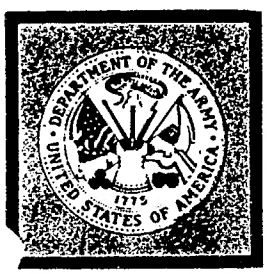
JOINT IMAGERY INTERPRETATION KEYS STRUCTURE

DIAM 57-7
TM 30-324



VOLUME XIII

SUBMARINES

15 APRIL 1983

DIAM 57-7-VOL XIII
TM 30-324
CHANGE 3

15 April 1983

SUBJECT: DIAM 57-7-VOL XIII (TM 30-324 (U)), JOINT IMAGERY INTERPRETATION KEYS STRUCTURE (JIIKS), VOLUME XIII, SUBMARINES.

1. (U) Included herein is revised Volume XIII of the Joint Imagery Interpretation Keys Structure (TM 30-324), Change 3.

2. (U) DIAM 57-7-VOL XIII (TM 30-324), Change 3, dated 15 April 1983, supersedes all previous editions and changes, all of which may be destroyed in accordance with present security procedures.

DIAM 57-7

JOINT IMAGERY INTERPRETATION KEYS STRUCTURE (JIIKS)

VOLUME XIII

SUBMARINES

15 APRIL 1983

Prepared by

Naval Intelligence Support Center for the Department of Defense Joint Imagery Interpretation Keys Committee.

FORWARD

This publication has been coordinated with representatives of the Department of Defense Imagery Interpretation Keys Committee (KEYSCOM), composed of members from the Defense Intelligence Agency, Department of the Army, Department of the Navy, and Department of the Air Force. It is authorized by the KEYSCOM in accordance with provisions outlined in DIAM 57-4.

The KEYSCOM solicits assistance from all users of this publication. Correspondence directed toward increasing the utility of the keys program or nominating new subject matter may be sent directly to the producer of this manual. Production and maintenance of keys are difficult tasks since keys can quickly become outdated and adequate source materials are often difficult to obtain. Keeping volumes current can be accomplished only by cooperative, community-wide efforts. Therefore, users are requested to be alert for imagery which satisfies any of the following criteria.

a. Imagery of significantly better quality than that presented in the volume.

b. Imagery of a new item in the same general category, or to fill in gaps in information provided in the volume.

c. Imagery displaying a modification of a particular ship or ship class.

d. Imagery revealing a new deployment technique or environment.

e. Multisensor (color, camouflage detection, thermal infrared, side looking airborne radar (SLAR), laser) coverage of objects or activities, particularly in deployed situations.

Imagery should be forwarded with complete identification in accordance with current security regulations to:

Commanding Officer
Naval Intelligence Support Center
4301 Suitland Road
Washington, D.C. 20390

SUPERSESSION NOTE: This publication supersedes all previous editions of DIAM 57-7, Volume XIII of 1 October 1977 and all previous keys on this subject.

PROCUREMENT INSTRUCTIONS

ARMY

All U.S. Army units must submit requests for II Keys to:

AG Publications Center
2800 Eastern Boulevard
Baltimore, MD 21220

All II Keys are published in the TM 30 series (i.e., TM 30-316, etc.) and are distributed throughout the regular Army, U.S. Army Reserve, and National Guard by means of the Pinpoint Distribution System.

To receive II Keys through this system, the unit must have established an account with the AG Publications Center following the procedures outlined in AR 310-2. After an account has been established, submission of a completed DA Form 12-34b places the unit on automatic distribution for all 30 series TM's that will be produced and distributed in the future.

To obtain an initial issue, or additional copies of previously produced II Keys on a one-time basis, DA Form 4569 must be used.

Volume I of the Joint Imagery Interpretation Keys Structure (JIIKS) (TM 30-326) contains an inventory of the II Keys that have been produced by all the services and the DIA.

The U.S. Army Intelligence and Threat Analysis Center/Imagery Intelligence Production Division (USAITAC/IIPD) Collateral Publications Catalog lists, by volume, the organization of all the JIIKS that have been or will be produced by the Army.

NAVY

U.S. Navy components will submit requests for II Keys in accordance with the procedures outlined herein regardless of producing agency.

Dissemination of II Keys is based on strict need-to-know to those activities with an established requirement for the material.

The Operating Forces (Afloat Units) of the Navy under the jurisdiction of U&S Commands will request one-time issue of II Keys by submitting a completed DD Form 1348 directly to:

Naval Publications and Forms Center
5801 Tabor Avenue
Philadelphia, PA 19130

Naval shore activities with an established requirement may correct deficiencies or obtain replacement copies by submitting a completed DD Form 1348 to:

Commander
Naval Intelligence Command (NIC-05)
4600 Silver Hill Road
Washington, DC 20389

Operating forces/afloat units desiring to change, delete or establish requirements for II Keys will submit the request by letter via the administrative chain of command to Commander, Naval Intelligence Command (NIC-05). This request will include:

a. List of the II Keys required.
b. Justification of need.
c. A statement that a continuing need for changes and/or revisions exists.
d. Completed DD Forms 1348 for initial issue of each II Key requested.

Type commanders will evaluate each request, indicate approval/disapproval, and provide a statement whether the requirement applies to all units of the type.

Naval shore activities desiring to change, delete or establish requirements for II Keys will submit the request by letter to Commander, Naval Intelligence Command (NIC-05). The request must contain the same information as above as well as completed DD Forms 1348 for initial issue of the JIIKS Keys requested.

AIR FORCE

Air Force organizations will submit requests for II Keys in accordance with AFR 5-3, "Standard Intelligence Publications System." These procedures apply to requests for all II Keys regardless of production agency (Army, Navy, Air Force, DIA). Specific procedures are summarized below for convenience.

All II Keys are disseminated on a strict need-to-know basis by AFIS/INDOC to activities having an intelligence mission or an operational requirement for intelligence publications.

Initial distribution requirements for new publications are established in response to specific written requests from AFIS/INDOC direct to Major Commands, Separate Operating Agencies, and offices within the Air Staff. Each of these activities establishes its own requirements and those of its subordinate organizations, including AFRES and ANG units. Requirements then are forwarded to AFIS/INDOC, Washington, DC 20330.

Activities not on initial distribution, those requiring a replacement issue, or those having a new one-time requirement must submit a DD Form 1142, (Interagency Document Request). The DD Form 1142 will be prepared in accordance with paragraph 8 of AFR 5-3 and forwarded to the Office of the Director of Intelligence of the Major Command or Separate Operating Agency.

The Major Command or Separate Operating Agency's Director of Intelligence or his designated representative will validate the requirement and, if approved, will forward the DD Form 1142 to AFIS/INDOC, Washington, DC 20330.

AFIS/INDOC will then process the requirement.

PROCUREMENT INSTRUCTIONS FOR ALL JOINT STAFF HEADQUARTERS AND ORGANIZATIONS AND AGENCIES EXTERNAL TO THE DEPARTMENT OF DEFENSE

Requests for additional copies of DIA 57-4, "Coordination, Production and Maintenance of the Joint Imagery Interpretation Keys Structure," or keys (Volumes and Parts) constituting DIAM 57-7, "The Joint Imagery Interpretation Keys Structure," will be sent to:

Chairman DOD KEYSCOM, DB-5A
Defense Intelligence Agency
Washington, D. C. 20301

RECORD OF CHANGES

CHANGE NO. AND DATE OF CHANGE	DATE OF ENTRY	PAGE COUNT VERIFIED BY (SIGNATURE)

LIST OF EFFECTIVE PAGES

Subject	*Page No.*	*Effective*
Title page	None	Original
FOREWORD	*3 (RB)*	Original
PROCUREMENT INSTRUCTIONS	*5* thru *7 (RB)*	Original
RECORD OF CHANGES	*9 (RB)*	Original
LIST OF EFFECTIVE PAGES	*11 (RB)*	Original
DISTRIBUTION LIST	*13 (RB)*	Original
TABLE OF CONTENTS	*15, 16*	Original
LIST OF ILLUSTRATIONS	*17 (RB)*	Original
PART ONE. INTRODUCTION, INDICES, AND IDENTIFICATION AIDS		
CHAPTER 1	1-1 (RB)	Original
CHAPTER 2	2-1 (RB)	Original
	2-3 (RB)	Original
	2-5 (RB)	Original
	2-7 thru 2-11 (RB)	Original
	2-13 thru 2-19 (RB)	Original
	2-21 (RB)	Original
	2-23 (RB)	Original
CHAPTER 3	3-1 thru 3-4	Original
CHAPTER 4	4-1, 4-2	Original
	4-3 (RB)	Original
	4-5 (RB)	Original
CHAPTER 5	5-1 (RB)	Original
	5-3 thru 5-11 (RB)	Original
PART TWO. KEYS TO INDIVIDUAL SUBMARINE CLASSES		
AGOSTA thru ZWAARDVIS	180 unnumbered pages	Original

DISTRIBUTION LIST

U.S. Army	250
U.S. Navy	350
U.S. Air Force	250
DIA	250
NIC-05	50
Stock	100
	1250

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LIST OF ILLUSTRATIONS

DIAM 57-7
TM 30-324

VOLUME XIII

PART ONE

INTRODUCTION, INDEXES, AND IDENTIFICATION AIDS

CHAPTER 1

Introduction

1. GENERAL

The JIIKS, Volume XIII, "Submarines" is an encyclopedic compilation of keys consisting of materials presented mainly in the photographic medium to aid the imagery interpreter in recognition and identification. Information in this publication is substantially the same as the submarine recognition data contained in NWP 12-7-1 (Rev. A), "Recognition Guide to Major Combatants," June 1982.

This publication contains two parts. Part One provides various materials to facilitate the recognition process--lists, indexes, submarine nomenclature, and a coding procedure. Part Two provides imagery interpretation keys--photographs, line drawings, silhouettes and recognition features--of the world's submarines arranged alphabetically by class name.

2. BACKGROUND

Identifying submarines is a difficult task because many are similar in appearance. For that reason, the designed identification procedure directs the observer to look at specific features in a prescribed sequence. By assigning a number to specific attributes, the observer obtains a code number which enables him to locate a group of submarines with similar features. After comparing the unidentified submarine with photographs and line drawings of submarines with the same code (the "keys"), he can identify the class. Chapter 4 describes the coding procedure in detail.

3. CLASSIFICATION

Considerable effort has been made to keep this guide unclassified to optimize its usefulness. Some sacrifices were made occasionally in photographic quality and in details of data or characteristics in order to meet the unclassified criterion. For exact information or specific details, the user should consult those publications designed specifically to provide technical information.

CHAPTER 2

Indexes and Lists

The following indexes and lists are provided to facilitate the identification process:

- Submarine Classifications - a list of submarine classifications and their descriptions. (Section A.)
- Country Code Abbreviations/Country Index - alphabetic listings by country code and by country name for country code symbols used throughout the publication where brevity is desired. (Section B.)
- Alphabetical Index of Submarines by Class - an alphabetical listing by class of the world's submarines along with builder country, user country, and recognition code for each class. (Section C.)
- User Country Index of Submarines - a grouping of submarine classes by country which is useful in determining an approximate force level or in identifying a submarine class when the user country is known. (Section D.)
- Index of Submarines by Classification - an arrangement of submarines by classification within which submarine classes are alphabetically listed along with their user countries. (Section E.)
- List of Submarines by Pennant/Hull Number - a means for identifying individual submarines within a particular class, or for identifying a unit with a visible pennant or hull number when the unit cannot be properly coded. (Section F.)
- Descending Length Index of Submarines - a listing of submarine classes by length. (Section G).
- Master Submarine Cross Reference List - an alphabetical listing of submarines by class with alternate names by which particular classes may be known. (Section H.)

SECTION A

SUBMARINE CLASSIFICATIONS

The classifications for the submarines described in this publication are listed below. The submarines are diesel-electric powered unless otherwise indicated.

AGSS	Auxiliary Submarine, noncombatant
SS	Attack Submarine
SSA	Auxiliary Submarine, noncombatant
SSB	Ballistic Missile Submarine
SSBN	Ballistic Missile Submarine, nuclear powered
SSG	Cruise Missile Submarine
SSGN	Cruise Missile Submarine, nuclear powered
SSN	Attack Submarine, nuclear powered
SSQ	Auxiliary Submarine, communications
SSR	Radar Picket Submarine
SST	Training Submarine

SECTION B

COUNTRY CODE ABBREVIATIONS/COUNTRY INDEX

COUNTRY CODE ABBREVIATIONS

CODE	COUNTRY	CODE	COUNTRY	CODE	COUNTRY
AL	Albania	FR	France	PK	Pakistan
AR	Argentina	GE	Germany, Feb Repb	PL	Poland
AS	Australia	GR	Greece	PO	Portugal
BR	Brazil	ID	Indonesia	SF	South Africa
BU	Bulgaria	IN	India	SP	Spain
CA	Canada	IS	Israel	SW	Sweden
CH	China	IT	Italy	TU	Turkey
CI	Chile	JA	Japan	TW	Taiwan
CO	Colombia	KN	Korea, Demo Peop Repb	UK	United Kingdom
CU	Cuba	LY	Libya	UR	USSR
DA	Denmark	NL	Netherlands	US	United States
EC	Ecuador	NO	Norway	VE	Venezuela
EG	Egypt	PE	Peru	YO	Yugoslavia

COUNTRY INDEX

COUNTRY	CODE	COUNTRY	CODE	COUNTRY	CODE
Albania	AL	France	FR	Peru	PE
Argentina	AR	Germany, Fed Repb	GE	Poland	PL
Australia	AS	Greece	GR	Portugal	PO
Brazil	BR	India	IN	South Africa	SF
Bulgaria	BU	Indonesia	ID	Spain	SP
Canada	CA	Israel	IS	Sweden	SW
Chile	CI	Italy	IT	Taiwan	TW
China	CH	Japan	JA	Turkey	TU
Colombia	CO	Korea, Demo Peop Repb	KN	United Kingdom	UK
Cuba	CU	Libya	LY	United States	US
Denmark	DA	Netherlands	NL	USSR	UR
Ecuador	EC	Norway	NO	Venezuela	VE
Egypt	EG	Pakistan	PK	Yugoslavia	YO

SECTION C

ALPHABETICAL INDEX OF SUBMARINES BY CLASS

CLASS	CLASSIFICATION	BUILDER COUNTRY	USER COUNTRY	RECOGNITION CODE
AGOSTA	SS	FR, SP	FR, PK, SP	414
ALFA	SSN	UR	UR	111
ARETHUSE	SS	FR	FR	537
ASASHIO	SS	JA	JA	714
BALAO (Type 1)	SS	US	SP	726
BALAO (Type 2)	SS	US	CI	526
BARBEL	SS	US	US	311
BRAVO	SST	UR	UR	311
CHARLIE I	SSGN	UR	UR	123
CHARLIE II	SSGN	UR	UR	133
DAPHNE	SS	FR, SP	FR, PK, PO, SF, SP	537
DARTER	SS	US	US	224
DELFINEN	SS	DA	DA	545
DELTA I	SSBN	UR	UR	213
DELTA II	SSBN	UR	UR	213
DELTA III	SSBN	UR	UR	213
DOLFIJN	SS	NL	NL	523
DOLPHIN	AGSS	US	US	712
DRAKEN	SS	SW	SW	754
DREADNOUGHT	SSN	UK	UK	311
ECHO	SSN	UR	UR	514
ECHO II	SSGN	UR	UR	514
ETHAN ALLEN	SSN	US	US	211
FOXTROT	SS	UR	CU, IN, LY, UR	625
GAL	SS	UK	IS	823
GEORGE WASHINGTON	SSN	US	US	211
GLENARD P. LIPSCOMB	SSN	US	US	311
GOLF	SSQ	UR	UR	926
GOLF I	SSB	CH, UR	CH, UR	626
GOLF II	SSB	UR	UR	625
GRAYBACK	SS	US	US	633
GUPPY IA, II, IIA	SS	US	AR, BR, GR, PE, SP, TU, TW, VE	525
GUPPY III	SS	US	BR, GR, IT, TU	525
GYMNOTE	SSB	FR	FR	227
HAN	SSN	CH	CH	–
HEROJ	SS	YO	YO	424
HOTEL II	SSBN	UR	UR	114
INDIA	SSA	UR	UR	916
JULIETT	SSG	UR	UR	624
KILO	SS	UR	UR	–
LAFAYETTE	SSBN	US	US	211
LE REDOUTABLE	SSBN	FR	FR	311
LIMA	SSA	UR	UR	744
LOS ANGELES	SSN	US	US	311
MING	SS	CH	CH	–
NACKEN	SS	SW	SW	214
NARVAL	SS	FR	FR	547
NARWHAL	SSN	US	US	311
NOVEMBER	SSN	UR	UR	112
OBERON	SS	UK	AS, BR, CA, CI, UK	546
OHIO	SSBN	US	US	311
OSCAR	SSGN	UR	UR	122

SECTION D

USER COUNTRY INDEX OF SUBMARINES

USER COUNTRY CLASS	CLASSIFICATION
ALBANIA	
WHISKEY	SS
ARGENTINA	
GUPPY IA, II, IIA	SS
TYPE 209	SS
AUSTRALIA	
OBERON	SS
BRAZIL	
GUPPY IA, II, IIA	SS
GUPPY III	SS
OBERON	SS
BULGARIA	
ROMEO	SS
WHISKEY	SS
CANADA	
OBERON	SS
CHILE	
BALAO (Type 2)	SS
OBERON	SS
CHINA	
GOLF I	SSB
HAN	SSN
MING	SS
ROMEO	SS
WHISKEY	SS
COLOMBIA	
TYPE 209	SS
CUBA	
FOXTROT	SS
WHISKEY	SS
DENMARK	
DELFINEN	SS
TYPE 205	SS
ECUADOR	
TYPE 209	SS
EGYPT	
ROMEO	SS
WHISKEY	SS
FRANCE	
AGOSTA	SS
ARETHUSE	SS
DAPHNE	SS
GYMNOTE	SSB
LE REDOUTABLE	SSBN
NARVAL	SS
SNA-72	SSN
GERMANY, FEDERAL REPUBLIC	
TYPE 205	SS
TYPE 206	SS

USER COUNTRY CLASS	CLASSIFICATION
GREECE	
GUPPY IA, II, IIA	SS
GUPPY III	SS
TYPE 209	SS
INDIA	
FOXTROT	SS
INDONESIA	
TYPE 209	SS
WHISKEY	SS
ISRAEL	
GAL	SS
ITALY	
GUPPY III	SS
SAURO	SS
TANG	SS
TOTI	SS
JAPAN	
ASASHIO	SS
UZUSHIO	SS
YUUSHIO	SS
KOREA, DEMO PEOP REPB	
ROMEO	SS
WHISKEY	SS
LIBYA	
FOXTROT	SS
NETHERLANDS	
DOLFIJN	SS
ZWAARDVIS	SS
NORWAY	
TYPE 207	SS
PAKISTAN	
AGOSTA	SS
DAPHNE	SS
PERU	
GUPPY IA, II, IIA	SS
TIBURON	SS
TYPE 209	SS
POLAND	
WHISKEY	SS
PORTUGAL	
DAPHNE	SS
SOUTH AFRICA	
DAPHNE	SS
SPAIN	
AGOSTA	SS
BALAO (Type 1)	SS
DAPHNE	SS
GUPPY IA, II, IIA	SS

SECTION E

INDEX OF SUBMARINES BY CLASSIFICATION

CLASSIFICATION CLASS	USER COUNTRY
AGSS - AUXILIARY SUBMARINE, NON-COMBATANT	
DOLPHIN	US
SS - ATTACK SUBMARINE	
AGOSTA	FR, PK, SP
ARETHUSE	FR
ASASHIO	JA
BALAO (Type 1)	SP
BALAO (Type 2)	CI
BARBEL	US
DAPHNE	FR, PK, PO, SF, SP
DARTER	US
DELFINEN	DA
DOLFIJN	NL
DRAKEN	SW
FOXTROT	CU, IN, LY, UR
GAL	IS
GRAYBACK	US
GUPPY IA, II, IIA	AR, BR, GR, PE, SP, TU, TW, VE
GUPPY III	BR, GR, IT, TU
HEROJ	YO
KILO	UR
MING	CH
NACKEN	SW
NARVAL	FR
OBERON	AS, BR, CA, CI, UK
ROMEO	BU, CH, EG, KN, UR
SAURO	IT
SAVA	YO
SJOORMEN	SW
SUTJESKA	YO
TANG	IT, TU, US
TANGO	UR
TIBURON	PE
TOTI	IT
TYPE 205	DA, GE
TYPE 206	GE
TYPE 207	NO
TYPE 209	AR, CO, EC, GR, ID, PE, TU, VE
UZUSHIO	JA
WHISKEY	AL, BU, CH, CU, EG, ID, KN, PL, UR
YUUSHIO	JA
ZULU IV	UR
ZWAARDVIS	NL
SSA - AUXILIARY SUBMARINE, NON-COMBATANT	
INDIA	UR
LIMA	UR
SSB - BALLISTIC MISSILE SUBMARINE	
GOLF I	CH, UR
GOLF II	UR
GOLF III	UR
GOLF IV	UR
GOLF V	UR
GYMNOTE	FR

CLASSIFICATION CLASS	USER COUNTRY
SSBN - BALLISTIC MISSILE SUBMARINE, NUCLEAR-POWERED	
DELTA I	UR
DELTA II	UR
DELTA III	UR
HOTEL II	UR
HOTEL III	UR
LAFAYETTE	US
LE REDOUTABLE	FR
OHIO	US
RESOLUTION	UK
TYPHOON	UR
YANKEE I	UR
YANKEE II	UR
SSG - CRUISE MISSILE SUBMARINE	
JULIETT	UR
WHISKEY LONG BIN	UR
WHISKEY TWIN CYLINDER	UR
SSGN - CRUISE MISSILE SUBMARINE, NUCLEAR-POWERED	
CHARLIE I	UR
CHARLIE II	UR
ECHO II	UR
OSCAR	UR
PAPA	UR
SSN - ATTACK SUBMARINE, NUCLEAR-POWERED	
ALFA	UR
DREADNOUGHT	UK
ECHO	UR
ETHAN ALLEN	US
GEORGE WASHINGTON	US
GLENARD P. LIPSCOMB	US
HAN	CH
LOS ANGELES	US
NARWHAL	US
NOVEMBER	UR
PERMIT	US
SEAWOLF	US
SKATE	US
SKIPJACK	US
SNA-72	FR
STURGEON	US
SWIFTSURE	UK
TULLIBEE	US
VALIANT	UK
VICTOR I	UR
VICTOR II	UR
VICTOR III	UR
YANKEE	UR
SSQ - AUXILIARY SUBMARINE, COMMUNICATIONS	
GOLF	UR
SSR - RADAR PICKET SUBMARINE	
WHISKEY CANVAS BAG	UR
SST - TRAINING SUBMARINE	
BRAVO	UR

SECTION F

LIST OF SUBMARINES BY PENNANT/HULL NUMBER

PENNANT NUMBER	SUBMARINE CLASS	CLASSIFICATION	USER COUNTRY	SUBMARINE NAME
S01	OBERON	SS	UK	PORPOISE
S07	OBERON	SS	UK	SEA LION
S08	OBERON	SS	UK	WALRUS
S09	OBERON	SS	UK	OBERON
S10	GUPPY IA, II, IIA	SS	BR	GUANABARA
S10	OBERON	SS	UK	ODIN
11	WHISKEY	SS	BU	POBEDA
S11	OBERON	SS	UK	ORPHEUS
S11	TYPE 209	SS	EC	SHYRI
12	WHISKEY	SS	BU	SLAVA
S12	GUPPY IA, II, IIA	SS	BR	BAHIA
S12	OBERON	SS	UK	OLYMPUS
S12	TYPE 209	SS	EC	HUANCAVILCA
S13	OBERON	SS	UK	OSIRIS
S14	GUPPY IA, II, IIA	SS	BR	CEARA
S14	OBERON	SS	UK	ONSLAUGHT
S15	GUPPY III	SS	BR	GOIAZ
S15	OBERON	SS	UK	OTTER
S16	GUPPY III	SS	BR	AMAZONAS
S16	OBERON	SS	UK	ORACLE
S17	OBERON	SS	UK	OCELOT
S18	OBERON	SS	UK	OTUS
S19	OBERON	SS	UK	OPOSSUM
S20	FOXTROT	SS	IN	KURSURA
S20	OBERON	SS	BR	HUMAITA
S20	OBERON	SS	UK	OPPORTUNE
21	BALBOA (Type 2)	SS	CI	SIMPSON
S21	FOXTROT	SS	IN	KARANJ
S21	OBERON	SS	BR	TONELERO
S21	OBERON	SS	UK	ONYX
22	GUPPY IA, II, IIA	SS	AR	SANTIAGO DEL ESTERO
22	OBERON	SS	CI	O'BRIEN
S22	FOXTROT	SS	IN	KANDERI
S22	GUPPY IA, II, IIA	SS	VE	PICUA
S22	OBERON	SS	BR	RIACHUELO
S22	RESOLUTION	SSBN	UK	RESOLUTION
23	OBERON	SS	CI	HYATT
S23	FOXTROT	SS	IN	KALVARI
S23	RESOLUTION	SSBN	UK	REPULSE
S26	RESOLUTION	SSBN	UK	RENOWN
S27	RESOLUTION	SSBN	UK	REVENGE
28	TYPE 209	SS	CO	PIJAO
29	TYPE 209	SS	CO	TAYRONA
31	TYPE 209	SS	AR	SALTA
31	TYPE 209	SS	PE	CASMA
S31	BALBOA (Type 1)	SS	SP	—
S31	TYPE 209	SS	VE	SABALO
32	TYPE 209	SS	AR	SAN LUIS
32	TYPE 209	SS	PE	ANTOFAGASTA
S32	GUPPY IA, II, IIA	SS	SP	ISAAC PERAL
S32	TYPE 209	SS	VE	CARIBE
S34	GUPPY IA, II, IIA	SS	SP	COSME GARCIA
S35	GUPPY IA, II, IIA	SS	SP	NARCISO MONTURIOL
S40	FOXTROT	SS	IN	VELA
41	TIBURON	SS	PE	DOS DE MAYO
S41	FOXTROT	SS	IN	VAGIR
42	TIBURON	SS	PE	ABTAO
S42	FOXTROT	SS	IN	VAGLI
43	TIBURON	SS	PE	ANGAMOS
S43	FOXTROT	SS	IN	VAGSHEER
44	TIBURON	SS	PE	IQUIQUE

LIST OF SUBMARINES BY PENNANT/HULL NUMBER (Continued)

PENNANT NUMBER	SUBMARINE CLASS	CLASSIFICATION	USER COUNTRY	SUBMARINE NAME
153	ROMEO	SS	CH	---
S163	DAPHNE	SS	PO	ALBACORA
S164	DAPHNE	SS	PO	BARRACUDA
S166	DAPHNE	SS	PO	DELFIN
S170	TYPE 206	SS	GE	U 21
S171	TYPE 206	SS	GE	U 22
172	ROMEO	SS	CH	---
S172	TYPE 206	SS	GE	U 23
S173	TYPE 206	SS	GE	U 24
S174	TYPE 206	SS	GE	U 25
S175	TYPE 206	SS	GE	U 26
176	ROMEO	SS	CH	---
S176	TYPE 206	SS	GE	U 27
S177	TYPE 206	SS	GE	U 28
S178	TYPE 206	SS	GE	U 29
S179	TYPE 206	SS	GE	U 30
S180	TYPE 205	SS	GE	U 1
S181	TYPE 205	SS	GE	U 2
S188	TYPE 205	SS	GE	U 9
S189	TYPE 205	SS	GE	U 10
S190	TYPE 205	SS	GE	U 11
S191	TYPE 205	SS	GE	U 12
S192	TYPE 206	SS	GE	U 13
S193	TYPE 206	SS	GE	U 14
S194	TYPE 206	SS	GE	U 15
S195	TYPE 206	SS	GE	U 16
S196	TYPE 206	SS	GE	U 17
S197	TYPE 206	SS	GE	U 18
S198	TYPE 206	SS	GE	U 19
S199	TYPE 206	SS	GE	U 20
201	WHISKEY	SS	CH	---
202	WHISKEY	SS	CH	---
203	WHISKEY	SS	CH	---
204	WHISKEY	SS	CH	---
205	WHISKEY	SS	CH	---
206	WHISKEY	SS	CH	---
207	WHISKEY	SS	CH	---
208	WHISKEY	SS	CH	---
208	ROMEO	SS	CH	---
209	ROMEO	SS	CH	---
210	ROMEO	SS	CH	---
211	ROMEO	SS	CH	---
212	ROMEO	SS	CH	---
221	WHISKEY	SS	CH	---
227	ROMEO	SS	CH	---
228	ROMEO	SS	CH	---
229	ROMEO	SS	CH	--
241	WHISKEY	SS	CH	---
243	WHISKEY	SS	CH	---
244	WHISKEY	SS	CH	---
245	ROMEO	SS	CH	---
248	ROMEO	SS	CH	---
249	ROMEO	SS	CH	---
254	ROMEO	SS	CH	---
265	WHISKEY	SS	CH	---
266	WHISKEY	SS	CH	---
267	ROMEO	SS	CH	---
268	ROMEO	SS	CH	---
269	ROMEO	SS	CH	---
270	ROMEO	SS	CH	---
281	ROMEO	SS	CH	---
282	ROMEO	SS	CH	---

LIST OF SUBMARINES BY PENNANT/HULL NUMBER (Continued)

PENNANT NUMBER	SUBMARINE CLASS	CLASSIFICATION	USER COUNTRY	SUBMARINE NAME
515	TANG	SS	IT	LIVIO PIOMARTA
516	TANG	SS	IT	ROMEO ROMEI
516	WHISKEY	SS	AL	---
518	SAURO	SS	IT	NAZARIO SAURO
519	SAURO	SS	IT	FECIA DI COSSATO
520	SAURO	SS	IT	LEONARDO DA VINCI
521	SAURO	SS	IT	GUGLIELMO MARCONI
555	DOLPHIN	AGSS	US	DOLPHIN
S561	ASASHIO	SS	JA	---
S562	ASASHIO	SS	JA	ASASHIO
S563	ASASHIO	SS	JA	HARUSHIO
S564	ASASHIO	SS	JA	MICHISHIO
565	TANG	SS	US	WAHOO
S565	ASASHIO	SS	JA	ARASHIO
566	UZUSHIO	SS	JA	UZUSHIO
567	TANG	SS	US	GUDGEON
567	UZUSHIO	SS	JA	MAKISHIO
568	UZUSHIO	SS	JA	ISOSHIO
569	UZUSHIO	SS	JA	NARUSHIO
570	UZUSHIO	SS	JA	KUROSHIO
571	UZUSHIO	SS	JA	TAKASHIO
572	UZUSHIO	SS	JA	YAESHIO
573	YUUSHIO	SS	JA	YUUSHIO
574	GRAYBACK	SS	US	GRAYBACK
574	YUUSHIO	SS	JA	MOCHISHIO
575	SEA WOLF	SSN	US	SEA WOLF
575	YUUSHIO	SS	JA	SETOSHIO
576	DARTER	SS	US	DARTER
578	SKATE	SSN	US	SKATE
579	SKATE	SSN	US	SWORDFISH
580	BARBEL	SS	US	BARBEL
581	BARBEL	SS	US	BLUEBACK
582	BARBEL	SS	US	BONEFISH
583	SKATE	SSN	US	SARGO
584	SKATE	SSN	US	SEA DRAGON
585	SKIPJACK	SSN	US	SKIPJACK
588	SKIPJACK	SSN	US	SCAMP
590	SKIPJACK	SSN	US	SCULPIN
591	SKIPJACK	SSN	US	SHARK
592	SKIPJACK	SSN	US	SNOOK
594	PERMIT	SSN	US	PERMIT
595	PERMIT	SSN	US	PLUNGER
596	PERMIT	SSN	US	BARB
597	TULLIBEE	SSN	US	TULLIBEE
598	GEORGE WASHINGTON	SSN	US	GEORGE WASHINGTON
599	GEORGE WASHINGTON	SSN	US	PATRICK HENRY
600	GEORGE WASHINGTON	SSN	US	THEODORE ROOSEVELT
601	GEORGE WASHINGTON	SSN	US	ROBERT E. LEE
S601	SNA-72	SSN	FR	RUBIS
602	GEORGE WASHINGTON	SSN	US	ABRAHAM LINCOLN
603	PERMIT	SSN	US	POLLACK
604	PERMIT	SSN	US	HADDO
605	PERMIT	SSN	US	JACK
606	PERMIT	SSN	US	TINOSA
607	PERMIT	SSN	US	DACE
608	ETHAN ALLEN	SSN	US	ETHAN ALLEN
609	ETHAN ALLEN	SSN	US	SAM HOUSTON
610	ETHAN ALLEN	SSN	US	THOMAS A. EDISON
611	ETHAN ALLEN	SSN	US	JOHN MARSHALL
612	PERMIT	SSN	US	GUARDFISH
613	PERMIT	SSN	US	FLASHER
614	PERMIT	SSN	US	GREENLING

LIST OF SUBMARINES BY PENNANT/HULL NUMBER (Continued)

PENNANT NUMBER	SUBMARINE CLASS	CLASSIFICATION	USER COUNTRY	SUBMARINE NAME
665	STURGEON	SSN	US	GUITARRO
666	STURGEON	SSN	US	HAWKBILL
667	STURGEON	SSN	US	BERGALL
668	STURGEON	SSN	US	SPADEFISH
669	STURGEON	SSN	US	SEAHORSE
670	STURGEON	SSN	US	FINBACK
671	NARWHAL	SSN	US	NARWHAL
672	STURGEON	SSN	US	PINTADO
673	STURGEON	SSN	US	FLYING FISH
674	STURGEON	SSN	US	TREPANG
675	STURGEON	SSN	US	BLUEFISH
676	STURGEON	SSN	US	BILLFISH
677	STURGEON	SSN	US	DRUM
678	STURGEON	SSN	US	ARCHERFISH
679	STURGEON	SSN	US	SILVERSIDES
680	STURGEON	SSN	US	WILLIAM H. BATES
681	STURGEON	SSN	US	BATFISH
682	STURGEON	SSN	US	TUNNY
683	STURGEON	SSN	US	PARCHE
684	STURGEON	SSN	US	CAVALLA
685	GLENARD P. LIPSCOMB	SSN	US	GLENARD P. LIPSCOMB
686	STURGEON	SSN	US	L. MENDEL RIVERS
687	STURGEON	SSN	US	RICHARD B. RUSSELL
711	ROMEO	SS	EG	---
722	ROMEO	SS	EG	---
733	ROMEO	SS	EG	---
S736	GUPPY IA, II, IIA	SS	TW	HAI SHIH
744	ROMEO	SS	EG	HAI SHIH
755	ROMEO	SS	EG	---
766	ROMEO	SS	EG	---
S794	GUPPY IA, II, IIA	SS	TW	HAI PAO
S804	DOLFIJN	SS	NL	POTVIS
S805	DOLFIJN	SS	NL	TONIJN
S806	ZWAARDVIS	SS	NL	ZWAARDVIS
S807	ZWAARDVIS	SS	NL	TIJGERHAAI
S808	DOLFIJN	SS	NL	DOLFIJN
S809	DOLFIJN	SS	NL	ZEEHOND
811	SUTJESKA	SS	YO	SUTJESKA
812	SUTJESKA	SS	YO	NERETVA
821	HEROJ	SS	YO	HEROJ
822	HEROJ	SS	YO	JUNAK
823	HEROJ	SS	YO	USKOK
Del	DRAKEN	SS	SW	DELFINEN
Naj	NACKEN	SS	SW	NAJAD
Nak	NACKEN	SS	SW	NACKEN
Nep	NACKEN	SS	SW	NEPTUN
Nor	DRAKEN	SS	SW	NORDKAPAREN
Sbj	SJOORMEN	SS	SW	SJOBJORNEN
Sha	SJOORMEN	SS	SW	SJOHASTEN
Shu	SJOORMEN	SS	SW	SJOHUNDEN
Sle	SJOORMEN	SS	SW	SJOLEJONET
Sor	SJOORMEN	SS	SW	SJOORMEN
Spr	DRAKEN	SS	SW	SPRINGAREN
Vgn	DRAKEN	SS	SW	VARGEN

SECTION G

DESCENDING LENGTH INDEX OF SUBMARINES

LENGTH (FEET)	SUBMARINE CLASS	CLASSIFICATION
560	OHIO	SSBN
560	TYPHOON	SSBN
499	DELTA II	SSBN
499	DELTA III	SSBN
446	DELTA I	SSBN
425	LAFAYETTE	SSBN
425	RESOLUTION	SSBN
422.1	LE REDOUTABLE	SSBN
419.9	YANKEE I	SSBN
419.9	YANKEE II	SSBN
410	ETHAN ALLEN	SSN
381.7	GEORGE WASHINGTON	SSN
380.6	ECHO II	SSGN
377.3	HOTEL II	SSBN
365	GLENARD P. LIPSCOMB	SSN
364	ECHO	SSN
360	LOS ANGELES	SSN
354	NOVEMBER	SSN
344	INDIA	SSA
337.5	SEAWOLF	SSN
334.6	VICTOR III	SSN
334	GRAYBACK	SS
328	PAPA	SSGN
326.5	GUPPY III	SS
321.5	CHARLIE II	SSGN
318.2	GOLF	SSQ
318.2	GOLF I	SSB
318.2	GOLF II	SSB
314.6	NARWAL	SSN
311.7	VICTOR II	SSN
311.6	BALAO (Type 2)	SS
311.5	BALAO (Type 1)	SS
306	GUPPY IA, II, IIA	SS
297.6	FOXTROT	SS
295.2	OBERON	SS
295.2	TANGO	SS
292.2	STURGEON	SSN
292	CHARLIE I	SSGN
288.7	ASASHIO	SS
287.7	ZULU IV	SS
287	TANG	SS
285	VALIANT	SSN
284.5	DARTER	SS
282.1	LIMA	SSA
279	VICTOR I	SSN
278.9	JULIETT	SSG
278.5	PERMIT	SSN
275.6	GYMNOTE	SSB
275.6	WHISKEY LONG BIN	SSG
273	TULLIBEE	SSN
272	SWIFTSURE	SSN
267.7	SKATE	SSN
265.8	DREADNOUGHT	SSN
260.9	DOLFIJN	SS
260.1	ALFA	SSN
254.6	NARVAL	SS
251.7	SKIPJACK	SSN
250	MING	SS
249.3	YUUSHIO	SS
249	ROMEO	SS
248	WHISKEY	SS
248	WHISKEY CANVAS BAG	SSR
248	WHISKEY TWIN CYLINDER	SSG
243	TIBURON	SS
236.5	SNA-72	SSN
236.2	UZUSHIO	SS
226.4	DRAKEN	SS
221.7	AGOSTA	SS
219.1	BARBEL	SS
217.2	ZWAARDVIS	SS
215.8	SAVA	SS
213	BRAVO	SST
210	HEROJ	SS
210	SAURO	SS
196.8	SUTJESKA	SS
195.1	TYPE 209	SS
189.6	DAPHNE	SS
177.2	DELFINEN	SS
167.3	SJOORMEN	SS
162.7	ARETHUSE	SS
159.4	TYPE 206	SS
157.5	GAL	SS
152	DOLPHIN	AGSS
151.5	TOTI	SS
149	TYPE 207	SS
144	TYPE 205	SS
135	NACKEN	SS
--	HAN	SSN
--	KILO	SS
--	OSCAR	SSGN

SECTION H

MASTER SUBMARINE CROSS REFERENCE LIST

CLASS	CLASSIFICATION	REMARKS
AGOSTA	SS	
ALFA	SSN	
ARETHUSE	SS	
ASASHIO	SS	
BALAO (Type 1)	SS	
BALAO (Type 2)	SS	
BARBEL	SS	
BENJAMIN FRANKLIN	SSBN	SEE LAFAYETTE
BRAVO	SST	
CHARLIE I	SSGN	
CHARLIE II	SSGN	
CHURCHILL	SSN	SEE VALIANT
DAPHNE	SS	
DARTER	SS	
DELFINEN	SS	
DELTA I	SSBN	
DELTA II	SSBN	
DELTA III	SSBN	
DOLFIJN	SS	
DOLPHIN	AGSS	
DRAKEN	SS	
DREADNOUGHT	SSN	
ECHO	SSN	
ECHO II	SSGN	
ETHAN ALLEN	SSN	
FOXTROT	SS	
GAL	SS	
GEORGE WASHINGTON	SSN	
GLAVKOS	SS	SEE TYPE 209
GLENARD P. LIPSCOMB	SSN	
GOLF	SSQ	
GOLF I	SSB	
GOLF II	SSB	
GOLF III	SSB	SEE GOLF I
GOLF IV	SSB	SEE GOLF I
GOLF V	SSB	SEE GOLF I
GRAYBACK	SS	
GUPPY IA, II, IIA	SS	
GUPPY III	SS	
GYMNOTE	SSB	
HAN	SSN	
HEROJ	SS	
HOTEL II	SSBN	
HOTEL III	SSBN	SEE HOTEL II
INDIA	SSA	
JAMES MADISON	SSBN	SEE LAFAYETTE
JULIETT	SSG	
KILO	SS	
KOBBEN	SS	SEE TYPE 207
LAFAYETTE	SSBN	
LE REDOUTABLE	SSBN	
LIMA	SSA	
LOS ANGELES	SSN	
MING	SS	
NACKEN	SS	
NARHVALEN	SS	SEE TYPE 205
NARVAL	SS	
NARWHAL	SSN	
NOVEMBER	SSN	
OBERON	SS	
OHIO	SSBN	
OOSHIO	SS	SEE ASASHIO
OSCAR	SSGN	
PAPA	SSGN	
PERMIT	SSN	
PIOMARTA	SS	SEE TANG
PORPOISE	SS	SEE OBERON
POTVIS	SS	SEE DOLFIJN
RESOLUTION	SSBN	
ROMEO	SS	
RUBIS	SSN	SEE SNA-72
SALTA	SS	SEE TYPE 209
SAURO	SS	
SAVA	SS	
SEAWOLF	SSN	
SJOORMEN	SS	
SKATE	SSN	
SKIPJACK	SSN	
SNA-72	SSN	
STURGEON	SSN	
SUTJESKA	SS	
SWIFTSURE	SSN	
TANG	SS	
TANGO	SS	
THRESHER	SSN	SEE PERMIT
TIBURON	SS	
TOTI	SS	
TULLIBEE	SSN	
TYPE 205	SS	
TYPE 206	SS	
TYPE 207	SS	
TYPE 209	SS	
TYPHOON	SSBN	
UZUSHIO	SS	
VALIANT	SSN	
VICTOR I	SSN	
VICTOR II	SSN	
VICTOR III	SSN	
WHISKEY	SS	
WHISKEY CANVAS BAG	SSR	
WHISKEY LONG BIN	SSG	
WHISKEY TWIN CYLINDER	SSG	
YANKEE	SSN	SEE YANKEE I
YANKEE I	SSBN	
YANKEE II	SSBN	
YUUSHIO	SS	
ZULU IV	SS	
ZWAARDVIS	SS	

CHAPTER 3

Submarine Nomenclature

1. GENERAL

The exterior view of the submarine presents a very low silhouette. This is because the submarine has a high density and therefore is normally two-thirds submerged, even when surfaced. The exterior hull of the submarine has a cylindrical shape which gradually tapers forward and aft to become the bow and stern, respectively.

On older fleet type, World War II submarines, the superstructure deck--called the main deck--extends virtually from the tip of the bow to near the stern. The deck is generally level. Beginning near the midships section, it rises gradually in the direction of the bow to a height of approximately 10 feet above the waterline. Freeboard at the after end of the main deck is about 4 feet.

2. OLDER SUBMARINE TYPES

Figure 3-1 depicts an annotated example of an older type submarine. The forward or bow section of the main deck normally has the following installations: a sonar head (1) which is

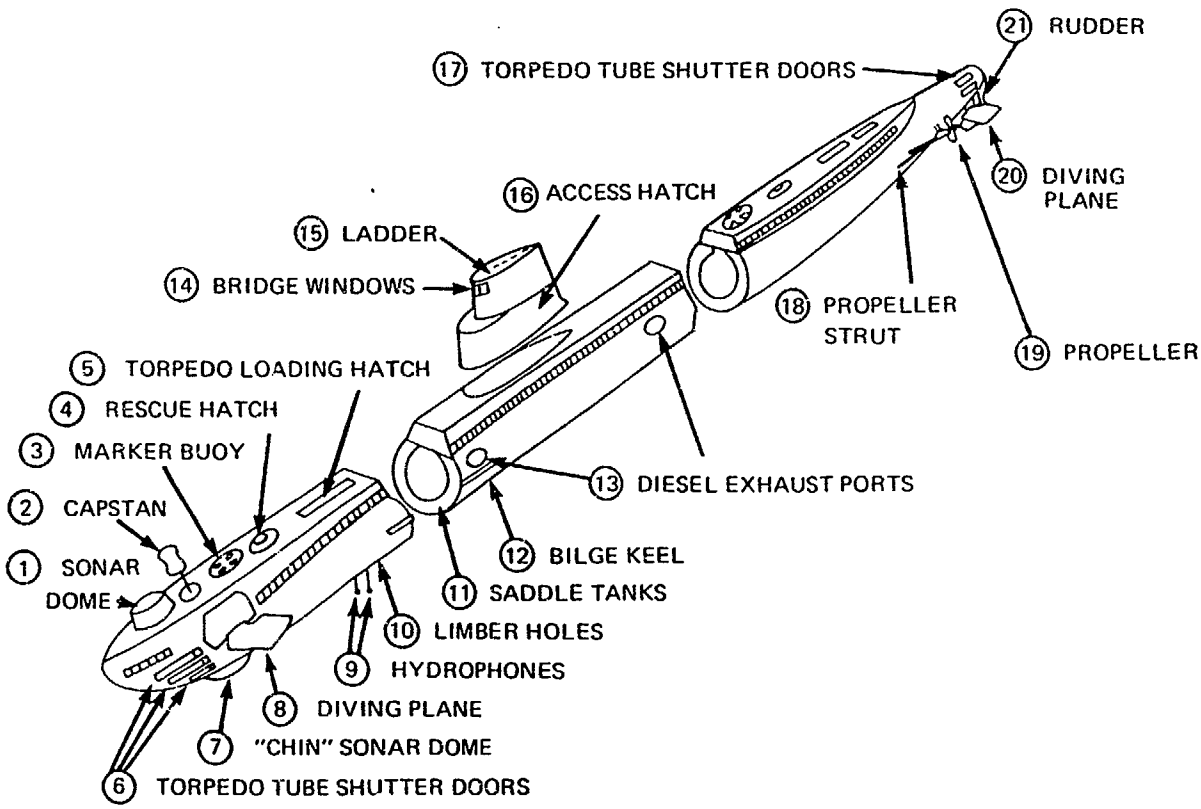


Figure 3-1. Older Submarine Types

often called a sonar dome; a capstan (2) which is often retractable; a marker buoy (3); an escape hatch (4); and a loading hatch (5) for forward torpedoes.

The bow section may be fitted with torpedo-tube shutter doors (6); a "chin"-mounted sonar dome (7); retractable or foldable "diving" planes (8); and hydrophones (9) or other retractable sound equipment.

Running from the bow section through the midship section and terminating in the after section, free-flooding ports called "limber holes" (10) may be arranged in various patterns. Saddle tanks (11) form a noticeable bulge in the hull shape. A bilge keel (12) might be evident if the hull were raised out of the water. Diesel exhaust ports (13) are located at the waterline.

Windows in the sail (14), ladders (15), and entrance hatches (16) are sometimes visible on the sail.

The stern section has deck structures similar to the bow section (marker buoy, rescue hatch, access hatch, capstan, etc.). There are usually fewer torpedo-tube shutter doors (17) aft than forward. Propeller struts (18) and propellers (19) are usually located port and starboard. Control surfaces at the stern include movable diving planes (20) and a rudder (21).

3. NEWER SUBMARINE TYPES

The basic hull shape of modern submarines resembles a torpedo, with a rounded bow forward and control planes at the stern set at right angles to each other (see Figure 3-2). Other surfaces show streamlined fairing. The following prominent recognition features are characteristic of modern submarines.

a. A sonar belt (1) or sound-transparent window may encircle the bow.

b. Sonar plates (2) or another belt of similar

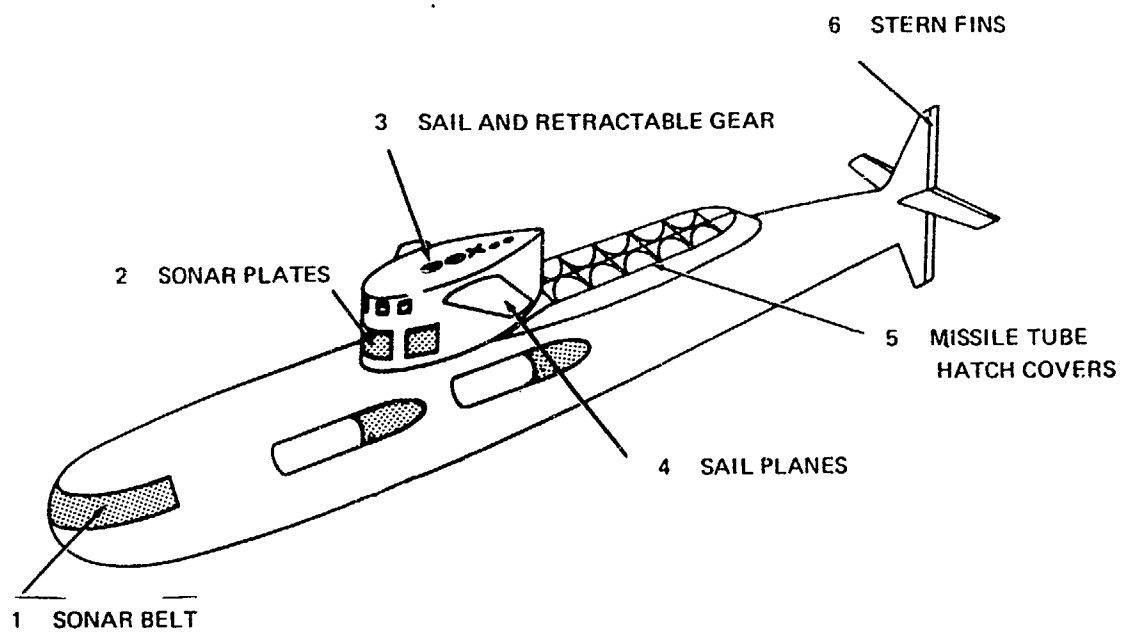


Figure 3-2. Newer Submarine Types

material may encircle the lower sail front.

c. The sail (3) may be rectangular, streamlined, or stepped, and it may have retractable gear wells.

d. Sail planes (4) are often present on newer submarines.

e. If so equipped, missile-tube hatch covers (5), or cowlings, occur in a variety of patterns. Tubes installed vertically may be located within the hull aft of the sail or within the sail itself.

f. Stern fins (6) provide one of the most prominent features of modern submarines. The vertical fin, which incorporates an extended rudder surface, may extend well above the main deckline. Fins on some units are set at a 45-degree angle to the vertical.

4. TYPICAL RETRACTABLE GEAR

Figure 3-3 depicts typical retractable equipment in a hypothetical submarine sail. The shape, sequence, and combinations of equipment will vary extensively, but will normally include:

a. An attack periscope (1).

b. A reconnaissance or search periscope (2), characterized by an enlarged barrel and head.

c. A navigation/search radar (3).

d. An air-induction valve (4) which is often called a snorkel intake.

e. A direction-finding antenna (5) which is often some type of DF loop.

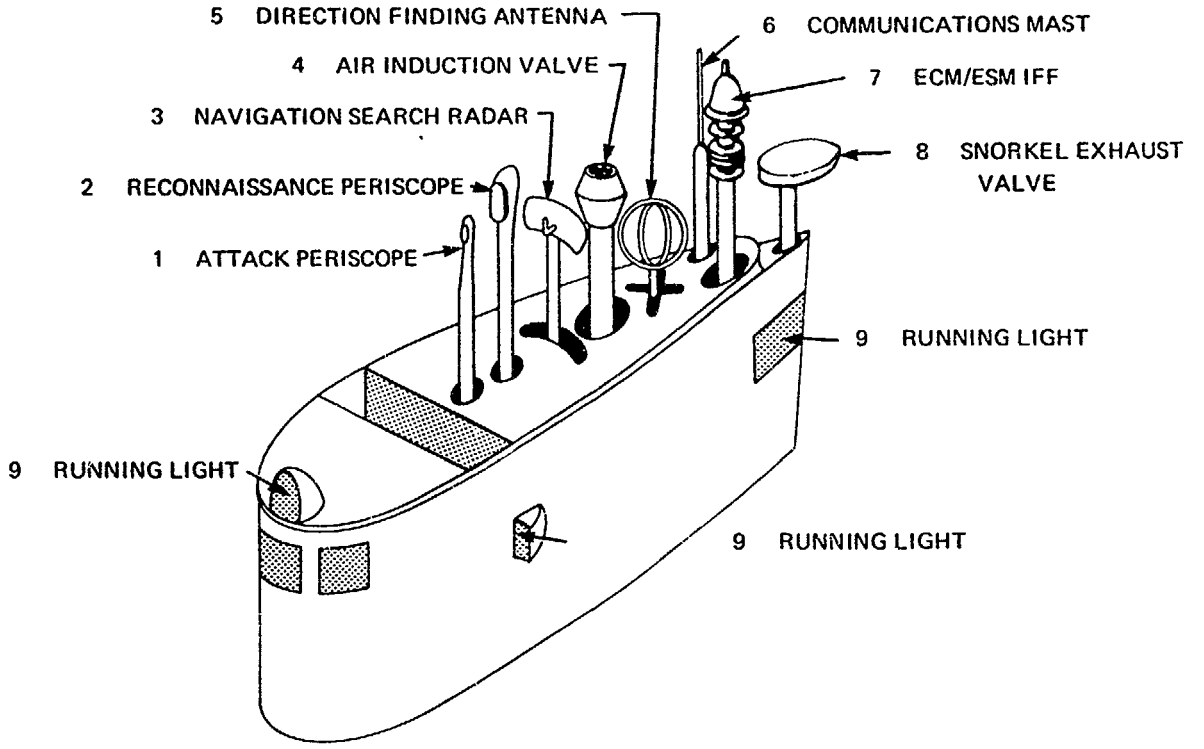


Figure 3-3. Typical Retractable Gear

f. One or more communications masts (6) for various radio frequency ranges.

g. An antenna (7) which houses various ECM/ESM and IFF installations.

h. A snorkel exhaust valve (8) which may take the form of a fixed installation within the sail.

i. Running lights (9) which may be fixed, recessed, retractable, or folded flush into the sail when not in use.

Other features often observed in the sail include electronic navigation devices, searchlights, fold-down windshields, guardrails, and ladders.

CHAPTER 4

Submarine Coding System

1. CODING SYSTEM

Three factors--overall profile, sail placement, and bow profile--are usually sufficient to identify a class; hence each submarine class has a three-digit code number. The coding system is based on examining the profile appearance of a given submarine and assigning a number to each of the three specific features that best corresponds with illustrated examples. In cases where several submarine classes possess the same code number, their profiles and photographs should be carefully compared to differentiate among them. In addition, the area of operations in which the submarine is sighted as well as the nationality of the tentatively recognized submarine are other useful factors to consider in identifying the submarine. Silhouette form profiles are arranged in ascending order of their code numbers so that similar appearing units are in close proximity to each other.

