

#2

**BRIDGE and ENGINE
BELL BOOK**



USNS

John Pope

**MILITARY SEA TRANSPORTATION SERVICE
DEPARTMENT OF THE NAVY**

MSTS FORM 5211-3 (Rev. 4-61)

INSTRUCTIONS

1. The Bridge and Engine Bell Book is an adjunct to the ship's log. Its primary purpose is to accurately record the transmission and receipt of engine orders. It further provides a convenient means for recording all information pertinent to maneuvering while entering or departing port, or while shifting berth.
2. The book is designed for use by the bridge and engine room(s) in both single and twin-screw ships. All information on upper left pages will be completed by bridge operators. (Names of pilots will include first name or initials.) Engine operators will only complete the first two lines on this page.
3. , Applicable boxes on the top of right pages will be checked by bridge and engine operators. Separate books will be maintained for twin-screw ships with engines located in separate spaces. Applicable boxes at the top of right page will be checked by engine operators to reflect appropriate engines. The RPM column shall be completed only by engine operators.
4. Approved symbols, as indicated, will be used for recording bells. Time will be entered in four-digit numbers, commencing at 0001, one minute past midnight, to 2400, the following midnight.
5. No alterations or erasures will be made in the book. When a correction is necessary, a single line shall be drawn through the original entry so that the entry remains legible. The correction shall be initialed by the person keeping the record. All information pertinent to maneuvering shall be recorded under "Remarks."

6. Bell book(s) shall be kept from:

- a. Arrival to finished with engines (FWE).
- b. Standby engines (SBE) to departure.
- c. Whenever the ship is shifted in a harbor under her own power.
- d. When otherwise deemed appropriate by the master.

7. The master will insure that bell books are available at all times on the bridge and in the engine room(s) and that officers on watch properly and accurately record all signals.

8. After the engines have been rung off on conclusion of a maneuver, officers recording the bells shall sign the book in the space designated. In the event an officer is relieved during a maneuver, a notation to this effect will be made in the remarks column, with the time and signature of the officer being relieved. The relieving officer will sign the book in the space provided at the bottom of the right page.

9. Bell books will be retained on board for six months after completion and then transferred to the home port commander. Bell books will be retained by the home port commander for three years from date of last entry and then destroyed.

PORT NS. OAKLAND CALIF		VOYAGE NO. 4A	
DATE JULY 19 1946		TIME	
☐ ARRIVAL	☒ DEPARTURE		
PILOT		ON BOARD	
AT THE CONN FROM		TO	
PILOT		ON BOARD	
AT THE CONN FROM		TO	
EMERGENCY STEERING MANNED 1410		SECURED	SBE
		FWE	

* BELL SYMBOLS

AHEAD			BACK	
SLOW	⌋		SLOW	⌋
HALF	⌋+		HALF	⌋+
FULL	⌋+	STOP Z	FULL	⌋+
EMERG	Ⓢ		EMERG.	Ⓢ

REMARKS

S.R.E. @ 1345
 S.FOM - 2708370
 P.FOM - 6615610
 TACH. - 04558050
 SHAFT CTR -

~~DEPT. @ 4628050, Ctr~~
 S.FOM - 2708670
 P.FOM - 6015900
 TACH. - 4628050
 SHAFT CTR -
 Dept @ 1600

J. Brinkman, Bay 2nd @ Thistle
 Dist. Webster, Answered Bells & recorded same -
 Departing N.C. Oakland, Ca. for Tacoma,
 Wash.

PORT <i>Tacoma -</i>		VOYAGE NO. <i>4-A</i>	
☒ ARRIVAL ☐ DEPARTURE		DATE <i>21 July 66</i>	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED	SECURED	SBE	FWE

• BELL SYMBOLS

AHEAD			BACK	
SLOW			SLOW	
HALF			HALF	
FULL		STOP Z	FULL	
EMERG.			EMERG.	

