that the ship is located somewhere in the shaded area of Figure 3.

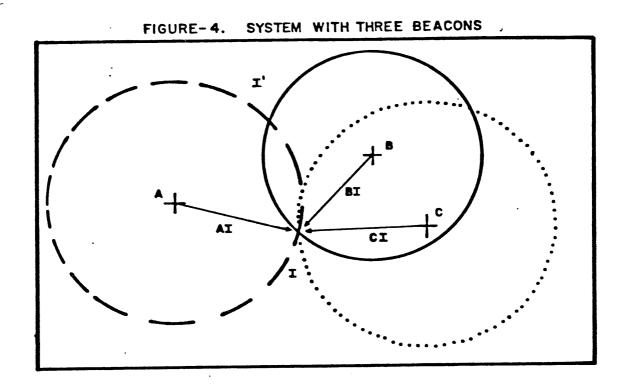


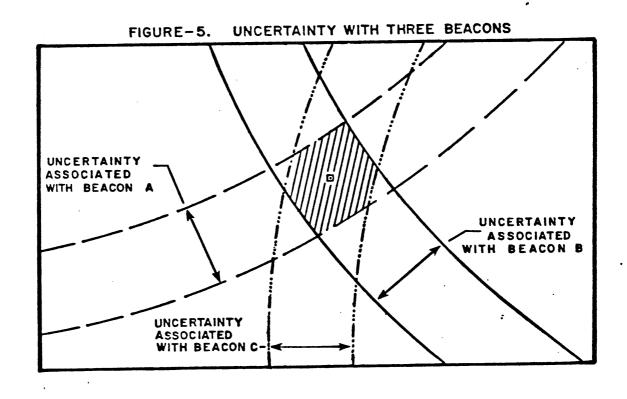


OFFSHORE NAVIGATION (AUSTRALIA) PTY. LTD.

For the purposes of the following discussion, it is assumed that there are now three Beacons utilized. Now three circles are defined, instead of the two from the discussion above. The third distance, from Beacon "C" to the Interrogator (call it distance Cl), defines a circle of radius length CI centered about Beacon "C". The new situation is illustrated in Figure 4. Notice that with the three circles, there is only one location where all three circles can intersect. This eliminates the ambiguity associated with using only two Beacons. Now there is no I' to worry about. An additional advantage of using three Beacons is illustrated in Figure 5. Now the area of uncertainty has been reduced even though the tolerance of Beacon "C"'s measurement isn't any better than that of the other Beacons.

As the ship moves along, one or more of the Beacons may become unusable for various reasons; out of range, too small or too great an operating angle, etc. If additional Beacons are situated on shore, they may be interrogated, as desired, to greatly expand the range and usability of the system.





OFFSHORE NAVIGATION (AUSTRALIA) PTV. LTD.

As many as three different Beacons may be selected at one time by the proper setting of the Monitor's Beacon-Select switches.