2. OVERALL PROFILE

The submarine's overall profile appearance, of which sail shape is the most important factor, determines the first digit in the submarine code. See Section A. Historically, older World War II submarines were virtually nondescript since the superstructure consisted of a conglomeration of raised components such as the conning tower, bridge, and a veritable forest of masts, stanchions, and antennas. The trend after World War II was to design the masts so that they were retractable and to construct a fairing around all objects extending above the weatherdeck. Most early post-World War II sail fairings were prominently stepped. Most stepped-type sails are being phased out, and new construction units feature streamlined sails that are completely faired.

The streamlined "turtleback" sail, which is a Soviet innovation, has a curved topline that merges with the after trailing edge of the sail. It is code number 1 in the Overall Profile coding group.

Rectangular type sails are so numerous that they must be subdivided as they appear in relation to other features. The new SSBNs usually have a large rectangular sail with sail planes. They also have a bullet-shaped bow, a stern fin, and a prominently raised deckline aft of the sail (a feature necessitated to accommodate missile tubes). SSBN classes largely constitute Overall Profile Code 2 grouping.

Other submarines with rectangular sails comprise groupings with Overall Profile codes of 3, 4, and 5. In these groups, hull features such as stern fin and bow type are the differentiating factors.

Submarines with Overall Profile Code 6 include a small group of transitory design types. In this group, the overall appearance of the sail is rectangular, but the topline is broken with minor knuckles, protuberances, and fixed or semi-retractable equipment. If a small step occurs, it measures less than one-fifth of the sail height and usually indicates a shield, raised well cover, or fixed snorkel exhaust casing. Generally speaking, this group is composed of conversions and experimental prototypes which bridge the gap between the irregular shapes of the World War II versions and the streamlined sails of the nuclear age. If the sail topline is broken and has an obvious step measuring one-fourth the sail height or more, it falls within Overall Profile Codes 7 through 9, depending on the position of the step.

3. SAIL PLACEMENT CODING

Sail placement determines the second digit in the code. See Section B. The system for coding sail placement parallels and reinforces the system for overall profile coding. Generally, newer

submarines have their sails placed much nearer the bow than older design types. In examining the five basic sail positions, it is intended that the observer choose the example which best shows the position of the sighted sail in relation to the hull. To do this, compare an imaginary line establishing the center of the sail with an imaginary line through the midpoint of the hull. There will be instances in which the visual angle will adversely affect coding so that a borderline judgment is necessary. In such cases, it is advisable to use the lower coding number so that the observer can examine the submarine silhouettes that follow in the general appearance group. The codings for sail placement are based on actual hull length, which includes any protruding stern fin regardless of whether it is readily visible at sea.

4. BOW PROFILE CODING

As illustrated in Section C, the bow profile determines the third digit in the code. A number is assigned in an ascending order that coincides with the severity of angle with which the stem or deckline approaches the waterline. With newer submarines, the bulbous bow is seldom seen even when surfaced, and the deckline forward of the sail appears to slope gently into the water. With older design types, the prow has a definite terminal point, and the angle of the stem is either raked or vertical. In borderline cases, it is again advised that the lower code number be used so that the observer can proceed logically in his search. In coding bow profiles, note that structures atop the bow (unless fully faired-in with a cowling so they appear to contribute to the permanent configuration of the hull) are not considered as part of the bow shape. Bow shapes are often difficult to see because of observer angle or water wave action, but this should not constrain the observer since it is often possible to identify a particular submarine class based only on the first two code numbers.

SECTION A — OVERALL PROFILE (First Digit)

Code No.	Silhouette	Description
1		**Streamlined Sail** Sail has unbroken topline with no prominent steps or breaks. Topline blends with trailing edge as it curves toward deckline aft.
2		**Rectangular Sail, Broken After Deckline, Stern Fin** Sail has unbroken topline and is basically rectangular. Prominent break in after deckline forms a knuckle above waterline. Stern fin is visible.
3		**Rectangular Sail, Unbroken After Deckline, Sloping Bow Deckline, Stern Fin** Sail has unbroken topline and is basically rectangular. There is no prominent break visible in after deckline. Deckline at bow slopes into waterline without revealing bow. Stern fin is visible.
4		**Rectangular Sail, Unbroken After Deckline, Blunt Bow, No Stern Fin** Same as Group 3 except forward deckline is relatively level and the bow profile is exposed.
5		**Rectangular Sail, Unbroken After Deckline, Blunt Bow, No Stern Fin** Same as Group 4 except no stern fin is visible above waterline.
6		**Rectangular Sail with Minor Breaks in Topline** Breaks in topline are not prominent enough to be considered steps and usually consist of raised well guards, fixed instruments, knuckles, etc.
7		**Sail Stepped Down Toward Bow** Sail has one or more prominent breaks in topline, forming a distinct step measuring 1/4 or more of the sail height. There may be a stern fin.
8		**Sail Stepped Down Toward Bow and Stern** Same as Group 7 except that a downward step aft is also present.
9		**Sail Stepped Down Toward Stern** Same as Group 7 except the downward step is toward the stern instead of the bow.

SECTION B — SAIL PLACEMENT (Second Digit)

Code No.	Silhouette	Description
1		**Sail Well Forward on Hull** Entire sail is well forward of hull midpoint.
2		**Sail Slightly Forward** Sail center is slightly forward of hull midpoint.
3		**Sail Centered** Sail center nearly coincides with hull midpoint.
4		**Sail Slightly Aft** Sail center is slightly aft of hull midpoint.
5		**Sail Well Aft On Hull** Entire sail is well aft of hull midpoint.

SECTION C — BOW PROFILE (Third Digit)

Code No.	Silhouette	Description
1		**Gently Sloping** Forward deckline slopes gently into waterline. Bow is submerged and not visible.
2		**Abruptly Sloping** Forward deckline curves abruptly below waterline at bow. Bow proper is submerged.
3		**Bluntly Rounded** Forward deckline terminates with definite bow. Prow is visible and curved stem shape is discernible.
4		**Bluntly Squared** Same basic features as Group 3 except prow shows a vertical stem.
5		**Bulbous** Prow shows a rounded and raked appearance in profile.
6		**Raked** Prow shows stem is straight and inclined from vertical.
7		**Upswept** Sheer prow shows exaggerated upswing from forward deckline.

CHAPTER 5

Submarine Codings

SUBMARINE CODINGS
OVERALL PROFILE CODE 1

111 ALFA SSN UR

112 NOVEMBER SSN UR

113 VICTOR I SSN UR

114 HOTEL II SSBN UR

122 OSCAR SSGN UR

123 CHARLIE I SSGN UR

123 VICTOR II SSN UR

123 VICTOR III SSN UR

124 WHISKEY LONG BIN SSG UR

133 CHARLIE II SSGN UR

OVERALL PROFILE CODE 2

211 ETHAN ALLEN SSN US

211 GEORGE WASHINGTON SSN US

211 LAFAYETTE SSBN US

211 TULLIBEE SSN US

213 DELTA I SSBN UR

213 DELTA II SSBN UR

213 DELTA III SSBN UR

213 YANKEE I SSBN UR

213 YANKEE II SSBN UR

214 NACKEN SS SW

224 DARTER SS US

224 SAURO SS IT

225 SKATE SSN US

225 TANG SS IT, TU, US

227 GYMNOTE SSB FR

OVERALL PROFILE CODE 3

311 BARBEL SS US

311 BRAVO SST UR

311 DREADNOUGHT SSN UK

311 GLENARD P. LIPSCOMB SSN US

311 LE REDOUTABLE SSBN FR

311 LOS ANGELES SSN US

311 NARWHAL SSN US

311 OHIO SSBN US

311 PERMIT SSN US

311 RESOLUTION SSBN UK

311 SKIPJACK SSN US

311 STURGEON SSN US

311 SWIFTSURE SSN UK

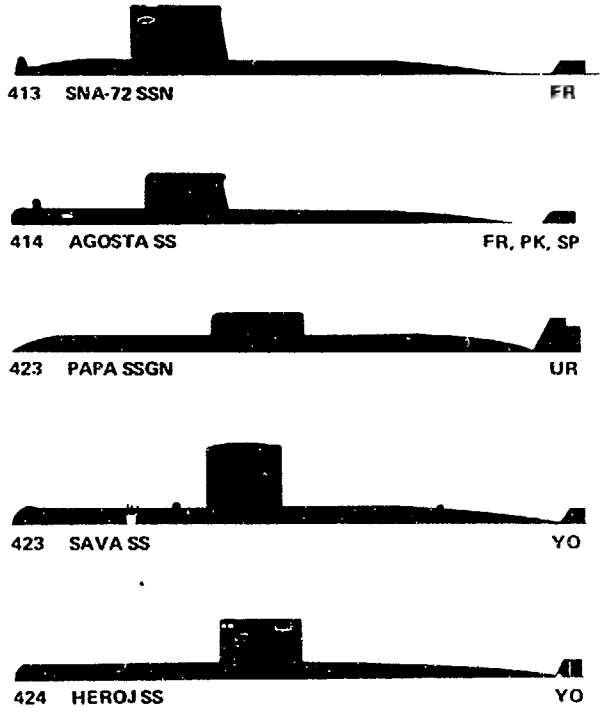
311 UZUSHIO SS JA

311 YUUSHIO SS JA

311 ZWAARDVIS SS NL

321 VALIANT SSN UK

OVERALL PROFILE CODE 4



OVERALL PROFILE CODE 5

514 ECHO SSN UR

514 ECHO II SSGN UR

523 DOLFIJN SS NL

525 GUPPY IA, II, IIA SS AR, BR, GR, PE, SP, TU, TW, VE

525 GUPPY III SS BR, GR, IT, TU

525 TIBURON SS PE

526 BALAO (Type 2) SS CI

537 ARETHUSE SS FR

537 DAPHNE SS FR, PK, PO, SF, SP

545 DELFINEN SS DA

546 OBERON SS AS, BR, CA, CI, UK

547 NARVAL SS FR

OVERALL PROFILE CODE 6

612 SJOORMEN SS SW

624 JULIETT SSG UR

624 TANGO SS UR

625 FOXTROT SS CU, IN, LY, UR

625 GOLF II SSB UR

626 GOLF I SSB CH, UR

633 GRAYBACK SS US

634 TOTI SS IT

635 WHISKEY CANVAS BAG SSR UR

OVERALL PROFILE CODE 7

712 DOLPHIN AGSS US

714 ASASHIO SS JA

714 SEAWOLF SSN US

726 BALAO (Type 1) SS SP

726 ZULU IV SS UR

736 SUTJESKA SS YO

744 LIMA SSA UR

754 DRAKEN SS SW

OVERALL PROFILE CODE 8

823 GAL SS IS

823 TYPE 209 SS AR, CO, EC, GR, ID, PE, TU, VE

825 ROMEO SS BU, CH, EG, KN, UR

852 TYPHOON SSBN UR

853 TYPE 205 SS DA, GE

854 TYPE 206 SS GE

OVERALL PROFILE CODE 9

916 INDIA SSA UR

924 WHISKEY SS AL, BU, CH, CU, EG, ID, KN, PL, UR

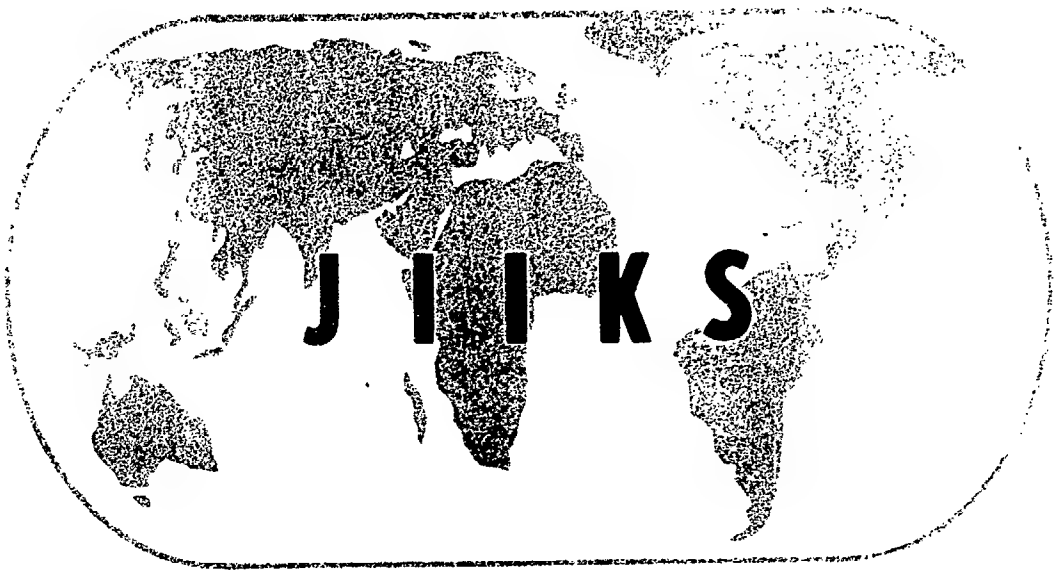
924 WHISKEY TWIN CYLINDER SSG UR

926 GOLF SSQ UR

934 TYPE 207 SS NO

DIAM 57-7
TM 30-324

VOLUME XIII

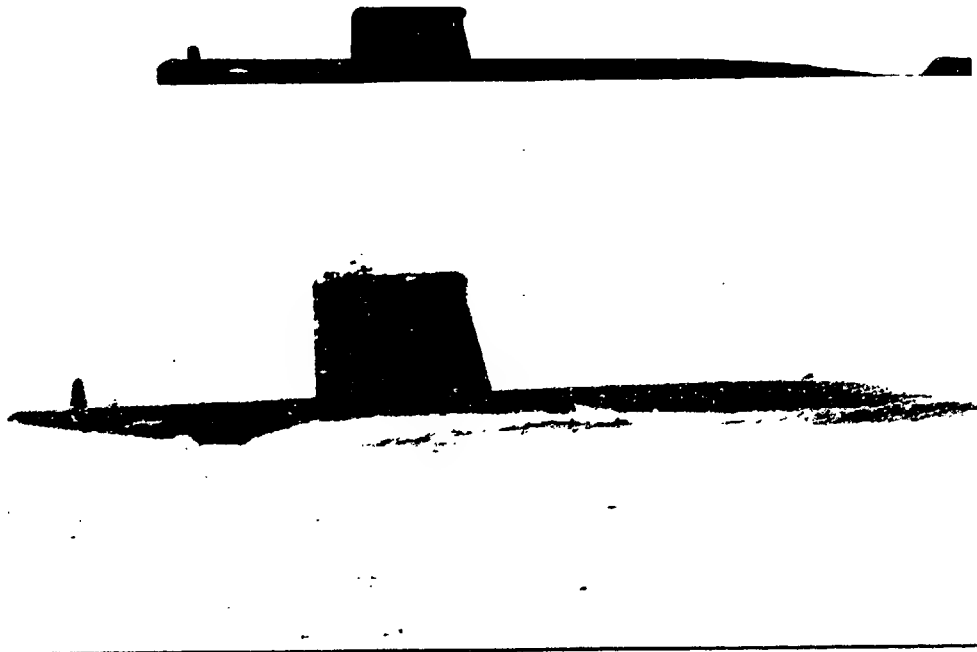


PART TWO

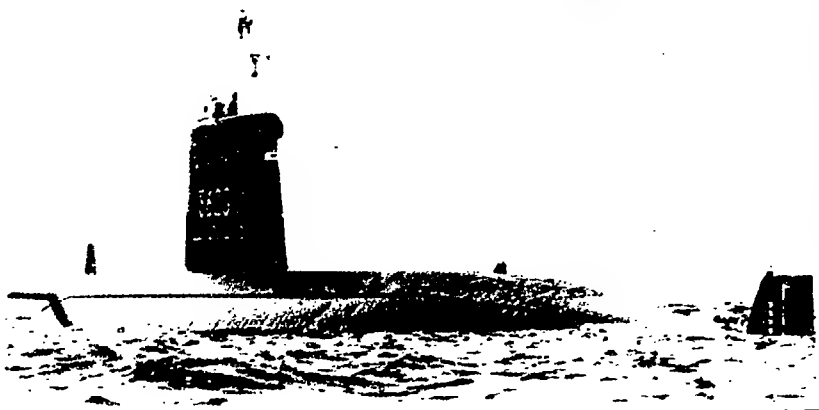
KEYS TO INDIVIDUAL SUBMARINE CLASSES

FR, PK, SP

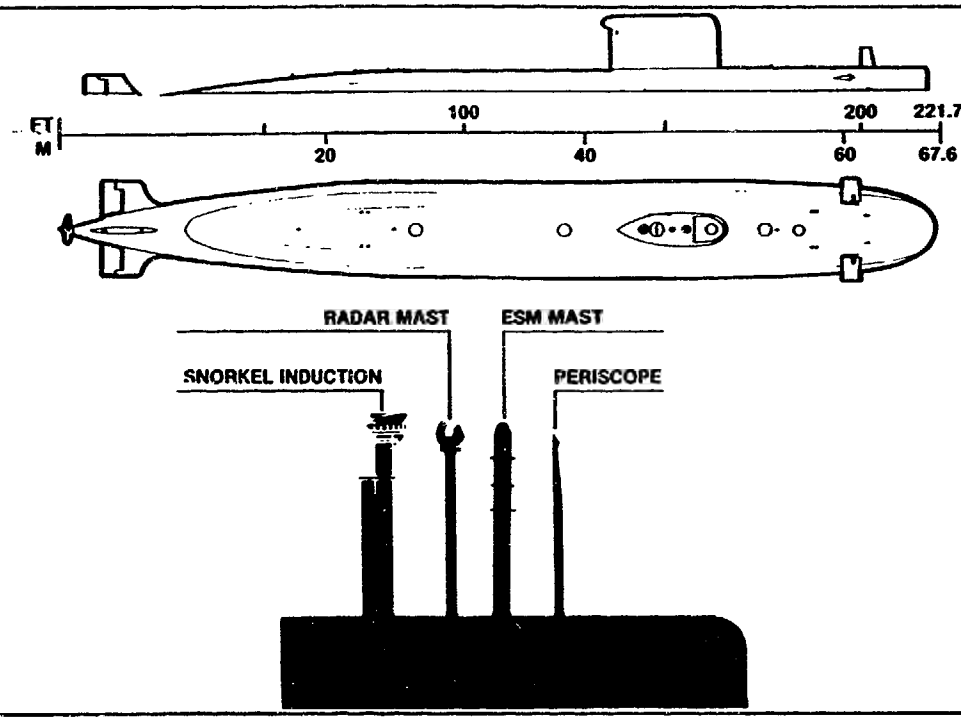
AGOSTA SS



Additional Views Desired



AGOSTA SS **FR, PK, SP**



MAJOR RECOGNITION FEATURES:

AGOSTA's sail is rectangular with vertical leading and trailing edges. The top of the sail is smooth and flat with a rounded corner forward and a squared-off corner aft. The spindle-shaped hull has an unbroken after deckline, a blunt bow with a vertical stem, and a low stern fin which rises no higher than the deckline. The rectangular sail is placed forward of the hull midpoint. The bow profile is bluntly squared, and the narrow flat deck is flush with the hull. The stern is tapered and gently sloping into the waterline before the visible stern fin.

CHARACTERISTICS:

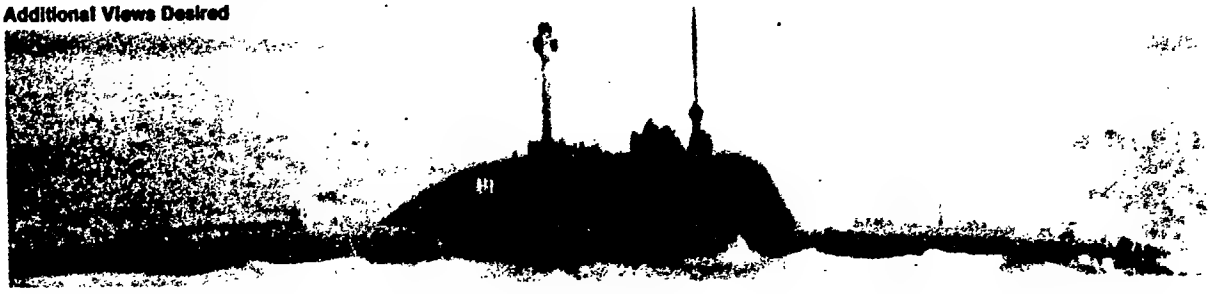
Displacement, tons: 1,450 surfaced; 1,725 submerged
Dimensions, feet (meters): 221.7 x 22.3 x 17.7 (67.6 x 6.8 x 5.4)
Torpedo tubes: 4 x 21 in (53.3 cm) bow (FR); 4 x 21.7 in (55 cm) (PK, SP)
Missiles: EXOCET may be carried by Spanish units
Propulsion: Diesel-electric; 2 diesels; 1 main motor; 1 cruising motor; 1 shaft
Speed, knots: 12 surfaced; 20 submerged
Pennant numbers: FR S620 thru S623; PK S135 and S136; SP S71 thru S74

REMARKS:

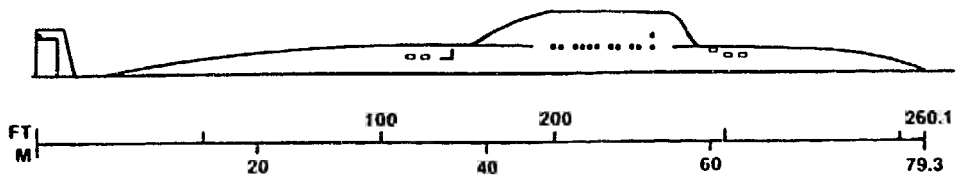
Four units have been commissioned in the French Navy and two in the Pakistan Navy. Four units are currently under construction for the Spanish Navy.

UR ALFA SSN

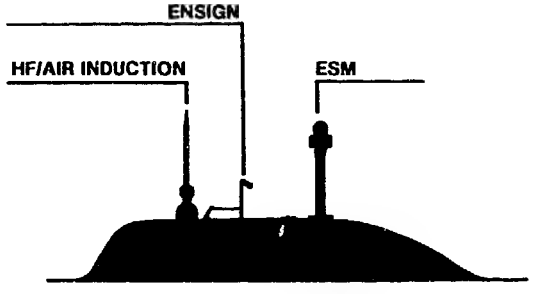
Additional Views Desired



ALFA SSN **UR**



Top View Desired



MAJOR RECOGNITION FEATURES:

The ALFA Class has a low, streamlined sail that is raked and rounded fore and aft, and is located fairly forward on the hull. ALFA has a high stern fin aft which projects to about 1/2 of the sail height. The bow and stern both slope gently into the waterline.

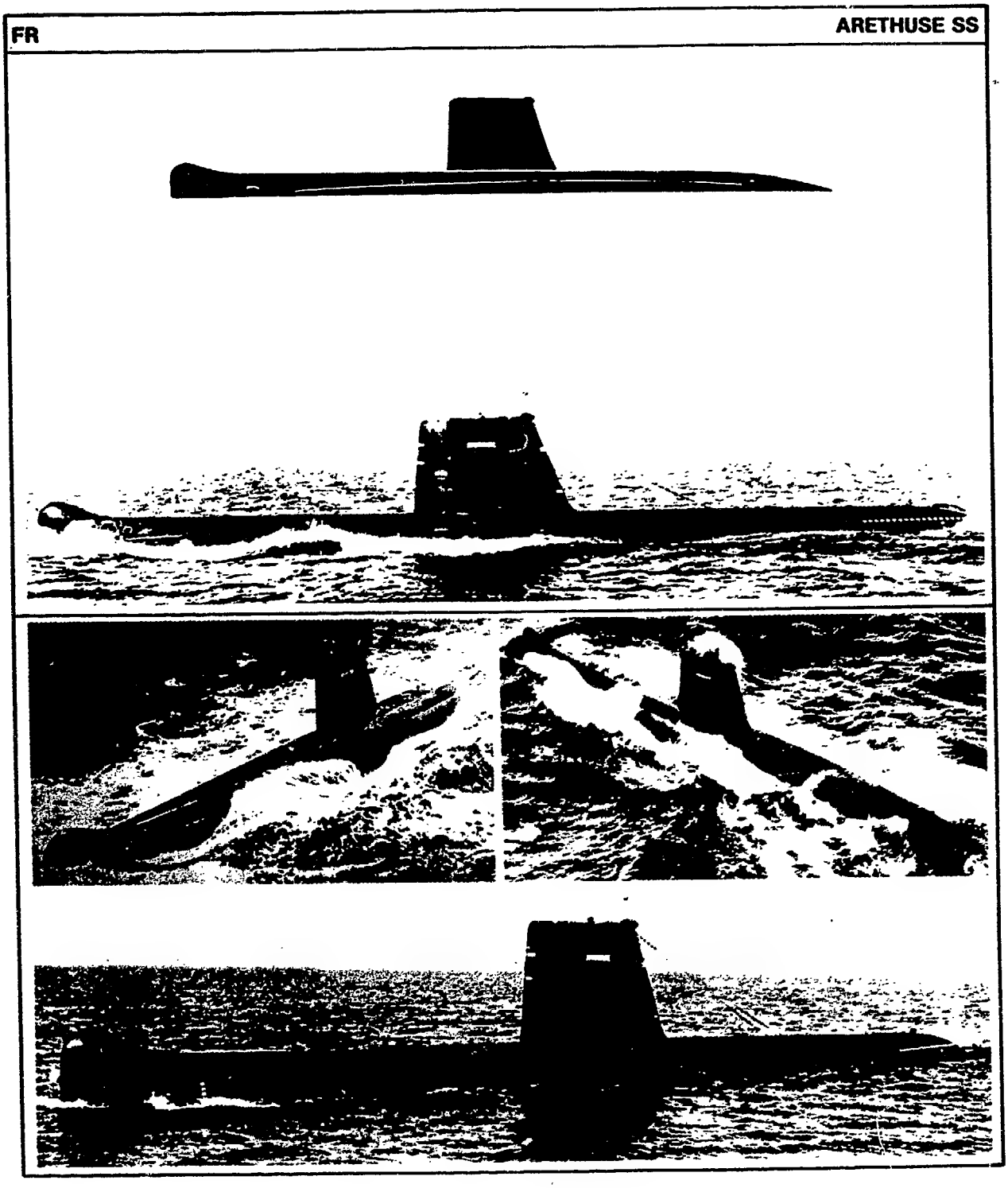
CHARACTERISTICS:

Displacement, tons: 3,500 surfaced; 4,200 submerged
Dimensions, feet (meters): 260.1 x 32.8 (79.3 x 10)
Torpedo tubes: 6 x 21 in (53.3 cm)
Missiles: May be fitted with ASW or SSMs
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 42+ submerged

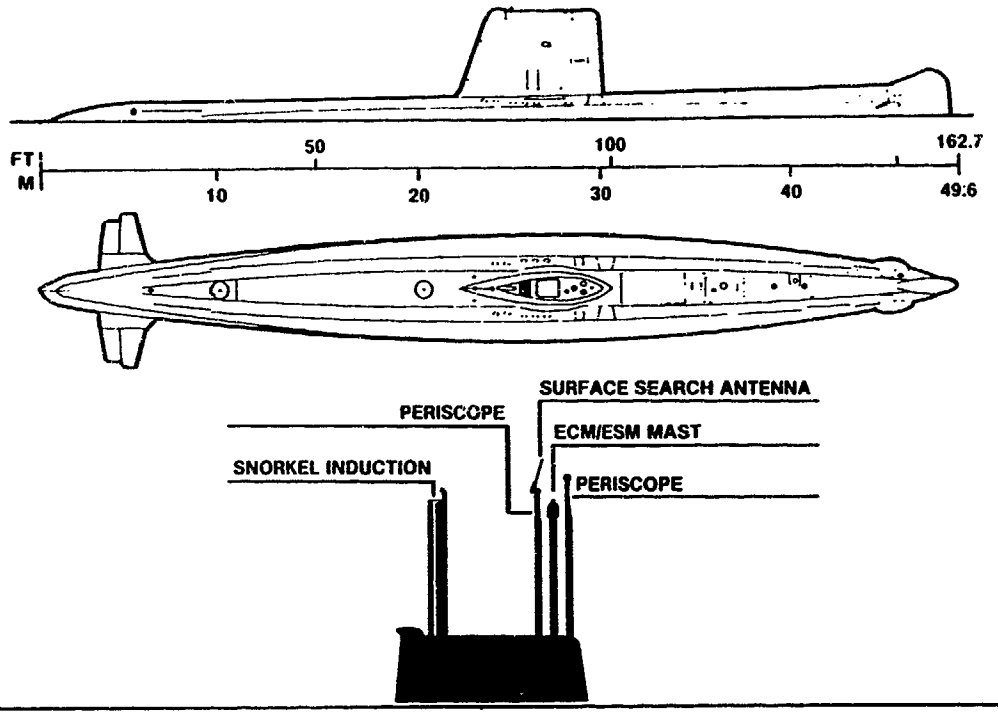
REMARKS:

The Soviet ALFA Class, which became operational in 1978, is a streamlined design, high speed, deep diving submarine. The class is now in slow series production.

FR ARETHUSE SS



ARETHUSE SS FR



MAJOR RECOGNITION FEATURES:

The prime identification feature of French submarines of this vintage is the faired-in bulbous bow which may be called "canoe-shaped." The sail is basically rectangular with a vertical leading edge, a raked trailing edge, and located near the center of the submarine. The fixed snorkel exhaust is somewhat raised above the sail before it is lipped over the trailing edge. ARETHUSE has a deck ridge or knuckle formed by the change of direction in the hull plates after they round off on the sides of the submarine. This effect causes a noticeable bulge at the sides of the submarine, resembling saddle tanks.

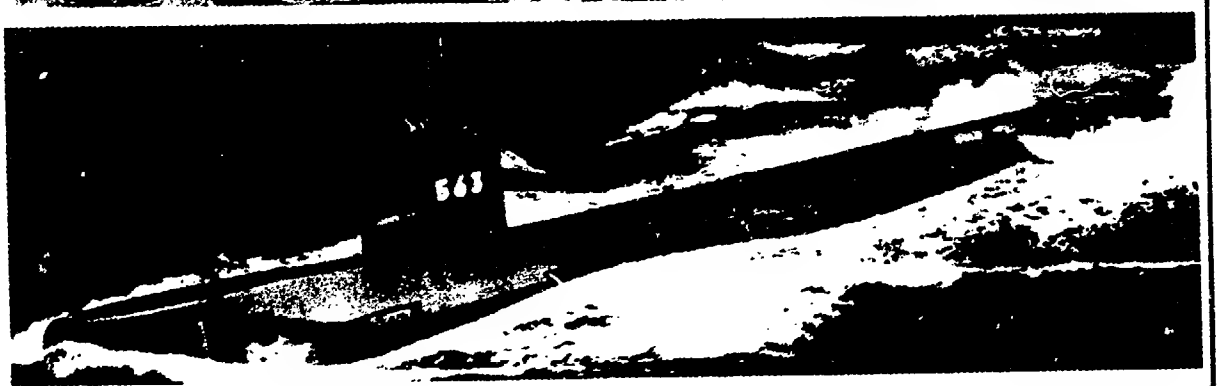
CHARACTERISTICS:

Displacement, tons: 543 surfaced; 669 submerged
Dimensions, feet (meters): 162.7 x 19 x 13.1 (49.6 x 5.8 x 4)
Torpedo tubes: 4 x 21.7 in (55 cm)(bow)
Propulsion: Diesel-electric; 1 shaft
Speed, knots: 12.5 surfaced; 16 submerged
Pennant numbers: S636

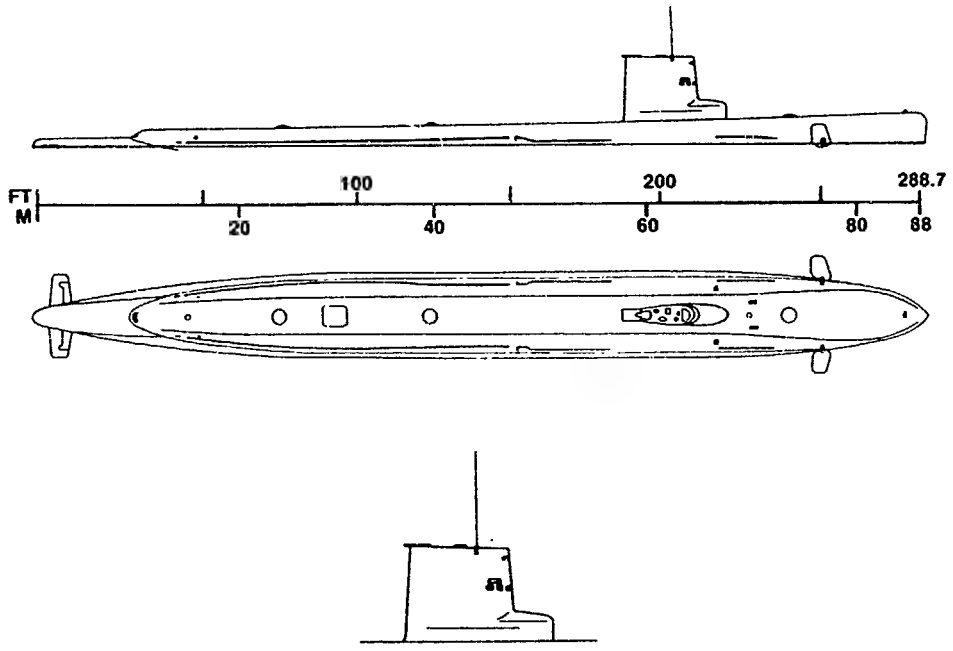
REMARKS:

The ARETHUSE Class, first commissioned in 1959, consisted of four small submarines. These units closely resemble the DAPHNE and NARVAL Class submarines also produced by France. There is presently only one in active service.

JA ASASHIO SS



ASASHIO SS **JA**



MAJOR RECOGNITION FEATURES:

The sail on the ASASHIO Class is located well forward of amidships. The leading edge has a downward step and the trailing edge is slightly raked. The topline is level except for a very small protuberance near the trailing edge. The bow is bluntly squared and folding bow planes are located midway between the bow and sail. The weatherdeck is flat and steps-down near the stern.

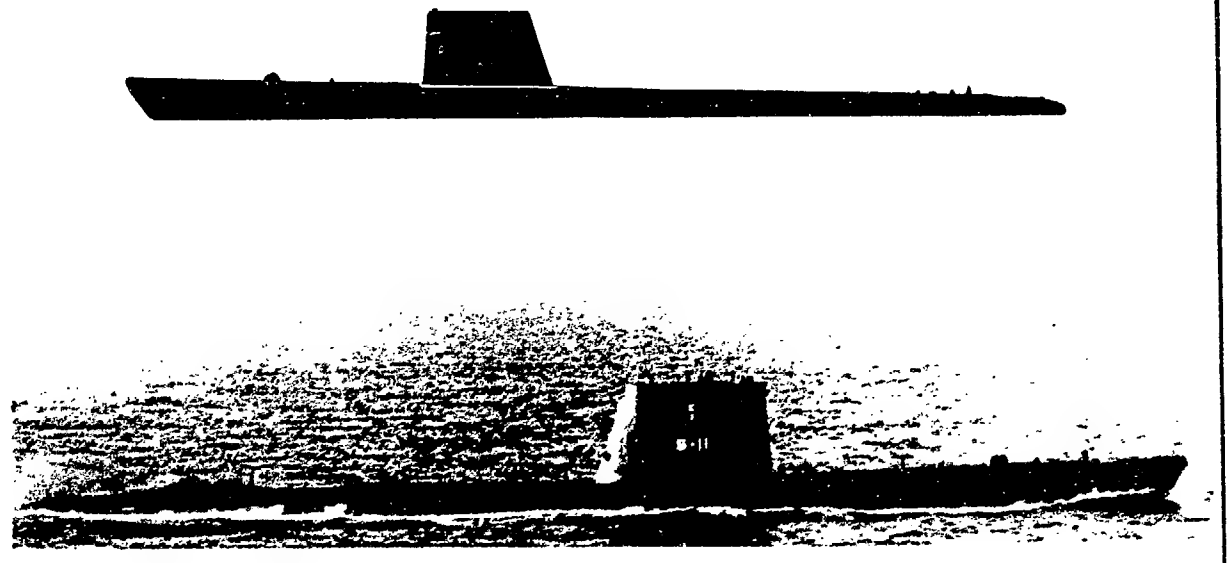
CHARACTERISTICS:

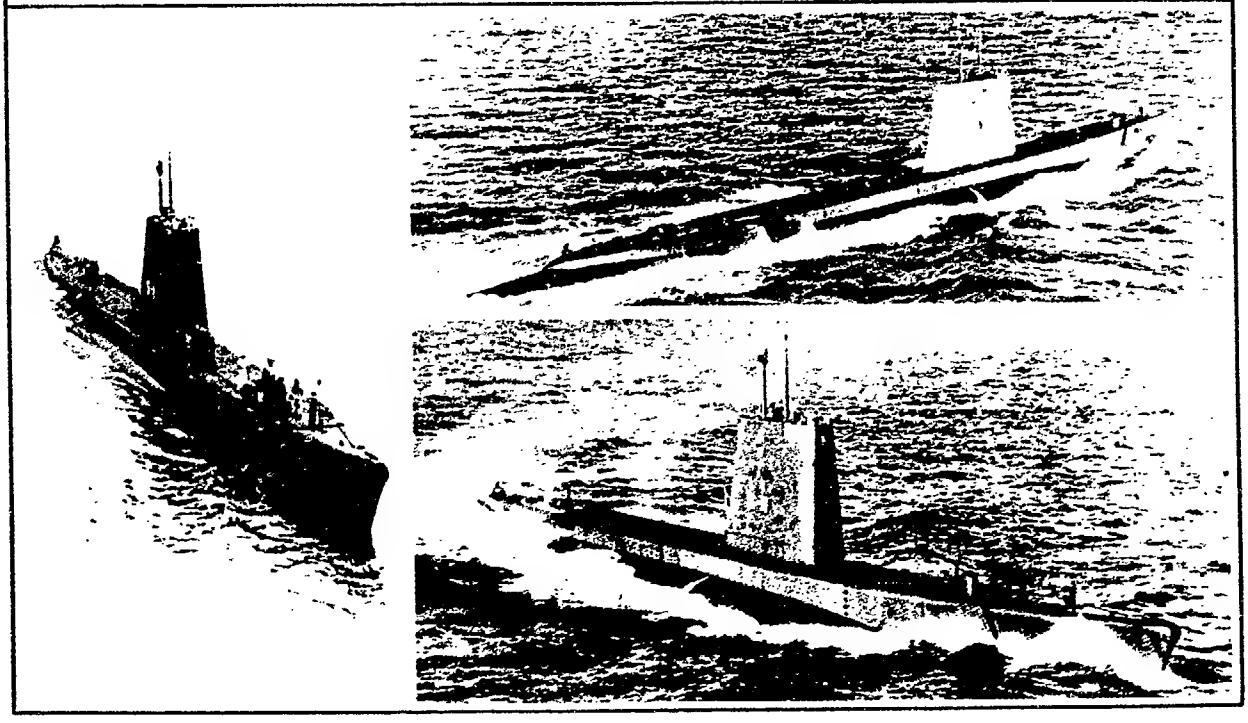
Displacement, tons: 1,650 standard; unknown surfaced and submerged
Dimensions, feet (meters): 288.7 x 26.9 x 16.2 (88 x 8.2 x 4.9)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow); 2 x 12.7 in (32.4 cm) (stern)
Propulsion: Diesel-electric; 2 diesels; 2 electric motors; 2 shafts
Speed, knots: 14 surfaced; 18 submerged
Pennant numbers: S561 thru S565

REMARKS:

The ASASHIO Class, first unit commissioned in 1966, is a follow-on to the single-ship OOSHIO Class (S561). The OOSHIO's bow has a more pronounced curve than that found on units of the ASASHIO Class.

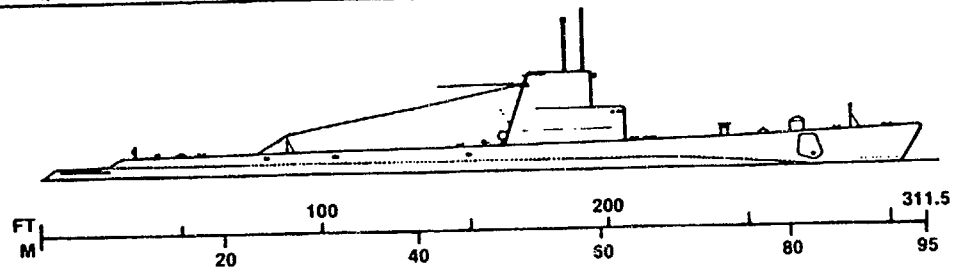
CI BALAO (Type 2) SS



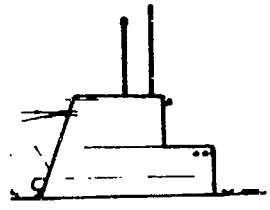


BALAO (Type 1) SS

SP



Top View Desired



MAJOR RECOGNITION FEATURES:

The BALAO (Type 1)'s sail is slightly forward of amidships with a sloped trailing edge and a downward step towards the bow. It has a raked bow with visible diving planes and a level aft deck with a single step down to the pressure hull near the stern.

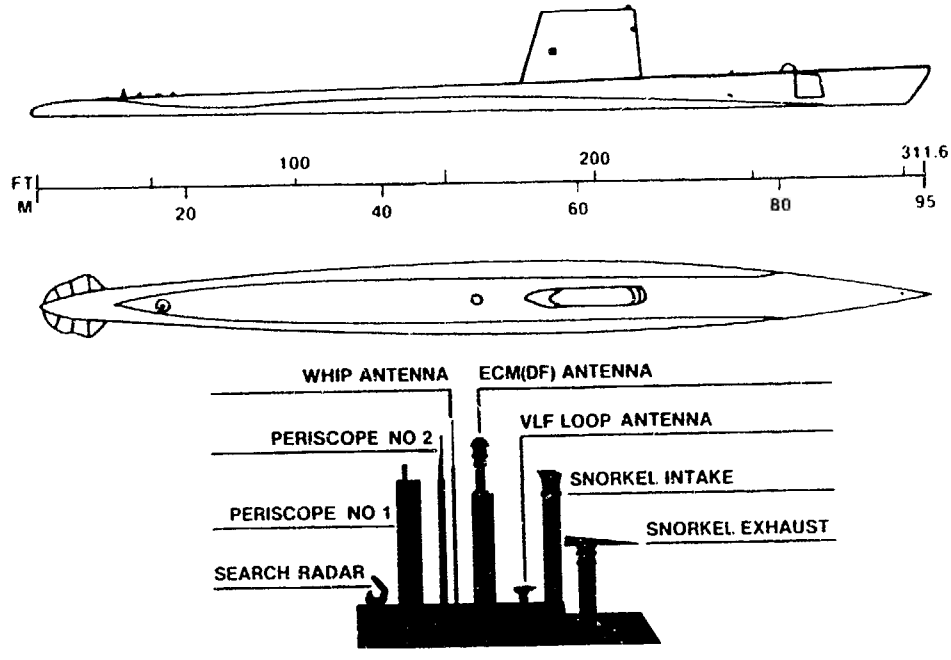
CHARACTERISTICS:

Displacement, tons: 1,816 surfaced; 2,400 submerged
Dimensions, feet (meters): 311.5 x 27.2 x 17.2 (95 x 8.3 x 5.2)
Torpedo tubes: 10 total, (6 x 21 in (53.3 cm) and 4 for ASW torpedoes)
Propulsion: Diesel; 4 diesels; 2 main motors; 2 shafts
Speed, knots: 18.5 surfaced; 10 submerged
Pennant number: S31

REMARKS:

The BALAO Class which became operational in 1944, had over 100 units. The Type 1 and Type 2 designators are used to differentiate between the two currently operational versions, both of which have a different appearance than the original class. The sail of the Type 1 is stepped down forward, whereas the Type 2's sail has a rectangular appearance. There are currently only two units active; one BALAO (Type 1) unit with the Spanish and one Type 2 unit in the Chilian Navy.

BALAO (Type 2) SS CI



MAJOR RECOGNITION FEATURES:

The sail of the BALAO (Type 2) is rectangular in appearance and is situated forward of amidships. It has a raked bow with visible diving planes, and a level aft deck with a single step down to the pressure hull near the stern. The BALAO (Type 2) is identical to the GUPPY IA, II, and IIA except that GUPPYs have a rounded bow.

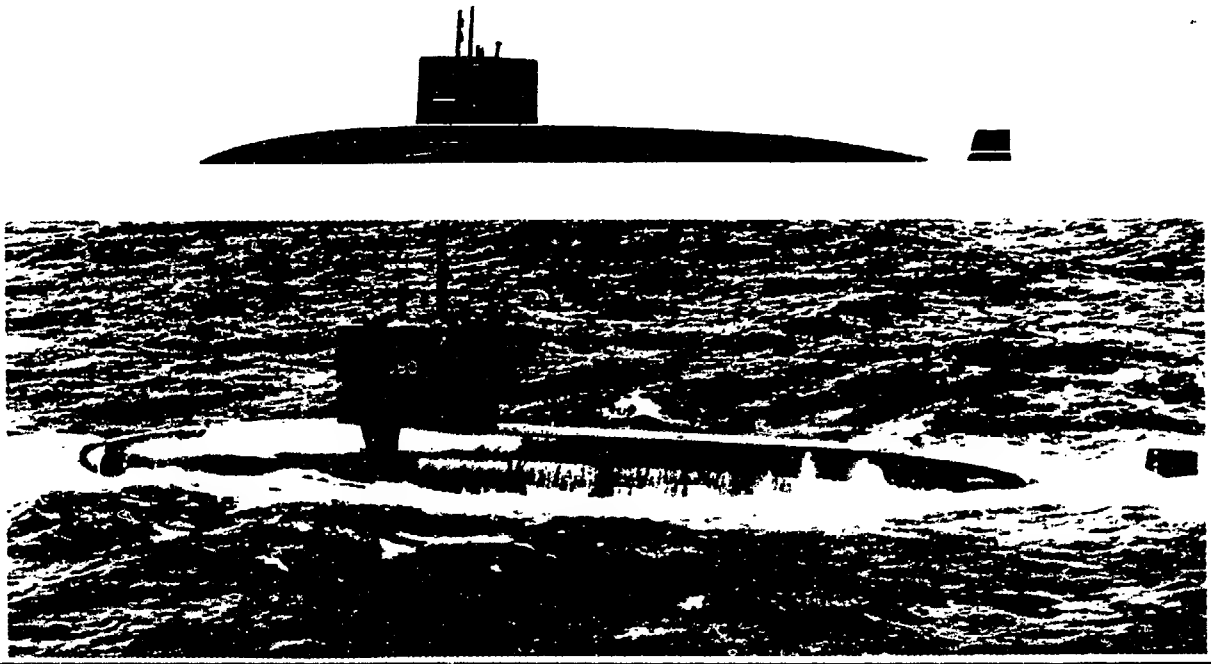
CHARACTERISTICS:

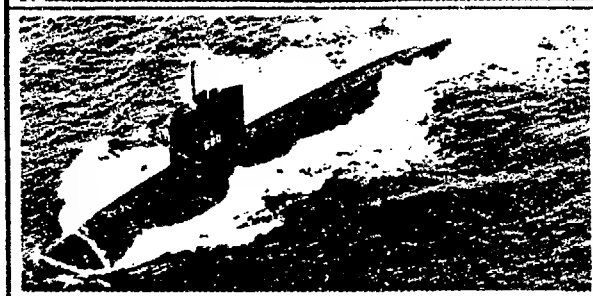
Displacement, tons: 1,816 surfaced; 2,425 submerged
Dimensions, feet (meters): 311.6 x 27 x 17 (95 x 8.2 x 5.2)
Torpedo tubes: 10 x 21 in (53.3 cm) (6 bow, 4 stern)
Propulsion: Diesel-electric; 4 diesels; 2 electric motors
Speed, knots: 20 surfaced; 10 submerged
Pennant number: 21

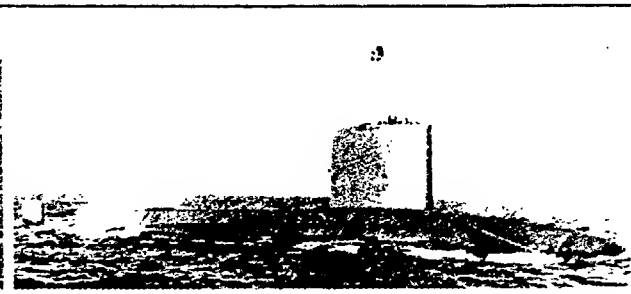
REMARKS:

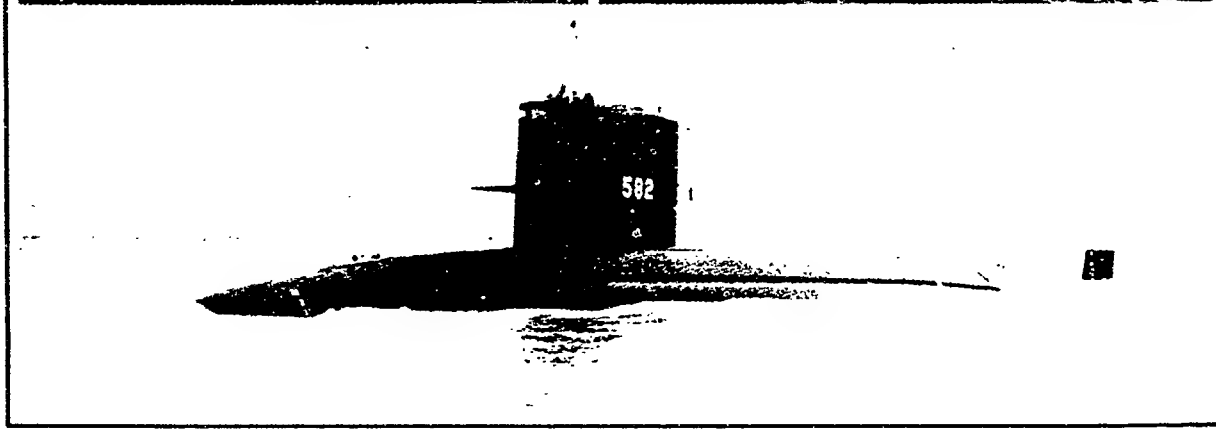
The Type 1 and Type 2 designators for BALAO Class submarines are used to differentiate between the two currently operational versions, both of which have a different appearance than the original BALAO units. The sail of the Type 1 is stepped-down forward, whereas the Type 2's sail has a rectangular appearance. The BALAO (Type 2) is a product of the overhaul program conducted in the 1960s. The sail had an additional 12 foot section added and was heightened by 5 feet to provide for an attack center. Only one unit remains active.

US BARBEL SS



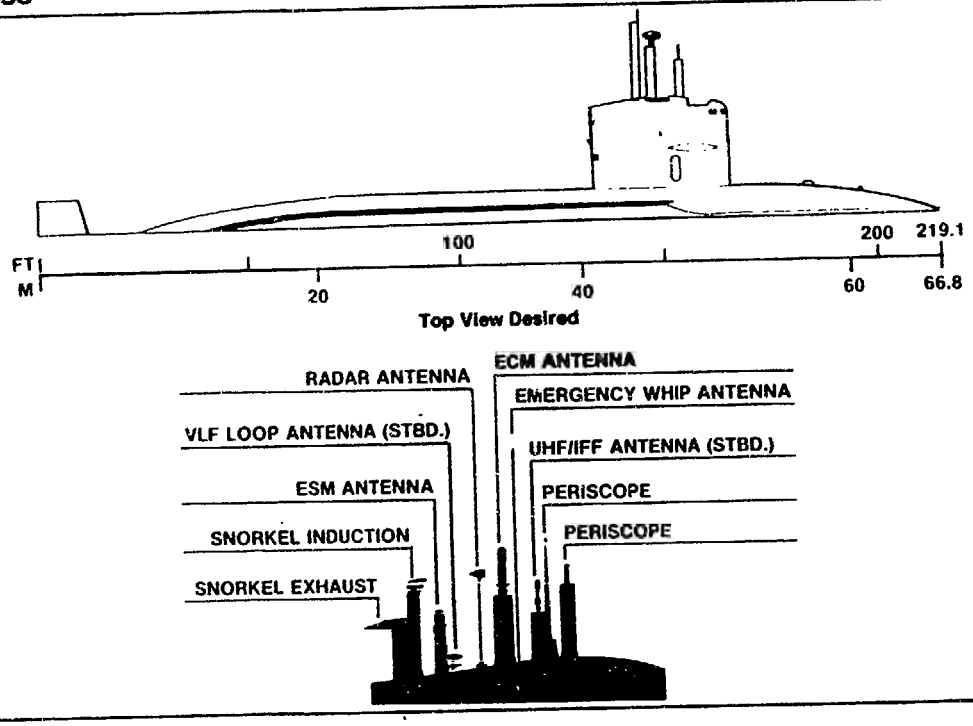






BARBEL SS

US



MAJOR RECOGNITION FEATURES:

BARBEL Class submarines have a rectangular sail situated well forward of amidships, a stern fin, and a prow that slopes gently to the waterline. The leading and trailing edges of the sail are vertical, but the topline evidences a slight convex curve. Sail planes are located near the leading edge of the sail, and are slightly lower than halfway up the sail. The BARBEL has a continuous-line pattern of free-flooding ports on its hull sides.