REMARKS

July 21, 1966 0800 - 1200
at sea, maneuver by order
of the Bridge.
L.P. Culammi

Arrival @ 1900

S-Ctr = 04854740

T-Ctr = 04847100

P-FOM = 6032400

S-FOM = 2724470

FWE @ 2103

S-Ctr 04858550

T-Ctr 04851794

P-FOM = 6032890

S-FOM 2724860

Bells Recorded by

Mr

on Throttle

Arr-Tacoma from San Francisco

☒ BRIDGE			☐ STARBOARD OR FWD (NO. 1)			☐ PORT OR AFT (NO. 2)		
STARBOARD ENGINE OR FORWARD (NO. 1)				PORT ENGINE OR AFT (NO. 2)				
TIME	* BELL	RPM	TIME	* BELL	RPM			
0832	4	40	2026	+	30			
0834	L	20	2029	Z	0			
0849	Z	0	2030	—	15			
0857	—	15	2030	+	30			
0854	4	40	2033	Z	0			
0900	4H	60	2033	L	20			
0939	4	40	2035	Z	0			
0951	Z	0	2035	—	15			
0955	L	20	2036	Z	0			
0957	4	40	2036	—	15			
1002	4H	60	2037	Z	0			
1107		16 NOZ	2037	L	20			
R.P. Adams			2037	4	40			
Stby @ 1500			2038	L	20			
1505	60 Rpm		2039	Z	0			
1506	4	40	2040	L	20			
1507	—	20	2042	Z	0			
1509	Z	0	2043	—	15			
1510	—	15	2043	Z	0			
1513	Z	0	2046	L	20			
1513.5	4H 16 Noz		2047	Z	0			
1929	STBY	60	2048	L	20			
M. J. 6/21/66			2048	Z	0			
1929	STBY	60	2050	L	20			
1939	4	40	2050	Z	0			
1956	L	20	2050	L	20			
L.H. Burk			2051	Z	0			
2007	Z	0	2052	—	15			
2009	L	20	2052	Z	0			
2022	Z	0	WE @ 2103					
2024	L	20	R.P. Adams					
2025	Z	0						
2025	—	20						
2025	—	15						

WATCH OFFICER'S SIGNATURE

PORT TACOMA WASH.		VOYAGE NO. 2.7 4-AB	
☒ ARRIVAL	☒ DEPARTURE	DATE JULY 23, 1966	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED	SECURED	SBE	FWE

peaslee 1400

* BELL SYMBOLS

AHEAD			BACK	
SLOW	<u> / </u>		SLOW	<u> / </u>
HALF	<u> + </u>		HALF	<u> + </u>
FULL	<u> + </u>	STOP Z	FULL	<u> + </u>
EMERG.	<u> (4) </u>		EMERG.	<u> (+) </u>

REMARKS

SBE @ 1347
S. FOM. - 2725120
P. FOM. - 6038720
TACH. - 04851400 ~~*04855010*~~
SHAFT CTR. -

DEPT. @ 1500
S. FOM. - 2725360
P. FOM. - 6038920
TACH. - 04854940

J. Brajendra Bay 2nd at Thistle
Brook - answering Telegraph &
writing Bell Book

Departing Tacoma
Washington for Naha
Okinawa

Buckner Bay, Okinawa			
PORT White Beach		VOYAGE NO. 4B	
☒ ARRIVAL ☐ DEPARTURE		DATE Aug 6, 1966	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED hoew 0630	SECURED	SBE	FWE 0812

* BELL SYMBOLS

AHEAD			BACK	
SLOW	⌒		SLOW	⌒
HALF	⌒+		HALF	⌒+
FULL	⌒+	STOP Z	FULL	⌒+
EMERG.	Ⓢ		EMERG.	Ⓢ

REMARKS,

ARRIVAL 0630

S-CTR 06612190

T-CTR - 06595950

P-7.0.M. 6138800

S-7.0.M 2822100

S.H. Buck

F.W.E. C 0812

S-CTR. 06615220

T-CTR. 06598988

P-FOM. 6139170

S-FOM 2822470

Brooks - answering Telegraph
writing in Bell Book
Day end at the table

Arrival @ Buckner Bay

PORT Buckner Bay Okinawa		VOYAGE NO. 4 C	
☐ ARRIVAL	☒ DEPARTURE	DATE AUG. 6 1966	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED	SECURED	SBE	FWE
Lowb - 1600			

* BELL SYMBOLS

	AHEAD		BACK
SLOW	⎓		⎓
HALF	⎓+		⎓+
FULL	⎓+	STOP Z	⎓+
EMERG	Ⓢ		Ⓢ

REMARKS

S.B.F. @ '600
 S. CTR. 06615370
 TACH. 06599260
 P.FOM. 6140030
 S.FOM. 2823150

DEPT. @ 1700
 S. CTR. 06618000
 TACH. 06601740
 P.FOM. 6140340
 S.FOM. 2823380

L. H. Burke

Departing Buckner Bay for
 Viet Nam

2nd Engr DW Mr Brazgushin
 on throttle

Bells,

☐ BRIDGE☒ STARBOARD
OR
FWD (NO. 1)☐ PORT
OR
AFT (NO. 2)STARBOARD ENGINE
OR FORWARD (NO. 1)PORT ENGINE
OR AFT (NO. 2)

TIME

* BELL

RPM

TIME

* BELL

RPM

1600

S J b g

1606.5

15

15

1608.5

30

30

1611

45

45

1614

30

30

1618.5

15

15

1623

0

0

~~1623.5~~~~1623.5~~

20

20

~~1623.5~~~~1623.5~~

60

60

1620 approx @ 1640

S. H. B. B. B.

P. H.

WATCH OFFICER'S SIGNATURE

H48767

PORT <i>C Sea</i>		VOYAGE NO. <i>40</i>	
☐ ARRIVAL ☐ DEPARTURE		DATE	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED	SECURED	SBE	FWE

* BELL SYMBOLS

<u>AHEAD</u>			<u>BACK</u>	
SLOW			SLOW	
HALF			HALF	
FULL		STOP Z	FULL	
EMERG			EMERG.	

REMARKS

*Deceleration Drill from
0926 to 0954
man overboard Drill from
1022 to 1049
Retention time two hours*



BRIDGE

STARBOARD
OR
FWD (NO. 1)PORT
OR
AFT (NO. 2)STARBOARD ENGINE
OR FORWARD (NO. 1)PORT ENGINE
OR AFT (NO. 2)

TIME	* BELL	RPM	TIME	* BELL	RPM
0859	LH	98			
0908	Stby	90			
0912	HW	45			
0916	Z	0			
0917	LH	80			
0926	Stby	60			
929.5	HW	45	0931	Bell answered	
933.6	Z	0	0934	"	"
934.2	LH	60	934.8	"	"
945	Stby	60			
947.8	HW	45	948.2	"	"
951.8	Z	0	952.3	"	"
952.7	LH	60	954.5	"	"

Emergency Drills.
Recorded by. W.C.B. 2nd ELEC.

8-8-66					
1022	Stby				
1023	✓	30			
1026½	Z	0			
1032	HW	45			
1034	Z	0			
1035	✓	20			
1041	Z	0			
1043½	✓	20			
1044	Z	0			
1049	14 NOV 22/65				
	R.P. Delami				
	<i>[Signature]</i>				

WATCH OFFICER'S SIGNATURE

PORT Qui Nhon		VOYAGE NO. 4-0	
☒ ARRIVAL ☐ DEPARTURE		DATE Aug 10, 1966	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED Loew 0605	SECURED 0943	SBE	FWE 0801

* BELL SYMBOLS

AHEAD			BACK	
SLOW			SLOW	
HALF			HALF	
FULL		STOP Z	FULL	
EMERG.			EMERG.	