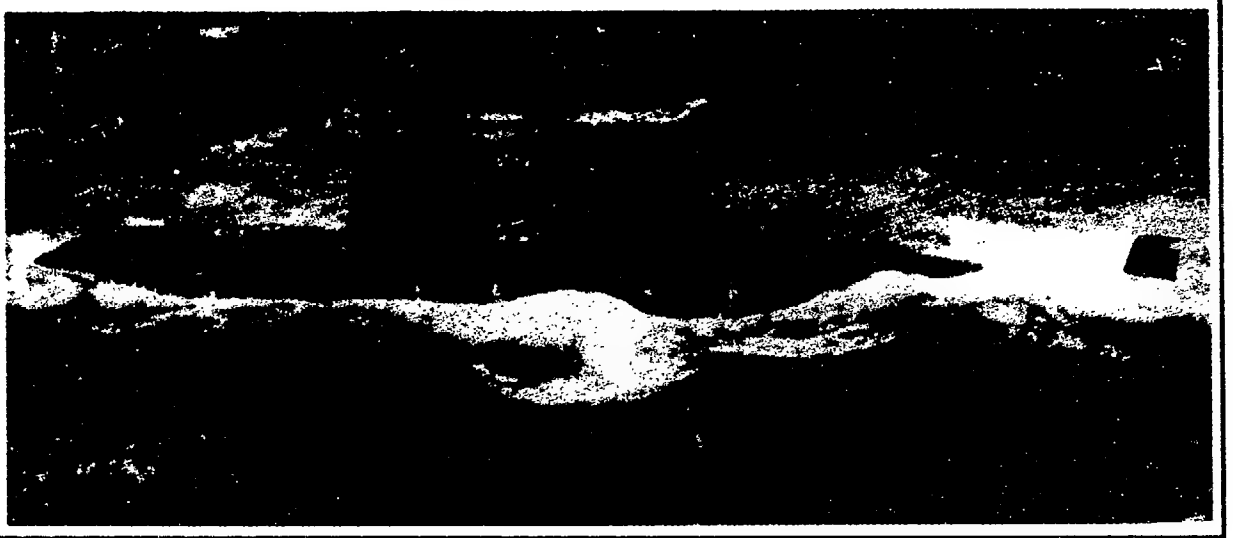
CHARACTERISTICS:

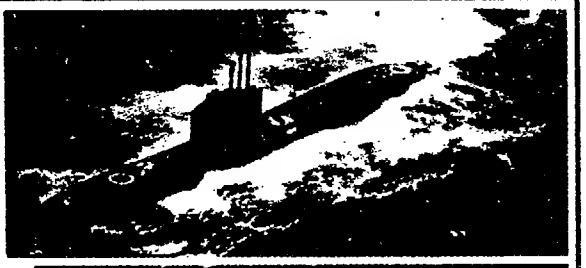
Displacement, tons: 2,145 surfaced; 2,894 submerged
Dimensions, feet (meters): 219.1 x 29 x 28 (66.8 x 8.8 x 8.5)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Propulsion: Diesel-electric; 3 diesels; 2 electric; 1 shaft
Speed, knots: 15 surfaced; 21 submerged
Pennant numbers: 580, 581, 582

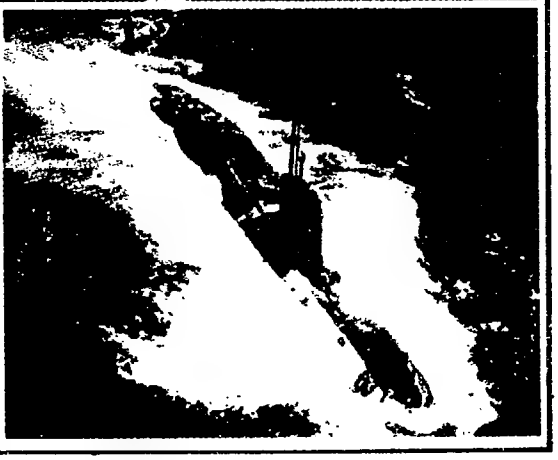
REMARKS:

The first unit of the three BARBEL Class submarines was commissioned in 1959. These submarines have the "tear drop" hull design. They introduced a new concept in centralized arrangement of controls in an "attack center" to increase efficiency, which was subsequently adopted for all new U.S. combat submarines.

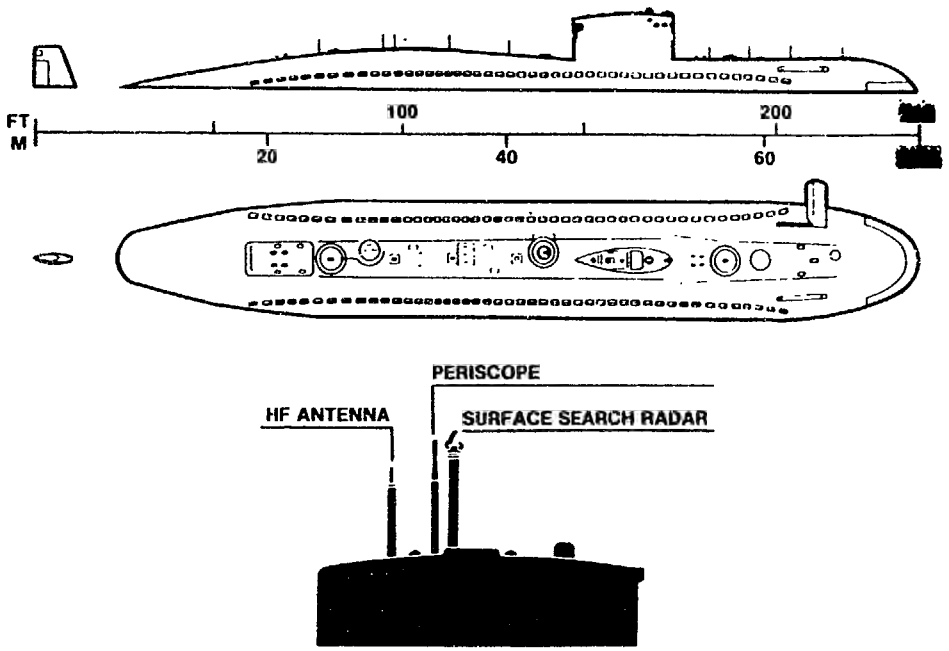
UR BRAVO SST







BRAVO SST UR



MAJOR RECOGNITION FEATURES:

BRAVO has a rectangular sail which is situated well forward of the hull midpoint. The sail is slightly curved on the top, giving the sail top a slight convex appearance. Distinctive features of the BRAVO Class include a stern fin aft and the sail located in the "swayback" area between the curved forward and aft decklines.

CHARACTERISTICS:

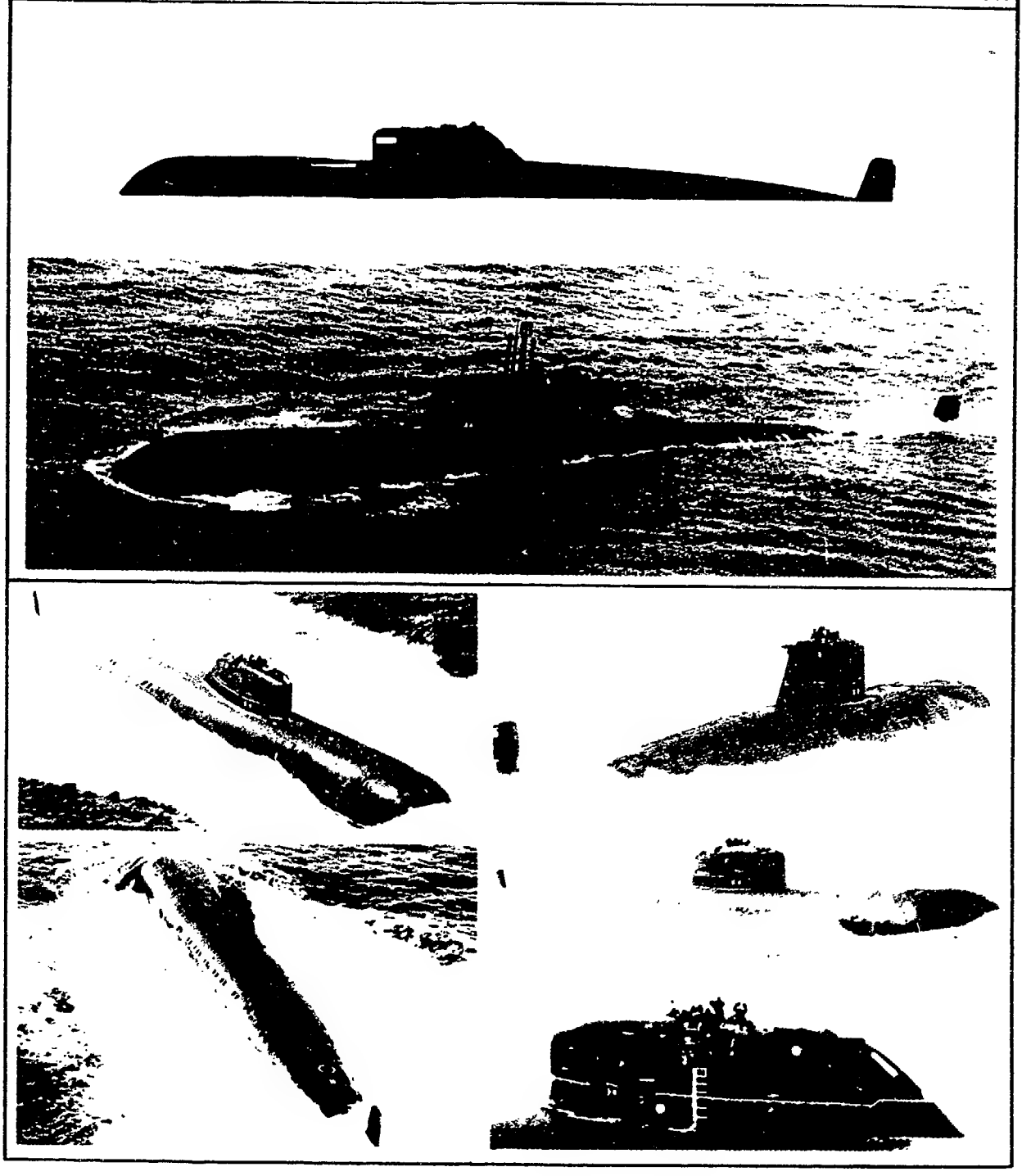
Displacement, tons: 2,400 surfaced; 2,700 submerged
Dimensions (wl), feet (meters): 213 x 32.8 (64.9 x 10)
Torpedo tubes: Possible 6 x 21 in (53.3 cm)
Propulsion: Diesel-electric
Speed, knots: Unknown surfaced; 14 submerged

REMARKS:

The BRAVO Class entered the Soviet Navy in the late 1960s as target and training submarines. Only four units were produced.

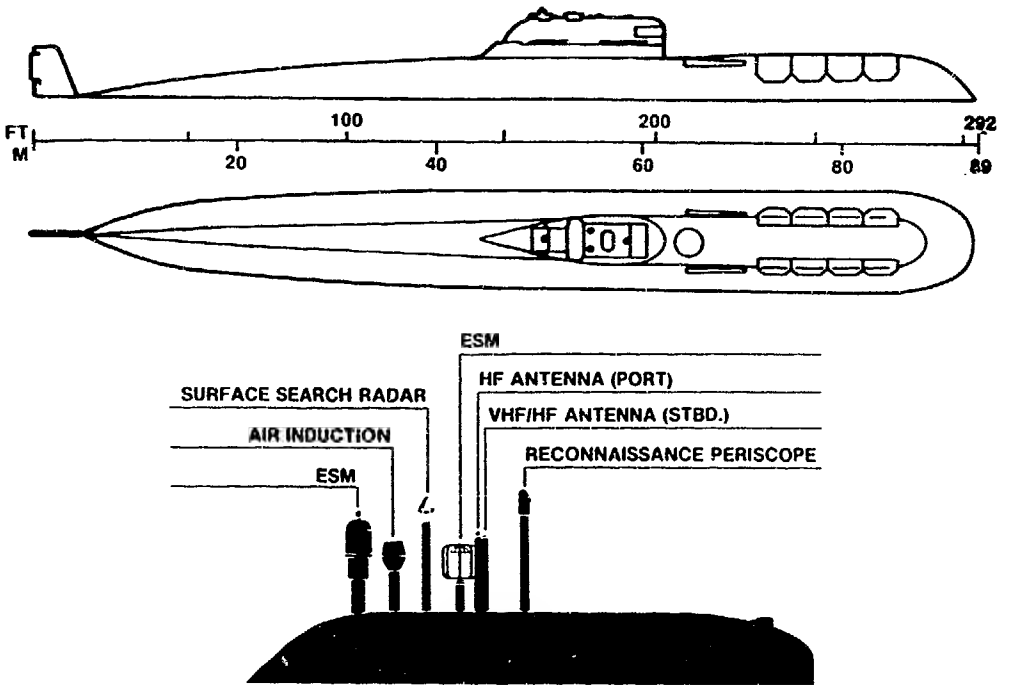
UR

CHARLIE I SSGN



CHARLIE I SSGN

CHARLIE I SSGN UR



MAJOR RECOGNITION FEATURES:

CHARLIE I Class submarines exhibit a short and stubby appearance with a blunt rounded bow and a high stern fin. The sail is located slightly forward of amidships and has a vertical leading edge and a raked trailing edge. The weather deck is rounded, with no suggestion of a flattened catwalk.

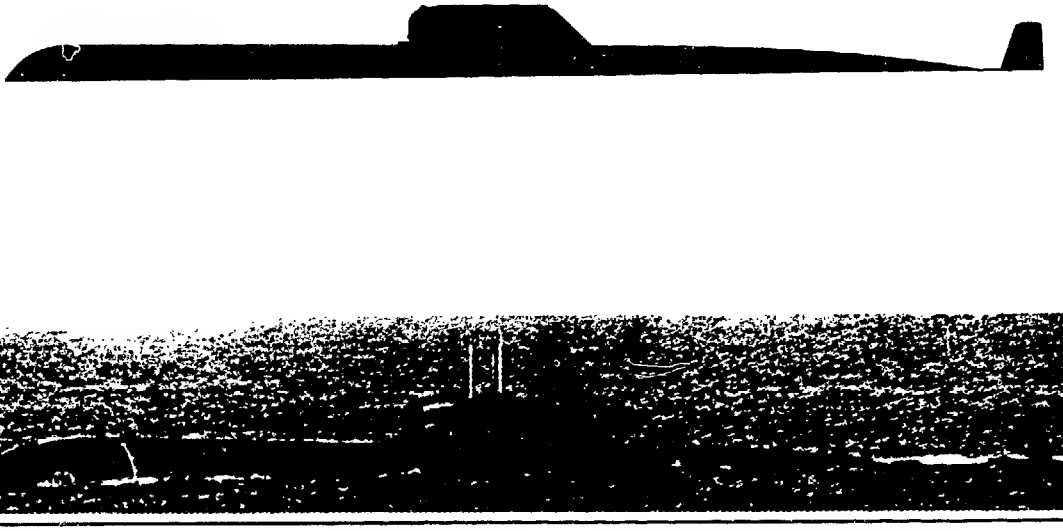
CHARACTERISTICS:

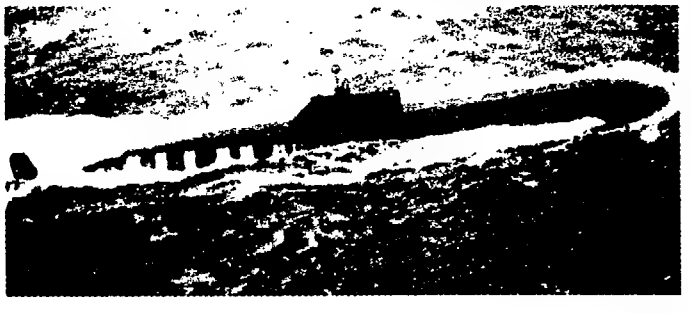
Displacement, tons: 4,000 surfaced; 4,900 submerged
Dimensions (wl), feet (meters): 292 x 32.8 (89 x 10)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Missiles: 8 tubes for SS-N-7
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 28 submerged

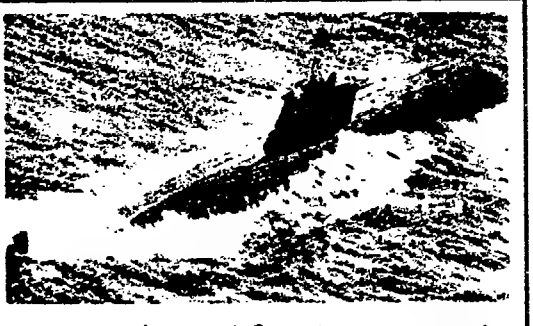
REMARKS:

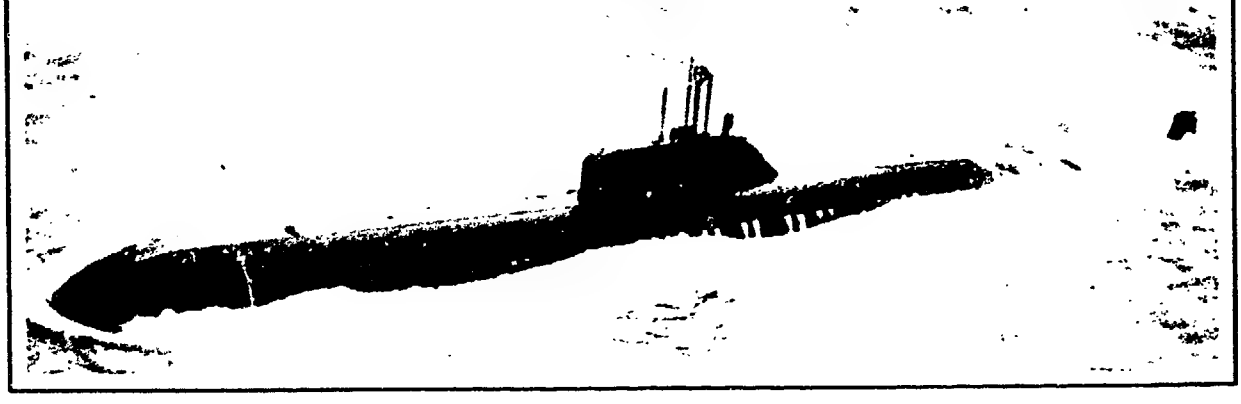
The first unit of this class became operational in 1968. The CHARLIE I was succeeded by the improved CHARLIE II Class.

UR CHARLIE II SSGN

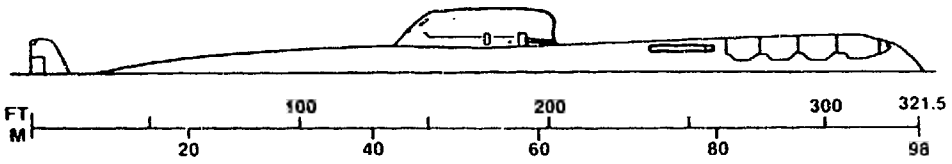




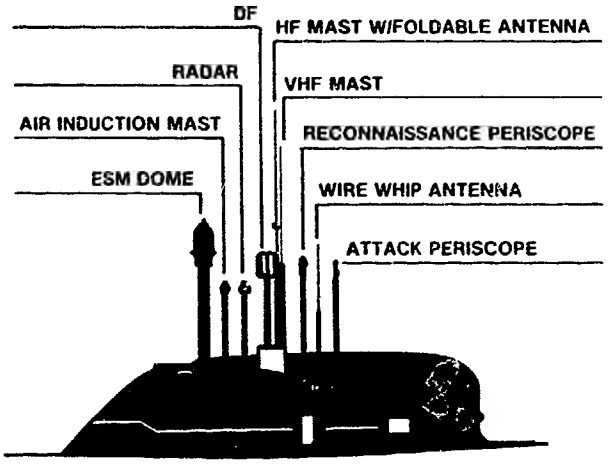




CHARLIE II SSGN UR



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the CHARLIE II is located amidships with a vertical leading edge. The trailing edge is slightly raked. The top of the sail is flat. Attached around the lower forward portion of the sail is a "horseshoe-shaped" device. Its function is unknown. The weatherwalk is rounded with a gentle slope towards the stern. The CHARLIE II has a high stern fin.

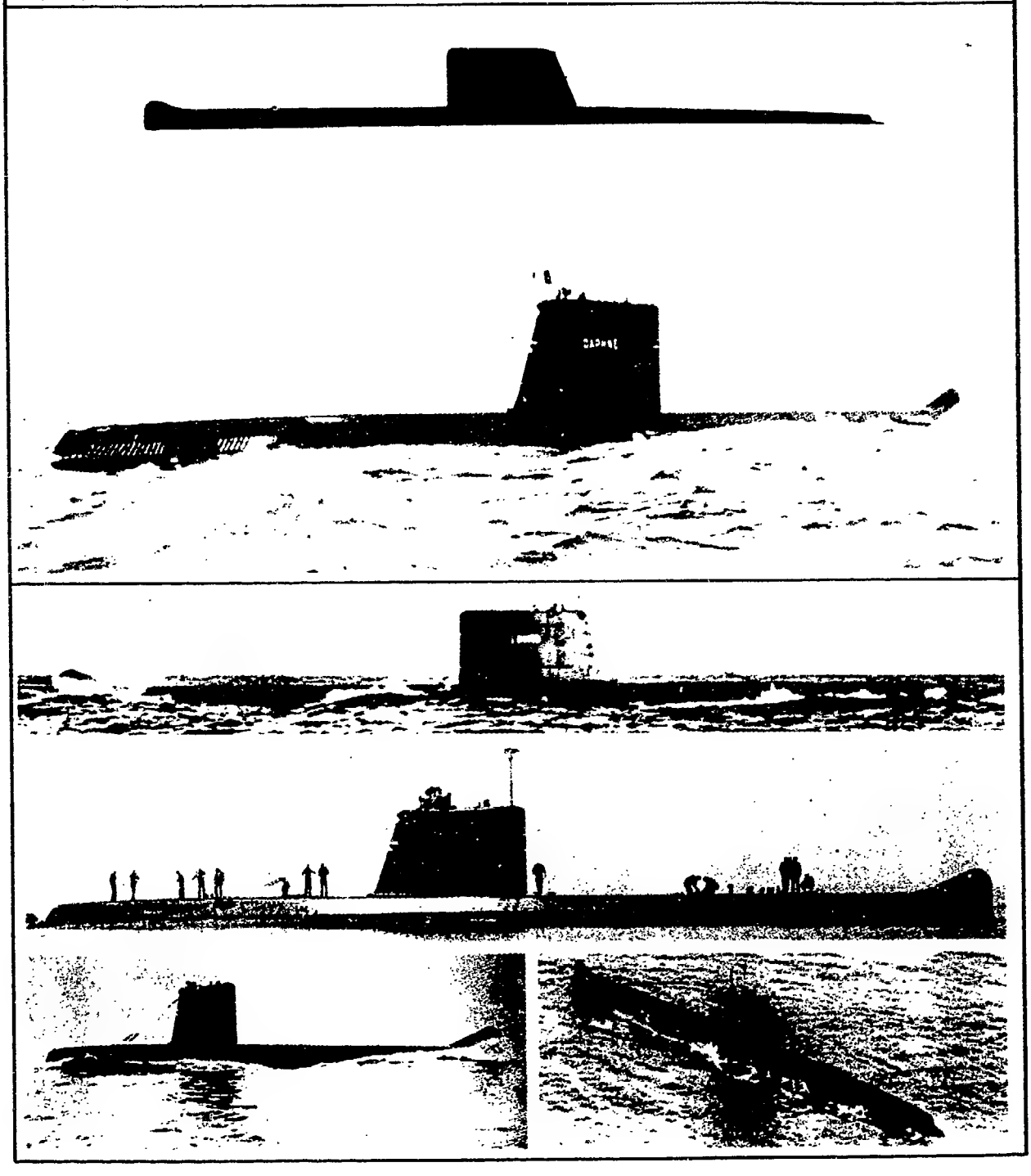
CHARACTERISTICS:

Displacement, tons: 4,400 surfaced; 5,500 submerged
Dimensions (wl), feet (meters): 321.5 x 32.8 (98 x 10)
Torpedo tubes: 6 x 21 in (53.3 cm)
Missiles: 8 tubes for SS-N-9
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 28 submerged

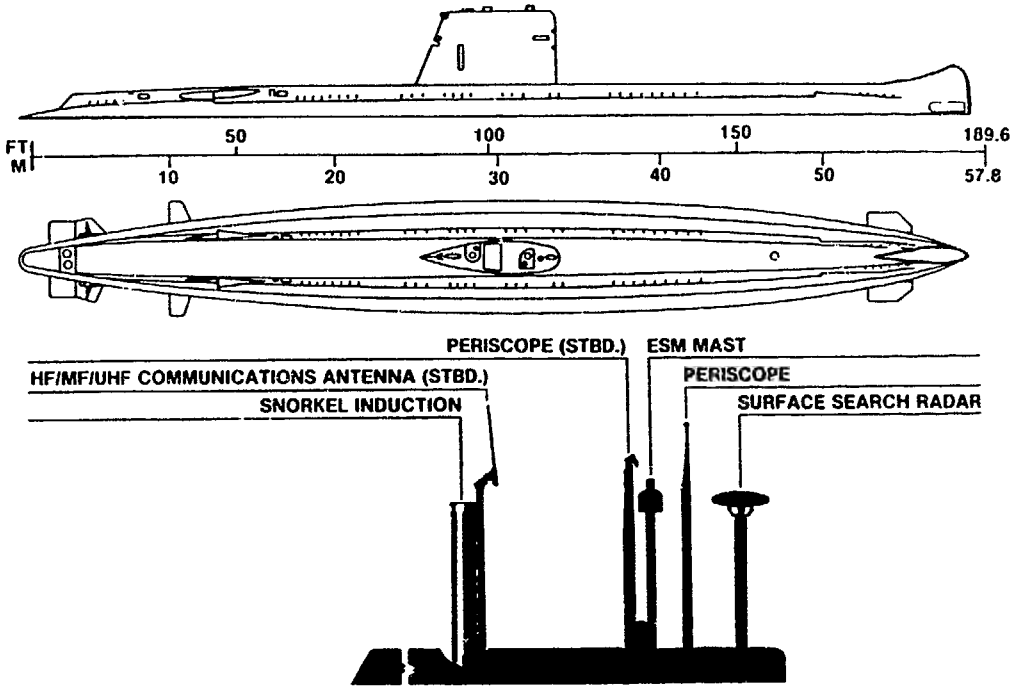
REMARKS:

The CHARLIE II, which entered service in 1973, is an enlarged version of the CHARLIE I. Five units have been constructed.

FR, PK, PO, SF, SP **DAPHNE SS**



DAPHNE SS **FR, PK, PO, SF, SP**



MAJOR RECOGNITION FEATURES:

The DAPHNE Class has a faired-in bulbous bow which may be called "canoe-shaped". The sail is rectangular in shape with a vertical leading edge and a raked trailing edge. The sail is located aft of amidships. The weather deck is level from the bow to the stern. The stern has a step-down to just above the waterline.

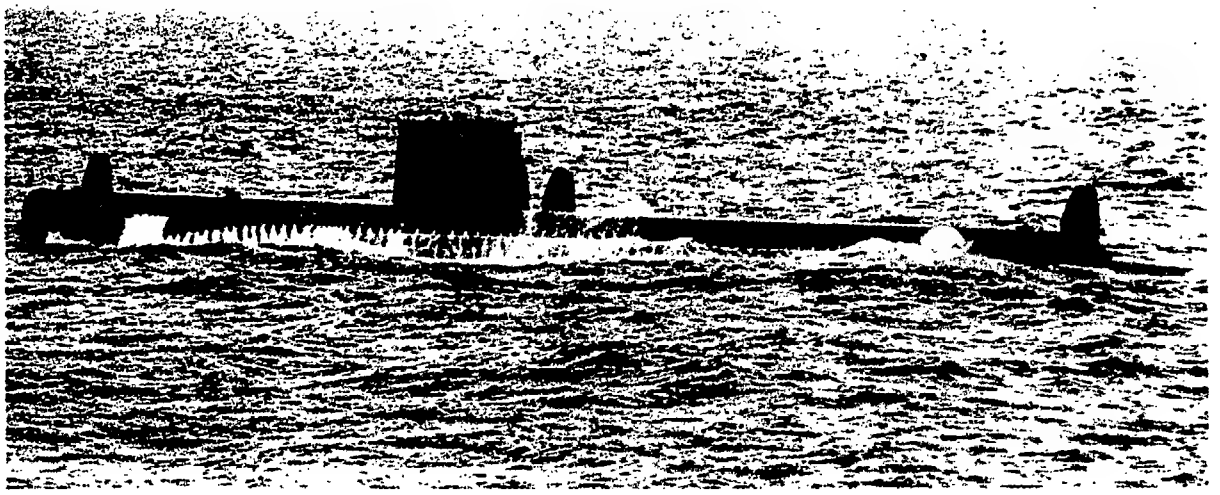
CHARACTERISTICS:

Displacement, tons: 869 surfaced; 1,043 submerged
Dimensions, feet (meters): 189.6 x 22.3 x 15.1 (57.8 x 6.8 x 4.6)
Torpedo tubes: 12 x 21.7 in (55 cm) (8 bow, 4 stern)
Propulsion: Diesel-electric; diesels; electric motors; 2 shafts
Speed, knots: 13.5 surfaced; 16 submerged
Pennant numbers: PK S131 thru S134; PO S163, S164, S166; SF S97, S98, S99; SP S61 thru S64

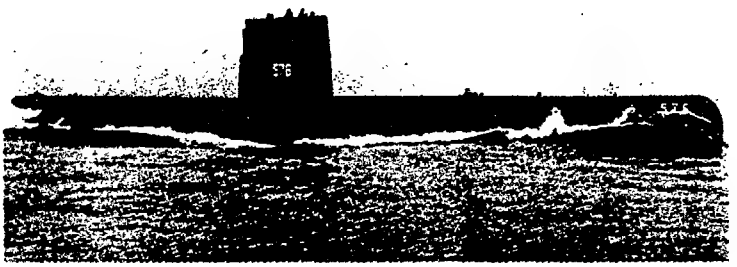
REMARKS:

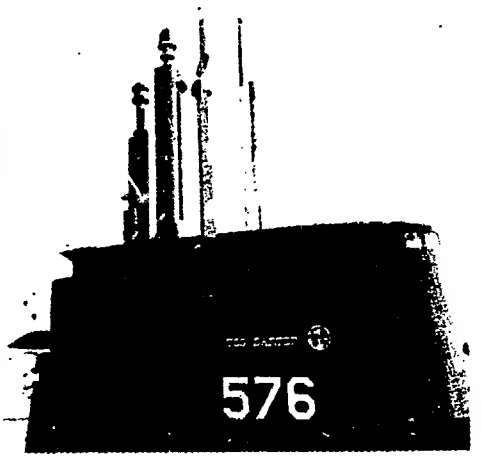
The DAPHNE Class, operational in 1964, is active in five navies. With the exception of the Spanish units which were built in Spain with French assistance, all versions were constructed in France.

US DARTER SS



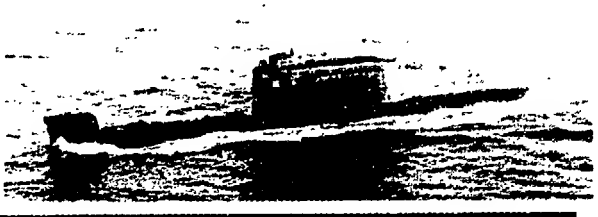
Additional Views Desired

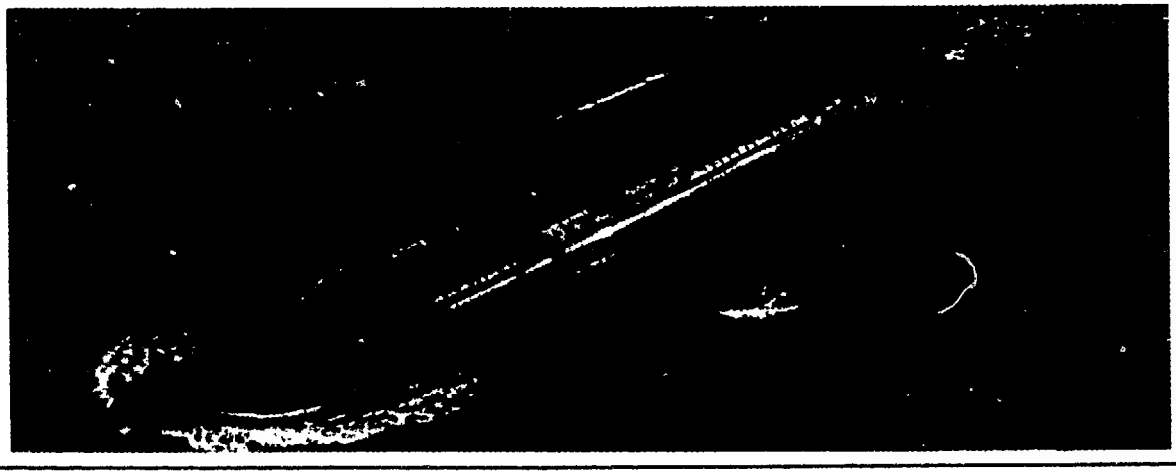




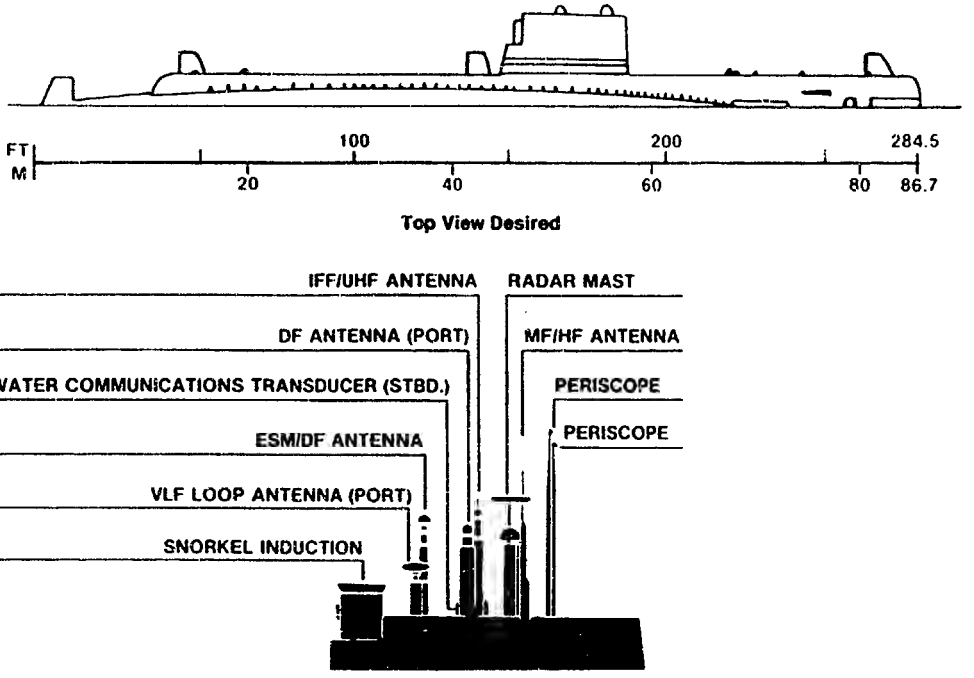
CH, UR GOLF I SSB

Additional Views Desired





DARTER SS US



MAJOR RECOGNITION FEATURES:

DARTER has a rectangular sail situated slightly forward of hull midpoint. The leading edge is vertical, but the trailing edge shows some minor breaks. The deckline is flat and level from the bow to a point slightly foward of the stern fin, at which point it breaks and drops abruptly into the waterline. There are three sonar domes atop the weather deck which are located near the bow, the stern and behind the sail. These domes constitute a distinctive recognition feature for the DARTER.

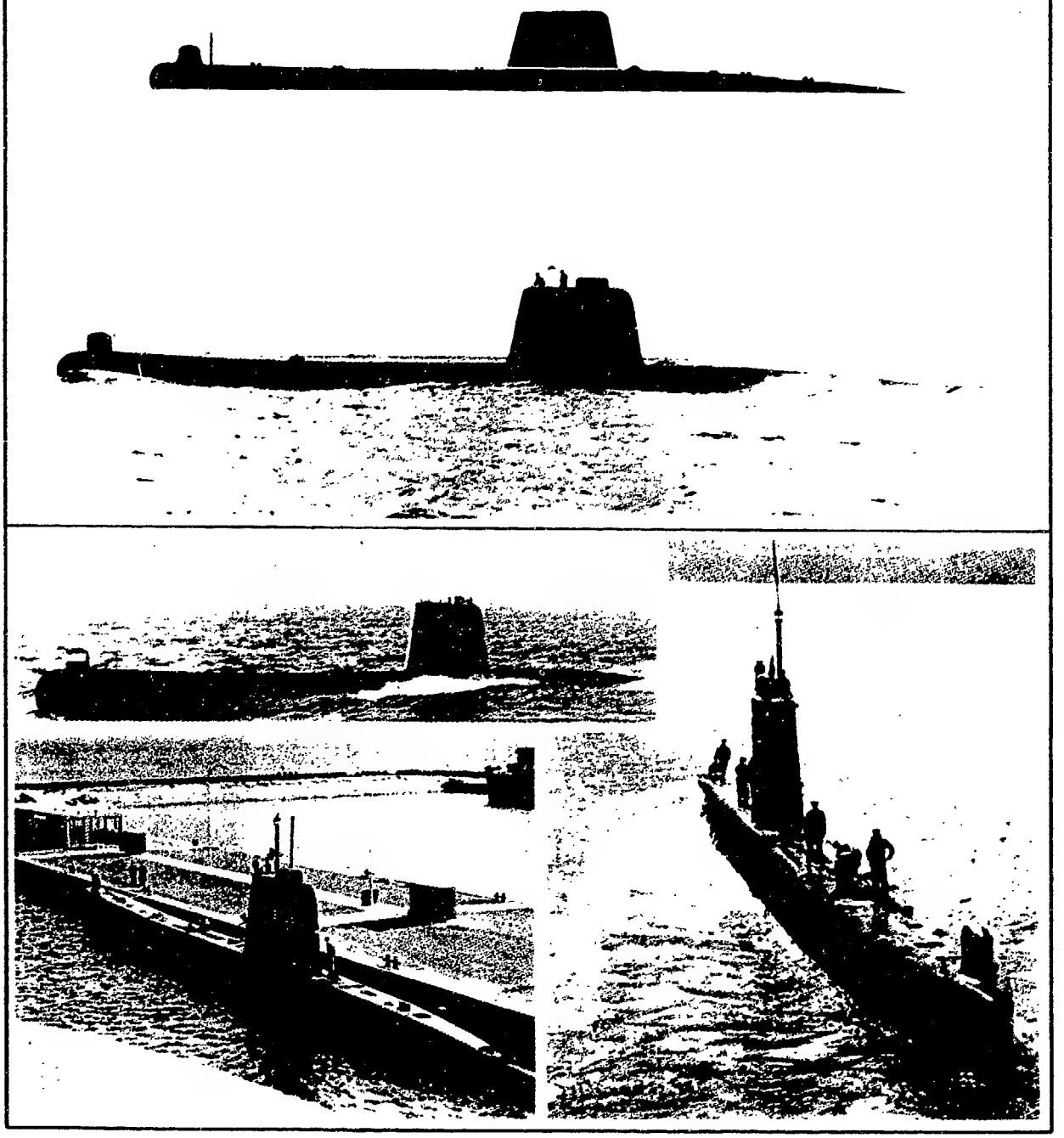
CHARACTERISTICS:

Displacement, tons: 1,720 surfaced; 2,388 submerged
Dimensions, feet (meters): 284.5 x 27.2 x 19 (86.7 x 8.3 x 5.8)
Torpedo tubes: 8 x 21 in (53.3 cm) 6 bow; 2 stern
Propulsion: Diesel-electric; 3 diesels; 2 electric motors; 2 shafts
Speed, knots: 19.5 surfaced; 14 submerged
Pennant number: 576

REMARKS:

The DARTER, one-of-a-kind, was commissioned in 1956. This unit is only one of two U.S. submarines to be homeported overseas.

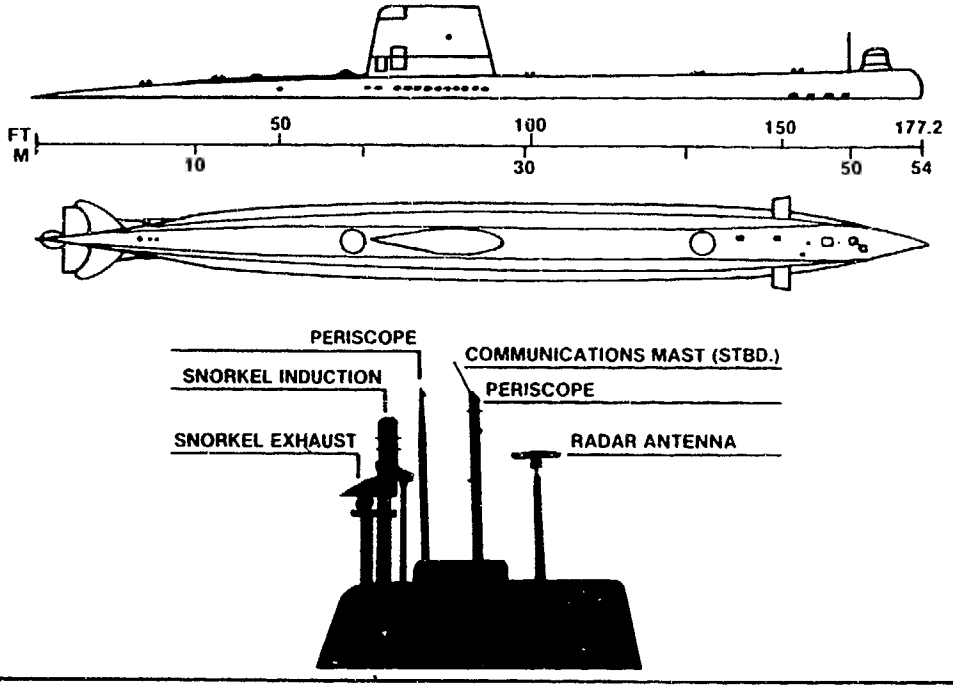
DA DELFINEN SS



DELFINEN SS

DELFINEN SS

DA



MAJOR RECOGNITION FEATURES:

The DELFINEN's sail is aft of amidships and has raked leading and trailing edges. The sail topline is broken by a small raised structure that projects above the sail. The deckline has a definite upsweep toward the bluntly squared bow. A sonar dome is located on top of the bow. The stern slopes gradually to the waterline.

CHARACTERISTICS:

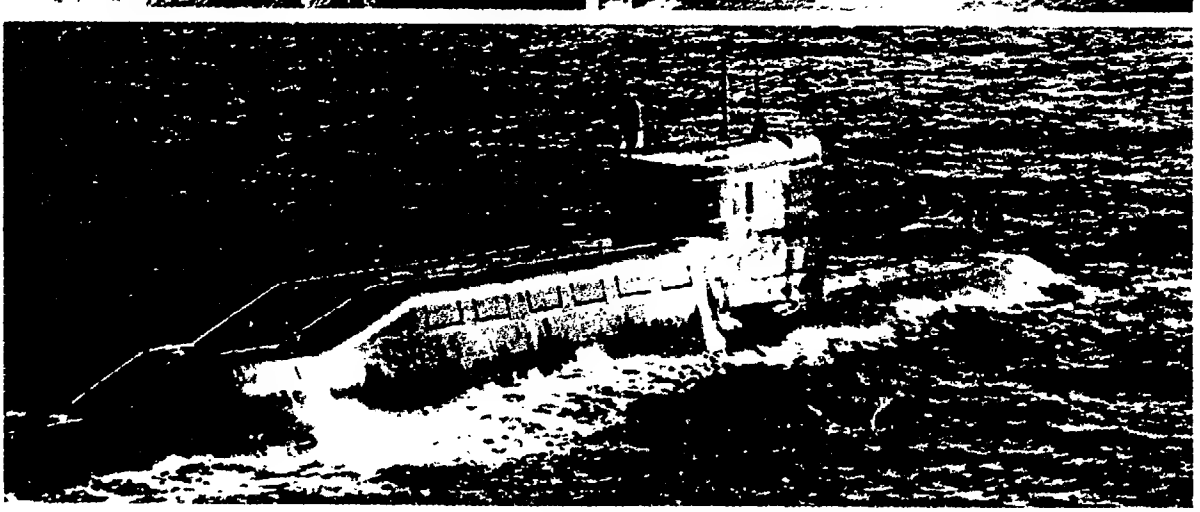
Displacement, tons: 595 surfaced; 643 submerged
Dimensions, feet (meters): 177.2 x 15.4 x 13.1 (54 x 4.7 x 4)
Torpedo tubes: 4 x 21 in (53.3 cm)
Propulsion: Diesel-electric; 2 diesels; 2 electric motors
Speed, knots: 16 surfaced; 16 submerged
Pennant numbers: S326 through S329

REMARKS:

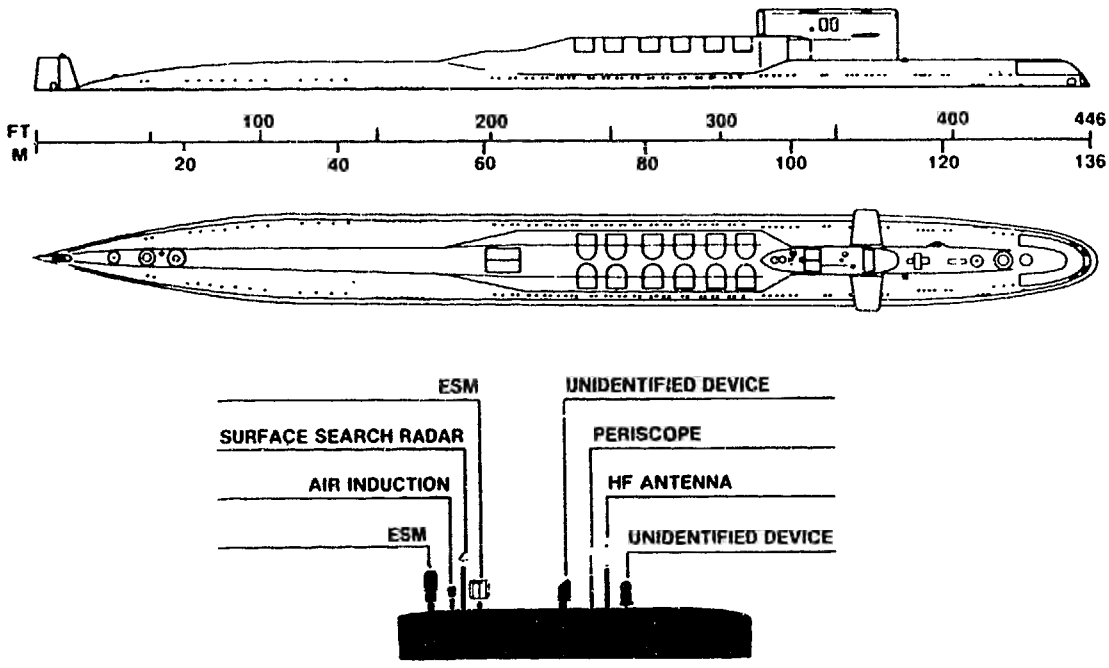
The DELFINEN Class, four units constructed, became operational in 1958. All units are in service with the Royal Danish Navy.

UR

DELTA I SSBN



DELTA I SSBN UR



MAJOR RECOGNITION FEATURES:

The sail on the DELTA I Class submarine is located well forward. The sail has vertical leading and trailing edges with fixed sail planes located halfway down the sail and near the leading edge. This class has a turtle back appearance which starts approximately two thirds of the way from the leading edge of the sail and is about half the sail's height. This hump continues aft with two slight step-downs to the main deck, which in turn slopes towards the stern. The bow is bluntly rounded. A high stern fin rises at the stern-waterline juncture.

CHARACTERISTICS:

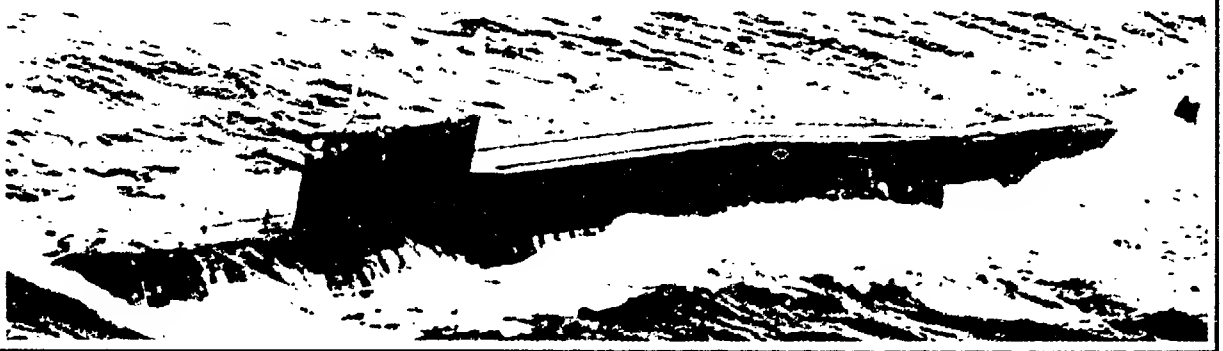
Displacement, tons: 8,600 surfaced; 11,750 submerged
Dimensions (wl), feet (meters): 446 x 36 (136 x 11)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Missiles: 12 SS-N-8 tubes
Propulsion: Nuclear; 1 reactor; 2 steam turbines; 2 shafts
Speed, knots: Unknown surfaced; 25 submerged

REMARKS:

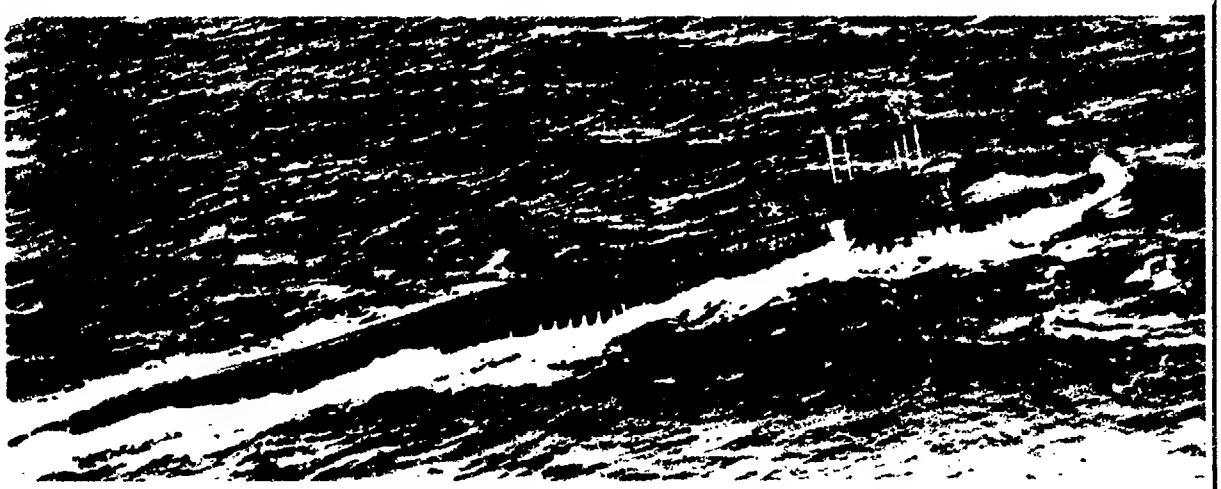
The DELTA I Class became operational in the Soviet Navy in 1973. Eighteen units of this class have been built. The DELTA I Class is a follow-on program to the Soviet YANKEE Class submarine.

UR

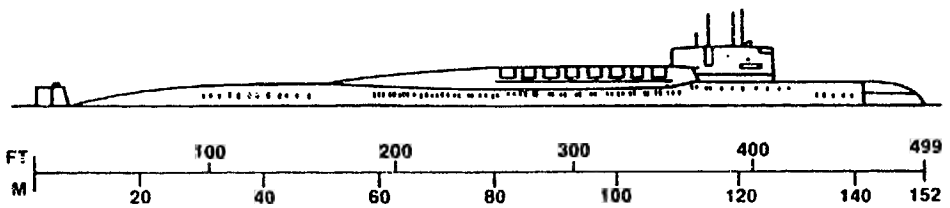
DELTA II SSBN



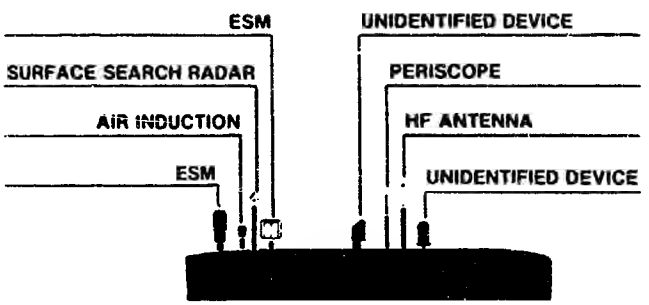
Additional Views Desired



DELTA II SSBN UR



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the DELTA II is located forward of amidships. The sail has fixed sail planes located halfway down the sail and near the leading edge. A missile casing, approximately one-half the height of the sail, begins just forward of the sail's trailing edge. The casing is level for the first half of its length and then gradually slopes to the weatherdeck. A stern fin rises aft. The distinguishing feature between the DELTA II and the DELTA III Classes is the height of the missile casing; the DELTA II's is one-half the height of the sail, and the DELTA III's is two-thirds the height of the sail. The stern fin is also shorter than on the DELTA III. The DELTA II has one VLF buoy compartment versus two on the DELTA III.

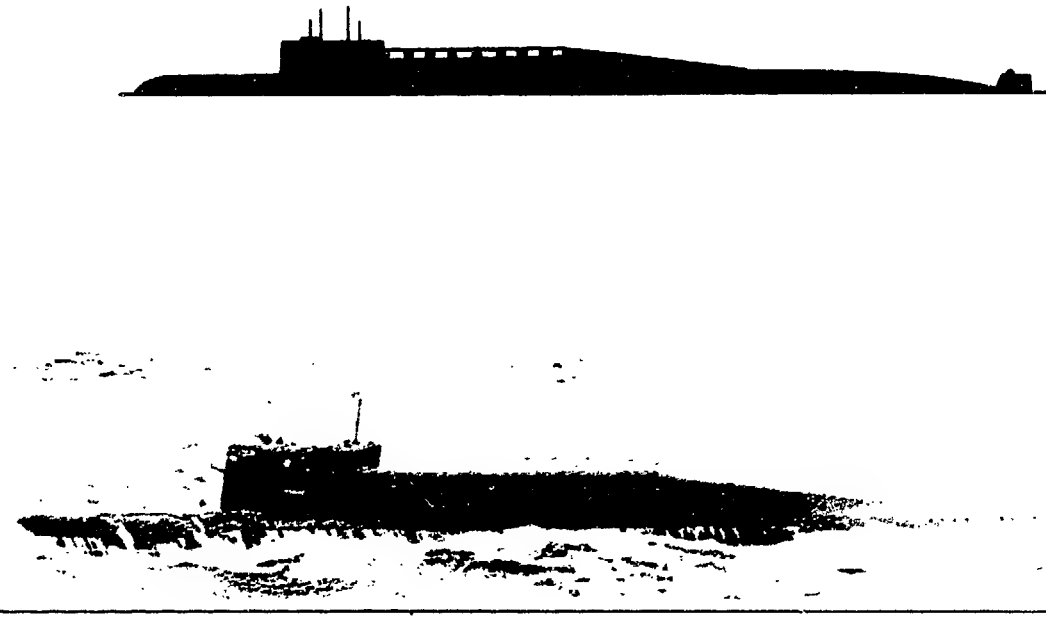
CHARACTERISTICS:

Displacement, tons: 9,600 surfaced; 11,400 submerged
Dimensions (wl), feet (meters): 499 x 36 (152 x 11)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Missiles: 16 tubes for SS-N-8 SLBM
Propulsion: Nuclear
Speed, knots: 20 surfaced; 28 submerged

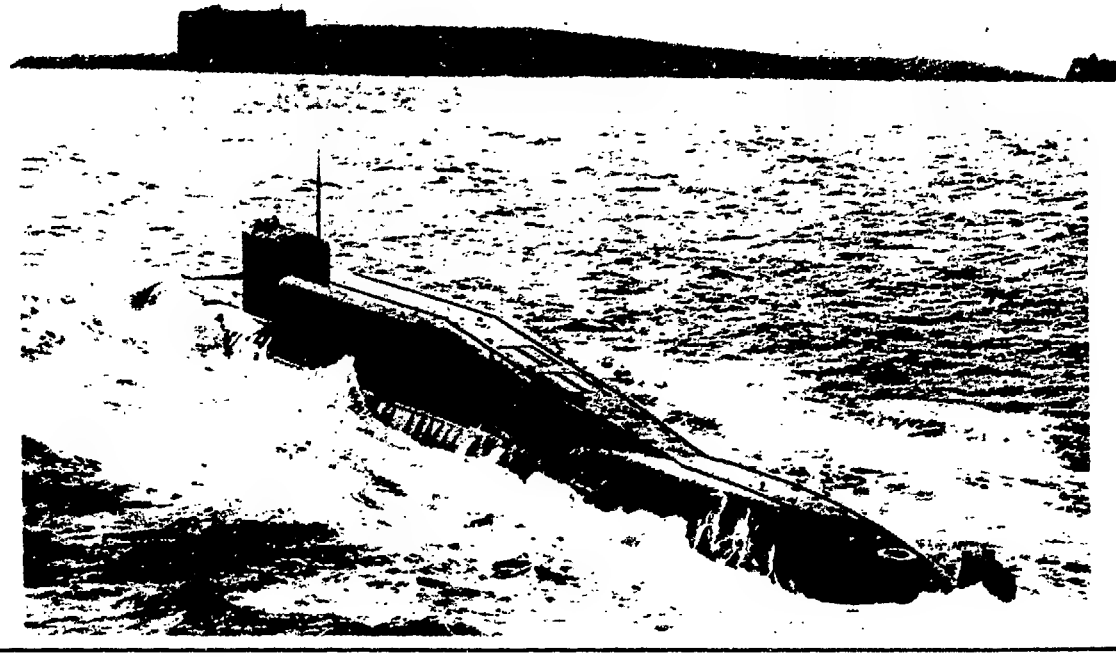
REMARKS:

The DELTA II Class, which was first seen in 1971, is a larger version of the DELTA I.