REMARKS

ARRIVAL - 0612

S-CTR 07065300

T. CTR 07047000

P-7.0M 6167590

S-7.0M 2849420

7.W.E. 0801

S-CTR. 07068390

T-CTR. 07050217

P-7.0.M 6167980

S-7.0.M 2849780

**Brake Taking Bell per Bell
Brake -**

Ray 2nd on Throttle

☐ BRIDGE☒ STARBOARD
OR
FWD (NO. 1)☐ PORT
OR
AFT (NO. 2)STARBOARD ENGINE
OR FORWARD (NO. 1)PORT ENGINE
OR AFT (NO. 2)

TIME	* BELL	RPM	TIME	* BELL	RPM
0613	LH	60	0740	Z	0
0613	Stby	60	0741.5	LH	40
0630	LH	40	0742	L	20
0640	L	20	0743	LH	30
0642.7	LH	40	0744	Z	0
0649.6	L	20	0744.2	L	20
0654.5	Z	0	0746.5	LH	60
0657	L	20	0747.6	L	20
0657.5	Z	0	0749	LH	40
0659	L	15	814		
0659.8	Z	0	0753.7	Z	0
0703	L	20	0755	LH	45
0703.5	Z	0	0756.5	Z	0
0705	L	15	0758	L	15
0707.2	LH	40	0759	Z	0
0709	LH	60	0801.4	FWE	
0710.4	L	20	R.P. Adams CPH		
0711.5	Z	0			
0714	L	20			
0714.4	Z	0			
0715	L	20			
0715.6	Z	0			
0716	L	20			
0716.8	LH	40			
0717.5	LH	60			
0718.5	LH	40			
0721.5	Z	0			
0722	L	20			
0728	LH	40			
0731.6	Z	0			
0733.5	L	20			
0736	LH	40			
0738	LH	60			
0739	LH	40			

WATCH OFFICER'S SIGNATURE

PORT Qui Nhon		VOYAGE NO. 4-C	
☐ ARRIVAL ☒ DEPARTURE		DATE Aug 11, 1966	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED		SECURED	SBE
Mc Ginnis 1834			FWE

* BELL SYMBOLS

AHEAD			BACK	
SLOW			SLOW	
HALF			HALF	
FULL		STOP Z	FULL	
EMERG.			EMERG.	

REMARKS

S.B-E. 1828
 S-CTR 07068910
 Tach - 0705045
 P-70M 6173290
 S-70M 2850790

DEPT@ 1900
 S. CTR 07070020
 TACH 07050245
 P-70M 6173380
 S-70M 2850910
 J.H. Buck

Reader answering and
 logging bells.
 Buck on throttle.

Qui Nhon to Com Rahn Bay

PORT <i>Corn Island Bay</i>		VOYAGE NO. <i>4-B</i>	
☒ ARRIVAL ☐ DEPARTURE		DATE <i>Aug. 12, 1966</i>	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED	SECURED	SBE	FWE
<i>McKinney - 0619</i>			<i>0740</i>

* BELL SYMBOLS

AHEAD			BACK	
SLOW			SLOW	
HALF			HALF	
FULL		STOP Z	FULL	
EMERG			EMERG.	

REMARKS

ARR- 0630

S-CTR 07110340

T-CTR 07050245

P- 7.0.M 0175630

S- 7.0.M 2853040

F.W.E 0740

S-CTR 07112850

P- 7.0.M 0175930

S- 7.0.M. 2853300

T-CTR 07050245

S. H. Burk

Brooks answering bells

Ray heard @ whistle

WATCH OFFICER'S SIGNATURE

PORT <i>Com John Boy</i>		VOYAGE NO. <i>4-B-4-E</i>	
☐ ARRIVAL	☒ DEPARTURE	DATE	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED	SECURED	SBE	FWE
<i>McKinney 1800</i>			

* BELL SYMBOLS

AHEAD		BACK
SLOW 		SLOW 
HALF 		HALF 
FULL 	STOP Z	FULL 
EMERG 		EMERG. 