UR DELTA III SSBN

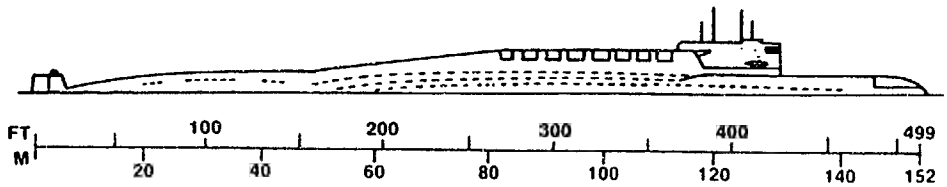


Additional Views Desired

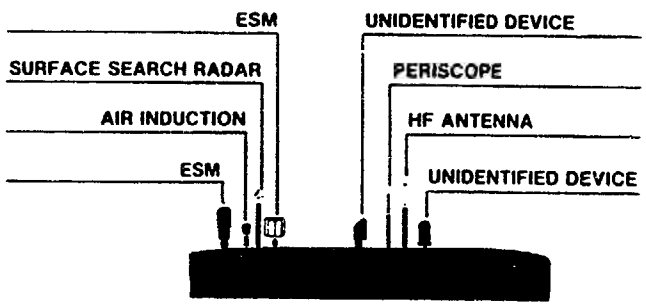


DELTA III SSBN

UR



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the DELTA III is forward of amidships. Sail planes, located halfway up the sail, are just aft of the leading edge. The DELTA III's primary distinguishing feature is the missile casing which is approximately two-thirds the height of the sail. The top of the casing is level for one-third of the aft deck; it is then gradually sloped for another third and rounds to the waterline at the stern fin. Additional distinguishing features are the three parallel lines of limber holes which are located just above the waterline and run from the trailing edge of the sail to the end of the raked missile casing section. The stern fin on the DELTA III is larger than the rudder on the DELTA II. The DELTA III has two VLF buoy compartments versus a single on the DELTA II.

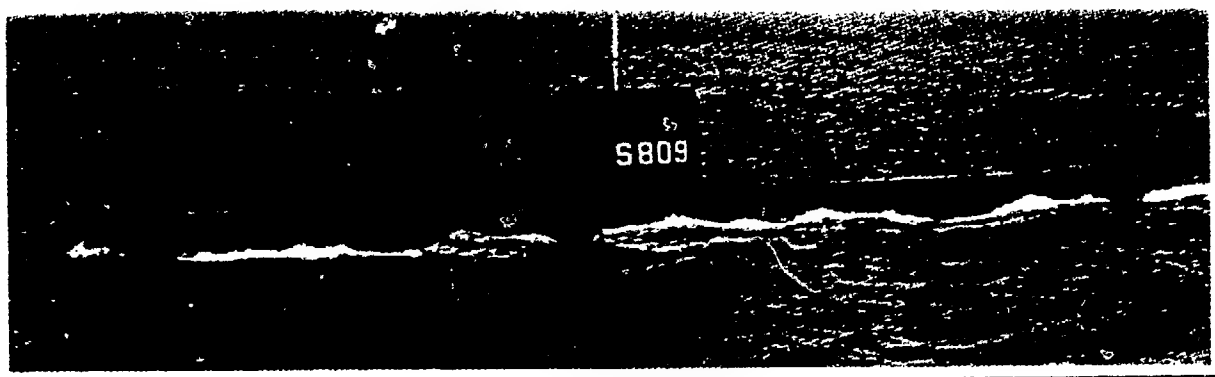
CHARACTERISTICS:

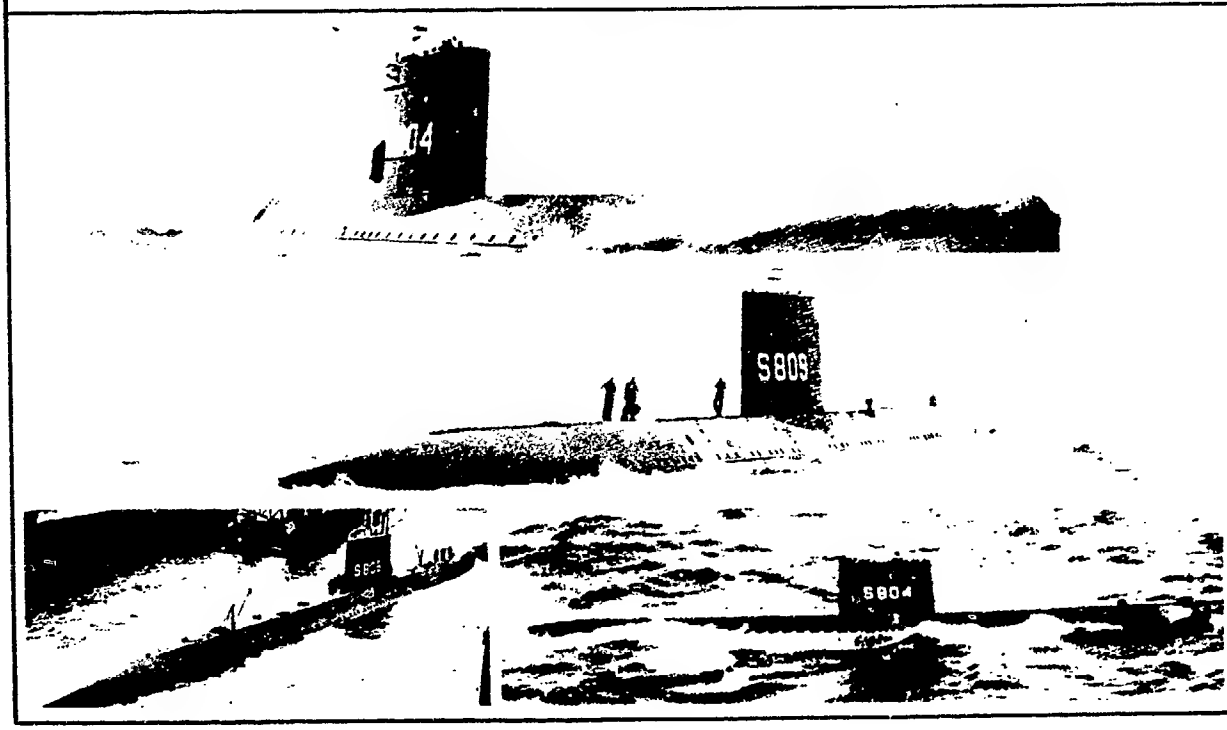
Displacement, tons: 11,000 surfaced; 13,250 submerged
Dimensions (wl), feet (meters): 499 x 36 (152 x 11)
Torpedo tubes: 6 x 21 in (53.3 cm)
Missiles: 16 tubes for SS-N-18 SLBM
Propulsion: Nuclear
Speed, knots: 20 surfaced; 25 submerged

REMARKS:

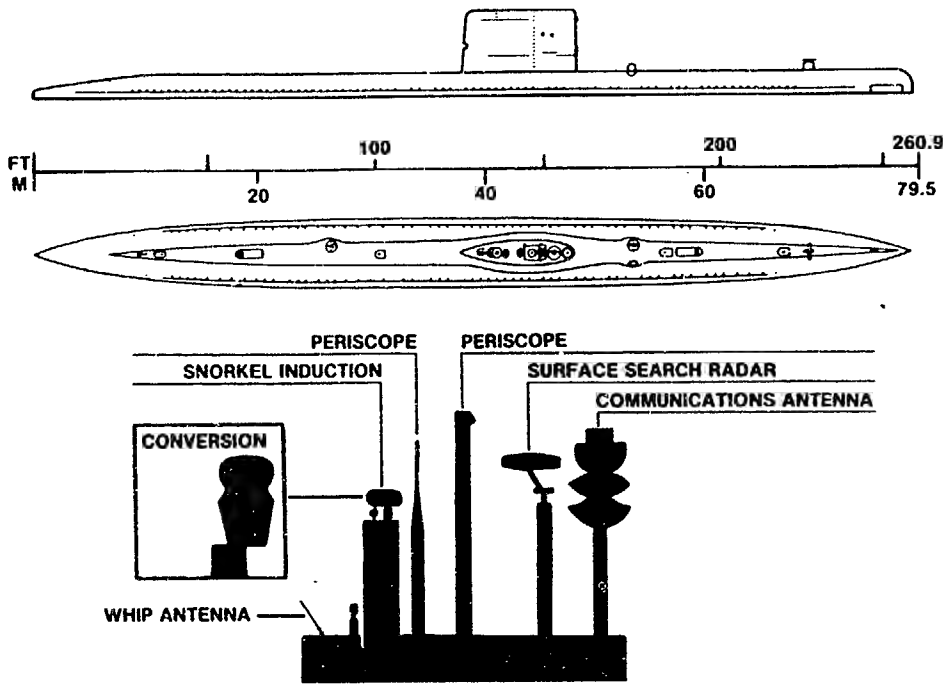
The first DELTA III was launched in 1975. There are approximately twelve units active.

NL DOLFIJN SS





DOLFIJN SS NL



MAJOR RECOGNITION FEATURES:

The sail on the DOLFIJN Class is forward of amidships. The leading edge is vertical. The trailing edge is vertical and has an inward break that occurs halfway down the sail. A sonar installation is located on the forward weather deck but well aft of the bow. The bow is bluntly square. The deckline is long and flat from the bow to the short tapered section at the stern.

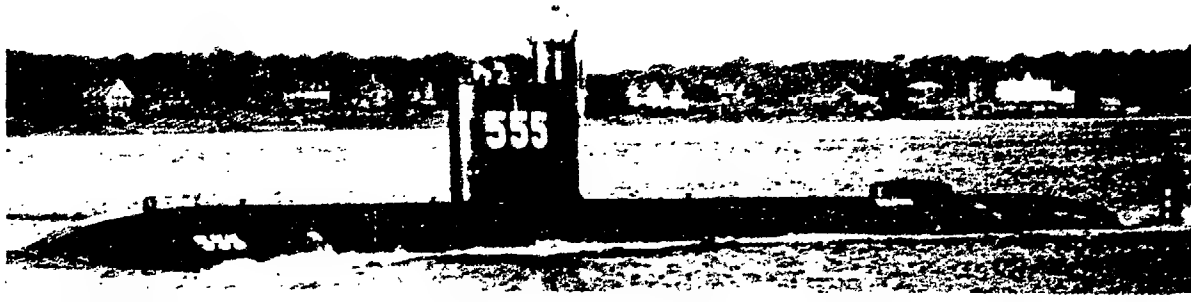
CHARACTERISTICS:

Displacement, tons: 1,140 standard; 1,494 submerged
Dimensions, feet (meters): 260.9 x 25.8 x 16.4 (79.5 x 7.8 x 5)
Torpedo tubes: 8 x 21 in (53.3 cm) (4 bow, 4 stern)
Propulsion: Diesel-electric; 2 diesels; 2 electric motors; 2 shafts
Speed, knots: 14.5 surfaced; 17 submerged
Pennant numbers: S804, S805, S808, S809

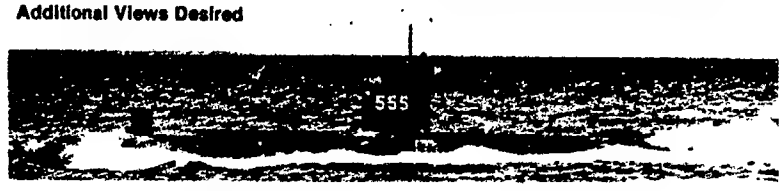
REMARKS:

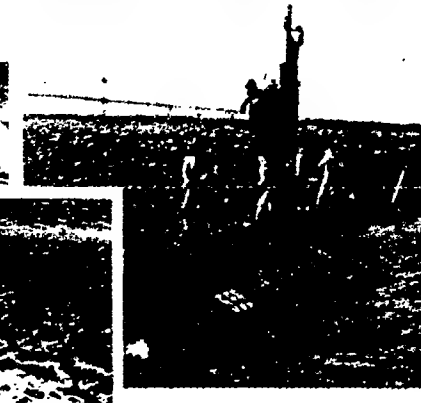
The DOLFIJN Class, operational 1965, consists of four units. All are in service with the Royal Netherlands Navy.

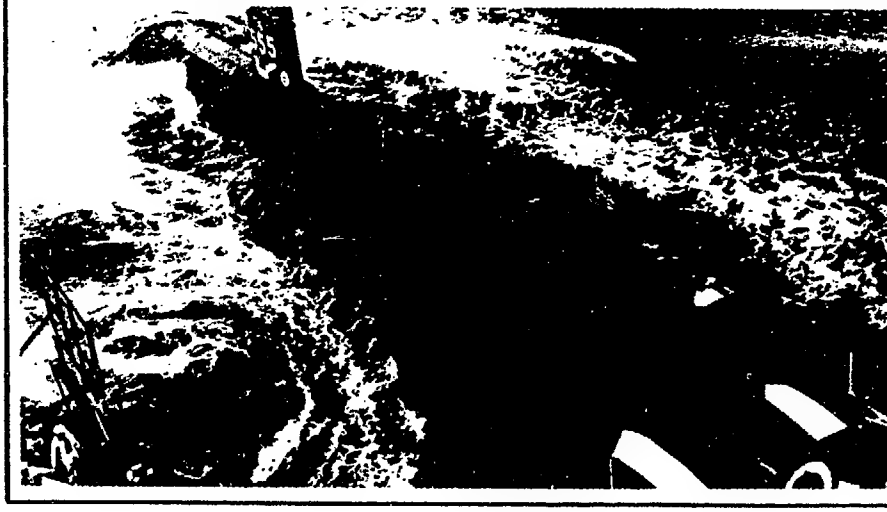
US DOLPHIN AGSS



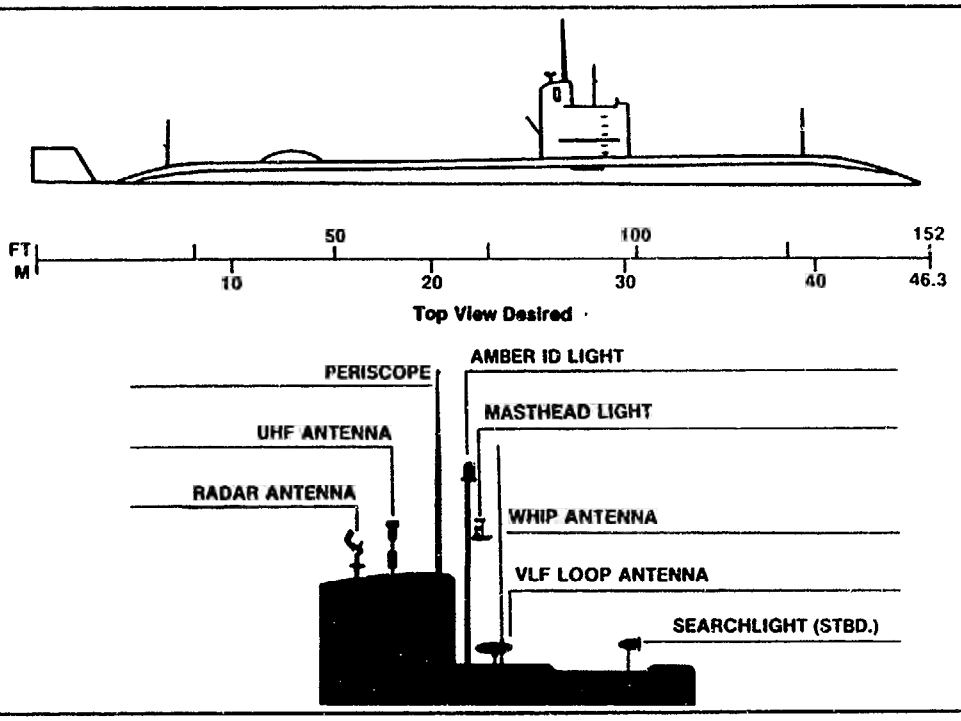
Additional Views Desired







DOLPHIN AGSS **US**



MAJOR RECOGNITION FEATURES:

The sail on the DOLPHIN Class is forward of amidships. The sail has a downward step forward, the upper level measuring about one-third of the sail length and about one-third of the sail height. The DOLPHIN has a prominent stern fin. The bow slopes abruptly into the waterline and a similar slope occurs on the after deckline near the stern fin. A small raised "box" is on the weatherdeck between the stern fin and sail.

CHARACTERISTICS:

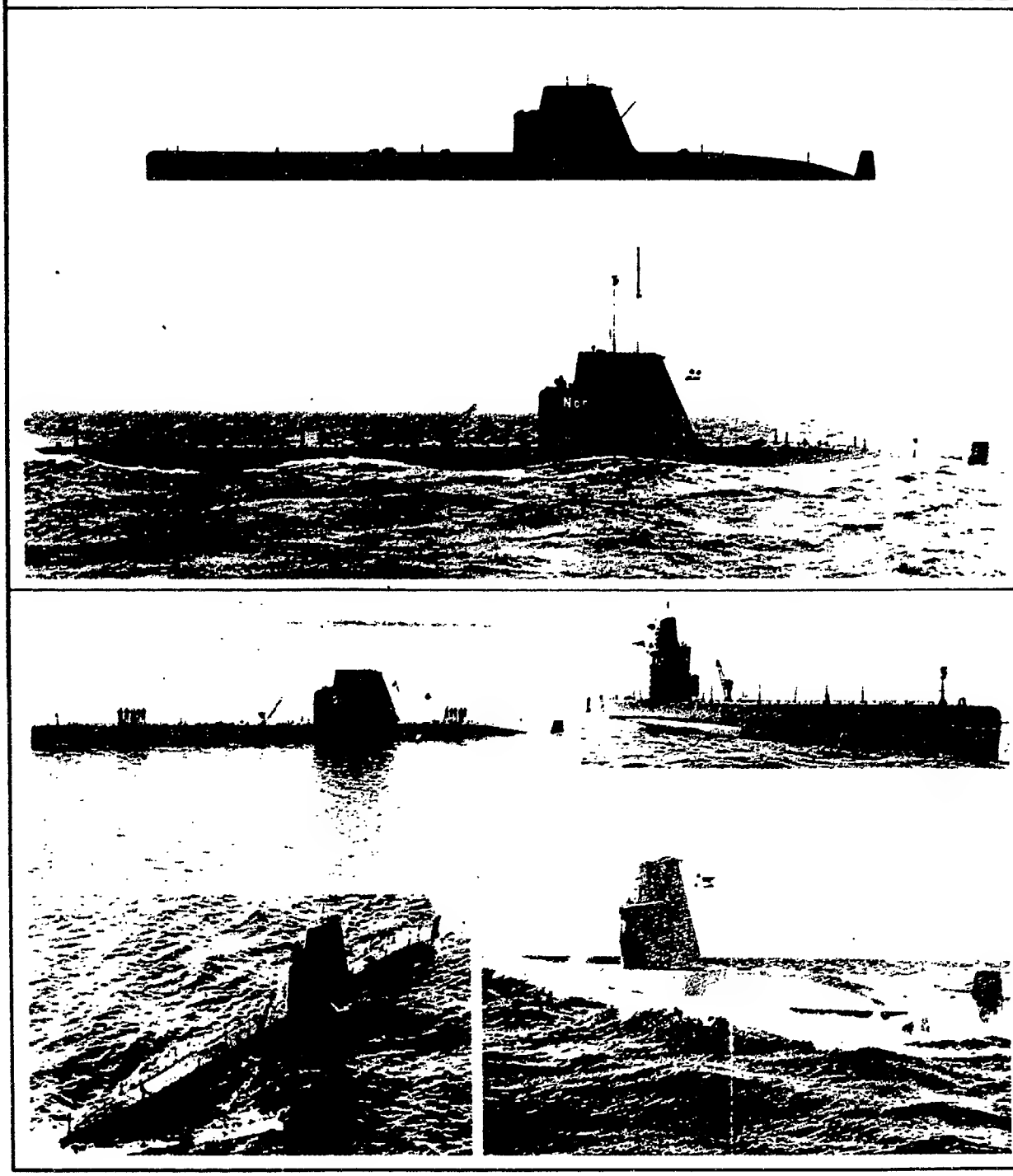
Displacement, tons: 800 standard; 930 submerged
Dimensions, feet (meters): 152 x 19.3 x 18 (46.3 x 5.9 x 5.5)
Propulsion: Diesel-electric; 2 diesels; 1 shaft
Speed, knots: Unknown surfaced; 15+ submerged
Pennant number: 555

REMARKS:

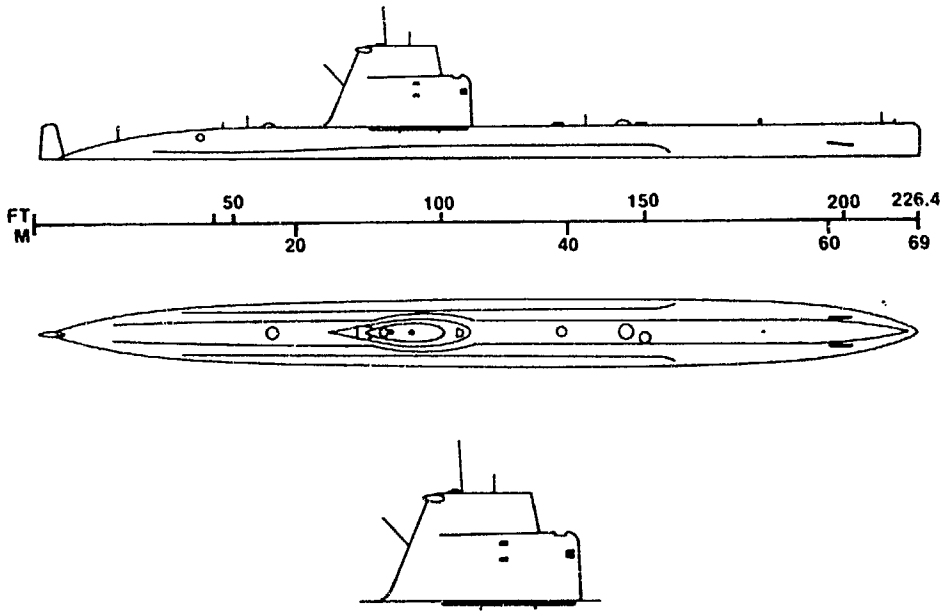
The DOLPHIN, a one-of-a-kind unit, was commissioned in 1968. This submarine was specifically designed for deep-diving operations.

SW

DRAKEN SS



DRAKEN SS **SW**



MAJOR RECOGNITION FEATURES:

DRAKEN has a stepped sail situated aft of amidships. The step is downward toward the bow. The trailing edge of the sail is raked with a fixed snorkel exhaust extending aft at the top of the upper tier. The forward deckline is long and level with a possible crane emplaced just forward of the sail. The stern is vertical and the bow looks almost squared-off in profile. The short after hull line slopes gently toward a prominent stern fin.

CHARACTERISTICS:

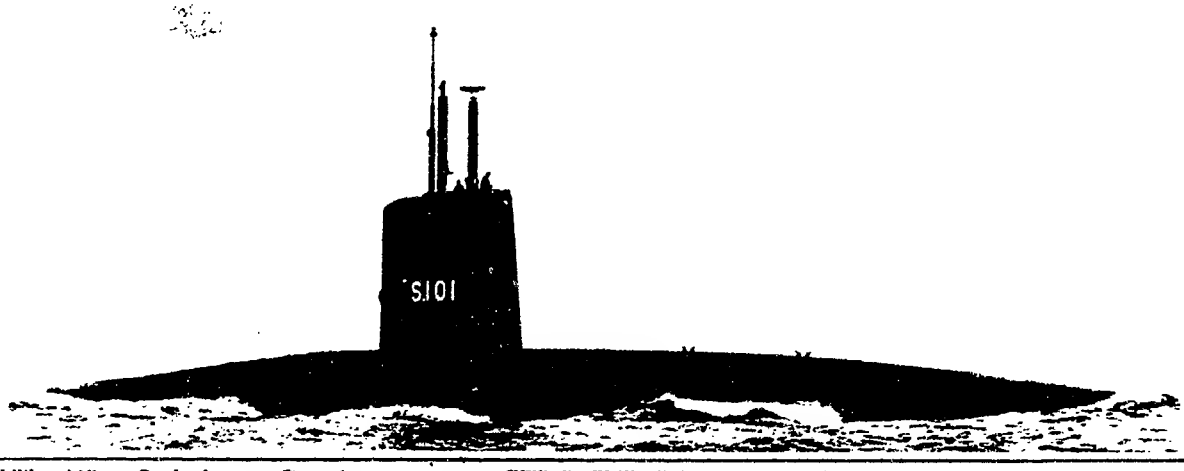
Displacement, tons: 835 surfaced; 1,110 submerged
Dimensions, feet (meters): 226.4 x 16.7 x 16.4 (69 x 5.1 x 5)
Torpedo tubes: 4 x 21 in (53.3 cm) (bow)
Propulsion: Diesel-electric; 2 diesels; 1 electric motor; 1 large 5 bladed propeller
Speed, knots: 17 surfaced; 20 submerged
Pennant numbers: Del, Nor, Spr, Vgn

REMARKS:

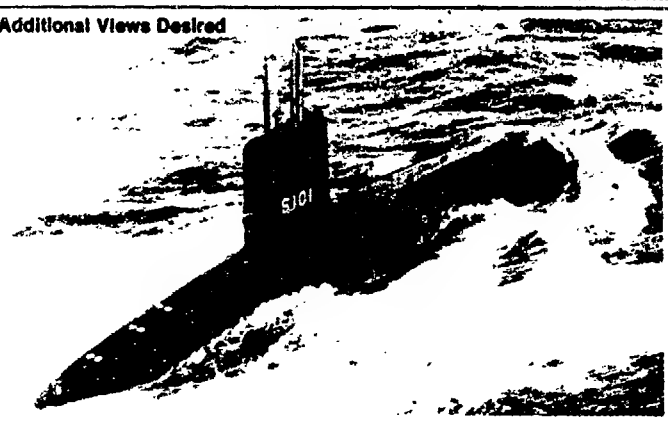
The DRAKEN Class, operational 1962, was a follow-on to the HAJEN Class. Four units have been built, and all are in service with the Royal Swedish Navy.

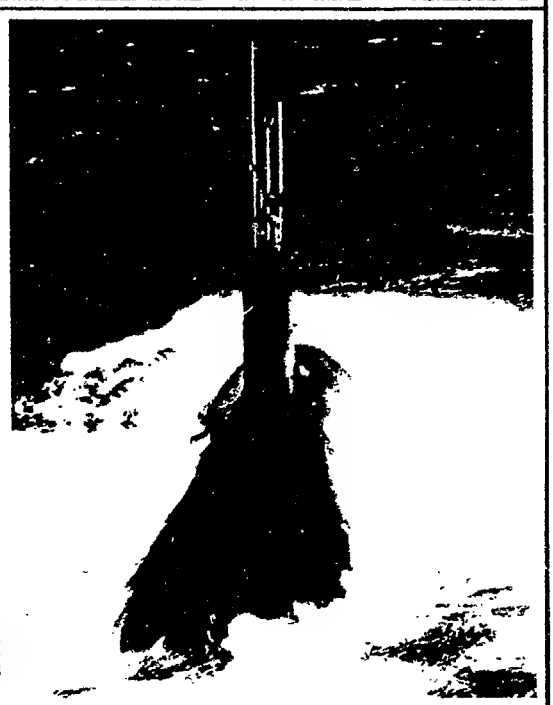
UK

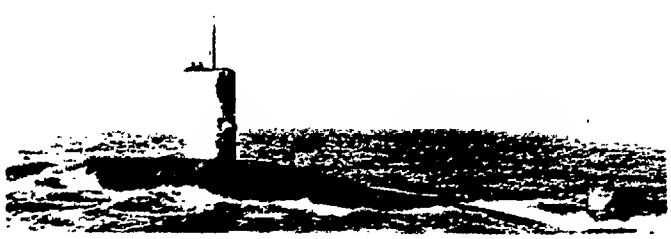
DREADNOUGHT SSN



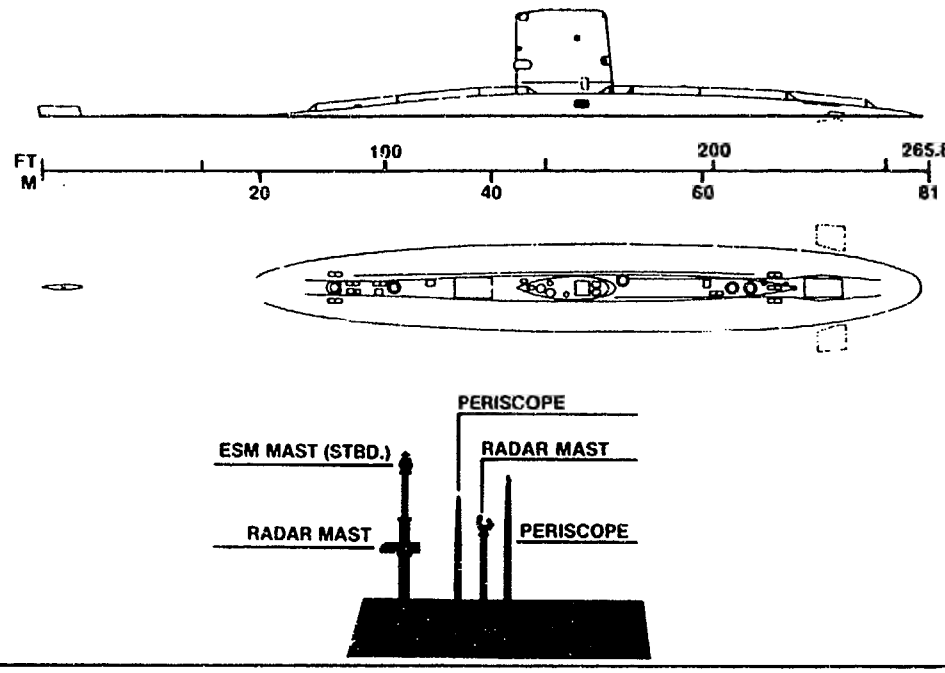
Additional Views Desired







DREADNOUGHT SSN — UK



MAJOR RECOGNITION FEATURES:

DREADNOUGHT has a tall and thin rectangular sail situated well forward of amidships on a whale-shaped hull. The sail has a smooth but slightly convex topline, a raked leading edge, and a vertical trailing edge. Prominent folding planes near the bow can often be seen folded upward and extending above the bow when the submarine is surfaced. The deckline slopes gently into the waterline near the bow, as it does aft of the sail. A prominent stern fin projects above the waterline some distance aft of the point where the after deckline enters the water.

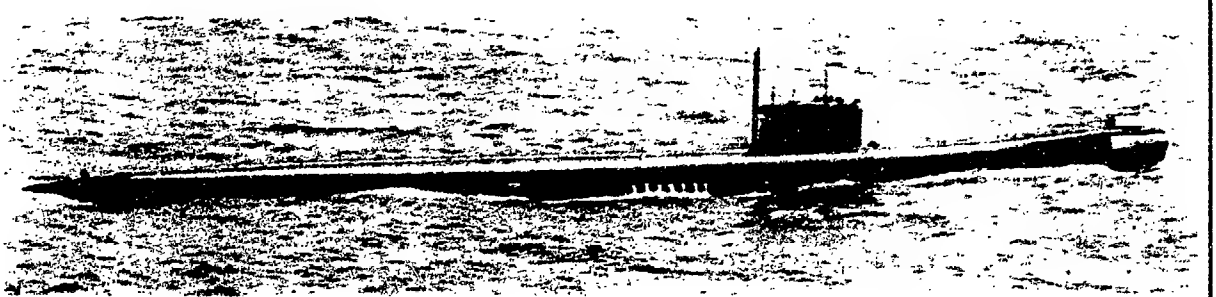
CHARACTERISTICS:

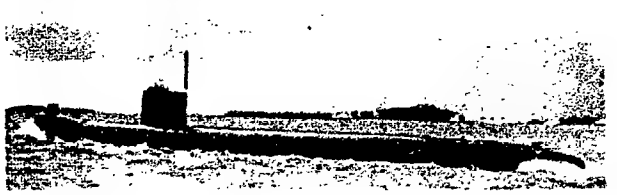
Displacement, tons: 3,500 surfaced; 4,000 submerged
Dimensions, feet (meters): 265.8 x 32.2 x 26 (81 x 9.8 x 7.9)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Propulsion: Nuclear; 1 reactor; steam turbines; 1 shaft
Speed, knots: Unknown surfaced; 28 submerged
Pennant number: S101

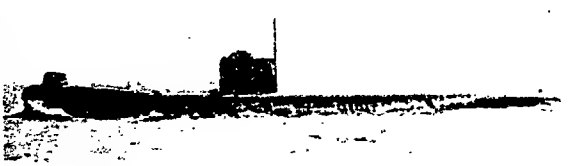
REMARKS:

The one-of-a-kind DREADNOUGHT was built in England and commissioned in 1963. Although basically a British design, the after hull lines closely resemble the USS SKIPJACK to accommodate the U.S. nuclear power plant installed.

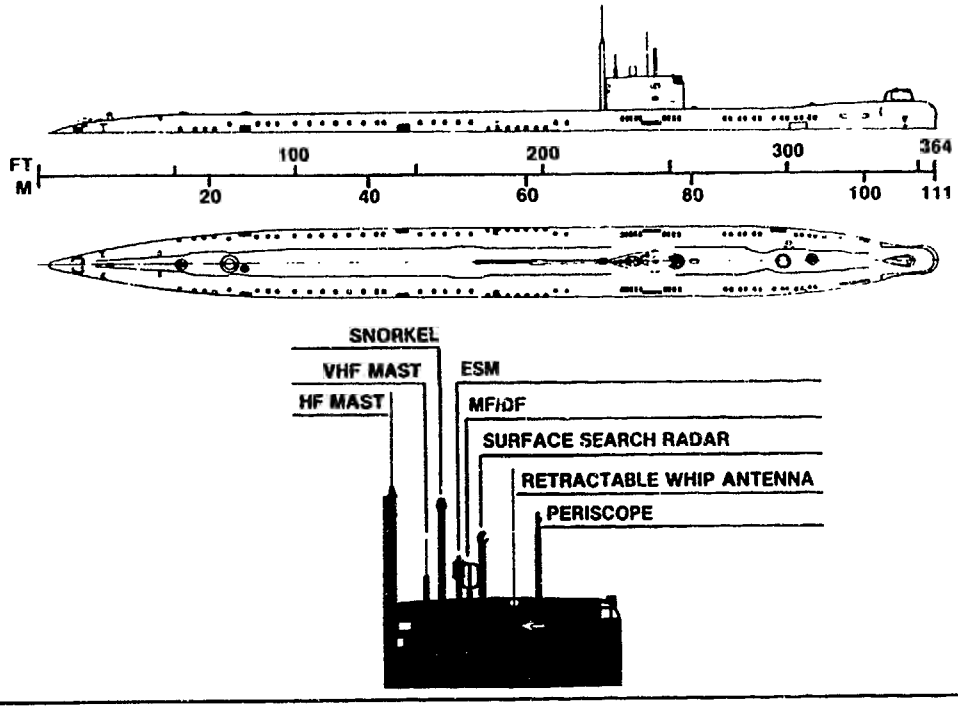
UR ECHO SSN







ECHO SSN UR



MAJOR RECOGNITION FEATURES:

The sail on the ECHO Class is well forward of amidships. The leading edge is vertical. The trailing edge is vertical with two slight breaks near the top. The bow is bluntly squared with a sonar dome located near the bow. The deck inclines upward from the sail to the bow and is level aft to just forward of the stern where it slopes gradually into the water.

CHARACTERISTICS:

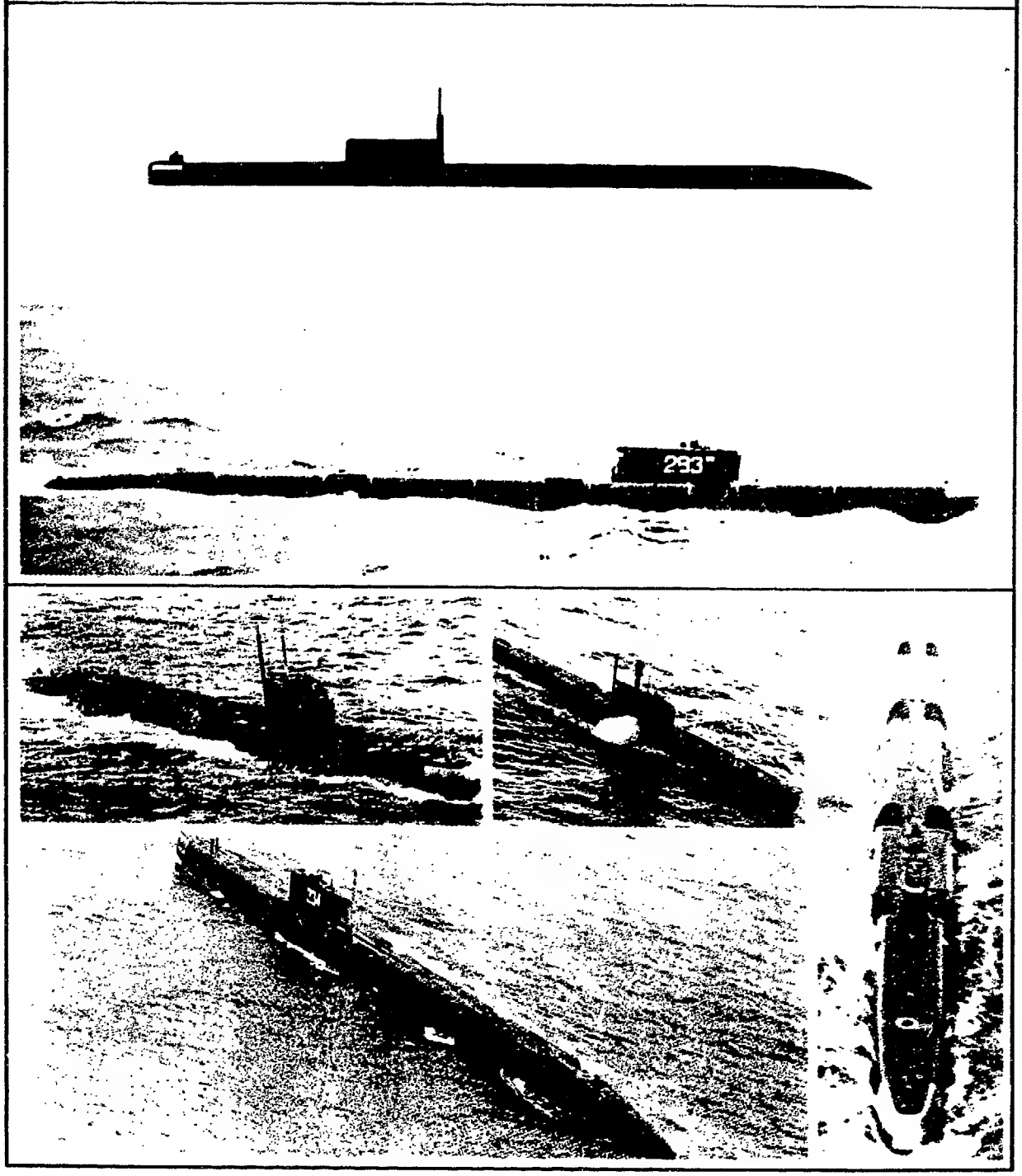
Displacement, tons: 4,500 surfaced; 5,200 submerged
Dimensions (wl), feet (meters): 364 x 29.8 (111 x 9.1)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow); 2 x 16 in (40.6 cm) (stern)
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 28 submerged

REMARKS:

Five ECHO Class units were built from 1960 to 1962. These submarines were armed originally with six tubes for the SS-N-3 antiship cruise missile and with torpedo tubes and identified as ECHO I Class SSGNs. All five units now have been converted to an attack configuration (SSN) by removal of the missile tubes.

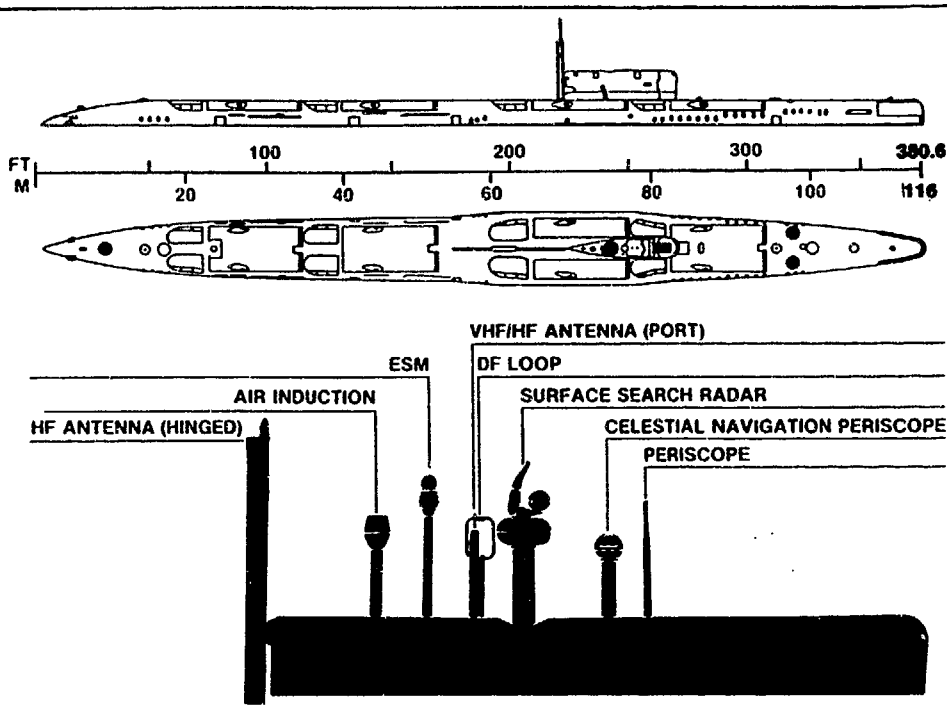
UR

ECHO II SSGN



ECHO II SSGN

ECHO II SSGN UR



MAJOR RECOGNITION FEATURES:

ECHO II Class sails are situated well forward of amidships. The sail is rectangular with vertical leading and trailing edges. The bow is blunt, the hull line is flat with a wide deck which exposes four pairs of blast deflector cavities beginning at the front end of the sail. The stern slopes gradually into the waterline. A sonar dome is located slightly aft of the bow just forward of folding dive planes on some units. Some units have a "bulge" located on the middle of the sail which houses a probable satellite-associated radome antenna.

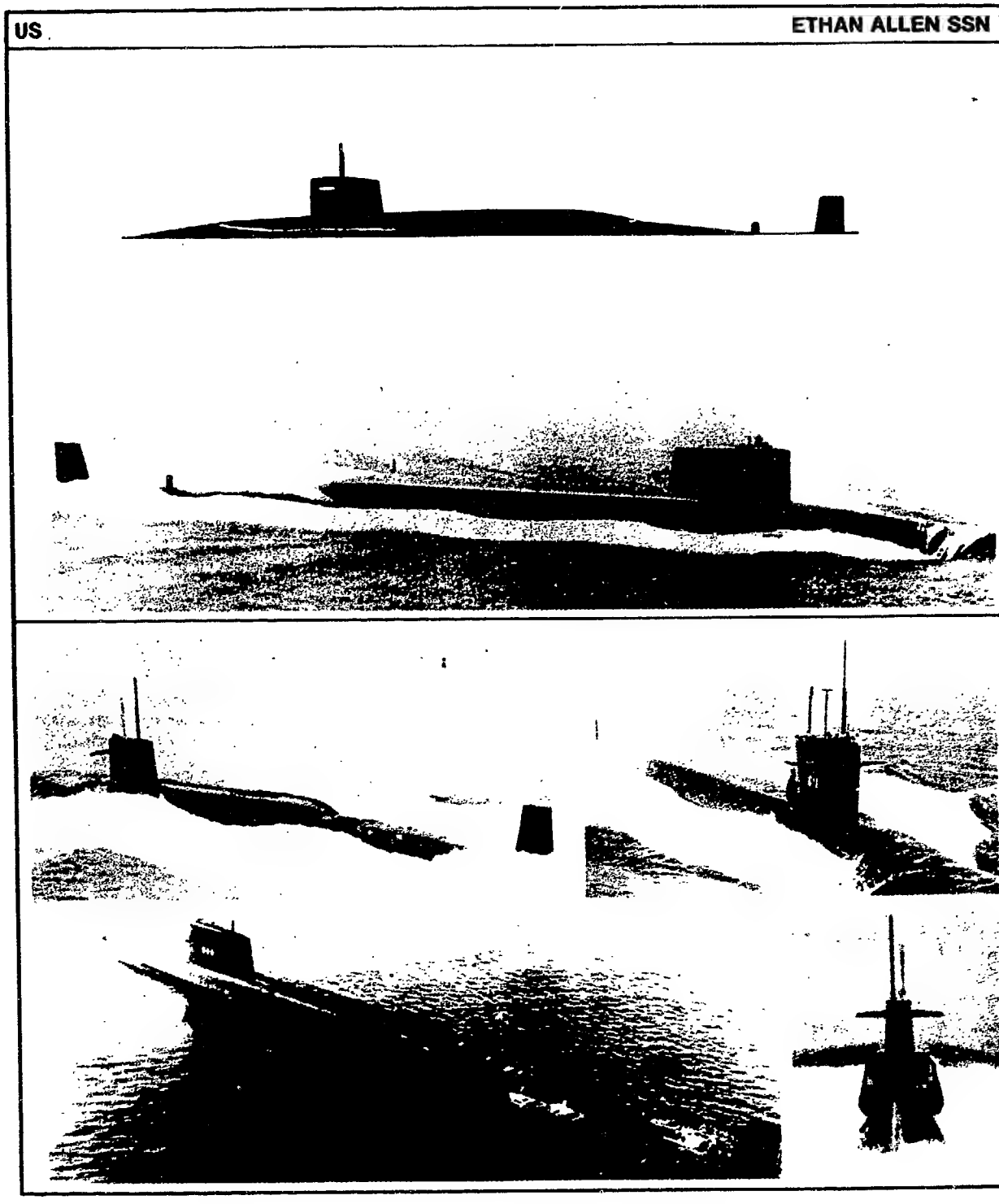
CHARACTERISTICS:

Displacement, tons: 5,000 surfaced; 5,800 submerged
Dimensions (wl), feet (meters): 380.6 x 32.8 (116 x 10)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow); 2 x 16 in (40.6 cm) (stern)
Missiles: 8 tubes for SS-N-3 or SS-N-12
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 25 submerged

REMARKS:

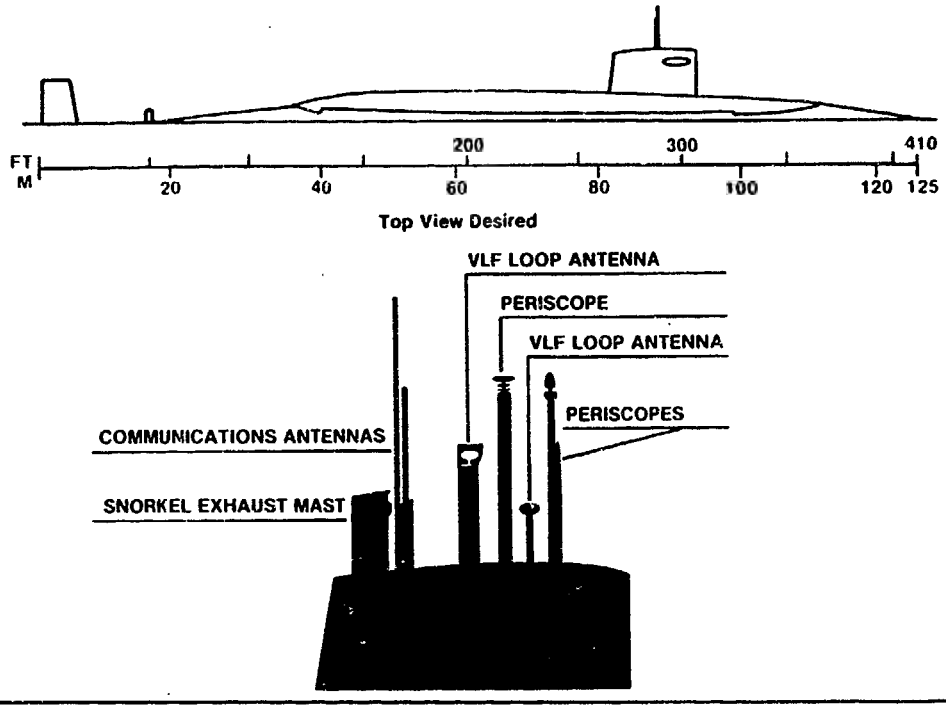
Twenty-nine ECHO II Class SSGNs were completed between 1962 and 1967. For many years, the ECHO II SSGN was one of the primary anticarrier threats. The ECHO II must surface to launch its missiles.

US ETHAN ALLEN SSN



ETHAN ALLEN SSN

ETHAN ALLEN SSN — US



MAJOR RECOGNITION FEATURES:

The sail on the ETHAN ALLEN is located forward of amidships. The leading edge is vertical. The trailing edge is slightly raked. Sail planes are located forward well up on the sail. The bow slopes gradually into the water. The aft weatherdeck is flat approximately two-thirds of the way and then steps down and slopes gradually into the waterline. A small dome-like object is located just forward of the stern at the aft end of the the weatherdeck. The ETHAN ALLEN's high stern fin is a prominent feature.

CHARACTERISTICS:

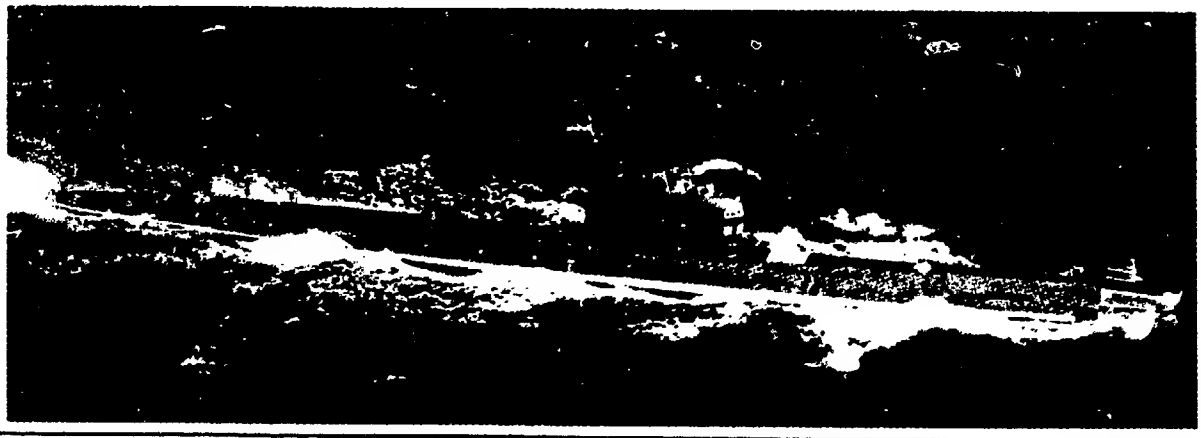
Displacement, tons: 6,955 surfaced; 7,880 submerged
Dimensions, feet (meters): 410 x 33 x 32 (125 x 10.1 x 9.8)
Torpedo tubes: 4 x 21 in (53.3 cm) (bow)
Missiles: 16 tubes for Polaris A-3 SLBM
Propulsion: Nuclear; 1 reactor; 2 geared turbines; 1 shaft
Speed, knots: 20 surfaced; 30 submerged
Pennant numbers: 608 thru 611, 618

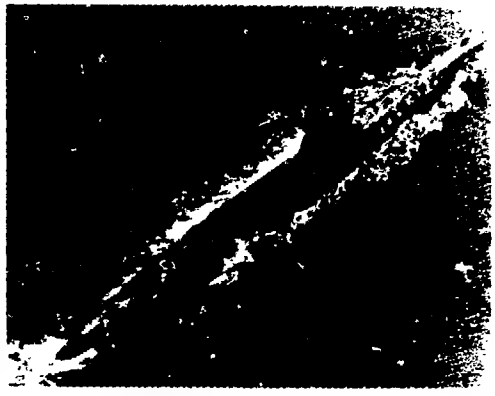
REMARKS:

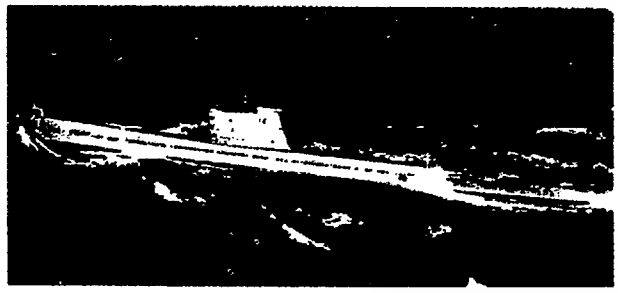
The ETHAN ALLEN Class, first commissioned in 1961, had a total of five units constructed. The submarines are projected to be removed from the SLBM force and converted to SSNs.

CU, IN, LY, UR

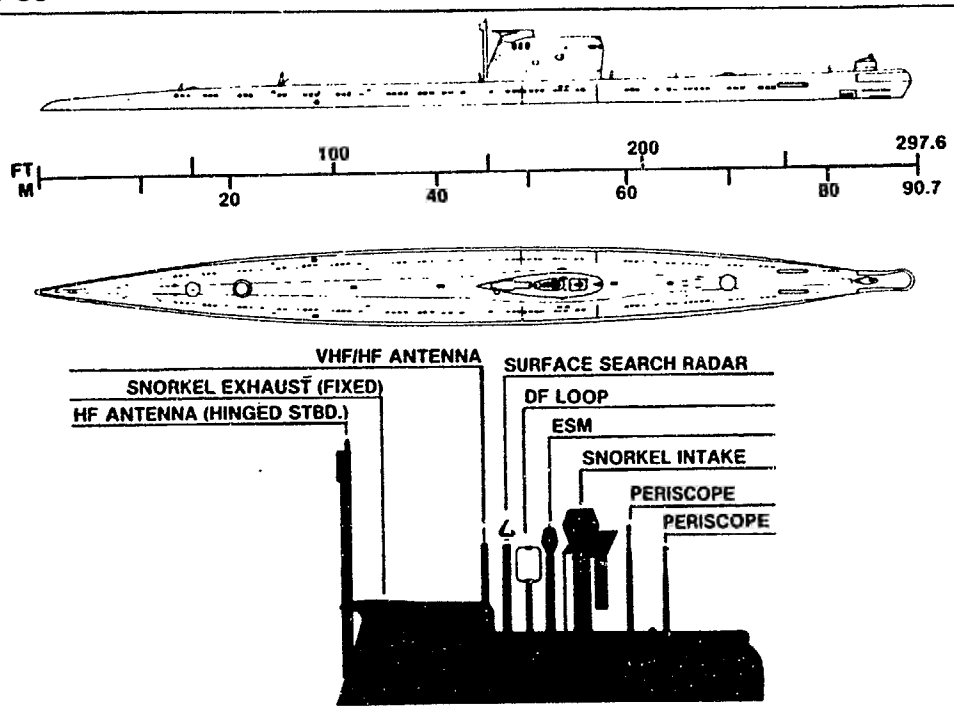
FOXTROT SS







FOXTROT SS CU, IN, LY, UR



MAJOR RECOGNITION FEATURES:

FOXTROT Class units are readily recognized by the sail and bow configurations. A unique, fixed snorkel exhaust extends beyond the raked trailing edge of the sail, and also forms a raised step to the after third of the sail. The leading edge of the sail is rounded, but nearly vertical in profile appearance. The bow is flared outward, appearing bulbous, and is usually capped with a prominent sonar dome. Some transferred units were delivered without the sonar dome. The weatherdeck is flat and slopes gradually to the stern. The snorkel intake is unique and serves as a prime recognition feature in views where it is exposed, even when the rest of the submarine is submerged.

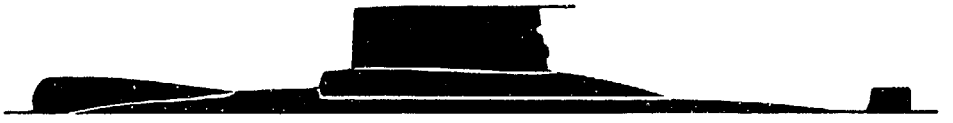
CHARACTERISTICS:

Displacement, tons: 1,950 surfaced; 2,500 submerged
Dimensions (wl), feet (meters): 297.6 x 22.6 (90.7 x 6.9)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow); 4 x 16 in (40.6 cm) (stern)
Propulsion: Diesel-electric; 3 diesels; 3 electric motors; 3 shafts
Speed, knots: 18 surfaced; 16 submerged
Pennant numbers: IN S20 thru S23, S40 thru S43; LY 312

REMARKS:

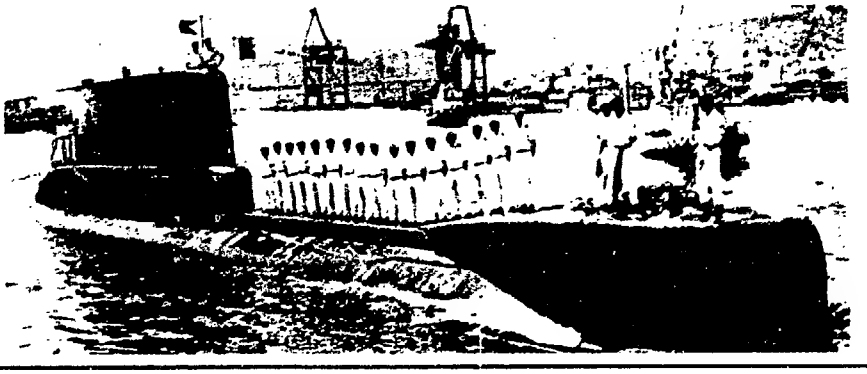
The FOXTROT Class, originally built between 1958-1971, has been deployed worldwide. Production was resumed in limited numbers in the 1970s. Eight units have been provided to India, four to Libya with an additional two units on order, and two to Cuba.

IS GAL SS

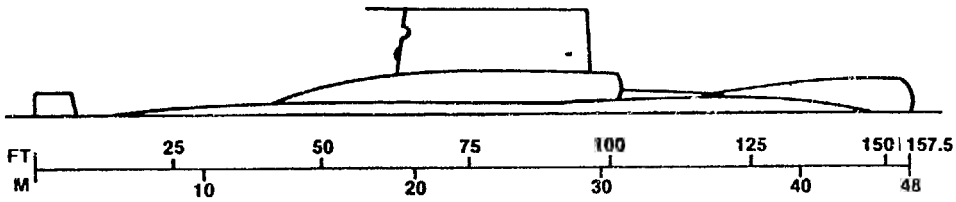


Beam View Desired

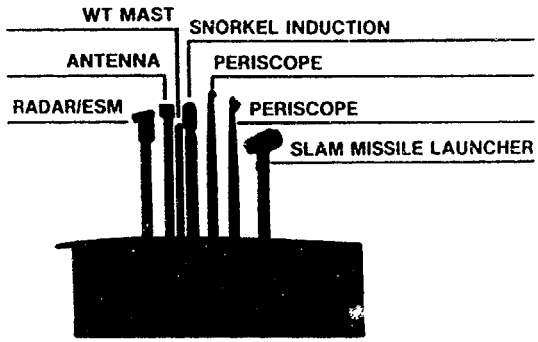
Additional Views Desired



GAL SS IS



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the GAL Class is slightly forward of amidships. The sail has vertical leading and trailing edges. The topline is unbroken and has a flat protrusion that extends beyond the upper trailing edge. The sail is stepped-down fore and aft, with the aft step being longer and sloped to the deckline. The bow is blunt. The aft weatherdeck slopes gradually to a stern fin.

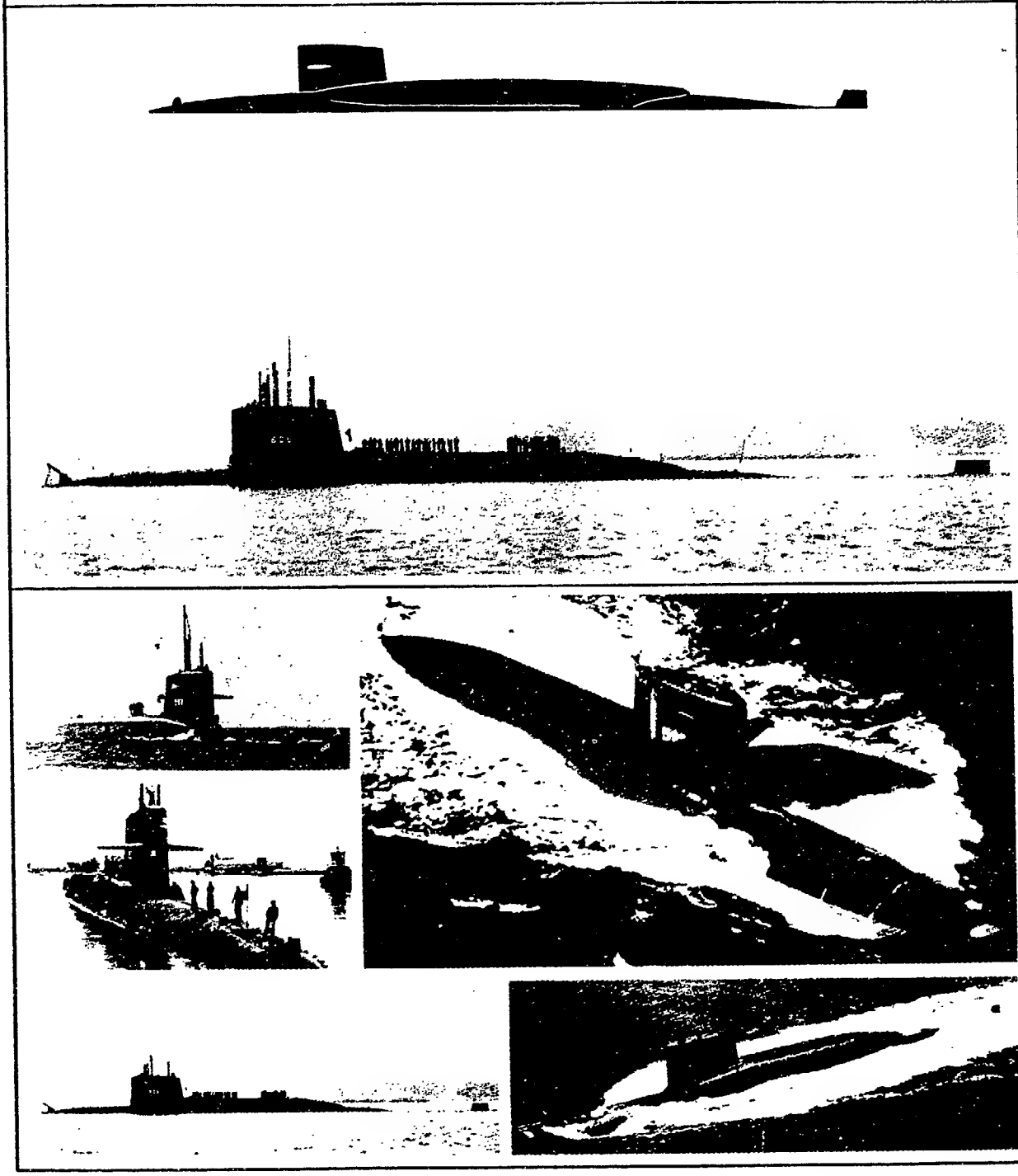
CHARACTERISTICS:

Displacement, tons: 500 surfaced; 600 submerged
Dimensions, feet (meters): 157.5 x 15.4 x 12.1 (48 x 4.7 x 3.7)
Torpedo tubes: 8 x 21 in (53.3 cm) (forward)
Missiles: Provision for submarine-launched antiair missile launcher
Propulsion: Diesel-electric; 2 diesels; 1 twin electric motor; 1 shaft
Speed, knots: 9 surfaced; 18 submerged

REMARKS:

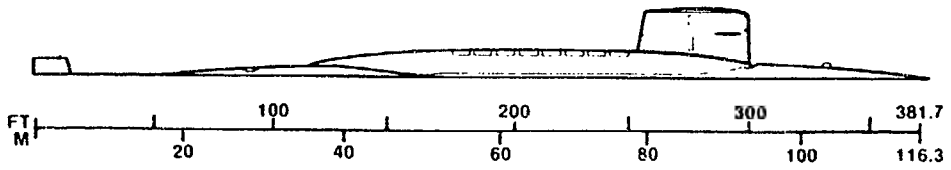
The GAL, the lead unit of the three GAL Class submarines, was completed in 1976. All units are currently in service with the Israeli Navy.

US GEORGE WASHINGTON SSN

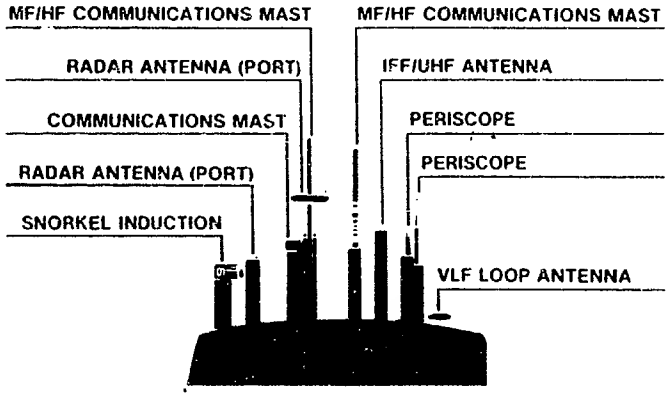


GEORGE WASHINGTON SSN

GEORGE WASHINGTON SSN — US



Top View Desired



MAJOR RECOGNITION FEATURES:

The GEORGE WASHINGTON Class submarine has a rectangular sail situated well forward of amidships with sail planes just aft of the leading edge one-half way up the sail. There is a noticeable bulge in the deckline beginning at the forward edge of the sail and extending aft midway to the protruding stern fin. Both the bow and the stern slope gently into the water. There is a sonar dome located aft of the bow. The rectangular stern fin is approximately one-half the height of the weatherdeck.

CHARACTERISTICS:

Displacement, tons: 6,019 standard; 6,888 submerged
Dimensions, feet (meters): 381.7 x 33 x 29 (116.3 x 10.1 x 8.8)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Missiles: 16 tubes for Polaris A-3 SLBM
Propulsion: Nuclear; 1 reactor; 2 geared turbines; 1 shaft
Speed, knots: 20 surfaced; 31 submerged
Pennant numbers: 598 thru 602

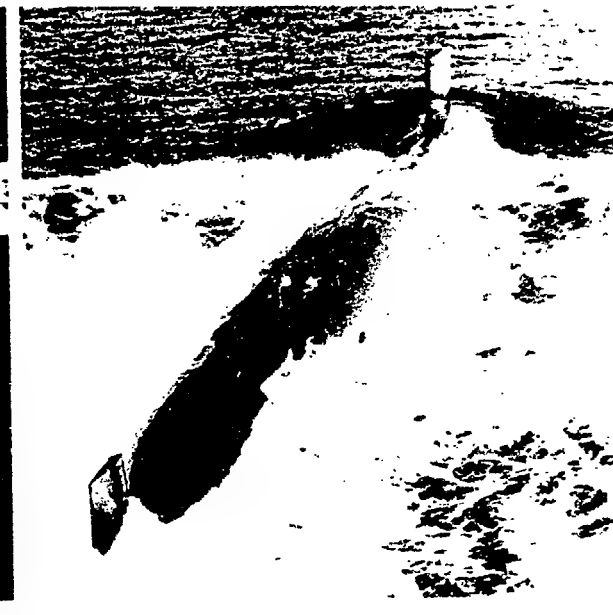
REMARKS:

The GEORGE WASHINGTON was the first U.S. submarine armed with ballistic missiles. Of the five ships commissioned between 1959 and 1961, two have been decommissioned, had missile compartments removed, and have been converted and recommissioned as SSNs.

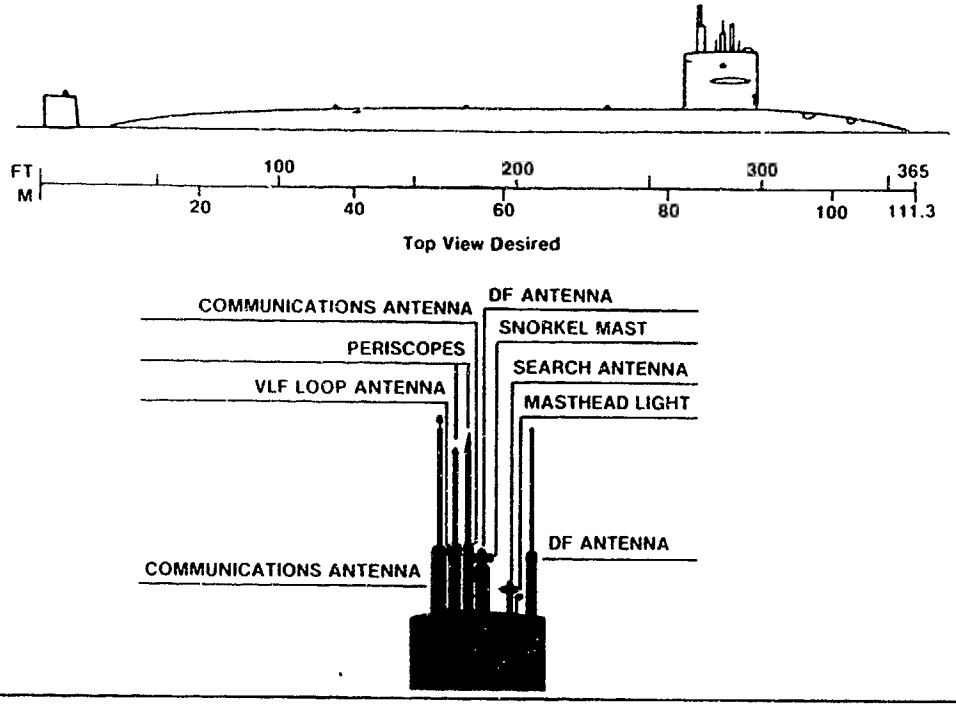
US **GLENARD P. LIPSCOMB SSN**

Beam View Desired

Additional Views Desired



GLENARD P. LIPSCOMB SSN — US



MAJOR RECOGNITION FEATURES:

The sail on the GLENARD P. LIPSCOMB is situated well forward of amidships. Leading and trailing edges are vertical. Sail planes are located midway up the sail and just aft of the leading edge. The bow slopes gradually to the waterline. The stern slopes to the waterline until the emergence of a prominent stern fin.

CHARACTERISTICS:

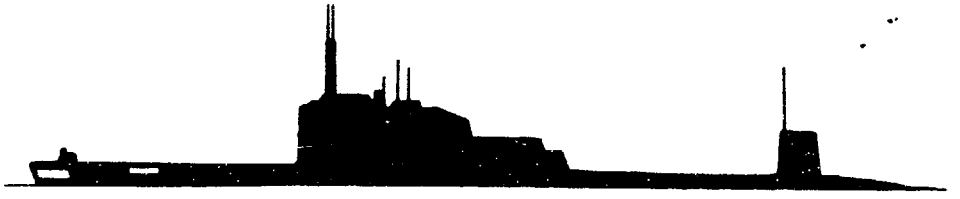
Displacement, tons: 5,800 surfaced; 6,480 submerged
Dimensions, feet (meters): 365 x 31.7 x 31 (111.3 x 9.7 x 9.5)
Torpedo tubes: 4 x 21 in (53.3 cm) (amidships)
Missiles: To be fitted for HARPOON
Propulsion: Nuclear; 1 reactor; turbine-electric drive; 1 shaft
Speed, knots: 18 surfaced; 25+ submerged
Pennant number: 685

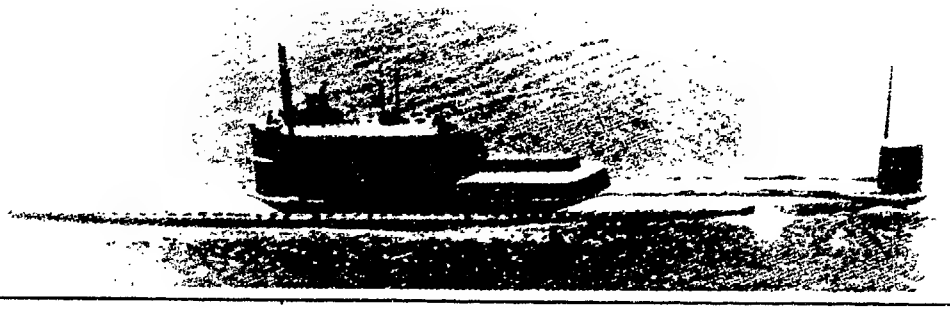
REMARKS:

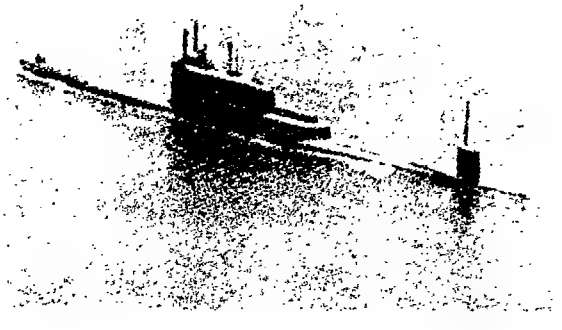
The one-of-a-kind USS GLENARD P. LIPSCOMB was commissioned in 1974. This unit was a prototype design with turbine electric drive to test advanced silencing techniques.

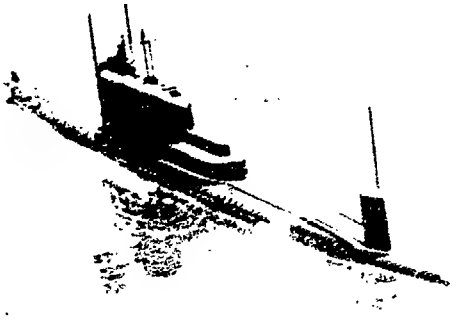
UR

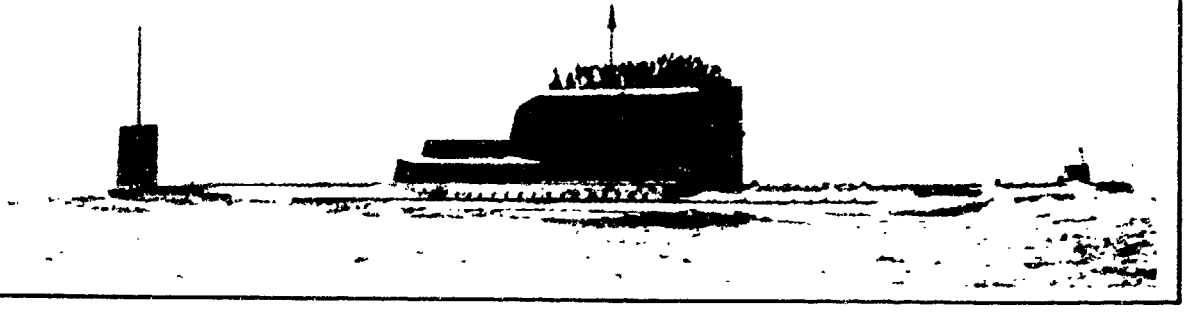
GOLF SSQ



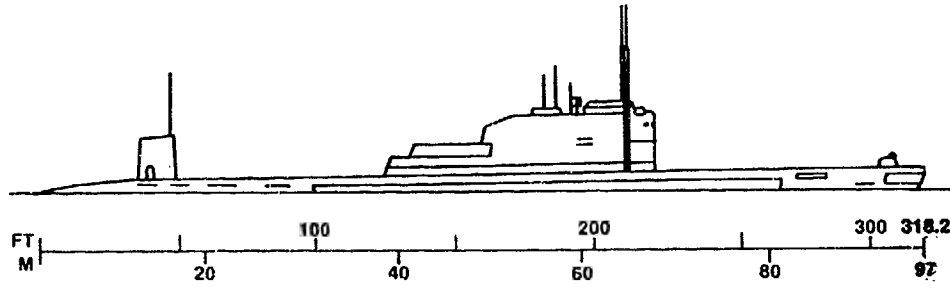




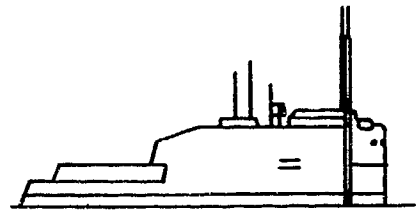




GOLF SSQ UR



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the Soviet GOLF SSQ, located forward of amidships, is so unique that identification should be very easy. The leading edge is vertical and the trailing edge is raked to a two-tiered platform which was part of the now removed missile casing. The bottom tier is the same width as the sail and the top tier is about one-third the width of the sail. A large rectangular object is located just forward of the stern. Large folding masts may be upright on either side of the sail and adjacent to the large object on the stern. A sonar dome is located just aft of the bow.

CHARACTERISTICS:

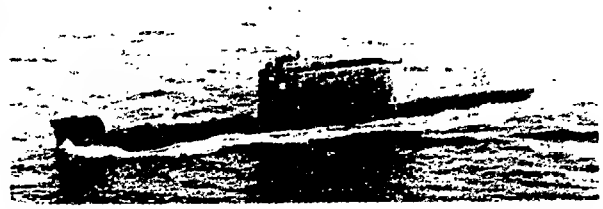
Displacement, tons: 2,300 surfaced; 2,850 submerged
Dimensions (wl), feet (meters): 318.2 x 27.9 (97 x 8.5)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Propulsion: Diesel-electric; 3 diesels; electric motors; 3 shafts
Speed, knots: 17 surfaced; 14 submerged

REMARKS:

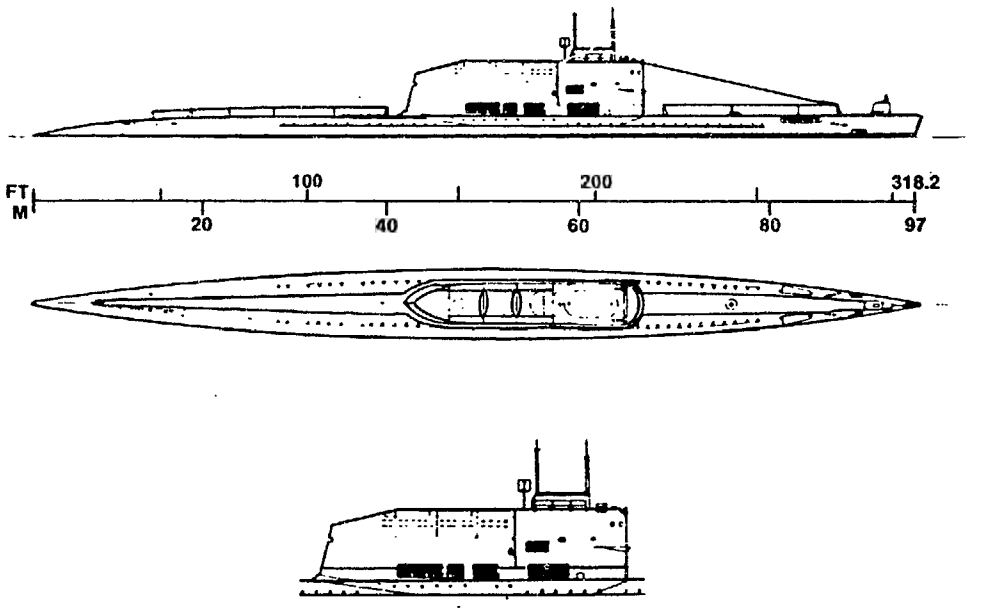
The GOLF SSQ is a recent conversion of the GOLF I Class SSB. The missiles have been removed and a variety of communications antennas have been installed, suggesting the submarines will perform some command, control, and communication function.

CH, UP GOLF I SSB

Additional Views Desired



GOLF I SSB CH, UR



MAJOR RECOGNITION FEATURES:

The large sail on the GOLF I is amidships with a vertical leading edge which has a small protruding lip that appears midway up the sail. The top of the sail has a box-like protrusion just aft of the leading edge. The back half of the top is broken by the eye shaped slits between the missile tube cowlings; it is also slightly sloped to the trailing edge. The trailing edge of the sail is raked. The bow is slightly raked with a sonar dome located just aft of the bow. The stern is gradually sloped to the waterline.

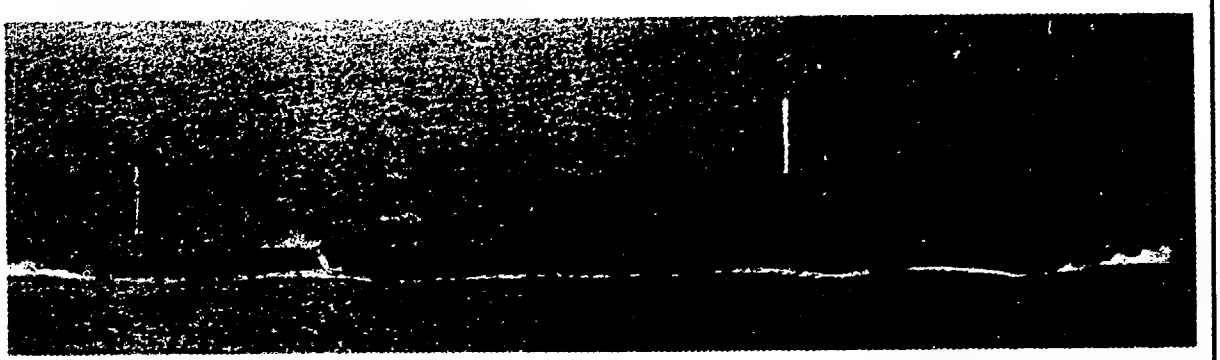
CHARACTERISTICS:

Displacement, tons: 2,300 surfaced; 2,850 submerged
Dimensions (wl), feet (meters): 318.2 x 27.9 (97 x 8.5)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Missiles: 3 SS-N-4 or 3 SS-N-5 SLBMs
Propulsion: Diesel-electric; 3 diesels; electric motors; 3 shafts
Speed, knots: 17 surfaced; 14 submerged

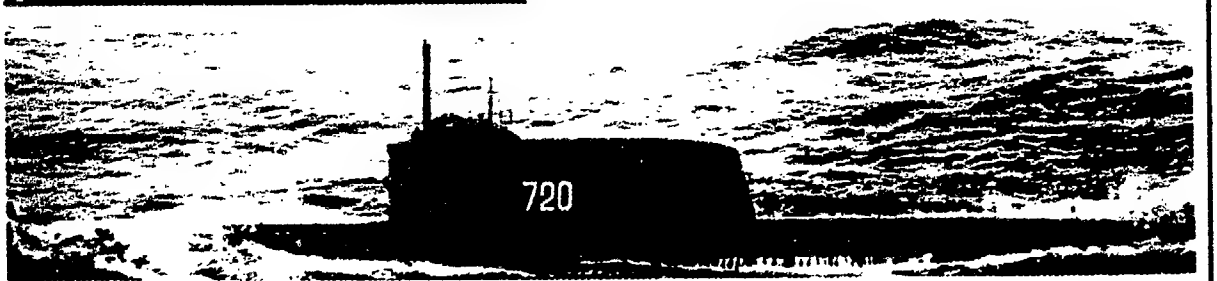
REMARKS:

Twenty-three GOLF Is were built by the Soviet Union from 1958 to 1962. Approximately 13 units have been modified to the GOLF II configuration. One unit had 32 feet added to the hull, the sail was elongated, and it was designated GOLF III. One unit was modified to carry the SS-N-6 missile and designated GOLF IV. One other unit was modified to test fire a new missile and designated GOLF V.

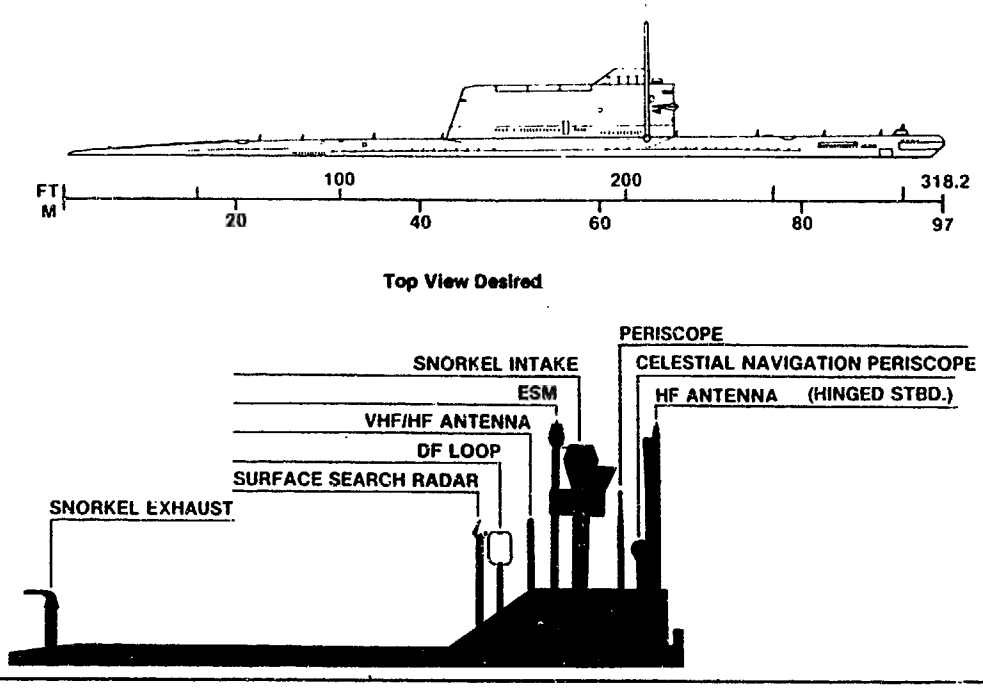
UR GOLF II SSB



Additional Views Desired



GOLF II SSB — UR



MAJOR RECOGNITION FEATURES:

The large sail on the GOLF II is slightly forward of amidships with a small streamlined "superstructure" on the forward end. The leading edge is vertical with a small lip in the middle. A tall, hull-mounted antenna is located near the forward end of the sail on the starboard side. The trailing edge is raked to the deck. The bow is bulbous with a sonar dome located just aft of the bow. The weatherdeck slopes gradually towards the stern and into the waterline. There are two additional variations of the GOLF II. Both have a mounted VLF buoy. On one version the buoy is mounted and protrudes upward just forward of the stern. The second has the buoy mounted directly aft of the sail giving the sail a step-down appearance.

CHARACTERISTICS:

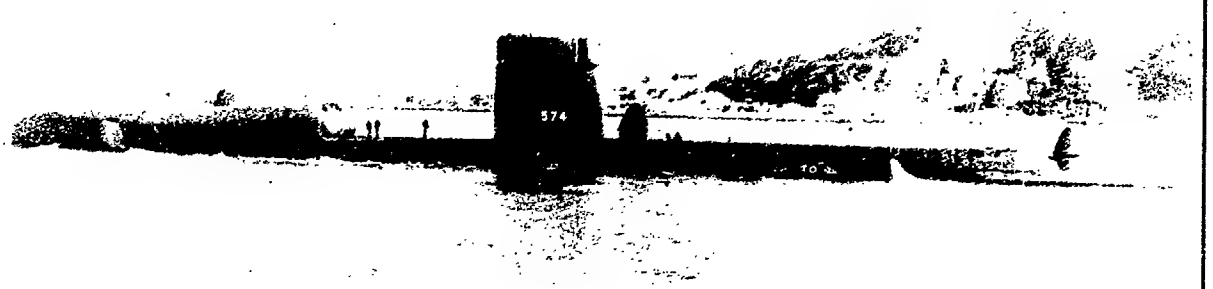
Displacement, tons: 2,300 surfaced; 2,800 submerged
Dimensions (wl), feet (meters): 318.2 x 27.9 (97 x 8.5)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Missiles: 3 SS-N-5 SLBMs
Propulsion: Diesel-electric; 3 diesels; electric motors; 3 shafts
Speed, knots: 17 surfaced; 14 submerged

REMARKS:

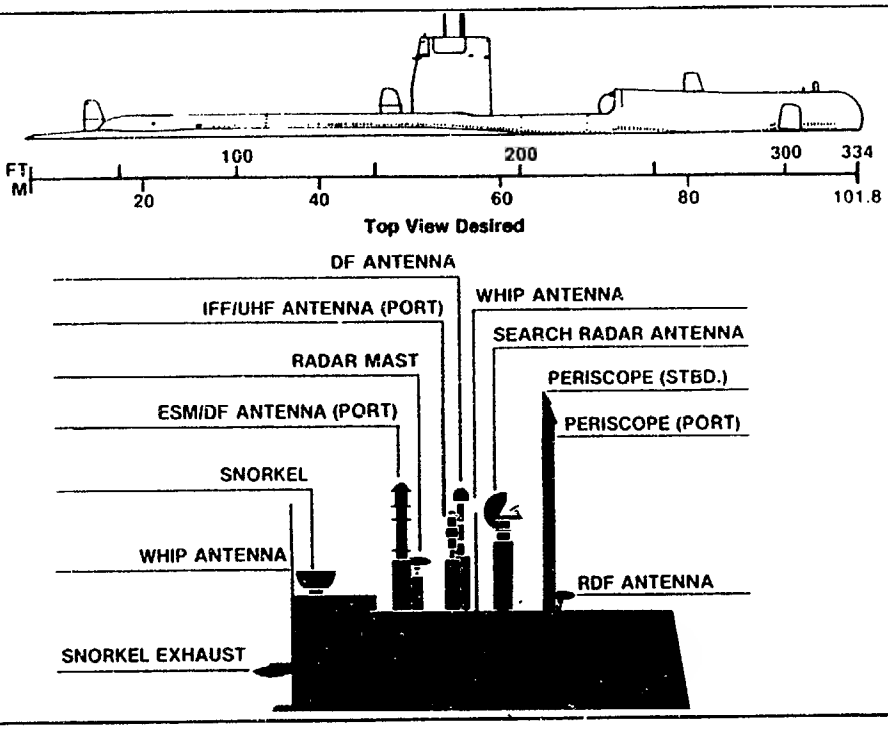
This class is a modification of the GOLF I Class submarines. About 13 units are estimated to be in active service.

US

GRAYBACK SS



GRAYBACK SS US



MAJOR RECOGNITION FEATURES:

GRAYBACK has a tall, thin rectangular sail located forward of amidships. The topline is straight and horizontal with a perpendicular leading edge; however, the trailing edge appears raked and broken with two segments, one near the top and one near the deckline. The hull configuration of GRAYBACK is unique. A flat weatherdeck surrounds the sail area, widening to more than double width forward of the sail and tapering to a point at the break near the stern. The bow section is raised and extends more than half way to the sail. The bow stem is bluntly rounded. GRAYBACK is fitted with three fin-like PUFF sonar domes: one on the raised bow section, one on the weatherdeck just aft of the sail, and one at the after break in the weatherdeck which could easily be mistaken for a stern fin.

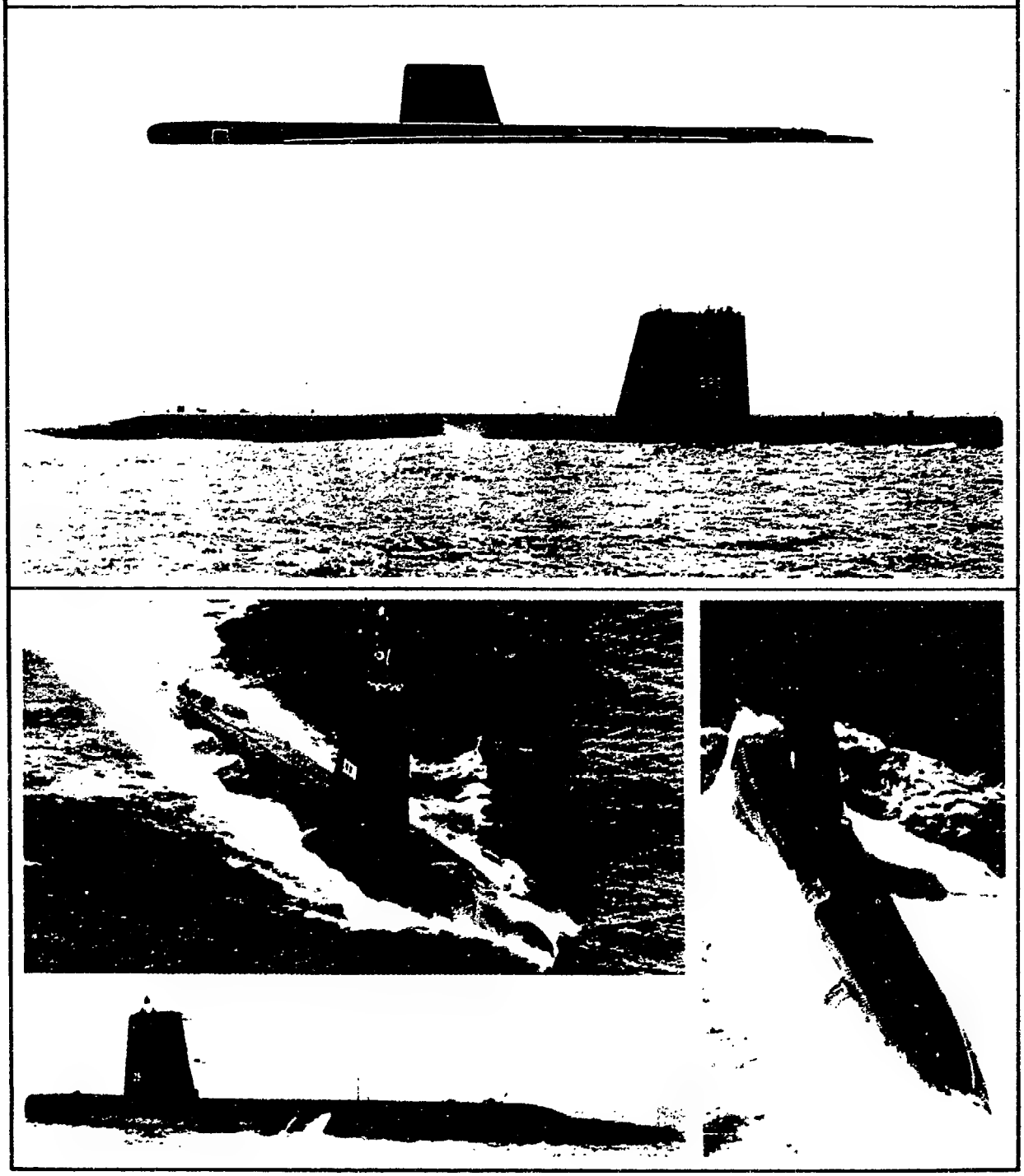
CHARACTERISTICS:

Displacement, tons: 2,670 standard; 3,650 submerged
Dimensions, feet (meters): 334 x 27.2 x 19 (101.8 x 8.3 x 5.8)
Torpedo tubes: 8 x 21 in (53.3 cm) (6 bow, 2 stern)
Propulsion: Diesel-electric; 3 diesels; 2 electric motors; 2 shafts
Speed, knots: 20 surfaced; 16.7 submerged
Pennant numbers: 574

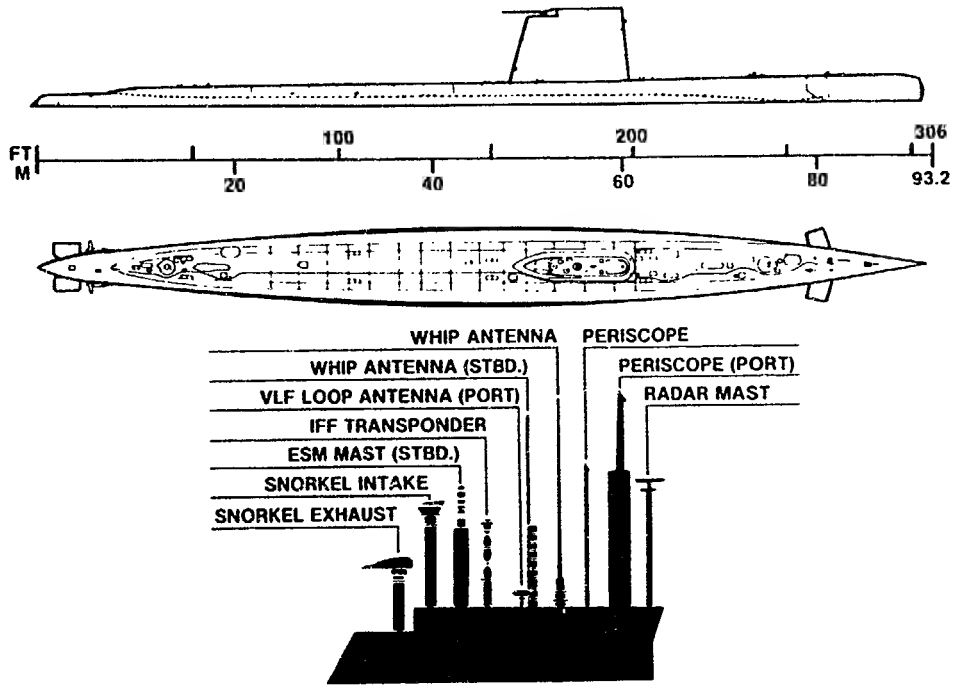
REMARKS:

The one-of-a-kind GRAYBACK, commissioned in 1958, was originally an SSG. However, during the 1968 conversion, she was reclassified as an LPSS and fitted to berth and mess 67 troops and their equipment. Although subsequently reclassified as an SS, GRAYBACK retains both a transport configuration and an attack capability.

AR, BR, GR, PE, SP, TU, TW, VE GUPPY IA, II, IIA SS



GUPPY IA, II, IIA SS — AR, BR, GR, PE, SP, TU, TW, VE



MAJOR RECOGNITION FEATURES:

The sail on the GUPPY IA, II, and IIA is forward of amidships. The leading and trailing edges are raked; the top is flat with a small step-down which occurs about two-thirds aft. This stepdown houses a retractable antenna which when retracted, extends beyond the sail's trailing edge. The bow is bulbous and folding bow planes are noticable aft of the bow. The weatherdeck is flat and slopes down just forward of the stern. Some units have a rectangular stern fin.

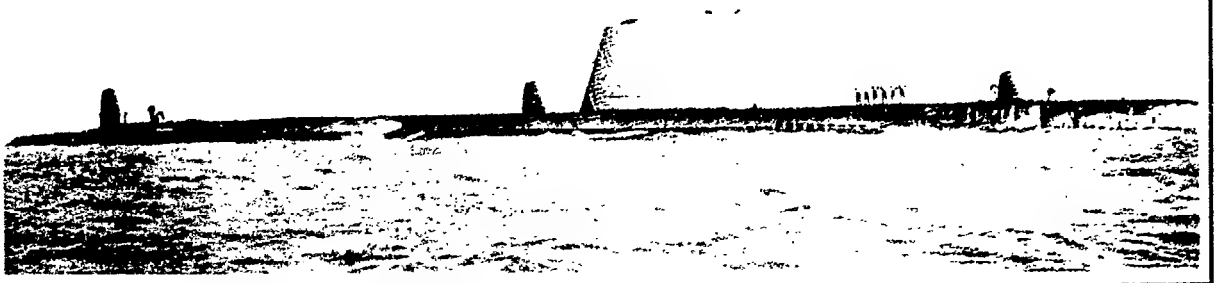
CHARACTERISTICS:

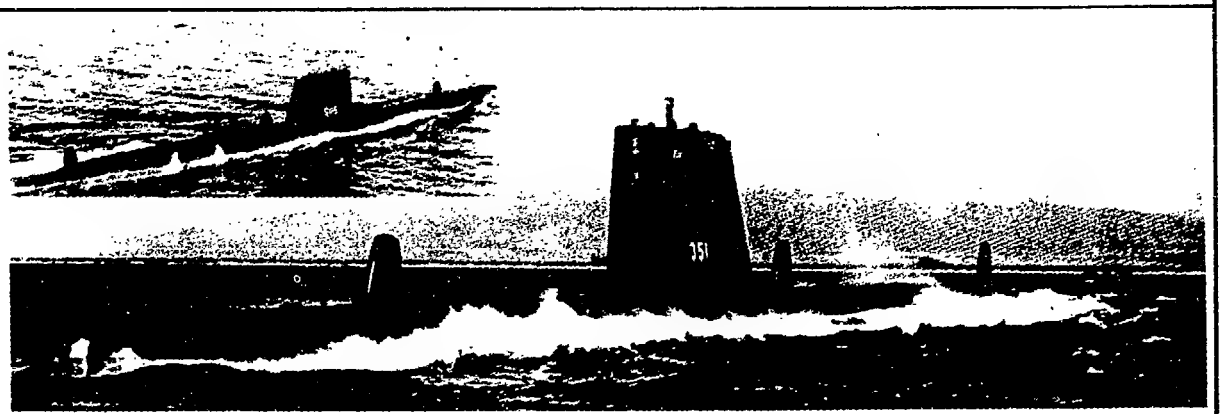
Displacement, tons: 1,840 standard; 2,445 submerged
Dimensions, feet (meters): 306 x 27 x 17 (93.2 x 8.2 x 5.2)
Torpedo tubes: 10 x 21 in (53.3 cm) (6 bow, 4 stern)
Propulsion: Diesel-electric; 3 diesels; 2 electric motors; 2 shafts
Speed, knots: 18 surfaced; 15 submerged
Pennant numbers: AR 22; BR S10, S12, S14; GR S114; PE 48, 49; SP S32, S34, S35; TU S335 thru S340, S345, S346; TW S736, S794; VE S22

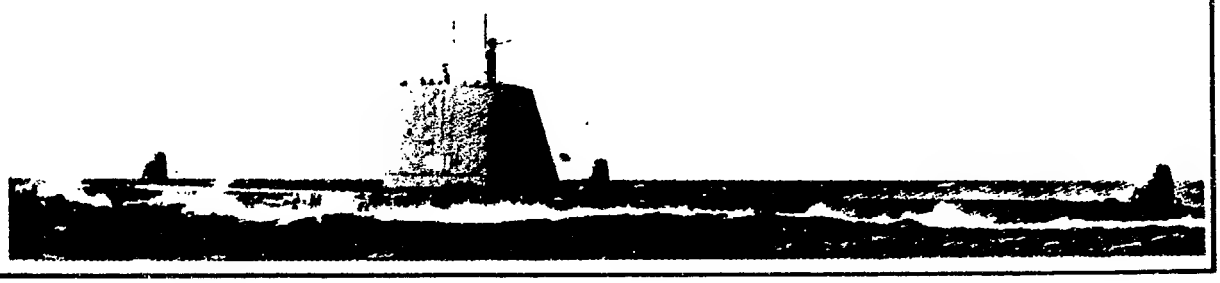
REMARKS:

The GUPPY IA, II, and IIA are all conversions of the USS BALAO and TENCH Class submarines. The GUPPY is active in eight navies throughout the world. Displacement, dimensions, and speed vary slightly among units.

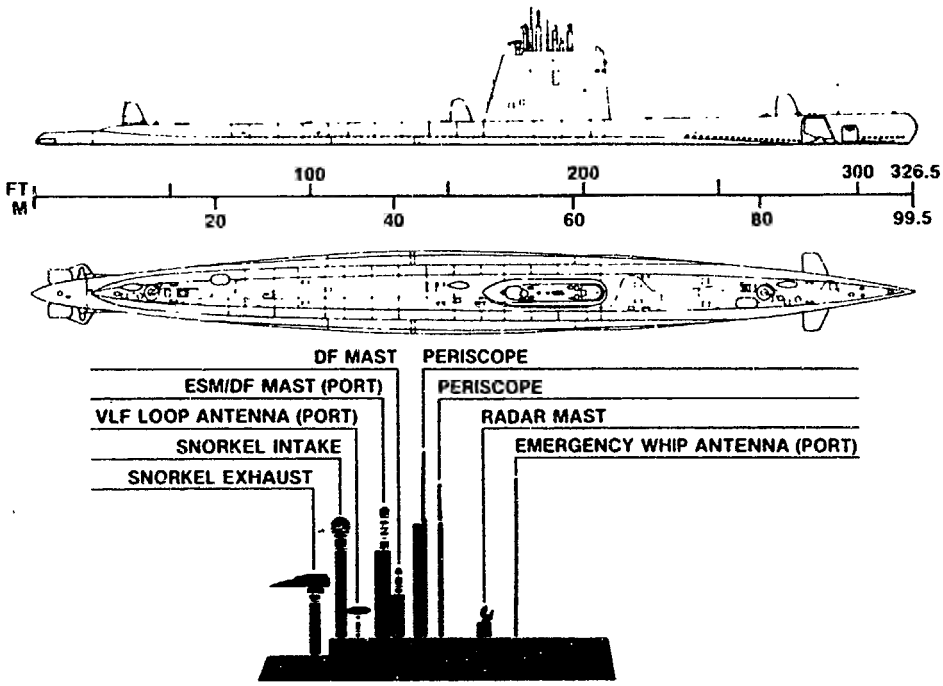
BR, GR, IT, TU **GUPPY III SS**







GUPPY III SS **BR, GR, IT, TU**



MAJOR RECOGNITION FEATURES:

GUPPY III submarines are easily identified by three large PUFF sonar domes. One dome is located just aft of the bow, the second just aft of the sail, and the third just forward of the stern. The sail has a near vertical leading edge, a raked trailing edge, and a level topline with a small notch down to the trailing edge. The sail is located just forward of amidships. The bow is rounded. The weatherdeck is level with a slight slope aft of the rear sonar dome. Folding dive planes are located at the waterline just forward of the bow sonar dome.