REMARKS

S.B.E. 2954 1954
S-CTR 07113790
Tach 07050245
P-7.0.M 6179600
S-7.0.M 2855690

Dept. 2112
SCTR 07116370
Tach 07050245
P-7.0.M 6179920
S-7.0.M 2855970

Run 2nd at throttle
R.P.A. Taking Bell per Bell Book

PORT <i>San Francisco, Calif.</i>		VOYAGE NO. <i>H</i>	
DATE <i>29 Aug. 1966</i>		TIME <i>0612</i>	
☒ ARRIVAL	☐ DEPARTURE	ON BOARD	
PILOT		DISCHARGED	
AT THE CONN FROM		TO	
PILOT		ON BOARD	
AT THE CONN FROM		TO	
DISCHARGED		FWE	
EMERGENCY STEERING MANNED		SECURED	SBE

McGinnis @ 0612

* BELL SYMBOLS

AHEAD		BACK	
SLOW		SLOW	
HALF		HALF	
FULL		FULL	
EMERG.		EMERG.	

STOP Z

REMARKS

Arr - 0612
S.CTR 09276340
Tach - CT R00006101
P-7.0m 6308730
S-7.0m 2977790

7.0m - @ 0929
S.CTR 09283630
P-7.0m 6309290
T-CT R00006101
S-7.0m 2978380

Breaker answering Bell.
R.P.A. on Throttle 3rd A/E

☐ BRIDGE☒ STARBOARD
OR
FWD (NO. 1)☐ PORT
OR
AFT (NO. 2)STARBOARD ENGINE
OR FORWARD (NO. 1)PORT ENGINE
OR AFT (NO. 2)

TIME	* BELL	RPM	TIME	* BELL	RPM
0612	arrival	50 RPM	0915	✓	15
0613	LH Phone	60 RPM	0915.2	Z	0
0646	+	40	0916	✓	15
0657	LH	60	0916.5	Z	0
0734	✓	20	0928	FWE	0929
0735.5	+	40		R.P. Adams	
0739	✓	20			
0742	Z	0			
0748.5	+	20			
	8N. Bruck				
0755	+	40			
0757	LH	60			
0800	+	40			
0815	✓	20			
0830	+	40			
0835.5	LH	60			
0845	+	40			
0848.5	✓	20			
0852	+	40			
0854	✓	20			
0855	LH 06.40				
0855	+	40			
0856	LH	60			
0856.5	✓	20			
0857	Z	0			
0858	✓	20			
0901	Z	0			
0906	+	30			
0907	Z	0			
0908	✓	20			
0909.5	+	40			
0910	Z	0			
0913	✓	15			
0913.5	+	30			

WATCH OFFICER'S SIGNATURE

PORT <u>Alameda.</u> <u>Naval Air.</u>		VOYAGE NO.	
☐ ARRIVAL ☒ DEPARTURE		DATE <u>9/3/66</u>	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED	SECURED	SBE	FWE
<u>0840 MC GINNIS</u>			

* BELL SYMBOLS

AHEAD		BACK	
SLOW	<u>L</u>	SLOW	<u>—</u>
HALF	<u>L</u>	HALF	<u>+</u>
FULL	<u>L</u>	FULL	<u>+</u>
EMERG.	<u>(4)</u>	EMERG.	<u>(+)</u>

STOP Z

REMARKS

~~Stop Eng~~ 0843 78 0910
 S. Ctr - 9284560
 Tach - W.C.B. 066708 0667410
 P-Fom - 6809980
 S-Fom - 2990730
 Stby. 0910