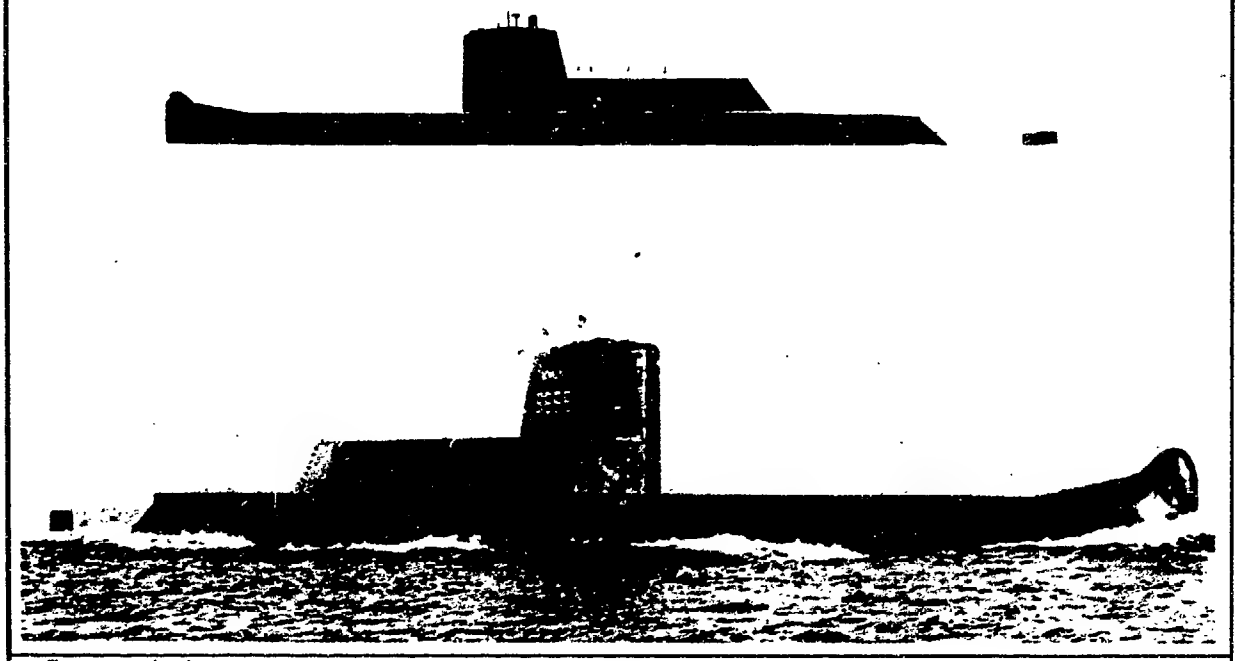
CHARACTERISTICS:

Displacement, tons: 1,975 standard; 2,450 submerged
Dimensions, feet (meters): 326.5 x 27 x 17 (99.5 x 8.2 x 5.2)
Torpedo tubes: 10 x 21 in (53.3 cm) (6 bow, 4 stern)
Propulsion: Diesel-electric; 4 diesels; 2 electric motors; 2 shafts
Speed, knots: 20 surfaced; 15 submerged
Pennant numbers: BR S15, S16; GR S115; IT 502; TU S341, S333

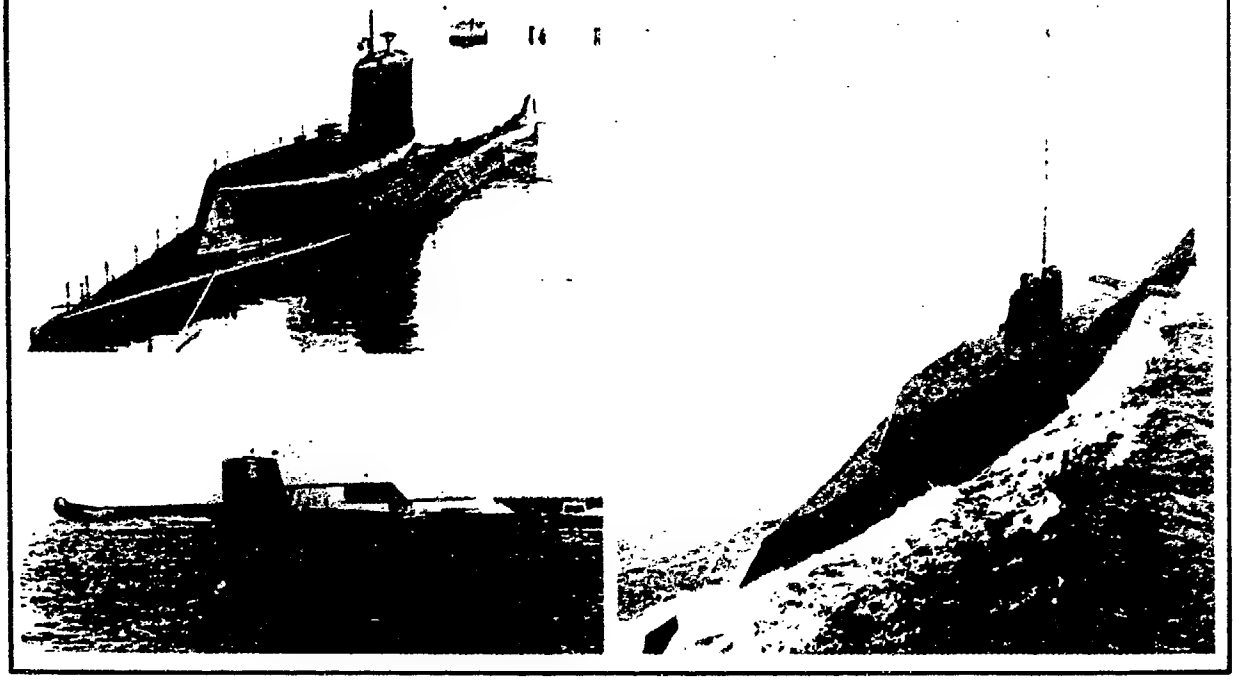
REMARKS:

The GUPPY III, originally of the USS BALAO and TENCH Class submarines, underwent conversion in the 1960s. The GUPPY III is in active service in the following navies: Brazil, Greece, Italy and Turkey.

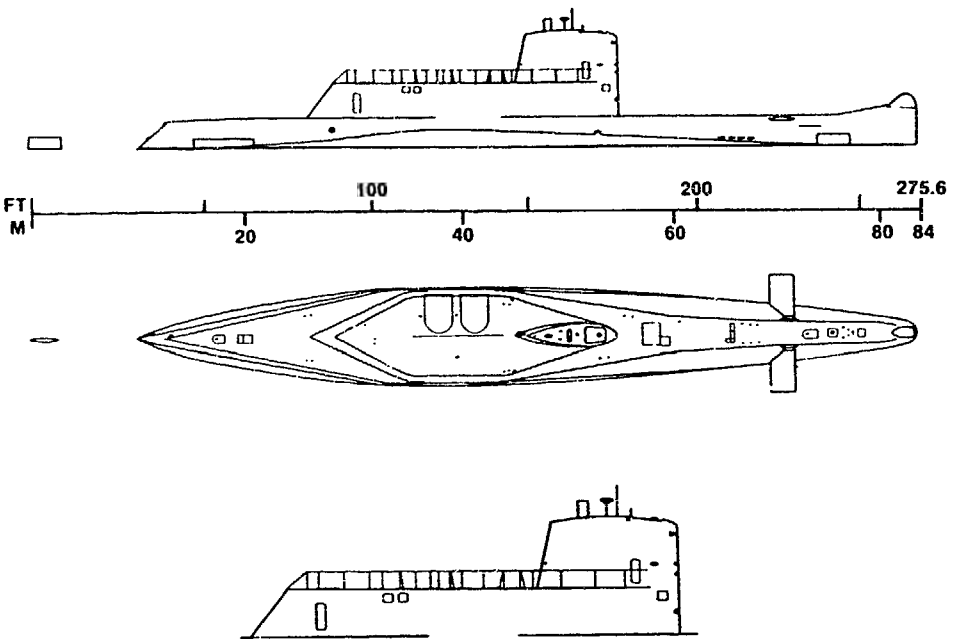
FR GYMNOTE SSB



Additional Views Desired



GYMNOTE SSB FR



MAJOR RECOGNITION FEATURES:

GYMNOTE's configuration is unique. The sail is rectangular in profile with a vertical leading edge, a raked trailing edge, and a slightly convex topline. In many sightings a telephone pole-type mast is erected atop the sail. The trailing edge is much shorter than the leading edge due to a high platform formed aft as an extension of the sail. The trailing edge of the platform is raked, as is the break in the main deckline aft, which drops into the waterline some distance forward of a prominent stern fin. The GYMNOTE bow has an upswing giving it a "canoe" shape. Fixed diving planes are located some distance aft of the bow, near the top of the weatherdeck.

CHARACTERISTICS:

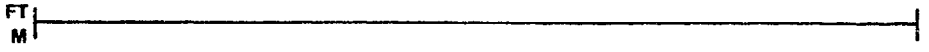
Displacement, tons: 3,000 surfaced; 3,250 submerged
Dimensions, feet (meters): 275.6 x 34.7 x 25 (84 x 10.6 x 7.6)
Missiles: 2 tubes for MSBS
Propulsion: Diesel-electric; 4 diesel-electric; 2 electric motors; 2 shafts
Speed, knots: 11 surfaced; 10 submerged
Pennant number: S655

REMARKS:

GYMNOTE was commissioned in 1966 as an experimental submarine for testing ballistic missiles for the French nuclear-powered SSBNs, and for use as an underwater laboratory to prove equipment and arms for nuclear-powered submarines. It was converted in 1979 for additional trial firings. It is the only ship of its class.

CH	HAN SSN
Silhouette Unavailable Beam View Desired	
All Views Desired	

HAN SSN	CH



All Views Desired

MAJOR RECOGNITION FEATURES:

Recognition features not available.

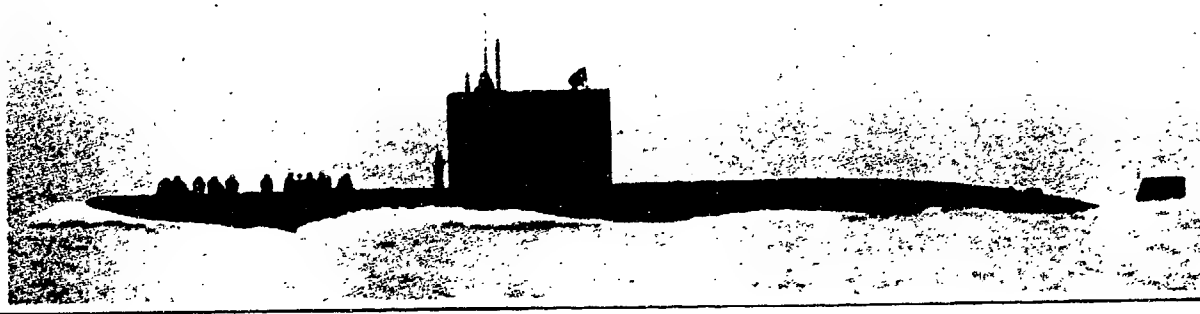
CHARACTERISTICS:

Displacement, tons:
Dimensions, feet (meters):
Torpedo tubes: UNCLASSIFIED DATA NOT AVAILABLE
Missiles:
Propulsion:
Speed, knots:
Pennant numbers:

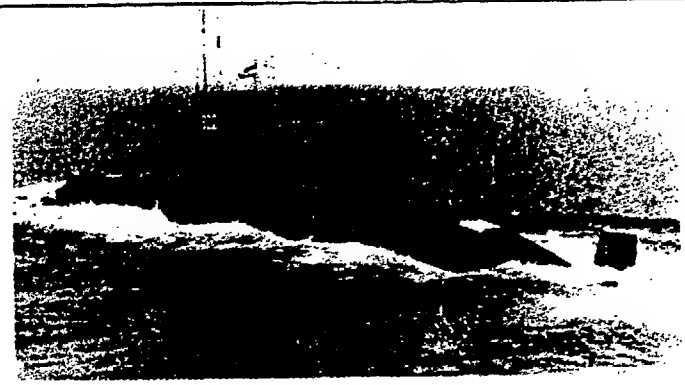
REMARKS:

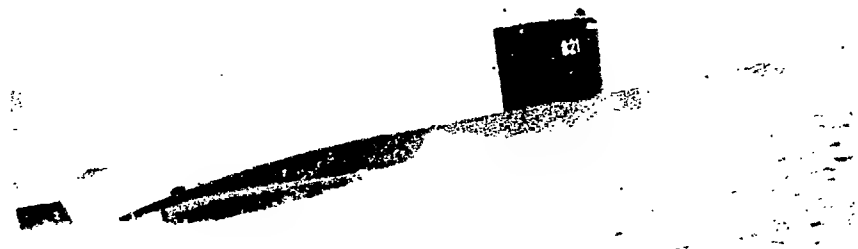
The HAN Class is believed to be the first Chinese nuclear submarine. Two units have been reported as completed. No unclassified pictures or characteristics are available.

YO HEROJ SS

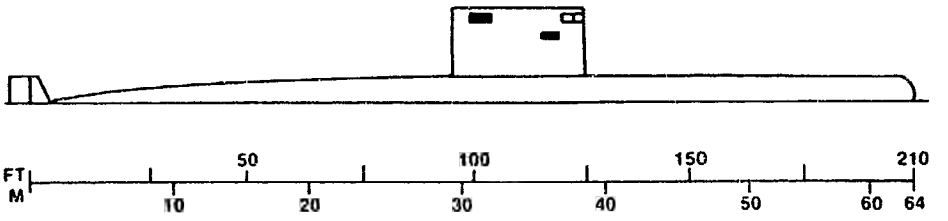


Additional Views Desired

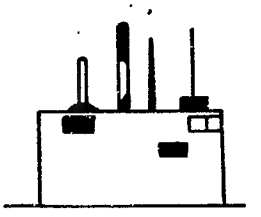




HEROJ SS YO



Top View Desired



MAJOR RECOGNITION FEATURES:

HEROJ Class submarines have a high rectangular sail located slightly forward of amidship. The deckline is level fore and aft of the sail, but curves sharply to the waterline near the stern. A squared-off stern fin rises to the height of the deck level at its highest point.

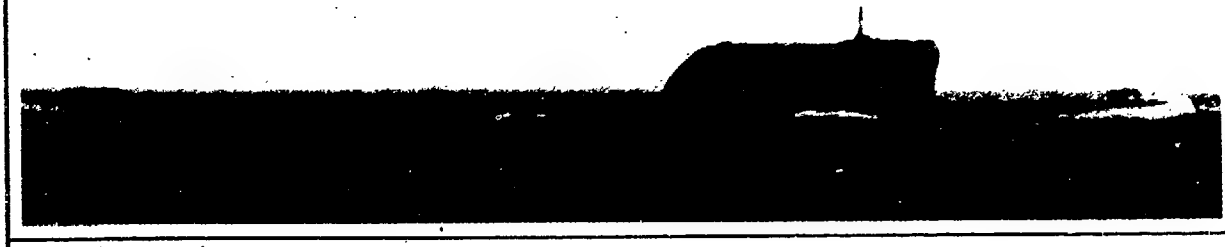
CHARACTERISTICS:

Displacement, tons: Unknown surfaced; 1,068 submerged
Dimensions, feet (meters): 210 x 23.6 x 16.4 (64 x 7.2 x 5)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Propulsion: Diesel-electric; diesels; electric motors; 1 shaft
Speed, knots: 16 surfaced; 10 submerged
Pennant numbers: 821, 822, 823

REMARKS:

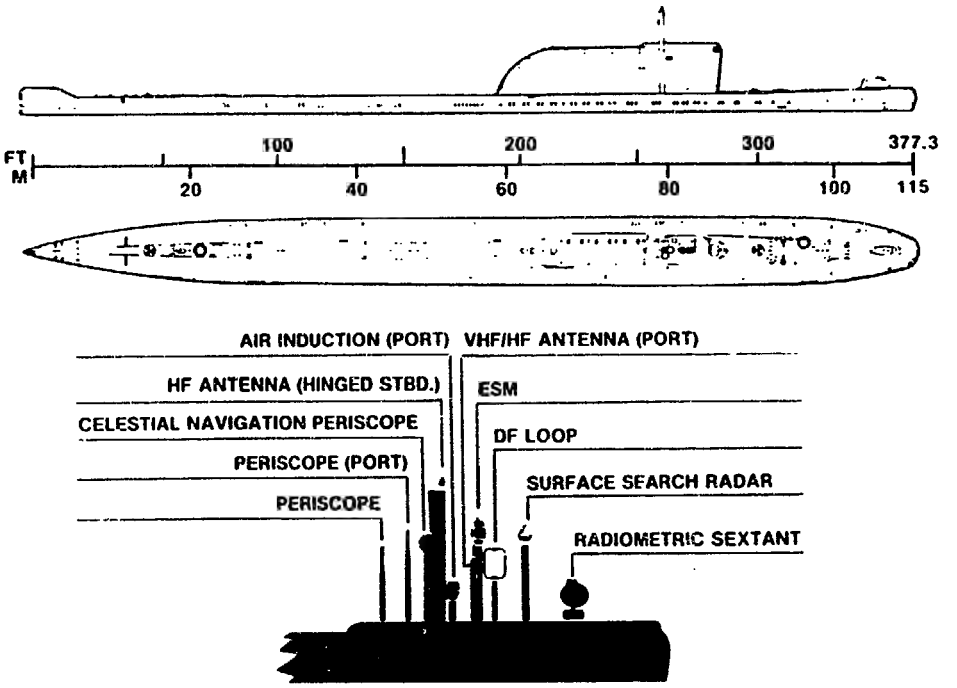
The HEROJ Class, built in Yugoslavia and commissioned in 1968, consists of three units. All are active in the Yugoslavian Navy.

UR HOTEL II SSBN



Additional Views Desired

HOTEL II SSBN UR



MAJOR RECOGNITION FEATURES:

HOTEL II Class submarines have a massive streamlined sail situated well forward of amidships. The sail's imposing height and length accommodates three vertically oriented ballistic missile tubes. The sail's leading edge is slightly raked aft from the top while the trailing edge is rounded to the deck. Except for a slight rise forward of the sail, the weatherdeck is flat to the stern. An elongated sonar dome is situated on the bow, and a low modest tail fin is present at the stern.

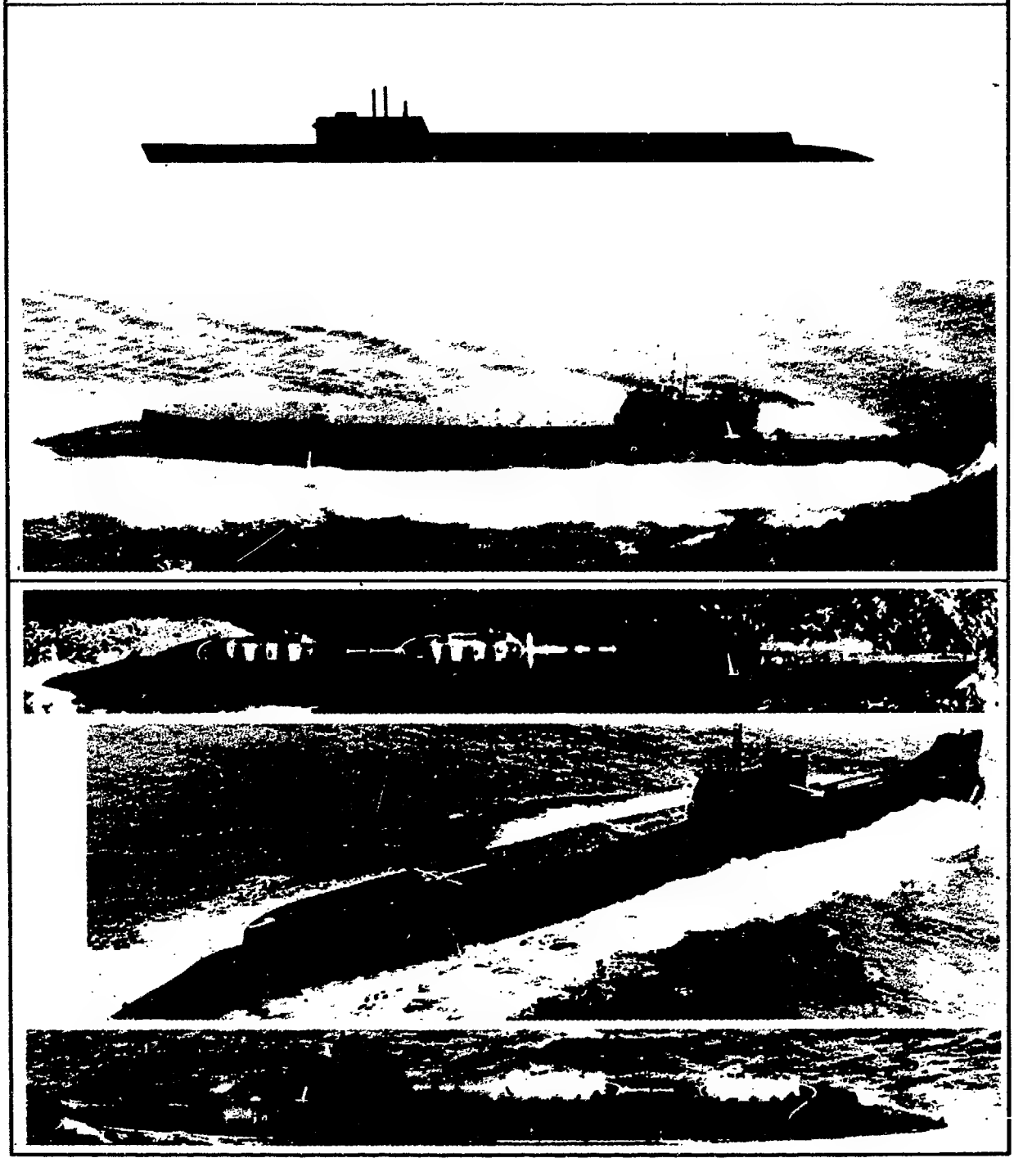
CHARACTERISTICS:

Displacement, tons: 4,750 surfaced; 5,600 submerged
Dimensions (wl), feet (meters): 377.3 x 29.5 (115 x 9)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow); 2 x 16 in (40.6 cm) (stern)
Missiles: 3 SS-N-5 tubes
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 26 submerged

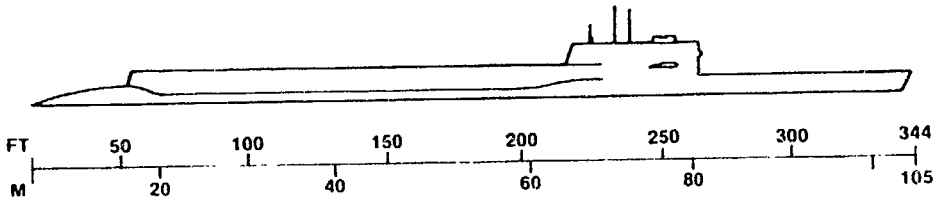
REMARKS:

The original HOTEL I Class submarines were constructed between 1958 and 1962 and fitted with SS-N-4 missiles. When these units were converted to carry the SS-N-5 missiles, they were designated the HOTEL II Class. One unit was converted to test fire the SS-N-8 missile and designated the HOTEL III.

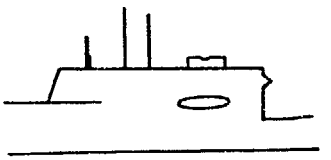
UR INDIA SSA



INDIA SSA UR



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the INDIA Class is located well forward of amidships. The leading edge is vertical with a protruding lip approximately two-thirds of the way up. The trailing edge is raked. The deck for the submersibles begins at the trailing edge of the sail and is level almost to the stern where it then steps-down to the hull which slopes gradually to the waterline. INDIA has been observed with a removable ice-breaker bow.

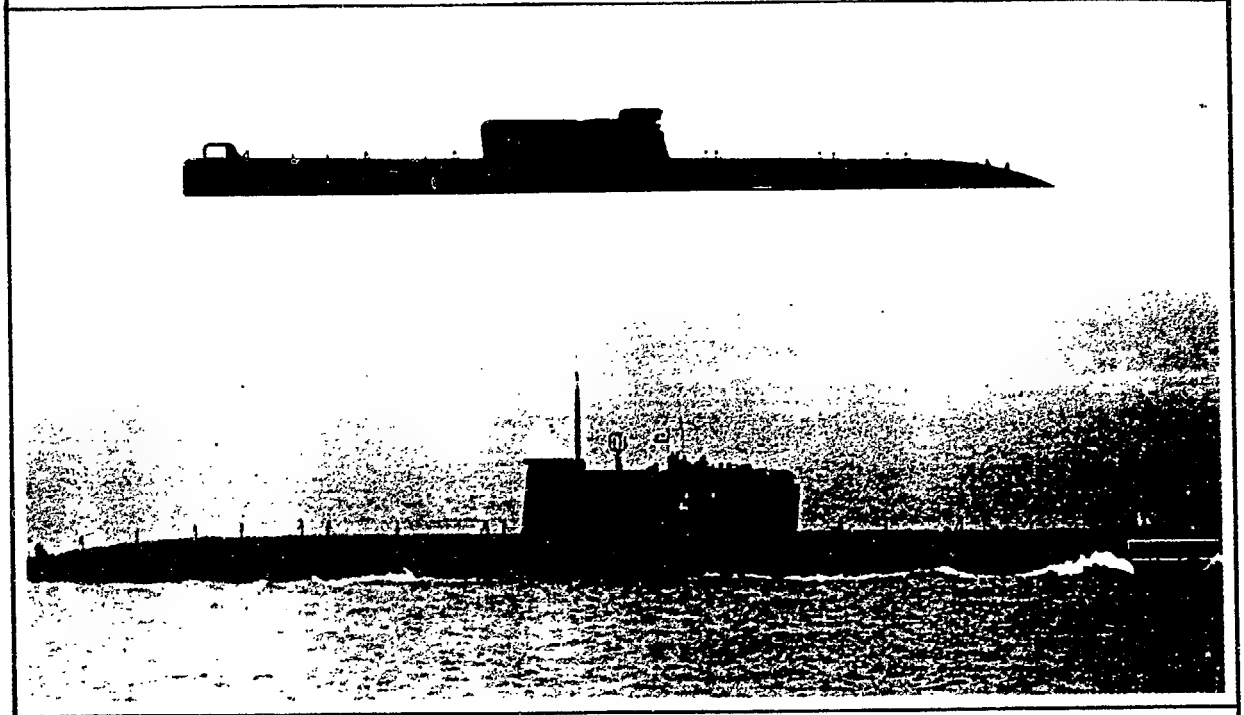
CHARACTERISTICS:

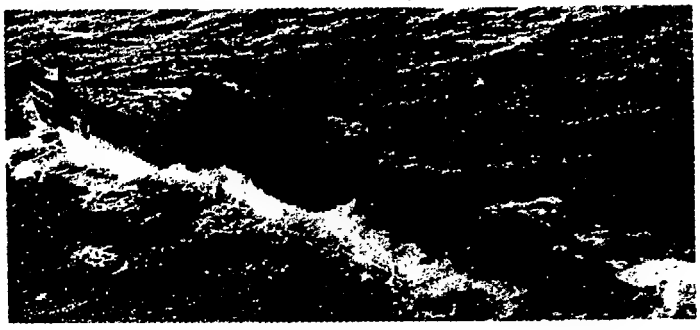
Dimensions (wl), feet (meters): 344 x 32.8 (105 x 10)

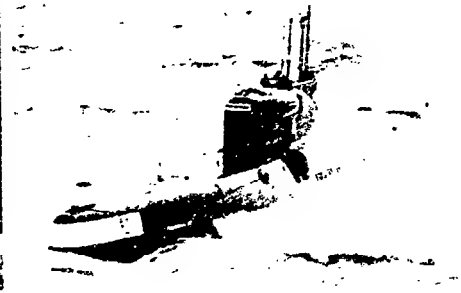
REMARKS:

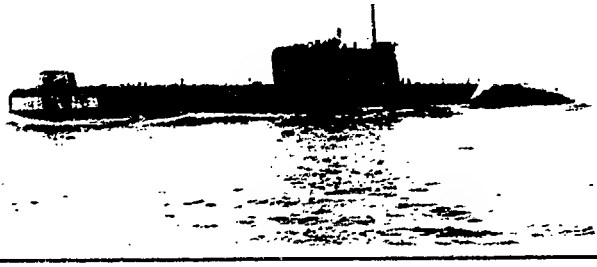
The INDIA Class is designed for rescue and salvage work; it carries two DSRVs on the after casing.

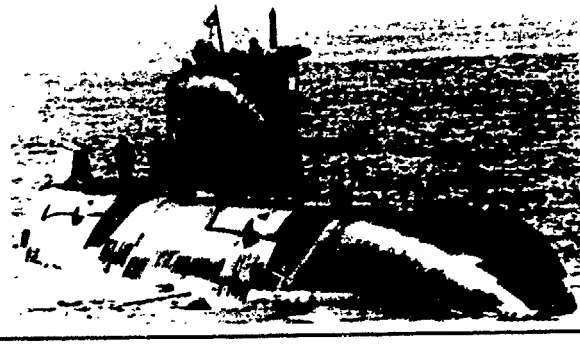
UR JULIETT SSG



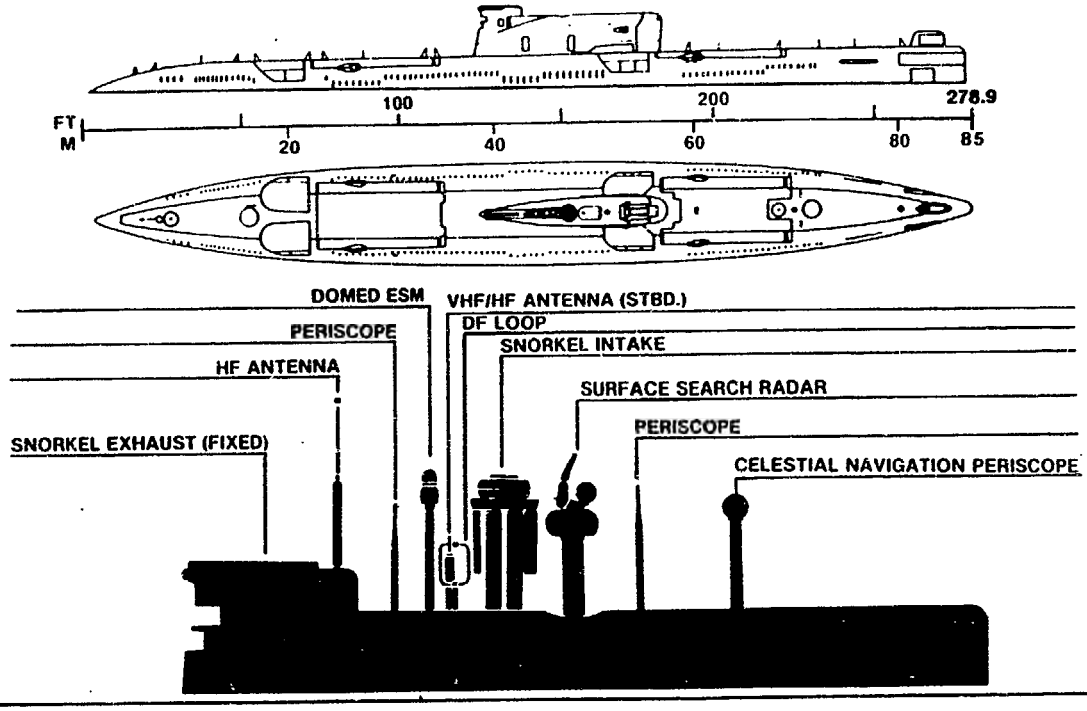








JULIETT SSG UR



MAJOR RECOGNITION FEATURES:

JULIETT Class submarines have a stubby appearance due to their relatively high freeboard and the length of the sail in comparison with other proportions. The paired cruise missiles are situated in the deck areas fore and aft of the sail, as evidenced by the large missile exhaust deflection cavities. A stepped snorkel exhaust housing is at the extremity of the sail, and a large sonar dome is on the bow.

CHARACTERISTICS:

Displacement, tons: 3,000 surfaced; 3,700 submerged
Dimensions (wl), feet (meters): 278.9 x 32.8 (85 x 10)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Missiles: 4 tubes for SS-N-3A (2 forward and 2 aft of sail)
Propulsion: Diesel-electric; 3 diesels; 3 electric motors; 2 shafts
Speed, knots: 19 surfaced; 17 submerged

REMARKS:

The JULIETT Class, completed between 1962 and 1967, was a follow-on program to the WHISKEY Class conversion. A total of 16 units have been produced. This class is the only diesel-powered cruise missile submarine still active as a first-line unit in the Soviet Navy.

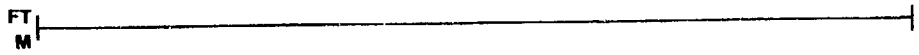
UR KILO SS

Silhouette Unavailable

Beam View Desired

All Views Desired

KILO SS **UR**



All Views Desired

MAJOR RECOGNITION FEATURES:

Recognition features not available.

CHARACTERISTICS:

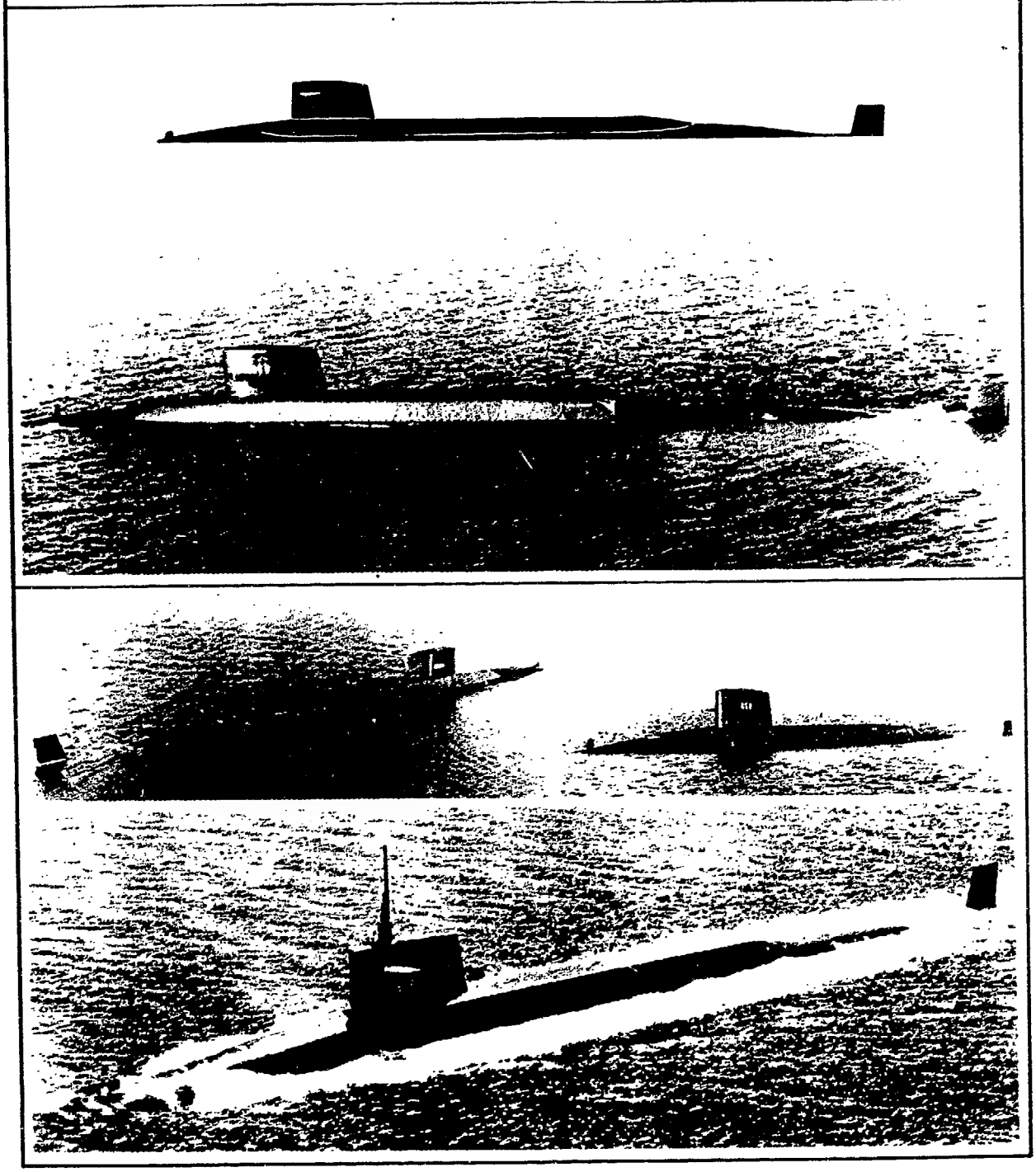
Displacement, tons:
Dimensions, feet (meters):
Torpedo tubes:
Missiles:
Propulsion:
Speed, knots:
Pennant numbers:

UNCLASSIFIED DATA NOT AVAILABLE

REMARKS:

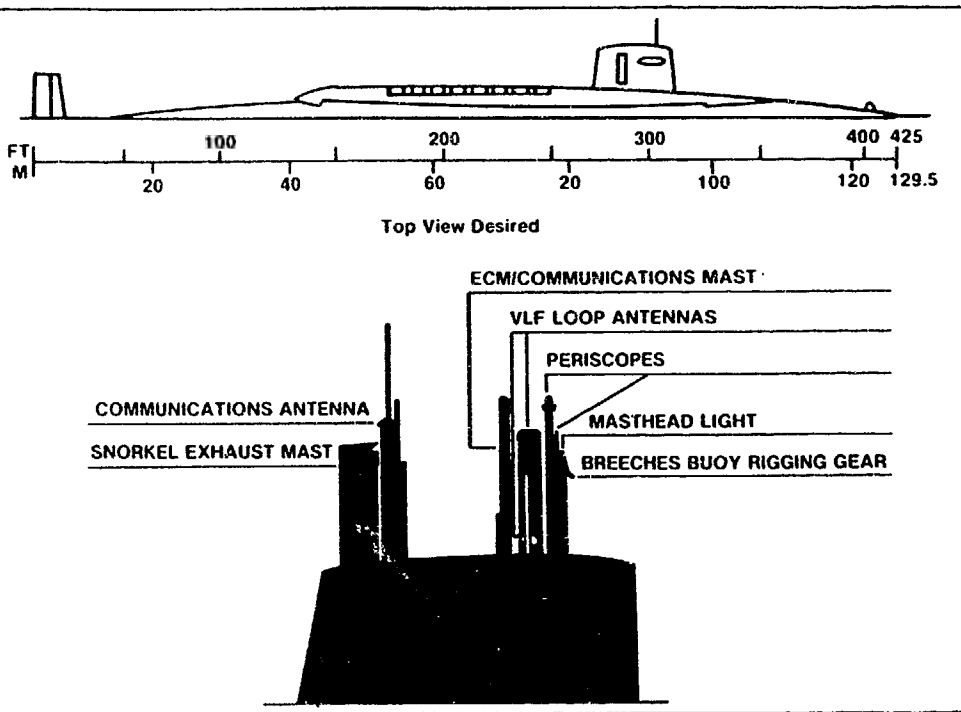
None.

US LAFAYETTE SSBN



LAFAYETTE SSBN

LAFAYETTE SSBN US



MAJOR RECOGNITION FEATURES:

With the exception of one unit (DANIEL WEBSTER SSBN 626), all ETHAN ALLEN, LAFAYETTE, JAMES MADISON, and BENJAMIN FRANKLIN units look alike; DANIEL WEBSTER differs by having diving planes on the bow instead of the sail. All others of the above classes have a rectangular sail situated well forward of the hull midpoint with sail planes near the leading edge and situated high on the sail. The classes also have a gently sloping prow, a break in the after deckline, and a prominent stern fin. They can be differentiated from the GEORGE WASHINGTON Class by examining the freeboard just forward and aft of the sail; GEORGE WASHINGTON has a much higher missile tube compartment, which produces a big difference in the length of trailing edge as compared to the leading edge. LAFAYETTE differs from UK SSBNs with regard to the sail planes; UK SSBNs have diving planes on the hull. The French LE REDOUTABLE is also quite similar.

CHARACTERISTICS:

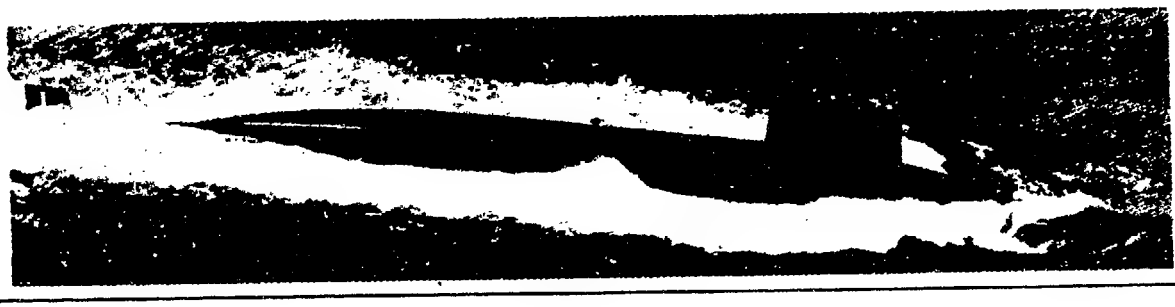
Displacement, tons: 7,250 surfaced; 8,250 submerged
Dimensions, feet (meters): 425 x 33 x 31.5 (129.5 x 10.1 x 9.6)
Torpedo tubes: 16 tubes for POSEIDON C-3, TRIDENT C-4 SLBMs
Missiles: 4 x 21 in (53.3 cm) (bow)
Propulsion: Nuclear; 1 reactor; 2 geared turbines; 1 shaft
Speed, knots: 20 surfaced; approximately 30 submerged
Pennant numbers: 616, 617, 619, 620, 622 thru 636, 640 thru 645, 654 thru 659

REMARKS:

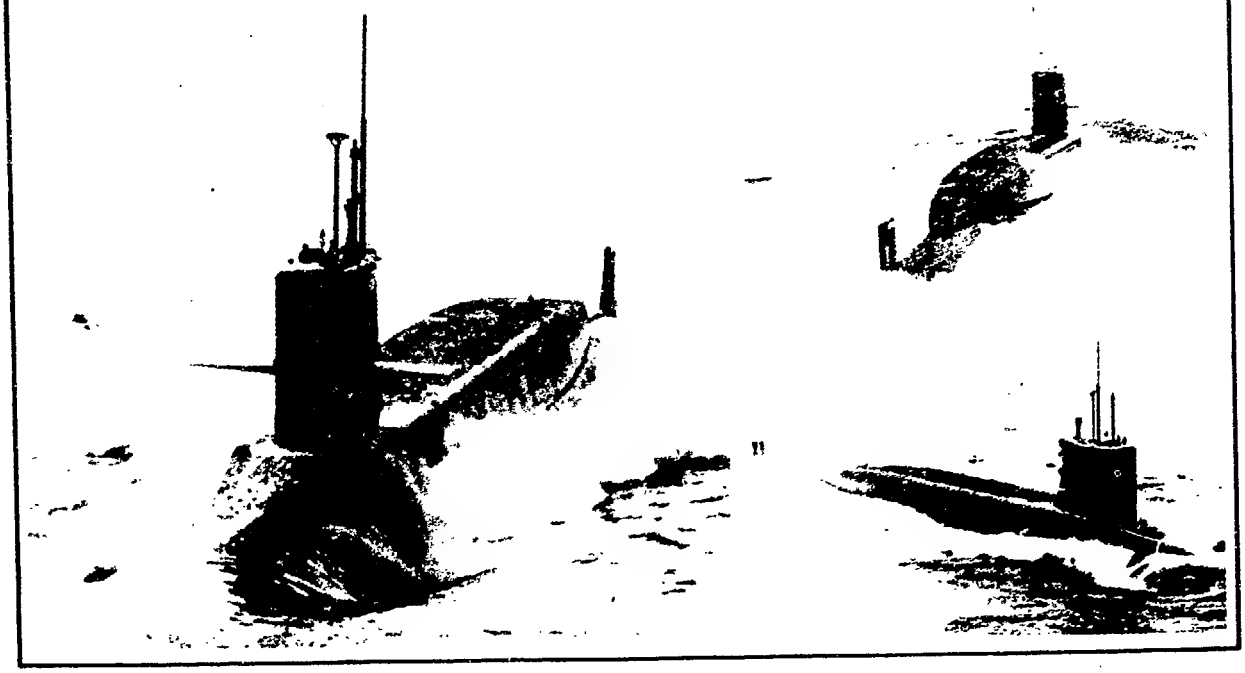
Thirty-one LAFAYETTE Class SSBNs were built between 1961 and 1967. Although uniform in appearance, different missile systems are carried by these units as newer systems are outfitted during overhauls.

FR

LE REDOUTABLE SSBN

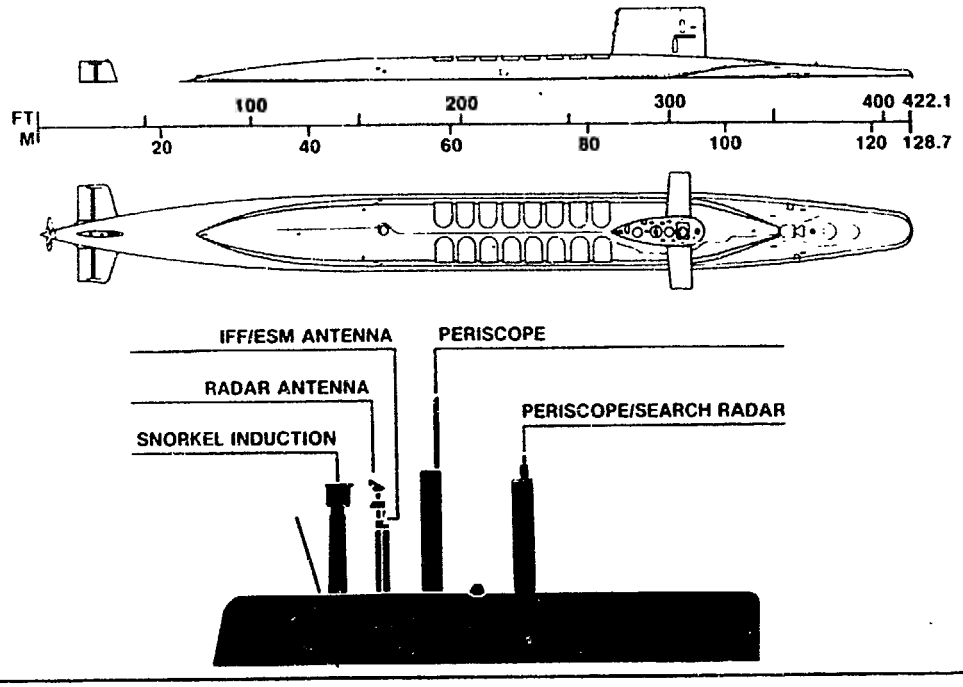


Additional Views Desired



LE REDOUTABLE SSBN

LE REDOUTABLE SSBN FR



MAJOR RECOGNITION FEATURES:

LE REDOUTABLE has a rectangular sail situated well forward of amidships, a prominent stern fin, a slight break in the after deckline, and a bow deckline that slopes gently into the waterline. The sail has a vertical leading edge and a slightly raked trailing edge. Sail planes are located about midway in sail height, very near the leading edge. The rudders are unusual in that there is a considerable gap between the fixed and moveable portions. LE REDOUTABLE is very similar in appearance to the USS GEORGE WASHINGTON Class. Differences that can be noted in configuration between LE REDOUTABLE and GEORGE WASHINGTON relate to the top line and the trailing edge. The top line of REDOUTABLE is level, whereas the GEORGE WASHINGTON top line evidences a slight convex curve. The trailing edge of REDOUTABLE has minor protuberances; the main one is a snorkel exhaust pipe that "lips" over the upper corner.

CHARACTERISTICS:

Displacement, tons: 8,045 surfaced; 8,940 submerged
Dimensions, feet (meters): 422.1 x 34.8 x 32.8 (128.7 x 10.6 x 10)
Torpedo tubes: 4 x 21 in (53.3 cm)
Missiles: 16 tubes for MSBS M-20 (amidships)
Propulsion: Nuclear; 1 reactor; 2 steam turbines; 2 turbo-alternators; 1 electric motor; 1 shaft; auxiliary-twin diesels
Speed, knots: 20+ surfaced; 25 submerged

REMARKS:

LE REDOUTABLE, operational 1971, was the first French nuclear-powered ballistic missile submarine. A total of five units have been constructed with a sixth in progress.

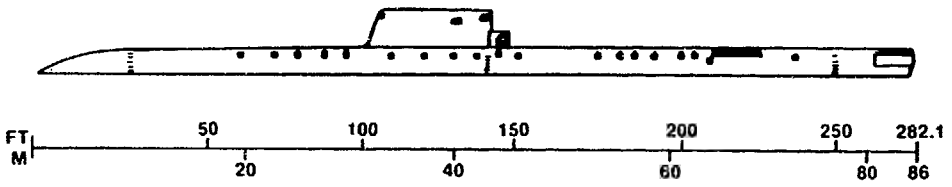
UR LIMA SSA

Beam View Desired

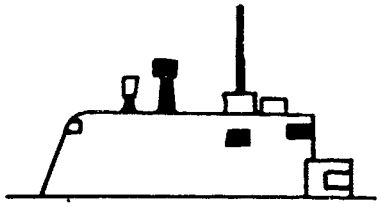
All Views Desired

LIMA SSA

UR



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail is slightly aft of amidships. The trailing edge is raked to the deck whereas the leading edge is vertical with a forward step-down. The bow is bluntly squared. The weatherdeck slopes gradually towards the stern and more steeply to the waterline. The profile is clean with no protuberances.

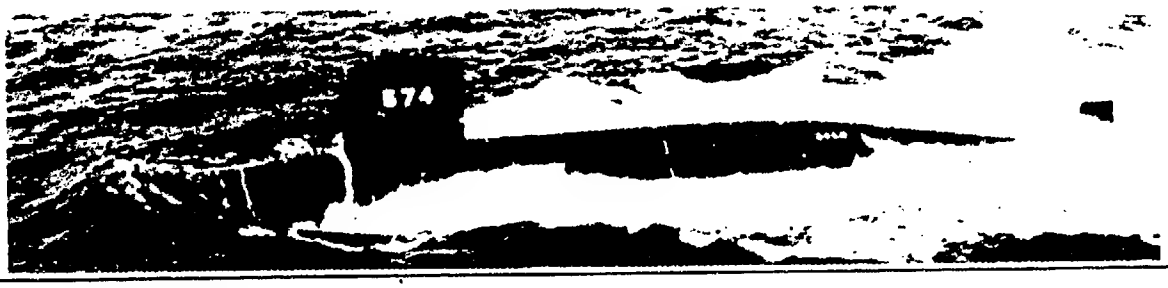
CHARACTERISTICS:

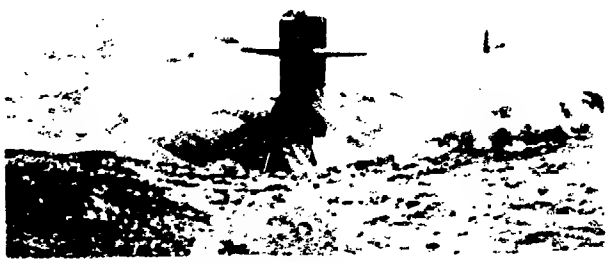
Displacement, tons: 2,450 surfaced; unknown submerged
Dimensions, feet (meters): 282.1 x 26.6 x 19.7 (86 x 8.1 x 6) (approximate)
Propulsion: Probable diesel-electric
Speed, knots: Unknown

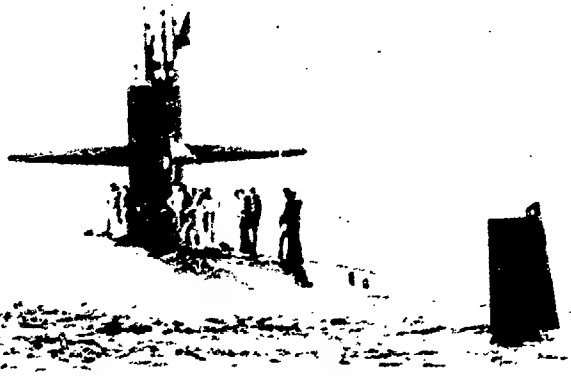
REMARKS:

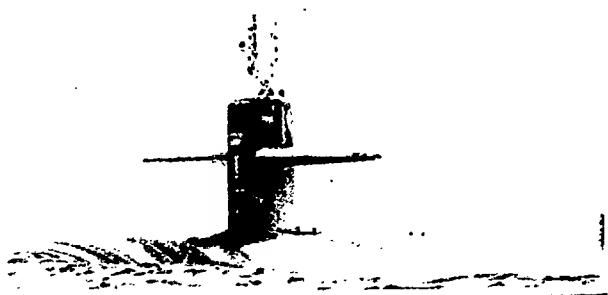
The one-of-a-kind LIMA Class submarine is probably used to conduct hydro-acoustic trials.

US LOS ANGELES SSN

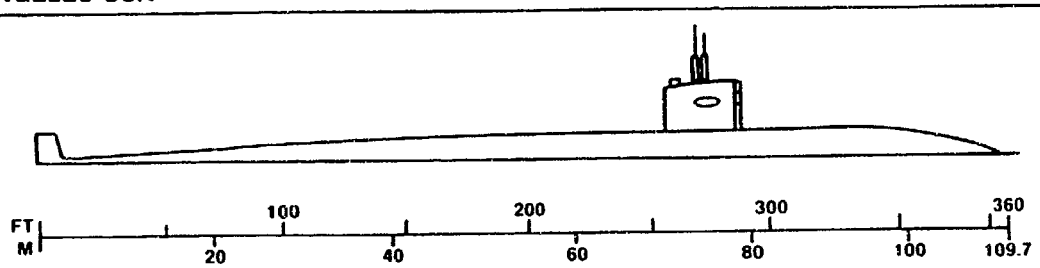




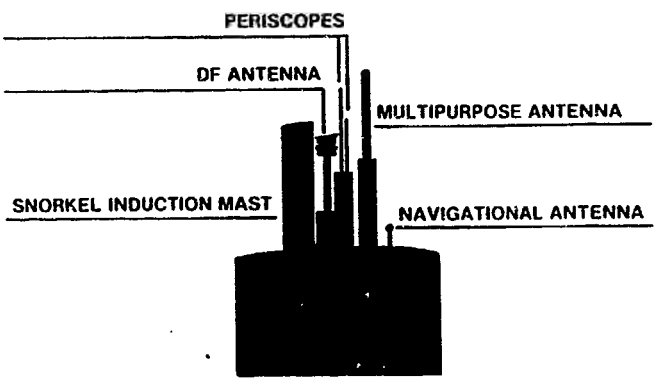




LOS ANGELES SSN — US



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the LOS ANGELES is well forward of amidships. Both leading and trailing edges are vertical. The top line is curved slightly giving it a convex appearance. Sail planes are mounted just aft of the leading edge and on the upper-third part of the sail. The weatherdeck at both the bow and the stern slope gradually to the waterline. A stern fin stands out well above deck height.

CHARACTERISTICS:

Displacement, tons: 6,000 standard; 6,900 submerged
Dimensions, feet (meters): 360 x 33 x 32.3 (109.7 x 10.1 x 9.9)
Torpedo tubes: 4 x 21 in (53.3 cm) (amidships)
Missiles: Tube launched HARPOON; TOMAHAWK to be fitted
Propulsion: Nuclear; 1 reactor; 2 geared turbines; 1 shaft
Speed, knots: Unknown surface; 30+ submerged

REMARKS:

The LOS ANGELES Class submarine entered service in 1976. To date a total of 21 have been constructed with another 12 units on order. These units are a follow-on to the experimental GLENARD P. LIPSCOMB and are much larger than previous SSNs.

CH

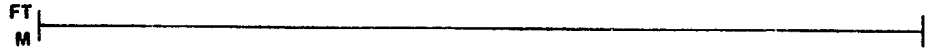
MING SS

Silhouette Unavailable

Beam View Desired

All Views Desired

MING SS **CH**



All Views Desired

MAJOR RECOGNITION FEATURES:

Recognition features not available.

CHARACTERISTICS:

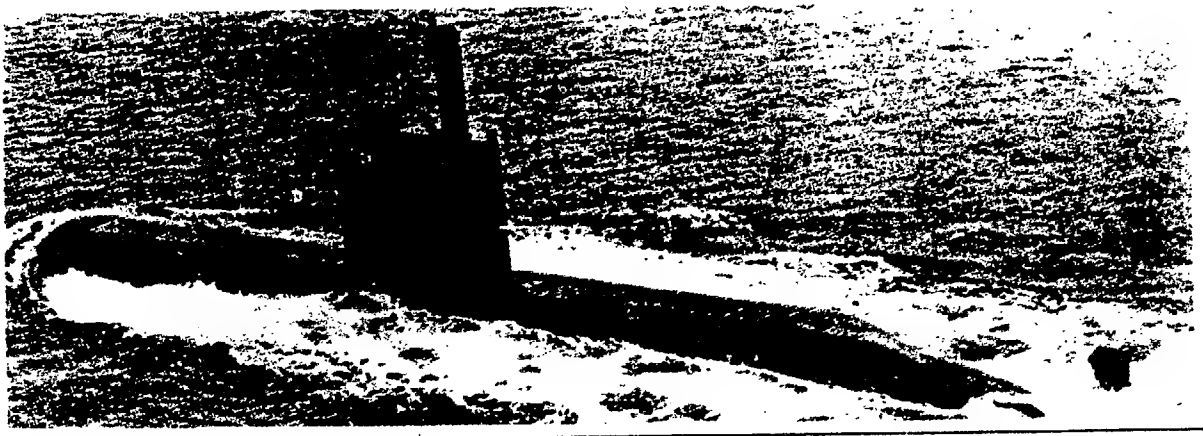
Displacement, tons: Probably 1,500 surfaced; 1,900 submerged
Dimensions, feet (meters): Probably length of 250 (76.2)
Torpedo tubes: Probably 6 x 21 in (53.3 cm)
Propulsion: Probably diesel-electric
Speed, knots: Unknown

REMARKS:

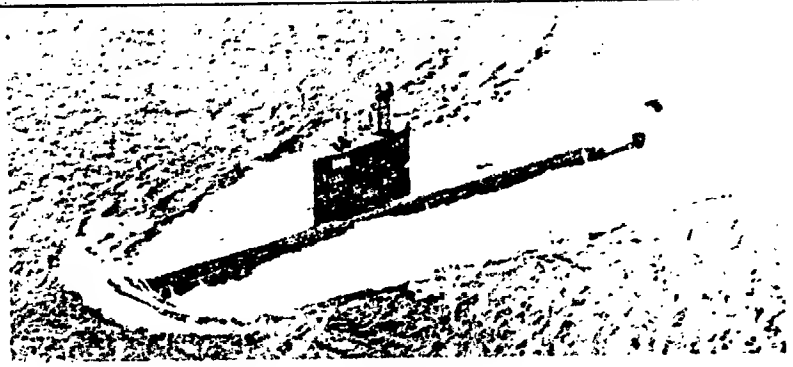
Two MING Class submarines have reportedly been constructed. It is believed that these units are an improved version of the ROMEO Class submarine.

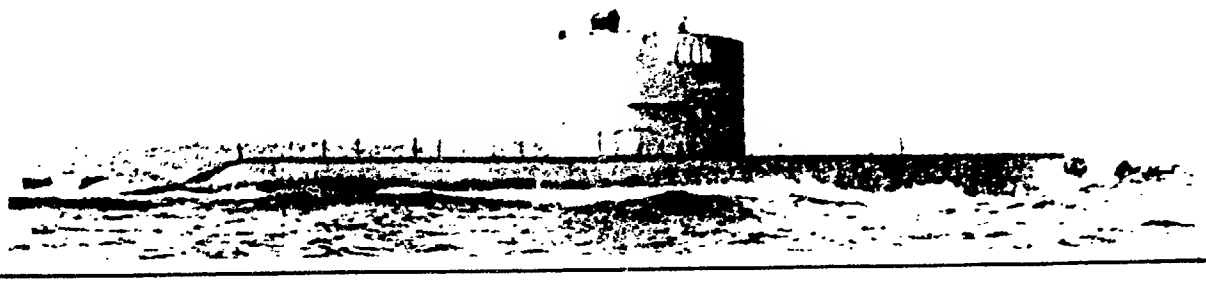
SW

NACKEN SS

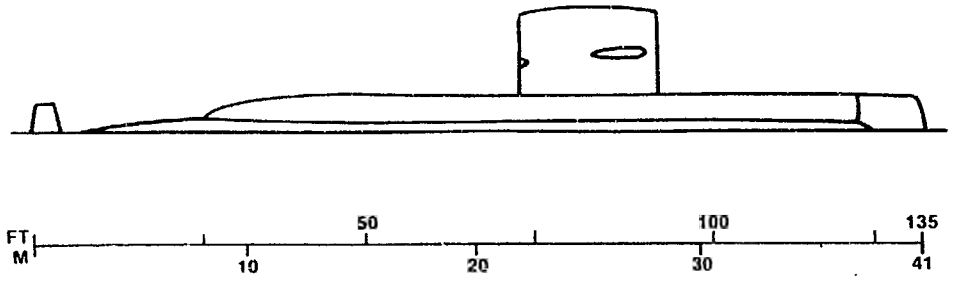


Additional Views Desired

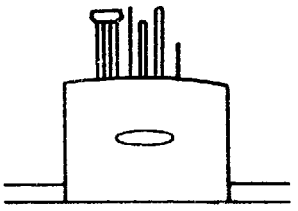




NACKEN SS **SW**



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the NACKEN is amidships. The leading and trailing edges are vertical, and the topline is slightly rounded giving it a convex appearance. Sail planes are located in the middle of the sail. The bow is rounded. The weatherdeck is level and steps-down just forward of the stern. NACKEN has two stern fins which are at 45 degree angles to the stern.

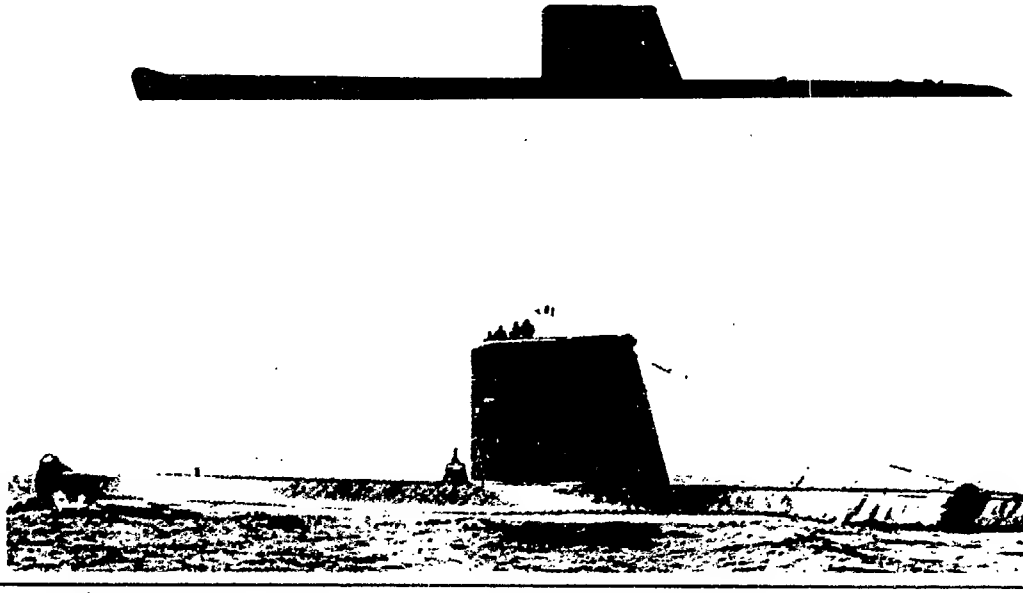
CHARACTERISTICS:

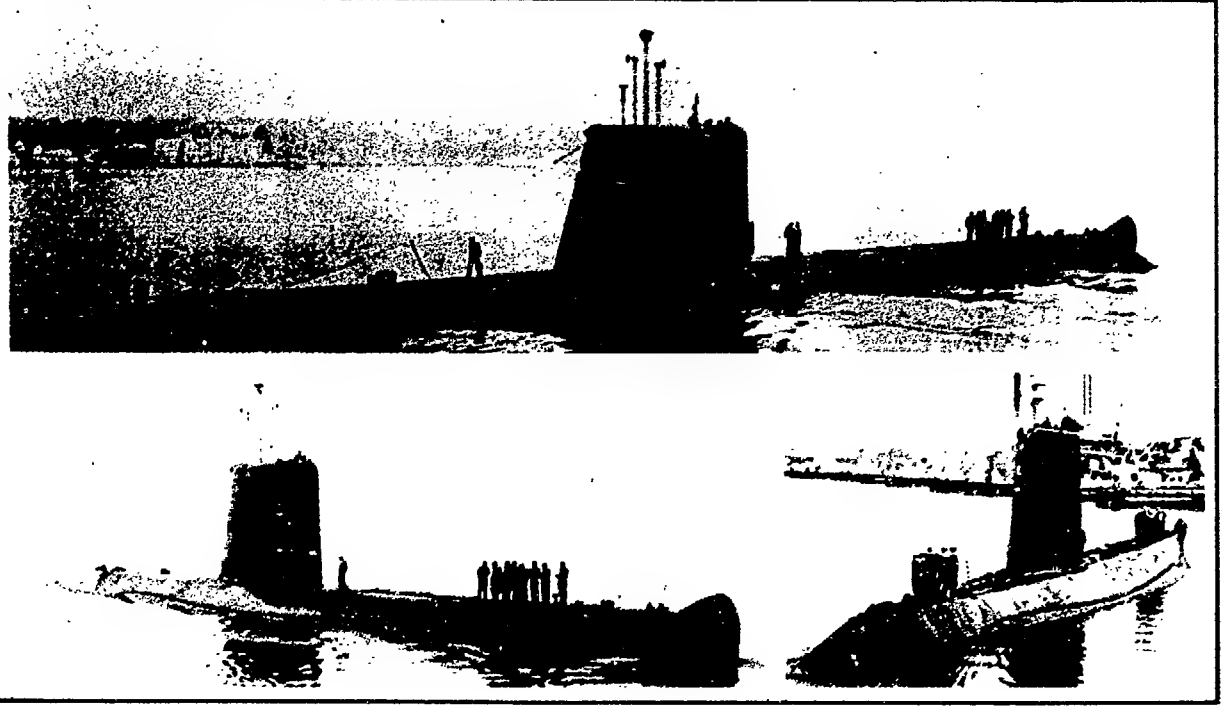
Displacement, tons: 980 surfaced; 1,125 submerged
Dimensions, feet (meters): 135 x 20 x 13.4 (41 x 6.1 x 4.1)
Torpedo tubes: 6 x 21 in (53.3 cm); 2 x 16 in (40 cm); minelaying capability
Propulsion: Diesel-electric; diesels; electric motors; 1 shaft with large 5 bladed propeller
Speed, knots: 20 surfaced; 20 submerged
Pennant numbers: Nak, Naj, Nep

REMARKS:

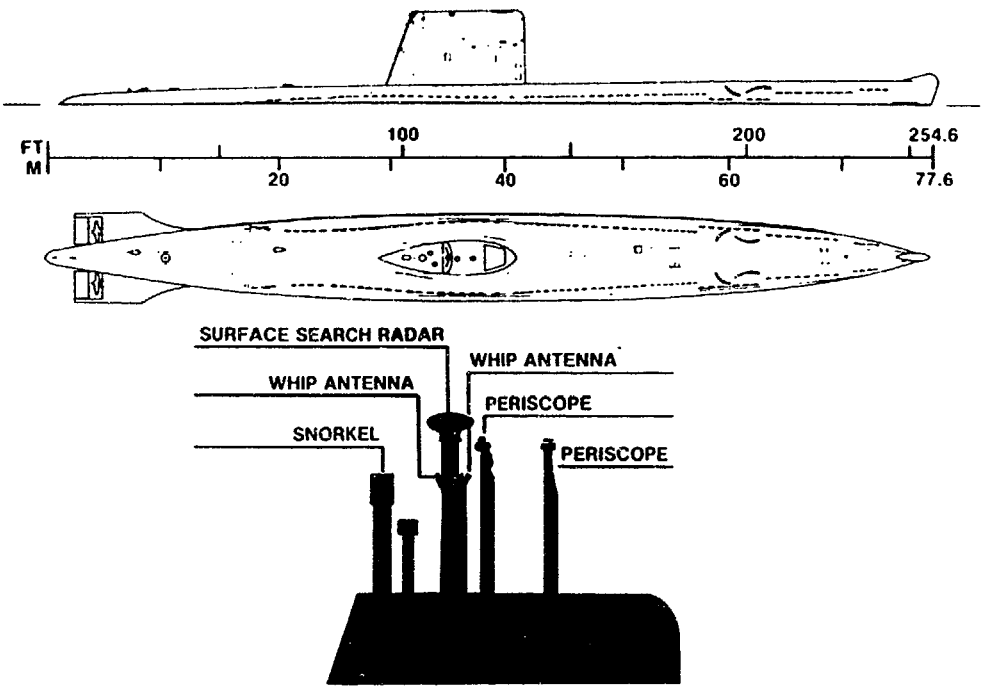
The NACKEN Class, commissioned in 1979, consists of three units. All are in service with the Royal Swedish Navy. The NACKEN is a follow-on to the SJOORMEN Class.

FR NARVAL SS





NARVAL SS FR



MAJOR RECOGNITION FEATURES:

The sail on the NARVAL Class is aft of amidships. The leading edge is vertical, and the trailing edge is raked. A snorkel exhaust lips just over the trailing edge at the top. The NARVAL has a faired-in bulbous bow. The deckline slopes gradually to the stern and then rounds into the waterline. There are two crescent shaped slits on both sides of the submarine located midway between the bow and the sail. NARVAL is very similar in appearance to its successors, ARETHUSE and DAPHNE.

CHARACTERISTICS:

Displacement, tons: 1,635 surfaced; 1,910 submerged
Dimensions, feet (meters): 254.6 x 25.6 x 17.7 (77.6 x 7.8 x 5.4)
Torpedo tubes: 6 x 21.7 in (55 cm) (bow); minelaying capability
Propulsion: Diesel-electric; 3 diesels; 2 electric motors; 2 shafts
Speed, knots: 15 surfaced; 18 submerged
Pennant numbers: S631 thru S634, S637, S638

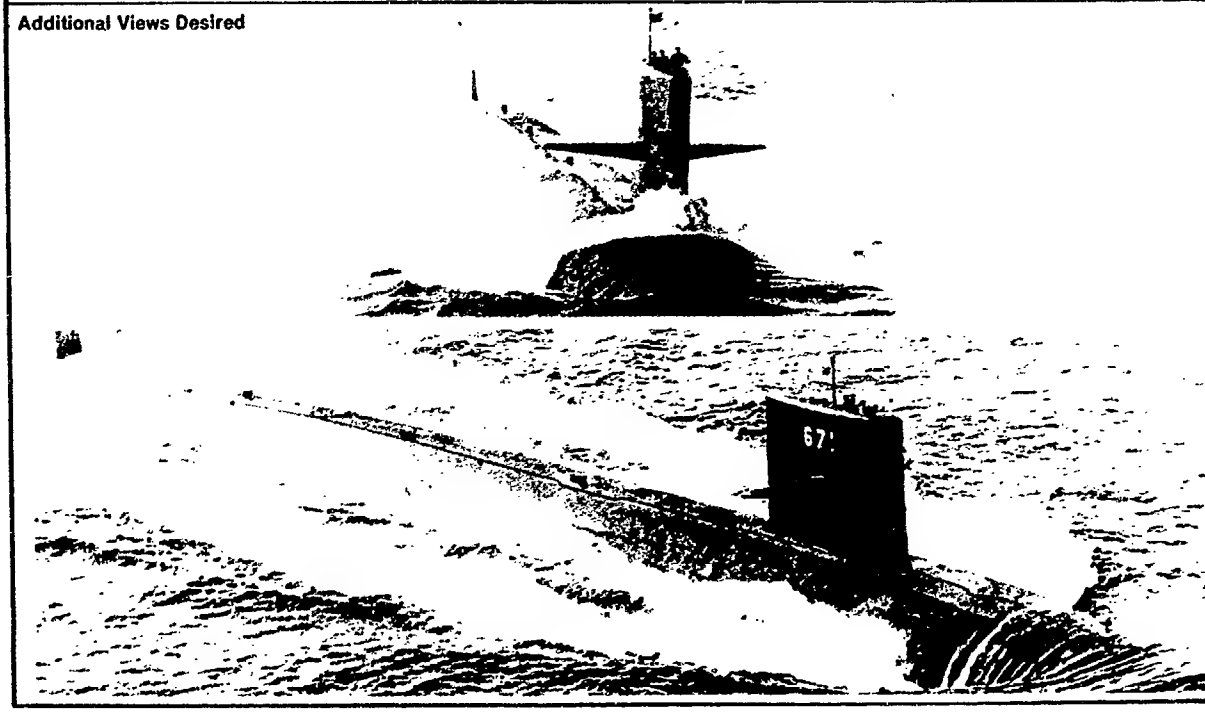
REMARKS:

The NARVAL Class, with the first unit commissioned 1957, had six units produced. During a five-year reconstruction program (1965-70), all six units had a full-sail modification, new weapons, and improved detection equipment installed.

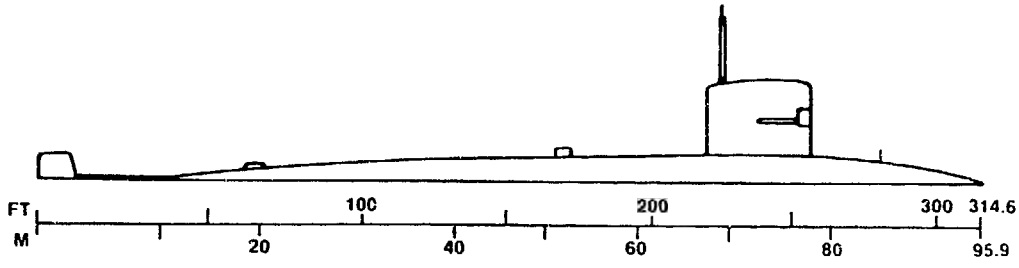
US NARWHAL SSN

Beam View Desired

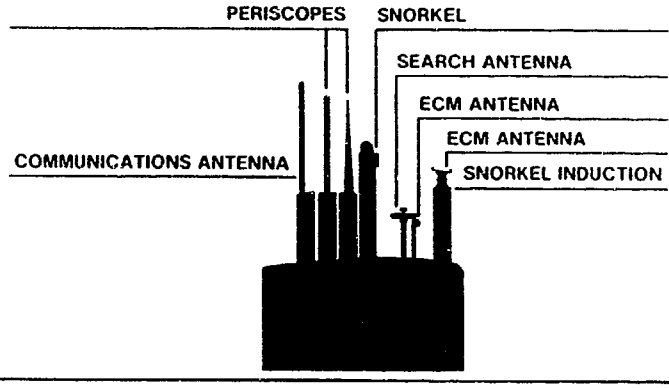
Additional Views Desired



NARWHAL SSN — US



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the NARWHAL Class is well forward of amidships. The leading and trailing edges are vertical while the topline is slightly curved giving it a convex appearance. Sail planes are located in the middle of the sail and just aft of the leading edge. The bow and stern slope gradually to the waterline. A rectangular stern fin approximately as high as the after weatherdeck is prominent. Some small protuberances on the weatherdeck are noticable: one forward of the stern, one aft of the sail, and one aft of the bow. The NARWHAL is identical to the STURGEON Class except that the NARWHAL is approximately 22 feet longer.

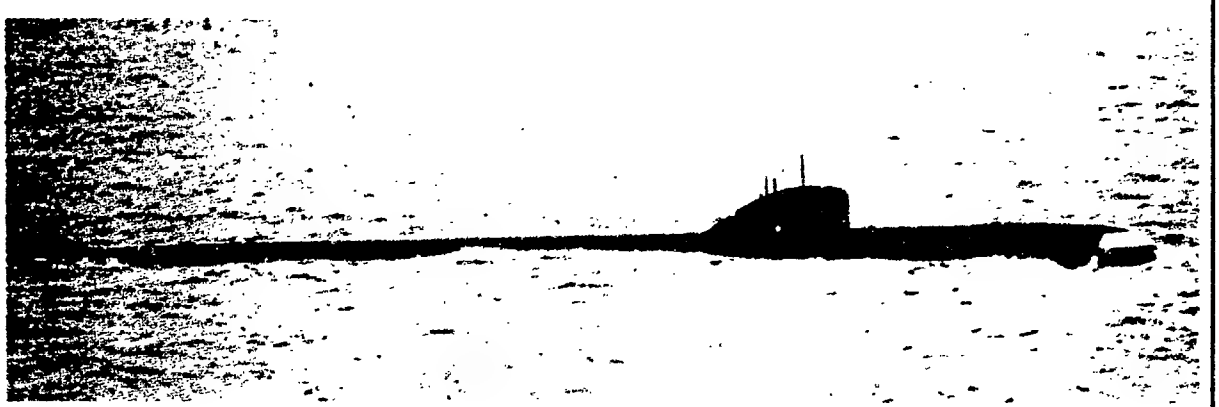
CHARACTERISTICS:

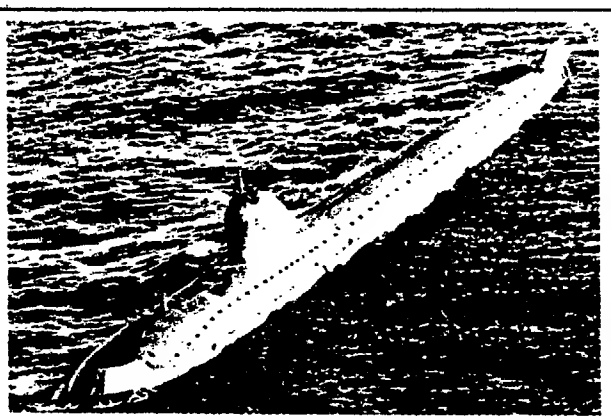
Displacement, tons: Unknown surfaced; 5,350 submerged
Dimensions, feet (meters): 314.6 x 37.7 x 27 (95.9 x 11.5 x 8.2)
Torpedo tubes: 4 x 21 in (53.3 cm) (amidships)
Missiles: To be fitted for HARPOON
Propulsion: Nuclear; 1 reactor; 2 steam turbines; 1 shaft
Speed, knots: 20+ surfaced; 30+ submerged
Pennant number: 671

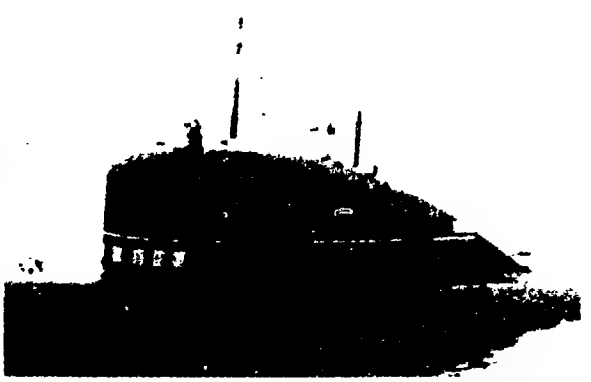
REMARKS:

The one-of-a-kind NARWHAL was commissioned in 1969. It is fitted with the prototype sea-going natural circulation reactor plant which increases reactor reliability, simplicity and noise reduction.

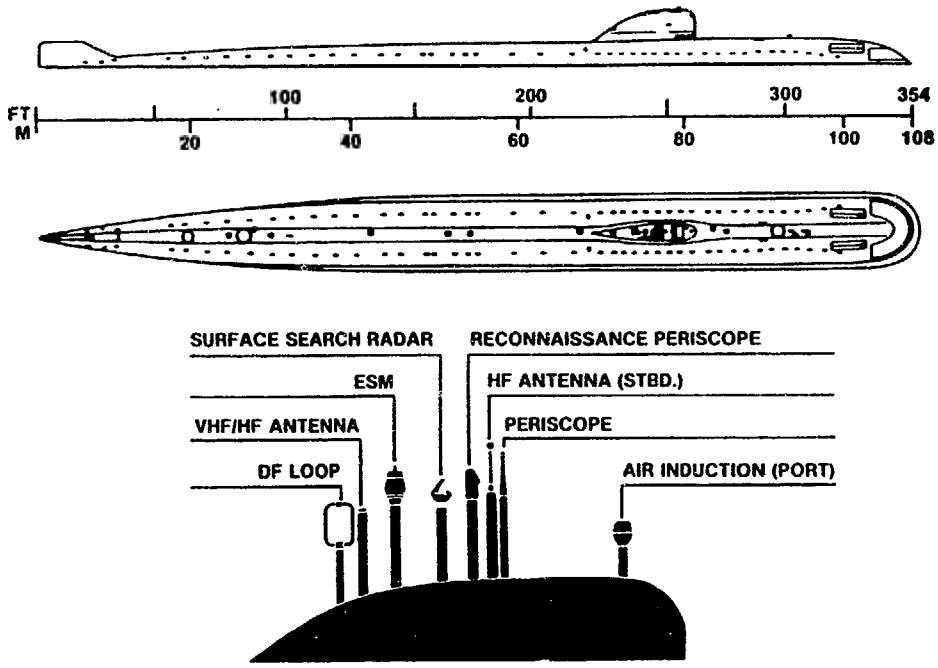
UR NOVEMBER SSN







NOVEMBER SSN UR



MAJOR RECOGNITION FEATURES:

NOVEMBER Class SSN exhibits a long, low profile with a streamlined sail located near the forward third of the hull. The sail appears much smaller in relation to the hull length than CHARLIE or VICTOR counterparts. Other distinctive features include the vertical leading edge of the sail, a low stern fin, an abruptly sloping bow, and a level, uncluttered deckline. While noting that the streamlined sail bears a strong resemblance to newer classes, it should be observed that the suit of retractable masts is different.

CHARACTERISTICS:

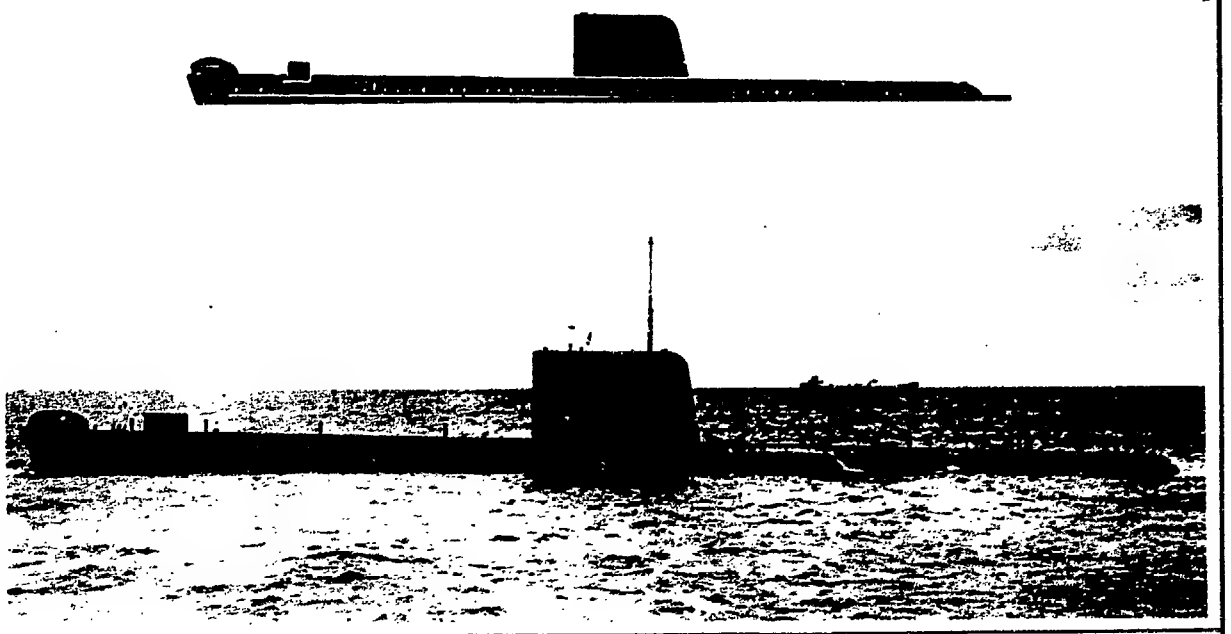
Displacement, tons: 4,200 surfaced; 5,000 submerged
Dimensions (wl), feet (meters): 354 x 29.5 (108 x 9)
Torpedo tubes: 8 x 21 in (53.3 cm) (bow); 2 x 16 in (40.6 cm) (stern)
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 30 submerged

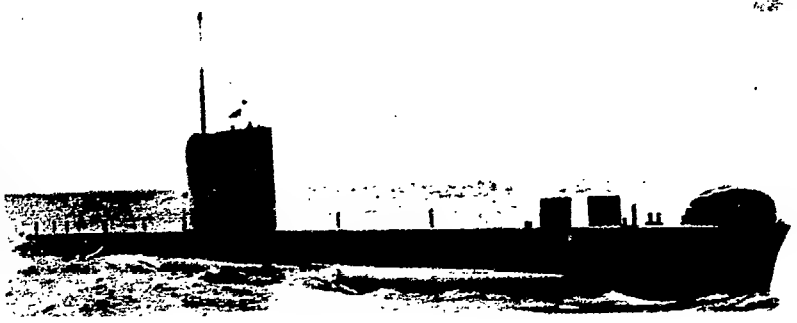
REMARKS:

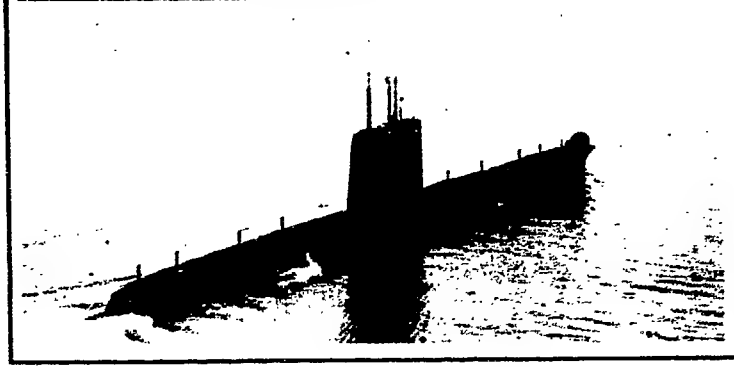
The NOVEMBER Class, the first Soviet nuclear-powered submarine, became operational in 1959. Fourteen units had been constructed by 1965.

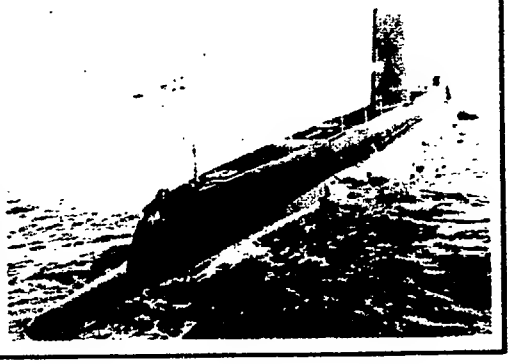
AS, BR, CA, CI, UK

OBERON SS

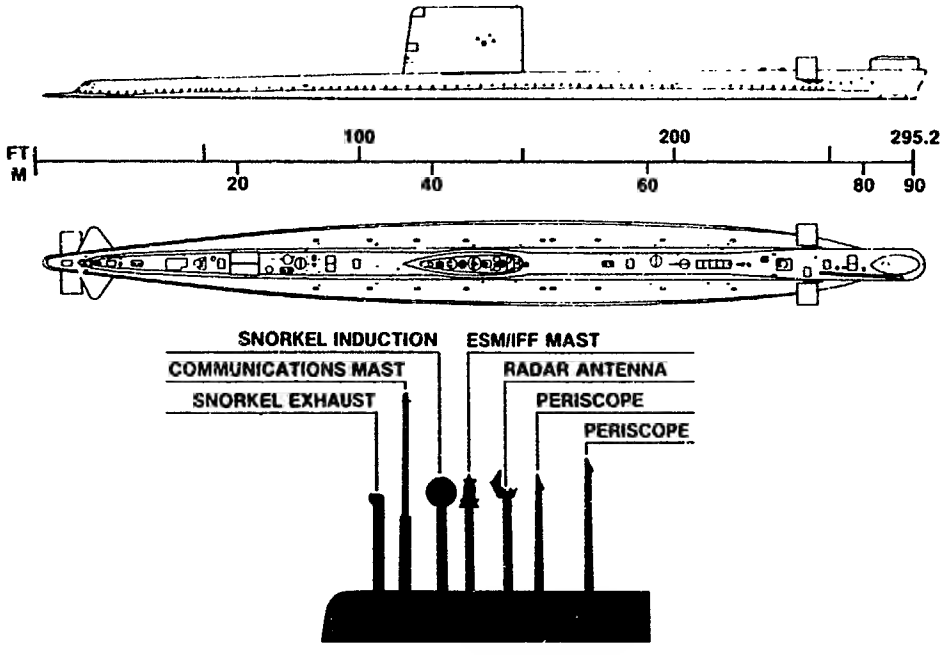








OBERON SS **AS, BR, CA, CI, UK**



MAJOR RECOGNITION FEATURES:

OBERON Class submarines have a rectangular sail centered slightly aft of amidships. The leading edge of the sail is vertical, the topline is level, and the trailing edge is slightly raked. The after upper corner formed by the junction of the topline and trailing edge is somewhat rounded. The bow is raked and surmounted by a massive sonar dome. Folding planes are near the bow, and when stowed, project above the level weatherdeck. Near the stern, the weatherdeck terminates, and the hull line drops sharply.

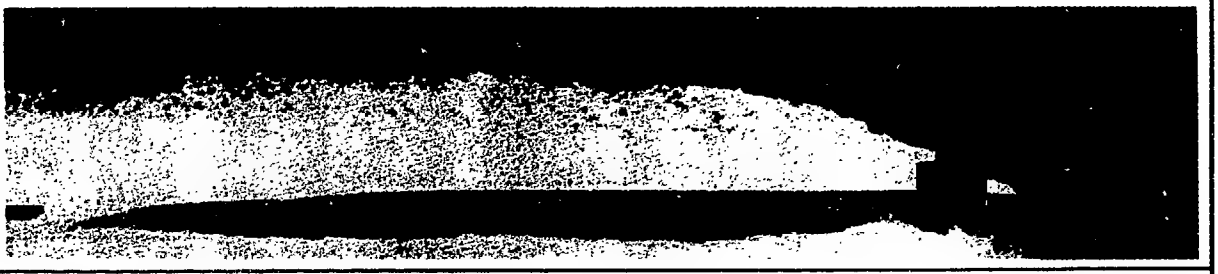
CHARACTERISTICS:

Displacement, tons: 2,030 surfaced; 2,410 submerged
Dimensions, feet (meters): 295.2 x 26.5 x 18 (90 x 8.1 x 5.5)
Torpedo tubes: 8 x 21 in (53.3 cm) (6 bow, 2 stern)
Guns: May carry a 20 mm gun
Propulsion: Diesel-electric; 2 diesels; 2 electric motors; 2 shafts
Speed, knots: 12 surfaced; 17 submerged
Pennant numbers: AS 57, 59 thru 62, 70; BR S20 thru S22; CA SS72 thru SS74; CI 22, 23; UK S01, S07 thru S21

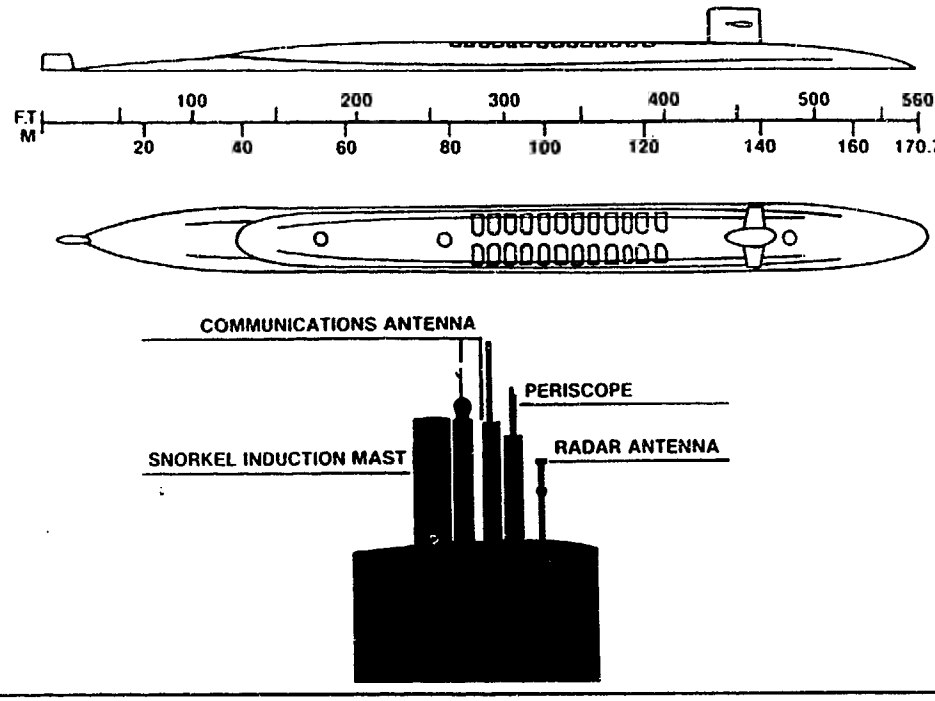
REMARKS:

The British built OBERON Class submarines have been in commission since 1961. They are excellent submarines with an unsurpassed record of safety and operational usage. This class is active in the following navies: Australia, Brazil, Canada, Chile, and the United Kingdom.

US OHIO SSBN



OHIO SSBN US



MAJOR RECOGNITION FEATURES:

The sail on the OHIO Class is situated about one-fourth of the length from the bow. The leading and trailing edges are vertical. The topline is slightly curved giving it a convex appearance. Sail planes are located in the middle of the sail. The bow slopes gradually into the waterline. The weatherdeck aft of the sail is level, with a slight step-down occurring approximately two-thirds of the way towards the stern fin. A high, rectangular stern fin is visible which extends above the weatherdeck to about one-half the height of the sail.

CHARACTERISTICS:

Displacement, tons: 16,600 surfaced; 18,700 submerged
Dimensions, feet (meters): 560 x 42 x 35.5 (170.7 x 12.8 x 10.8)
Torpedo tubes: 4 x 21 in (53.3 cm) (bow)
Missiles: 24 tubes for TRIDENT I SLBM
Propulsion: Nuclear; 1 reactor; geared turbines; 1 shaft
Speed, knots: Unknown

REMARKS:

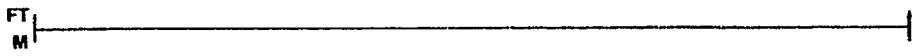
The OHIO Class submarine, first unit commissioned in 1981, is the largest U.S. submarine ever built. A total of 16 are projected.

UR	OSCAR SSGN

Beam View Desired

All Views Desired

OSCAR SSGN **UR**



All Views Desired

MAJOR RECOGNITION FEATURES:

Recognition features not available.

CHARACTERISTICS:

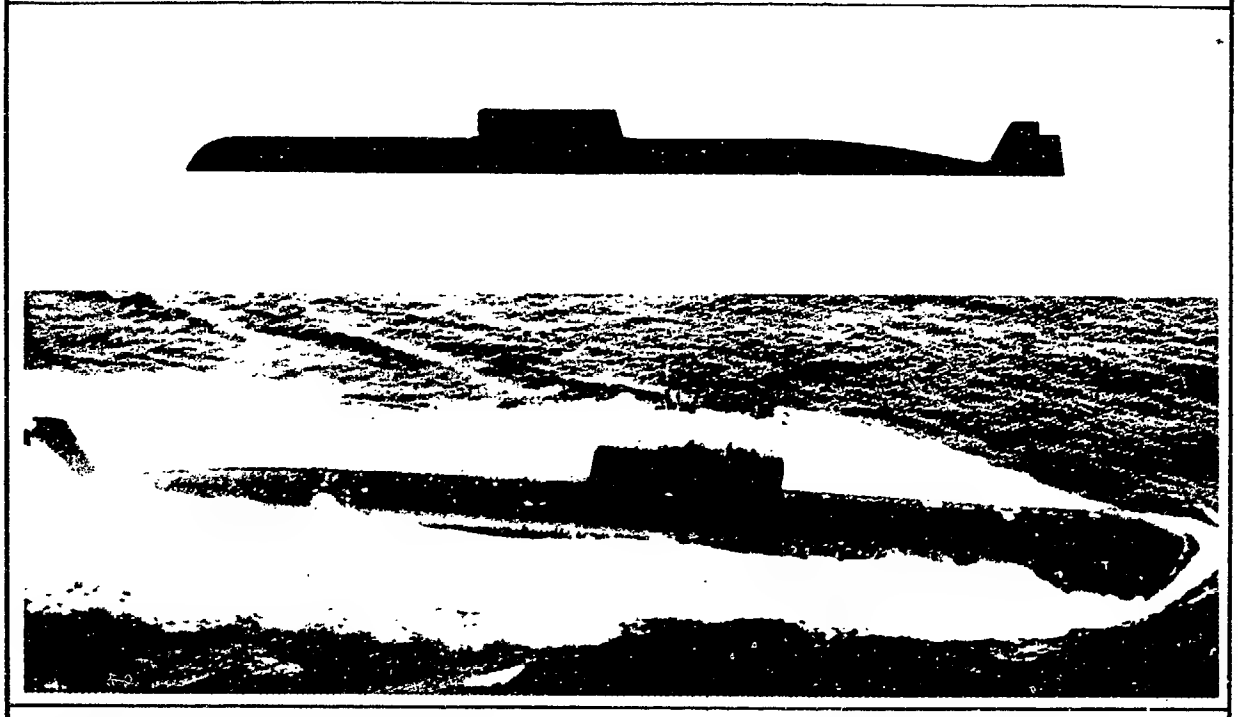
Displacement, tons:
Dimensions, feet (meters):
Torpedo Tubes:
Missiles: UNCLASSIFIED DATA NOT AVAILABLE
Propulsion:
Speed, knots:

REMARKS:

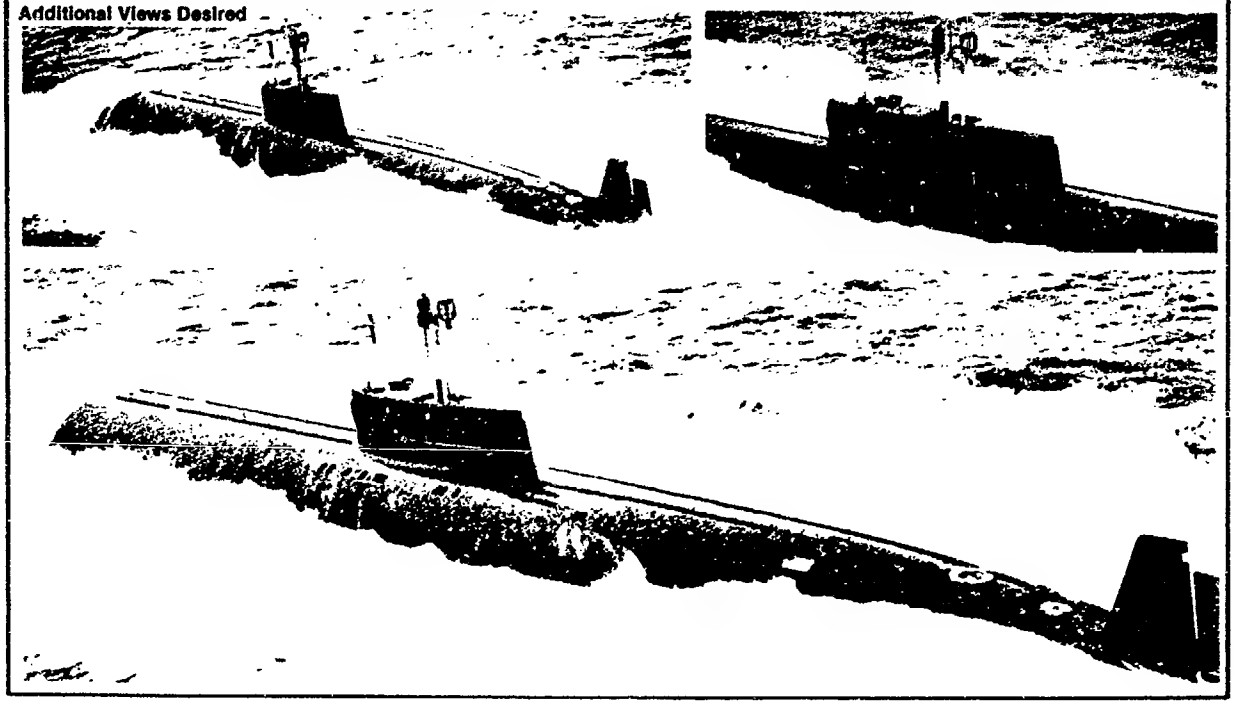
The OSCAR is the initial unit of a new lcass of large nuclear powered submarines capable of launching antiship cruise missiles while submerged. Substantially larger than earlier Soviet SSGNs, OSCAR is expected to carry 24 of a new type antiship cruise missile.

UR

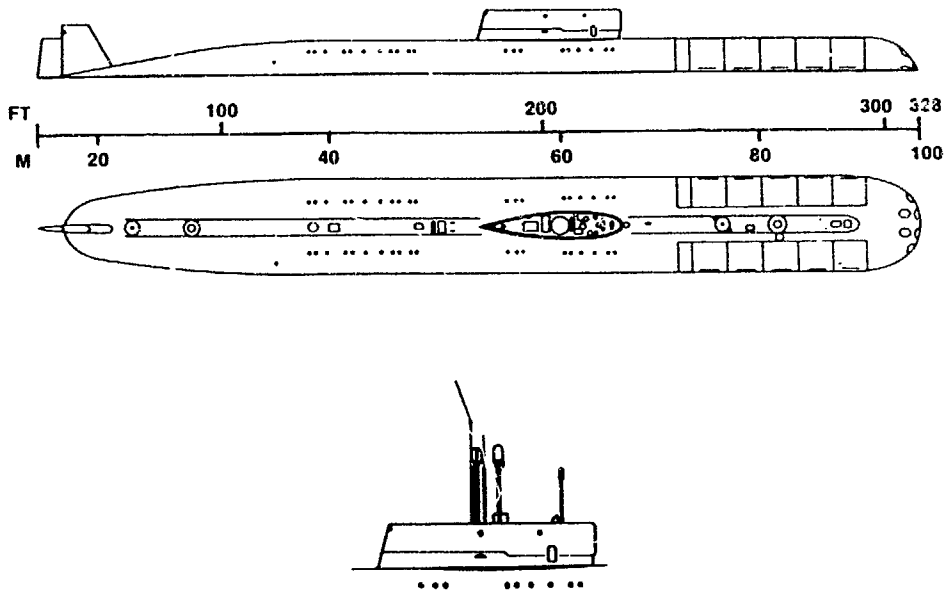
PAPA SSGN



Additional Views Desired



PAPA SSGN **UR**



MAJOR RECOGNITION FEATURES:

PAPA has a blunt, rounded bow, a low rectangular sail, and a high vertical stabilizer. The sail appearance is unusual in that the height is only about one-fourth the sail length, giving the sail an extremely flattened and elongated appearance. Another unusual feature is the large size of the vertical stabilizer. It is not only uncommonly high and wide at the base, but has a notched configuration. The after portion or rudder, is considerably shorter than the forward fixed half. This prominent step in the stern fin and the elongated, flattopped sail provide ready recognition features. The walking deck is accented by two, dark, parallel lines which are the life line tracks.

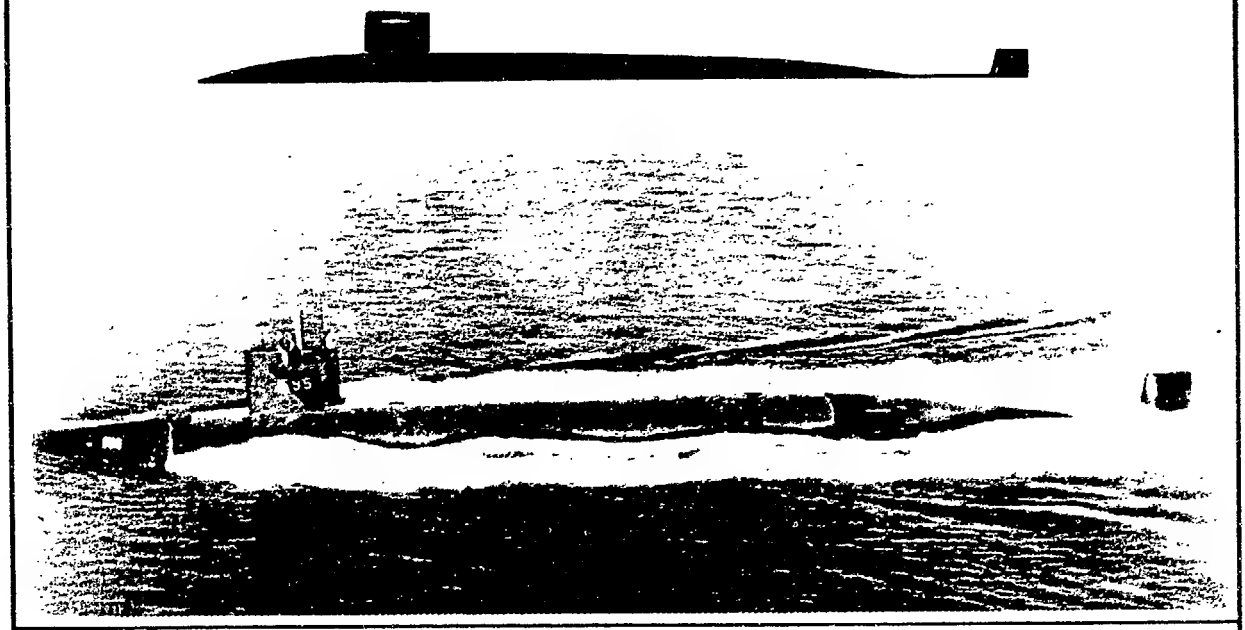
CHARACTERISTICS:

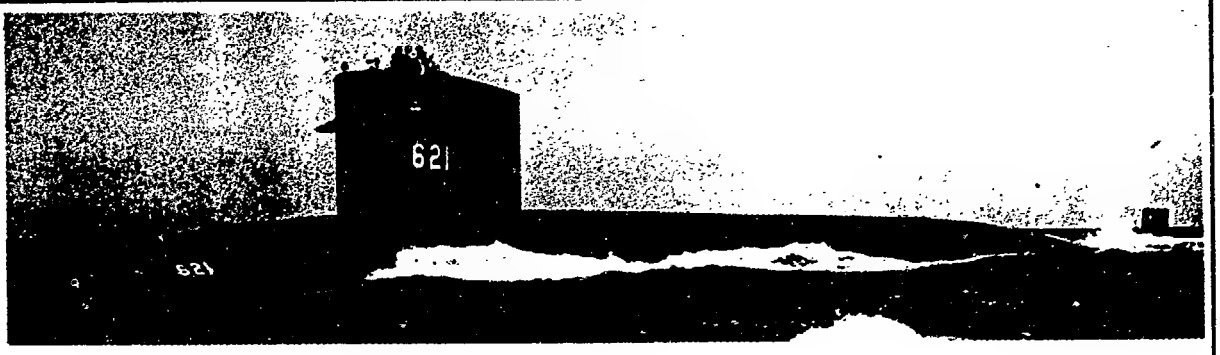
Displacement, tons: 5,500 surfaced; 6,500 submerged
Dimensions (wl), feet (meters): 328 x 39.4 (100 x 12)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Missiles: 10 tubes (probable SS-N-7/9)
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 30 submerged

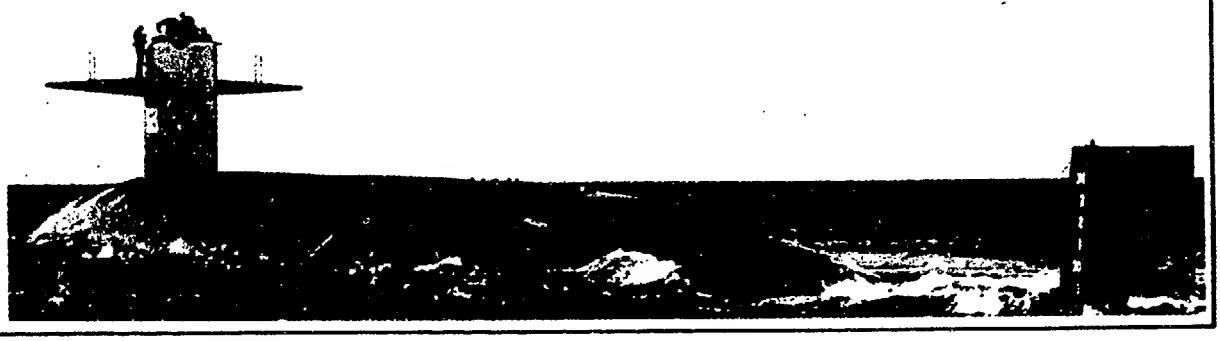
REMARKS:

The one-of-a-kind PAPA entered the Soviet Navy in the mid-1970s. Possibly used as a trial vehicle for the OSCAR Class.

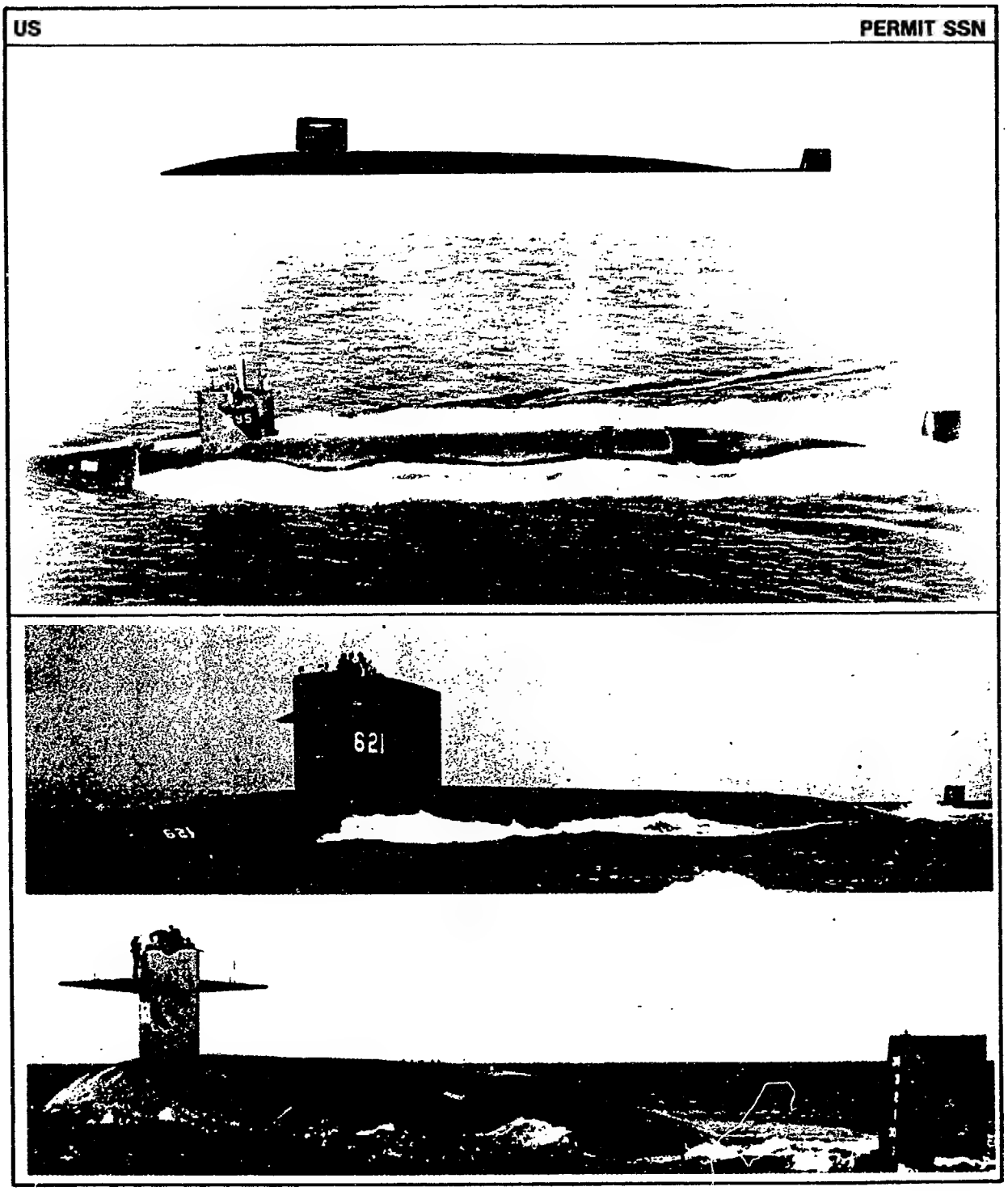
US PERMIT SSN



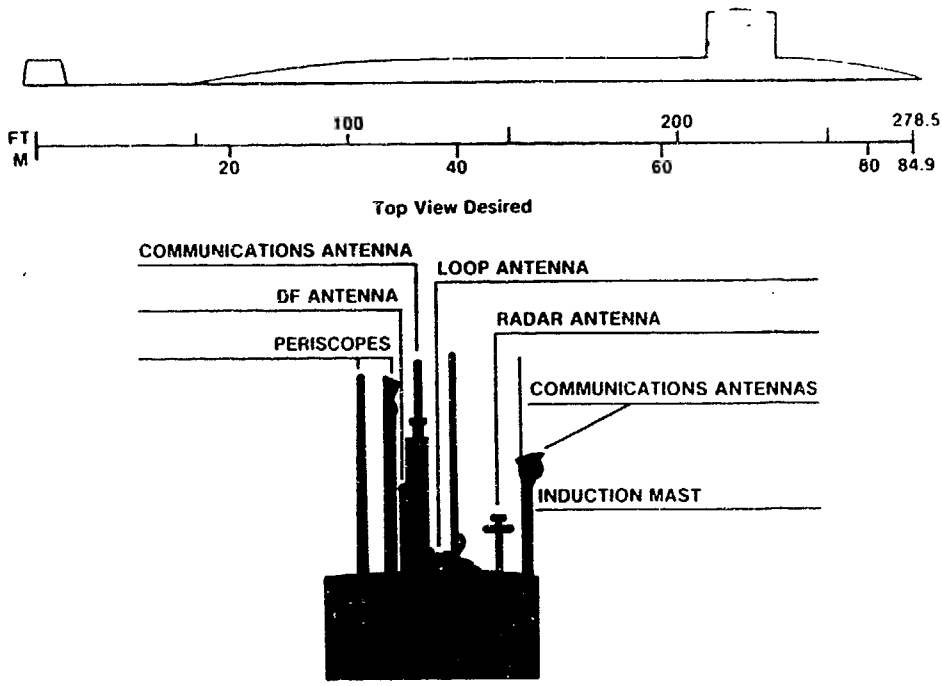




US PERMIT SSN



PERMIT SSN **US**



MAJOR RECOGNITION FEATURES:

PERMIT Class submarines have a rectangular sail situated well forward of amidships. The sail top'ine is level; trailing and leading edges are nearly perpendicular. The dimensions of the sail are such that it is almost square in profile. Sail planes are located above midpoint on the sail, a factor that can be used to differentiate the class from the STURGEON Class which otherwise is almost identical in appearance. A word of caution is needed here, however, because three later PERMIT units had the sail enlarged by approximately 7 feet in height during construction and the hull was lengthened to 292 feet. The hull is an elongated tear-drop shape, and is clean and unobstructed. Due to the lack of flat deck space, crewmen use the sail fins as deck area when the submarine is operating on the surface. The hull line curves into the water at the bow and just forward of the prominent stern fin.