Departure. 1142
 S- Ctr. 9291170
 Tach 0735770
 P-Fom 16810500
 S-Fom. 2991140

PORT <u>Seattle</u>		VOYAGE NO.	
☒ ARRIVAL ☐ DEPARTURE		DATE <u>9-5-66</u>	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED	SECURED	SBE	FWE

* BELL SYMBOLS

	<u>AHEAD</u>		<u>BACK</u>
SLOW	<u> / </u>	SLOW	<u> \ </u>
HALF	<u> + </u>	HALF	<u> + </u>
FULL	<u> + </u>	FULL	<u> + </u>
EMERG	<u> (4) </u>	EMERG.	<u> (+) </u>

STOP Z

REMARKS

ARRIVAL 1242

SCTR 09551400

Tach.

P FOM 6325770

S FOM 3004750

FWE. 1320

SCTR 09551690

P FOM 6325760

S FOM 3004790

Tach. 03338610

☐ BRIDGE☒ STARBOARD
OR
FWD (NO. 1)☐ PORT
OR
AFT (NO. 2)STARBOARD ENGINE
OR FORWARD (NO. 1)PORT ENGINE
OR AFT (NO. 2)

TIME	* BELL	RPM	TIME	* BELL	RPM
0225 ¹¹⁴⁰	40	40	1242	ARRIVAL	60
0225	4	40	1246	W.P.G.	
0238	4H	60	1246	V	20
0311	4H	40	1257.5	Z	0
0320	4H	60	1300	V	20
9-5-66			1301	Z	0
Henry Bunnay			1301.8	V	20
0415 ^{By Phone}	4H	80	1306	Z	0
0426	Standby		1306.5	V	15
0430	Z		1307.5	H	30
0431	4	40	1308.7	Z	0
0443	4H	60	1309	V	15
Henry Bunnay			1310	Z	0
9/5/66			1320	FWE	
0809	4H	40	9-5-66		
0811 1/2	L	20	Henry Bunnay		
0814	Z	0	8		
0815	V	15			
0816 1/2	Z	0			
0818	4H	60			
0823	B/O/B	10 Nozz			
0934	R.R.C				
0835	Z				
0838	4	40			
0840	4H	80			
1013	Z				
1014	L	20			
1016	4H	60			
1016 1/2	L	20			
1023	4H	60			
1036	B/O/B	10 Nozz			
1143	B/O/B	18 Nozz			
1300	Demons				
9/5/66					

WATCH OFFICER'S SIGNATURE

PORT SEATTLE		VOYAGE NO.	
☐ ARRIVAL ☒ DEPARTURE		DATE 9-6-66	TIME
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
PILOT		ON BOARD	
AT THE CONN FROM		TO	DISCHARGED
EMERGENCY STEERING MANNED	SECURED	SBE	FWE

* BELL SYMBOLS

<u>AHEAD</u>			<u>BACK</u>	
SLOW			SLOW	
HALF			HALF	
FULL		STOP Z	FULL	
EMERG			EMERG.	

REMARKS

DEPARTURE TIME
 STDY - 1045
 COUNTER - 09552060
 P FOM 6327130
 S FOM 3005810
 TACH 003342689332940
 FWE @ 1321
 COUNTER - 09559750
 F.O.M - 9334210

TIME	* BELL	RPM	TIME	* BELL	RPM
045	STD. By	0			
108	✓	40			
1110	✓	60			
1113	FULL THROTTLE	Bridge-Phone 64			
1124	FULL THROTTLE	84			
1234	Reduce SPEED	Bridge-Phone 60			
1244	✓	40			
1245	✓	20			
1245.5	✓	10			
1247.5	Z	0			
1307.5	✓	15			
1308.5	✓	30			
1309.5	✓	45			
1310	✓	30			
1310.2	✓	15			
1310.5	Z	0			
1311	✓	20			
1312.5	Z	0			
1315.5	✓	15			
1316	✓	30			
1317	Z	0			
9-6-64					
Clemson					

WATCH OFFICER'S SIGNATURE