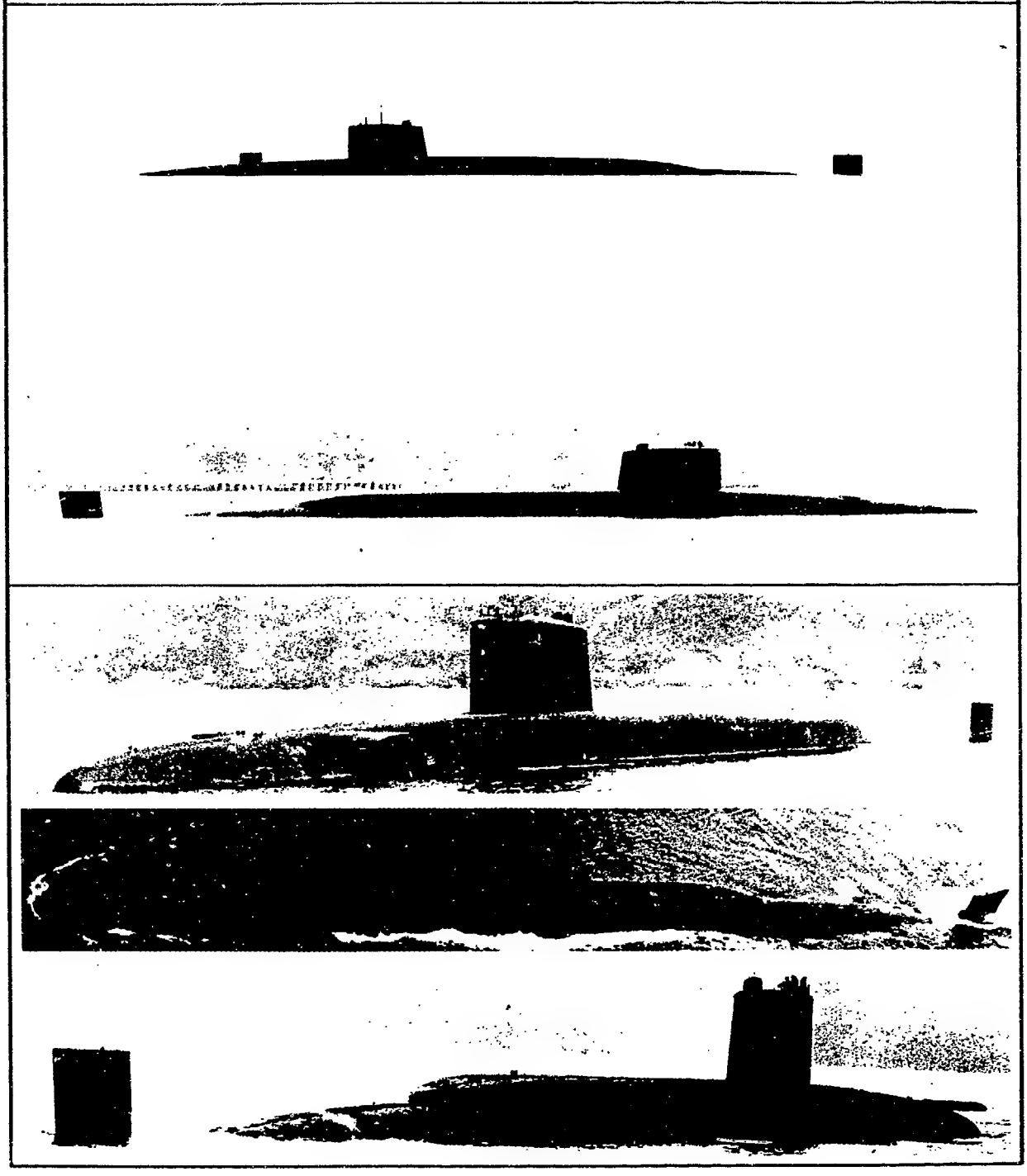
CHARACTERISTICS:

Displacement, tons: 3,750 surfaced; 4,300 submerged
Dimensions, feet (meters): 278.5 x 31.7 x 28.4 (84.9 x 9.6 x 8.7)
Torpedo tubes: 4 x 21 in (53.3 cm) (amidships); carry SUBROC
Missiles: Being fitted for HARPOON
Propulsion: Nuclear; 1 reactor; 2 steam turbines; 1 shaft
Speed, knots: 20+ surfaced; 30+ submerged
Pennant numbers: 594 thru 596, 603 thru 607, 612 thru 615, 621

REMARKS:

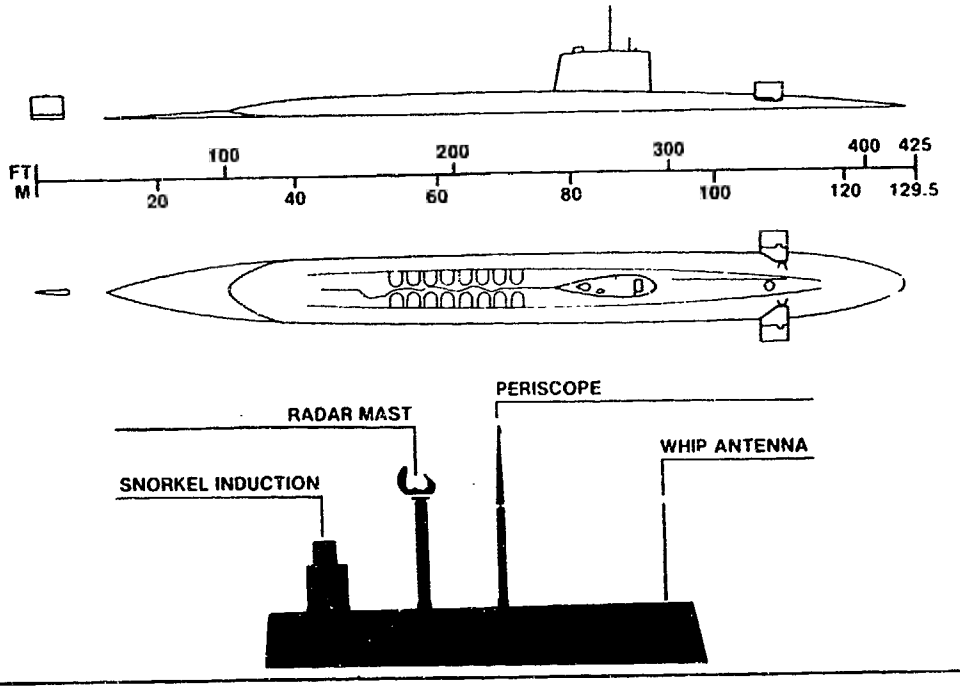
Fourteen units of the PERMIT Class were constructed. One unit, the USS THRESHER, went down in 1963. The last three units constructed in this class have a length of 292.2 feet and a surfaced and submerged displacement of 3,800 and 4,242 tons respectively.

UK RESOLUTION SSBN



RESOLUTION SSBN

RESOLUTION SSBN — UK



MAJOR RECOGNITION FEATURES:

RESOLUTION, with the exception of a single LAFAYETTE unit (DANIEL WEBSTER), is the only streamlined SSBN class without diving planes mounted on the sail; the diving planes are mounted midway between the sail and the bow near the upper extremity of the hull. These diving planes may also be seen folded in an upright position, projecting above the deckline. The sail is rectangular and located well forward of amidships. The sail topline is slightly convex, with a round protuberance near the trailing edge, the leading edge is vertical, and the trailing edge is raked. The deckline appears to rise gradually out of the water at the bow, and continues to rise aft of the sail until it slopes down abaft of the missile tube compartment. A prominent stern fin is as tall as the deckline.

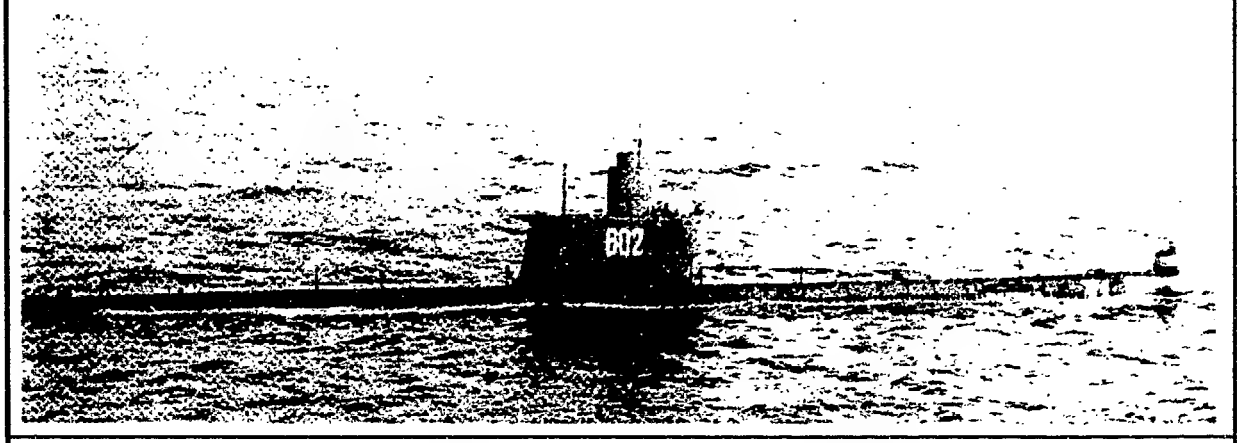
CHARACTERISTICS:

Displacement, tons: 7,500 surfaced; 8,400 submerged
Dimensions, feet (meters): 425 x 33 x 30 (129.5 x 10.1 x 9.1)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Missiles: 16 POLARIS A3 SLBMs
Propulsion: Nuclear; 1 reactor; geared turbines; 1 shaft
Speed, knots: 20 surfaced; 25 submerged
Pennant numbers: S22, S23, S26, S27

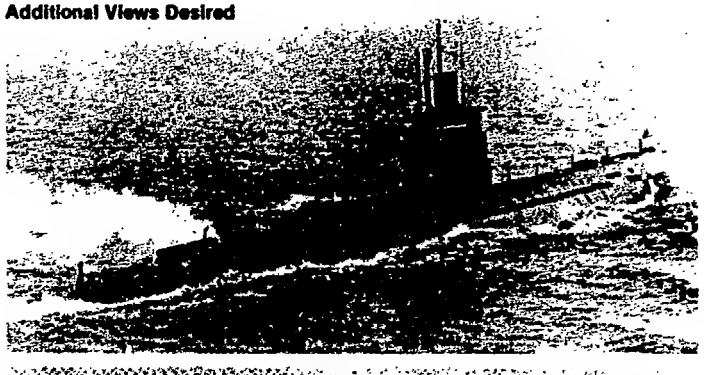
REMARKS:

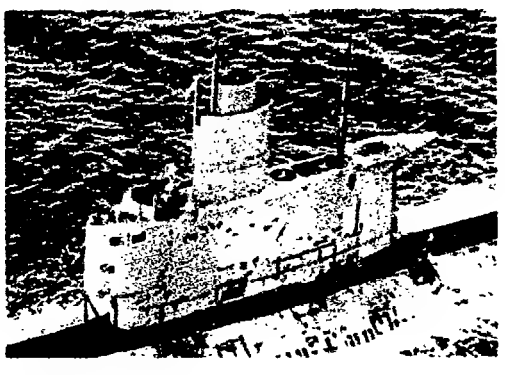
The RESOLUTION Class, first unit commissioned in 1967, consists of four units. All are in service with the British Royal Navy.

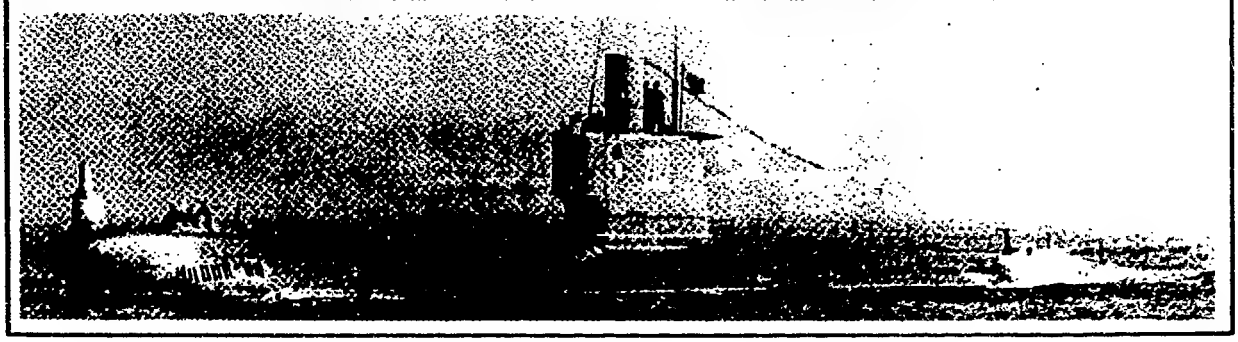
BU, CH, EG, KN, UR ROMEO SS



Additional Views Desired

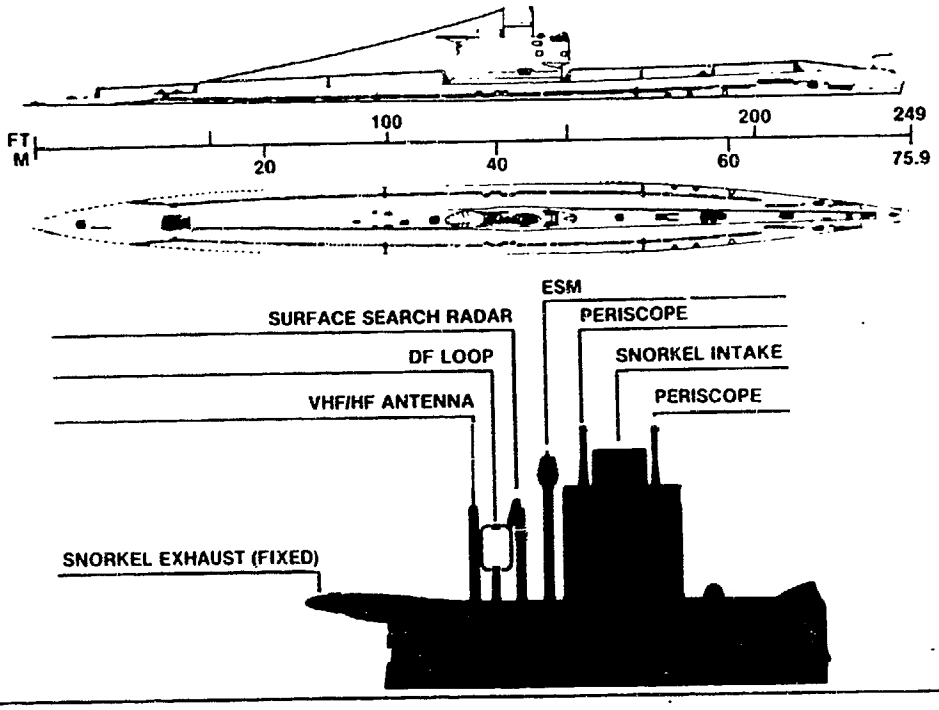






ROMEO SS

BU, CH, EG, KN, UR



MAJOR RECOGNITION FEATURES:

ROMEO Class submarines are readily identified by the sail configuration. It is the only class with a large cylindrical housing projecting upward from the sail top. This smokestack-configured housing includes the intake which cannot be retracted into the sail proper. ROMEO Class submarines also have a "beavertail" type fixed snorkel exhaust projecting horizontally beyond the sail trailing edge. Early units of the class all had an overhang to the sail leading edge, but recent photographs show some units have been modified to eliminate this overhang. Most Soviet ROMEO units have a large sonar dome on the bow, but some units transferred to other countries lacked this installation when transferred.

CHARACTERISTICS:

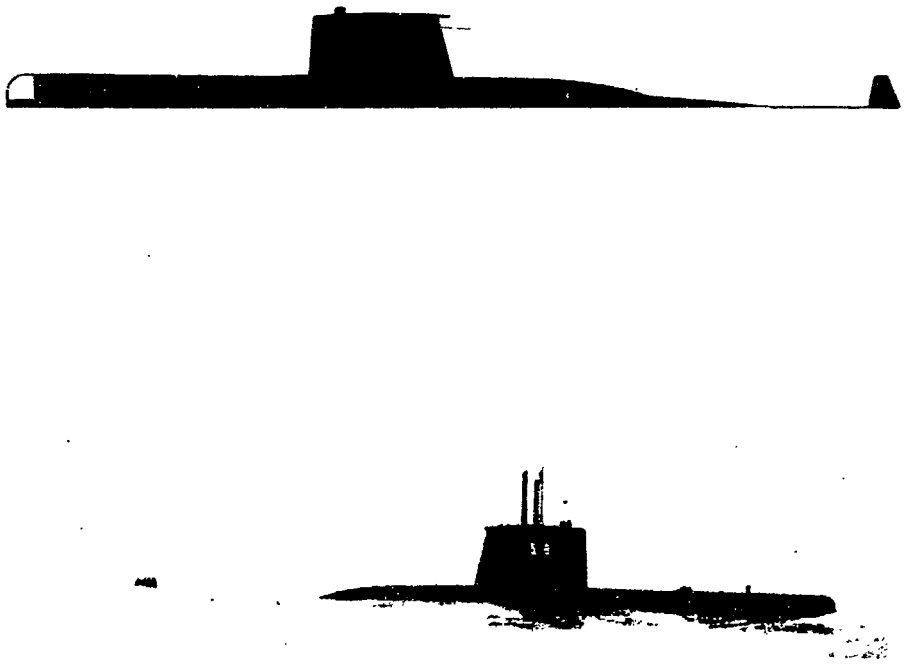
Displacement, tons: 1,400 surfaced; 1,800 submerged
Dimensions (wl), feet (meters): 249 x 21 (75.9 x 6.4)
Torpedo tubes: 8 x 21 in (53.3 cm) (6 bow, 2 stern)
Propulsion: Diesel-electric; 2 diesels; 2 electric motors; 2 shafts
Speed, knots: 17 surfaced; 14 submerged
Pennant numbers: CH 100 to 200 series; EG 711, 722, 733, 744, 755, 766

REMARKS:

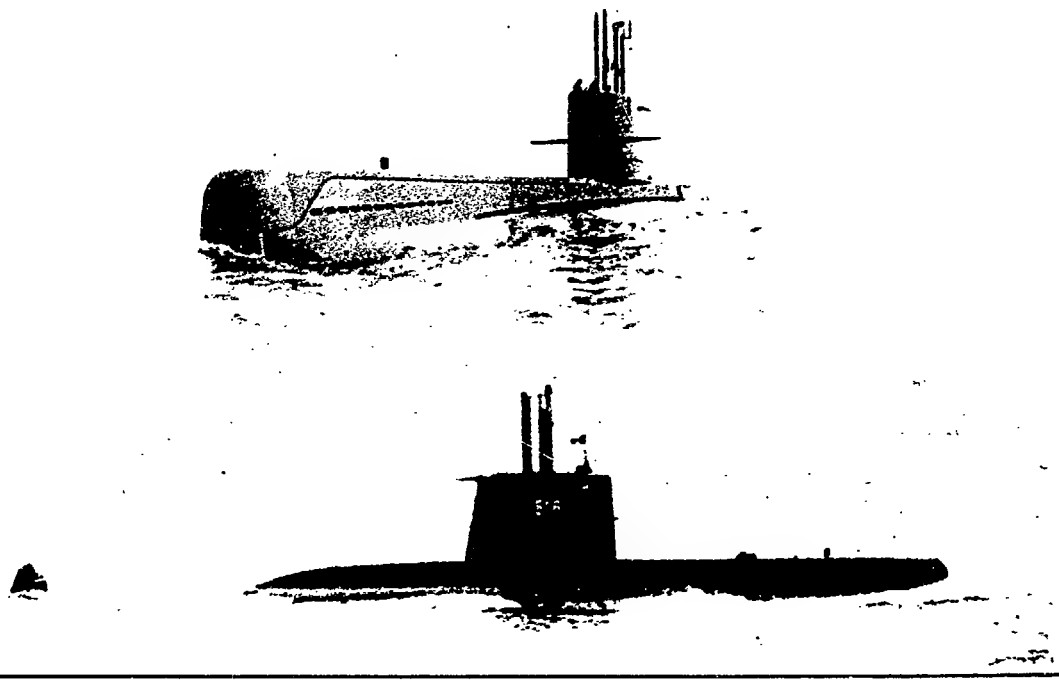
Approximately 110 ROMEO Class submarines have been constructed by the Soviet Union and China since 1958. The ROMEO is currently serving in five navies: Bulgaria, China, Egypt, North Korea, and the Soviet Union. Displacement, length, and speed vary among units.

IT

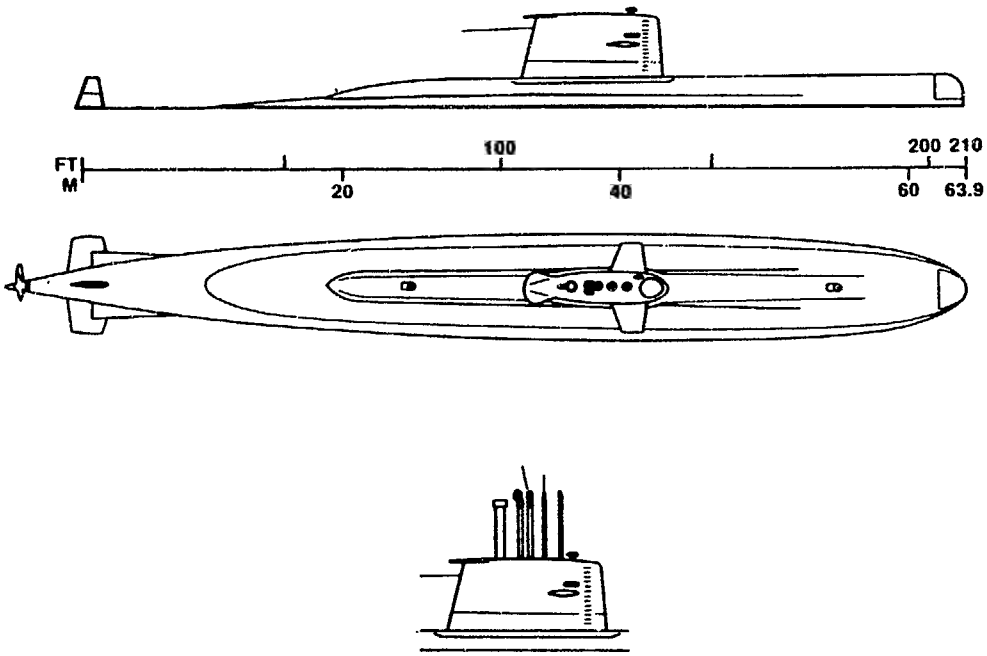
SAURO SS



Additional Views Desired



SAURO SS IT



MAJOR RECOGNITION FEATURES:

The sail on the SAURO Class is just forward of amidships. The leading and trailing edges are slightly raked. The topline is curved, giving it a convex appearance. A flat protuberance on the topline extends beyond the trailing edge, and another protuberance is located forward. Sail planes are located just aft of the leading edge. The bow is bluntly squared. The aft weatherdeck slopes down to the waterline. The stern fin is rectangular in shape and rises as high as the aft weatherdeck.

CHARACTERISTICS:

Displacement, tons: 1,456 surfaced; 1,631 submerged
Dimensions, feet (meters): 210 x 22.5 x 18.9 (63.9 x 6.8 x 5.7)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Propulsion: Diesel-electric; 3 diesels; 1 electric motor; 1 shaft
Speed, knots: 11 surfaced; 20 submerged
Pennant numbers: 518 thru 521

REMARKS:

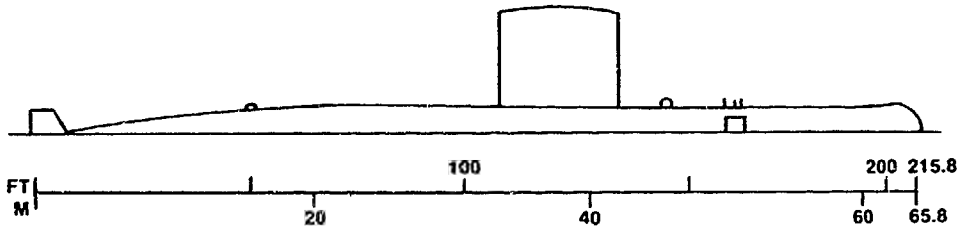
The SAURO Class, first unit commissioned in 1980, consists of four units. The SAURO is the newest Italian submarine, and an export variant is being offered for sale to other countries.

YO SAVA SS

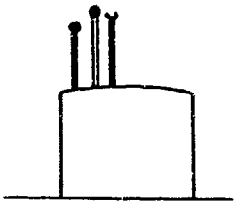
Beam View Desired

All Views Desired

SAVA SS **YO**



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the SAVA Class is forward of amidships. Leading and trailing edges are vertical. Bow planes are located midway between the sail and the rounded bow. The weatherdeck is level and gradually slopes near the stern to a rectangular stern fin.

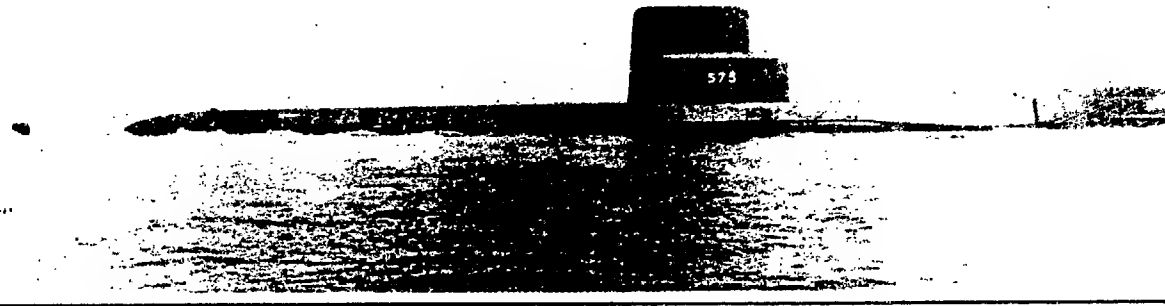
CHARACTERiSTICS:

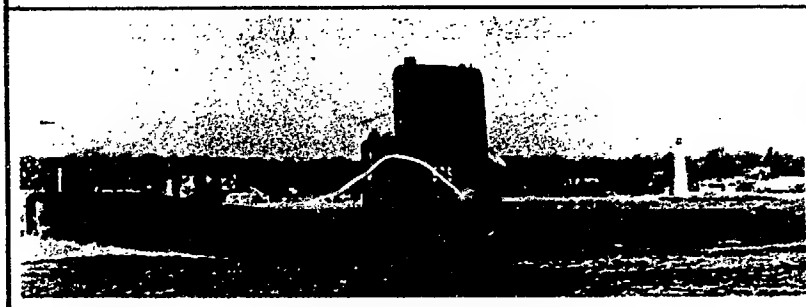
Displacement, tons: Unknown surfaced; 964 submerged
Dimensions, feet (meters): 215.8 x 22.9 x 18 (65.8 x 7 x 5.5)
Torpedo tubes: 6 x 21 in (53.3 cm)
Propulsion: Diesel-electric; 1 shaft
Speed, knots: Unknown surfaced; 16 submerged

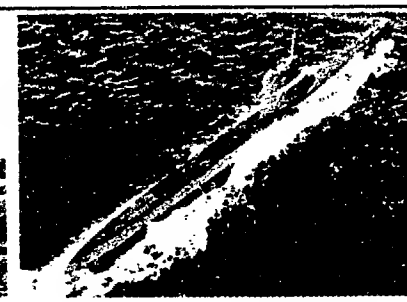
REMARKS:

The Yugoslavian built SAVA Class, first unit commissioned in 1978, consists of two units. A total of four units are planned.

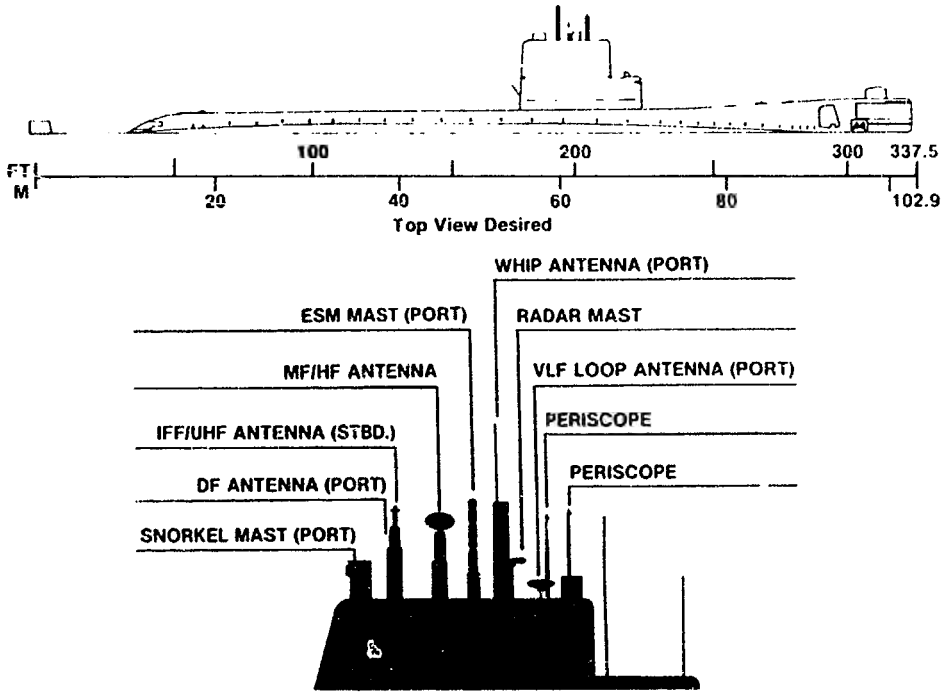
US SEAWOLF SSN







SEAWOLF SSN US



MAJOR RECOGNITION FEATURES:

SEAWOLF has a stepped sail with a single downward step occurring toward the bow. The uppermost tier extends over two-thirds of the sail length and over half the sail height. The entire sail is situated well forward of amidships. The hull lines are fairly distinctive. There is an obvious rise in the deckline near the bow and an abrupt drop in deckline just forward of the stern fin. A large cylindrical sonar dome is situated above the raised bow section. In profile, the stem of the bow is perpendicular to the waterline. Hinged bow planes are situated just aft of a wide sonar belt. A pronounced line along the hull sides is formed by hull planes meeting at a wide angle just below the alignment of limber holes.

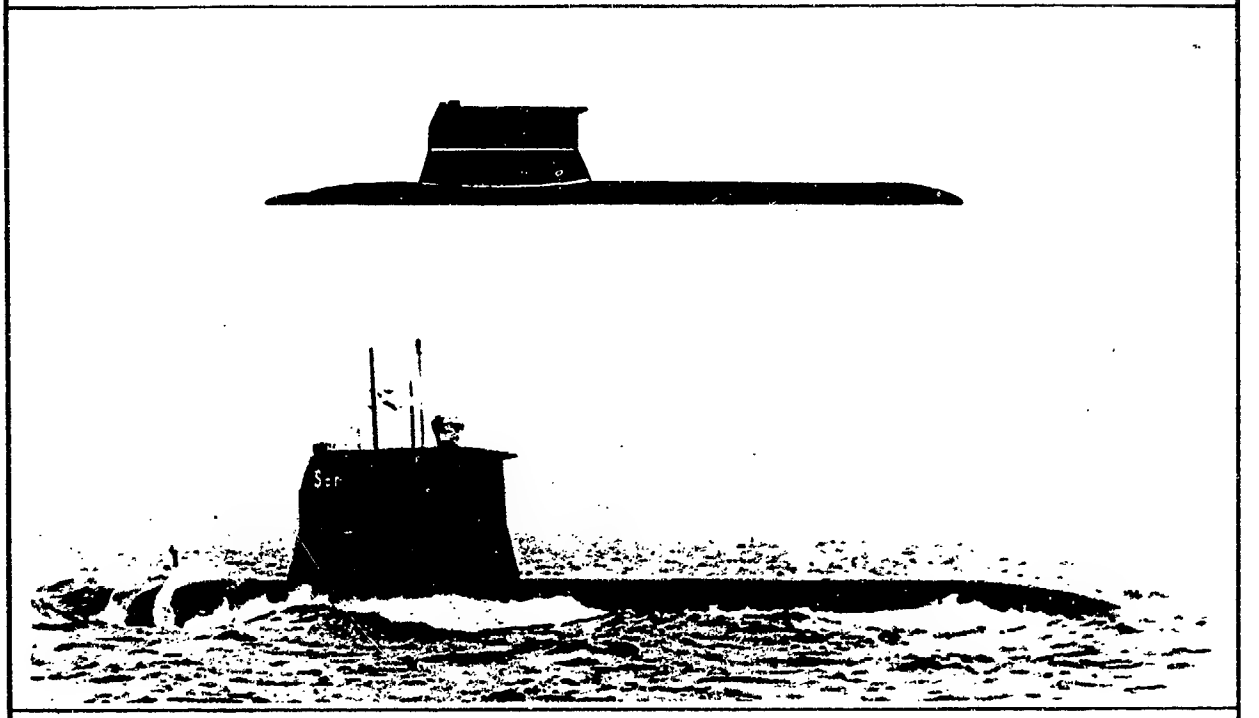
CHARACTERISTICS:

Displacement, tons: 3,765 surfaced; 4,200 submerged
Dimensions, feet (meters): 337.5 x 27.7 x 23 (102.9 x 8.4 x 7)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Propulsion: Nuclear; 1 reactor; 2 steam turbines; 2 shafts
Speed, knots: 20+ surfaced; 20+ submerged
Pennant number: 575

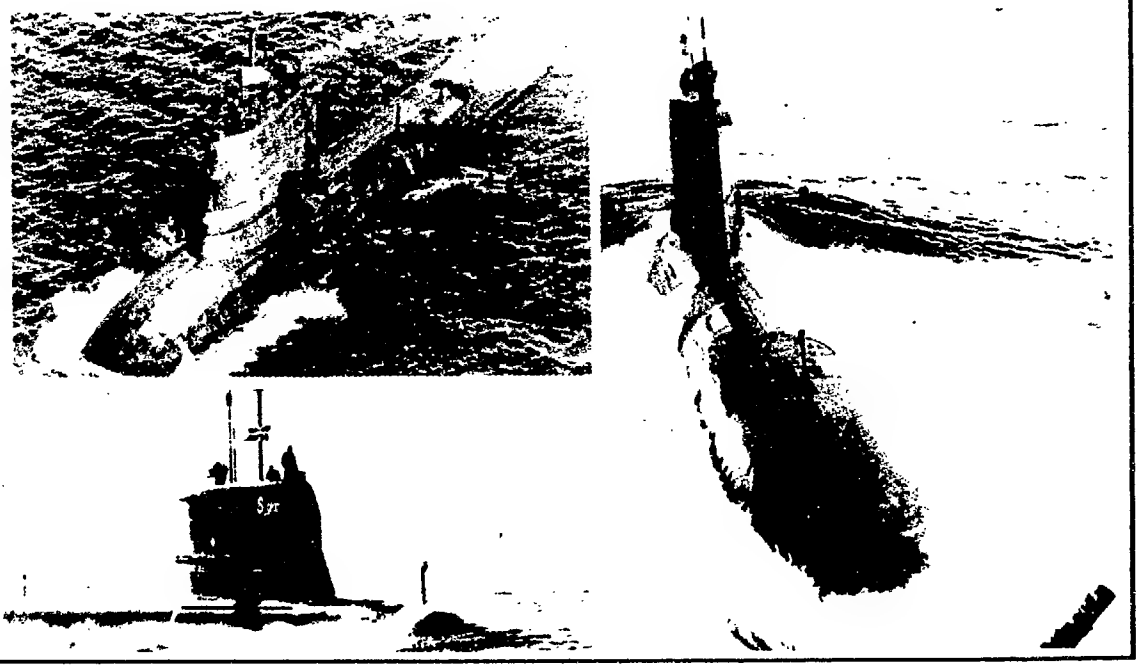
REMARKS:

The SEAWOLF was the world's second nuclear submarine. This unit is no longer considered a first-line submarine and has been engaged primarily in research work since 1969.

SW SJOORMEN SS

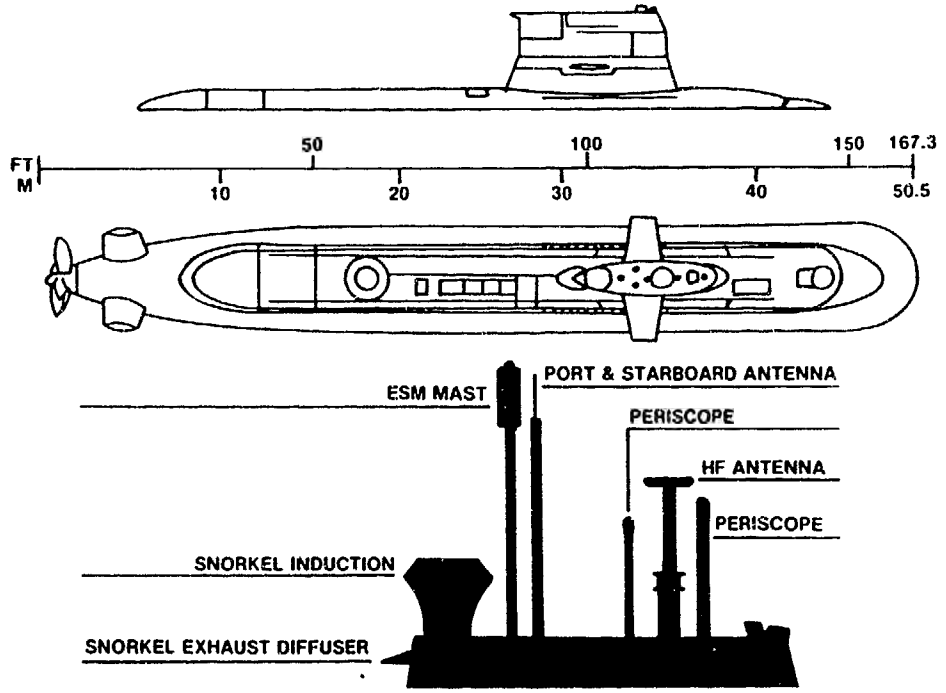


Additional Views Desired



SJOORMEN SS

SW



MAJOR RECOGNITION FEATURES:

SJOORMEN Class submarines are short, stubby, and streamlined. The streamlined sail is situated well forward of amidships, very near the bow. The sail topline is straight and horizontal, but all photos observed to date reveal a snorkel intake valve projecting above the topline. The snorkel intake valve is unique, with a double taper. A fixed snorkel exhaust protrudes aft, beyond the trailing edge of the sail. Both the trailing edge and the leading edge of the sail are symmetrical and somewhat unusual in appearance. Although the general impression is that of raked edges, both the trailing edge and leading edge have a double break or knuckle in their lines. Sail planes are located lower than midway up the sail height. The entire hull is tubular in shape, with a level profile fore and aft of the sail. The hull lines slope abruptly near the bow and the stern. V-shaped stern fins are present, but they are not usually seen in profile views.

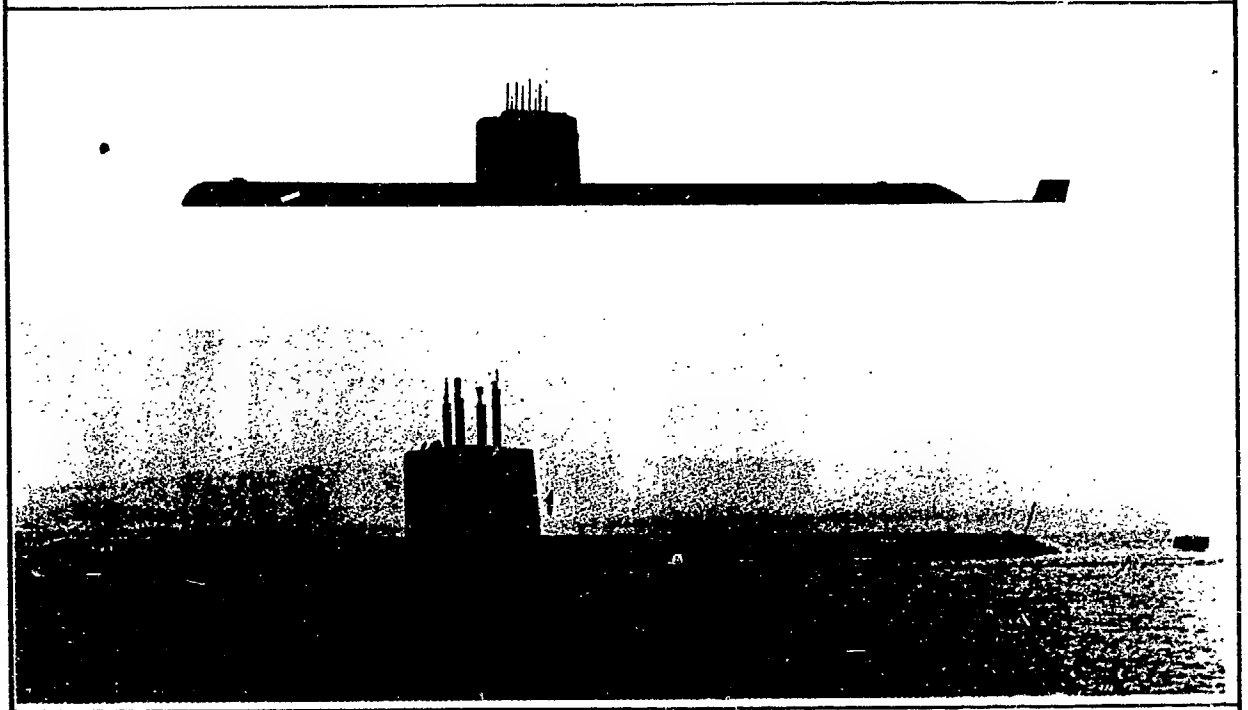
CHARACTERISTICS:

Displacement, tons: 1,125 standard; 1,400 submerged
Dimensions, feet (meters): 167.3 x 20 x 16.7 (50.5 x 6.1 x 5.1)
Torpedo tubes: 4 x 21 in (53.3 cm) (bow); 2 antisubmarine tubes
Propulsion: Diesel-electric; 2 diesels; 1 electric motor; 1 large 5-bladed propeller
Speed, knots: 15 surfaced; 20 submerged
Pennant numbers: Sor, Sle, Shu, Sbj, Sha

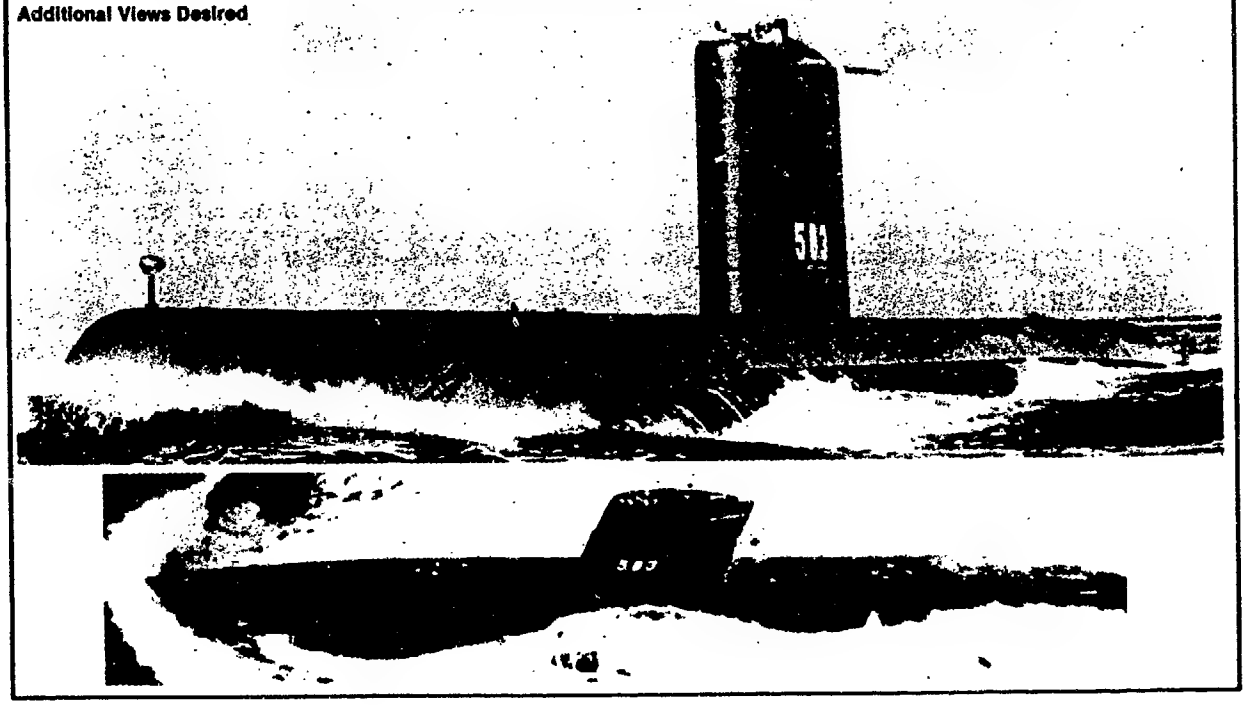
REMARKS:

The SJOORMEN Class, first unit commissioned in 1967, consists of five units. All are in service in the Royal Swedish Navy.

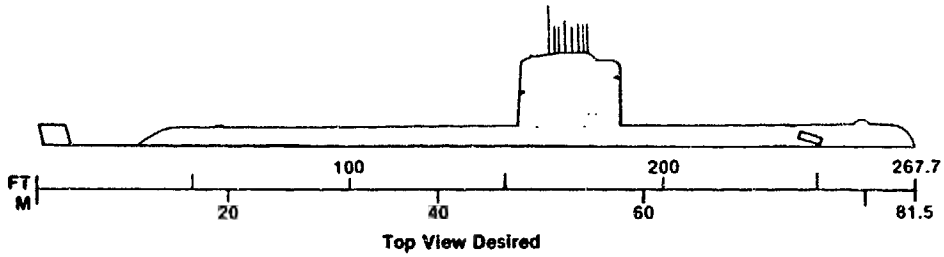
US SKATE SSN



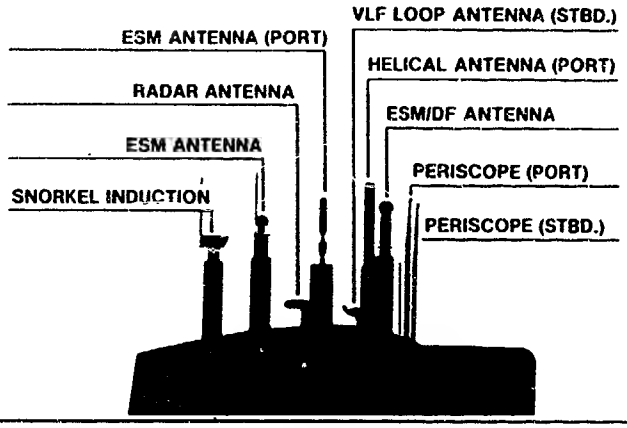
Additional Views Desired



SKATE SSN — US



Top View Desired



MAJOR RECOGNITION FEATURES:

SKATE Class submarines have a rectangular sail situated forward of amidships. The topline is level and forms almost a 90-degree angle with the perpendicular fore and aft edges. The bow is rounded and enters the water at a vertical angle. The deckline is nearly level forward of the sail and slopes very gently aft until it drops into the water just forward of the stern fin. A continuous open slot extends from the after break in the deckline to a point forward of the sail where it breaks and curves downward. An unusual feature is the angle at which the opening for the retractable bow planes are set. In some views, a wide sonar belt can be seen encircling the bow.

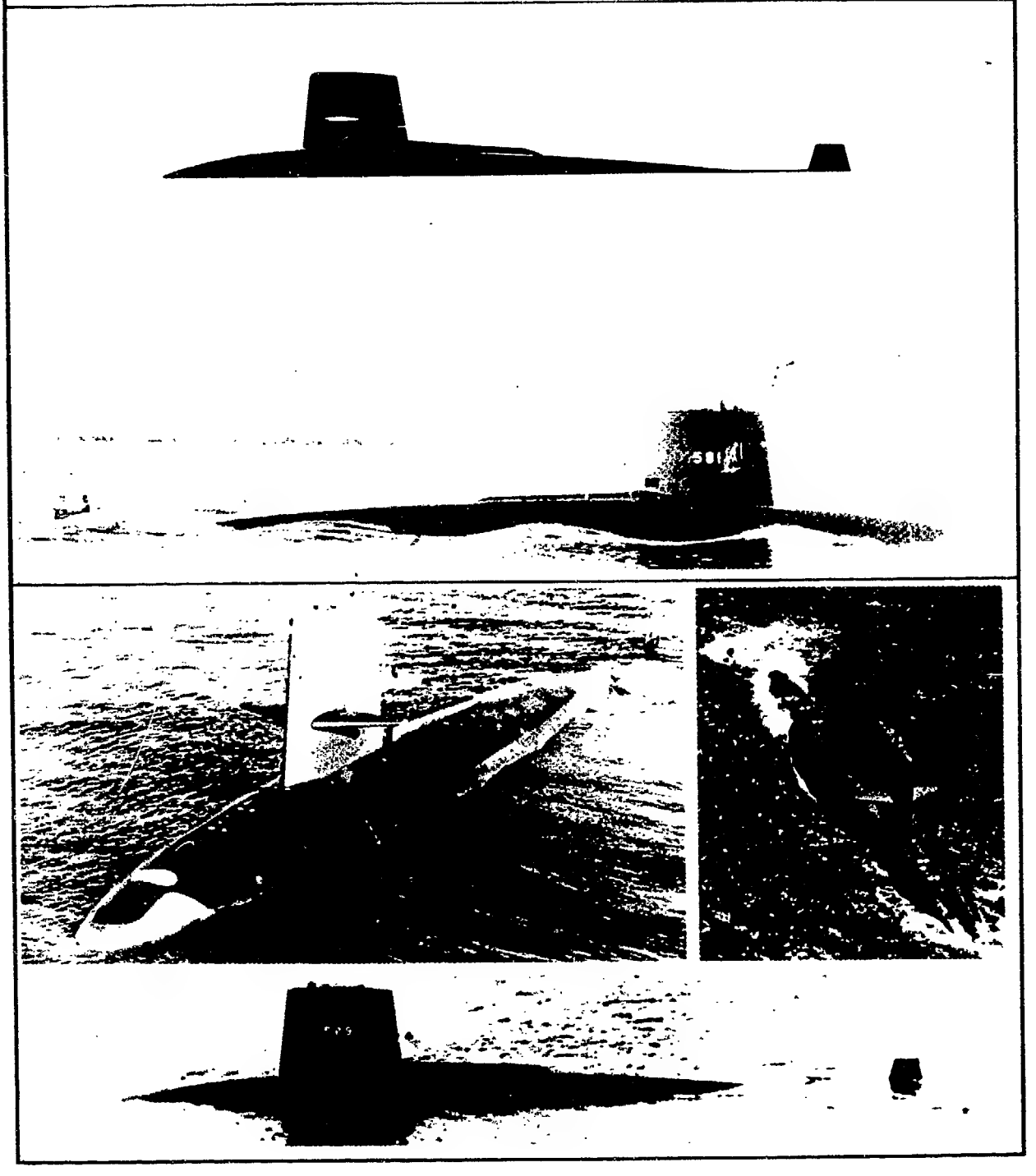
CHARACTERISTICS:

Displacement, tons: 2,570 surfaced; 2,860 submerged
Dimensions, feet (meters): 267.7 x 25 x 22 (81.5 x 7.6 x 6.7)
Torpedo tubes: 8 x 21 in (53.3 cm) (6 bow, 2 stern)
Propulsion: Nuclear; 1 reactor; 2 steam turbines; 2 shafts
Speed, knots: 20+ surfaced; 25+ submerged
Pennant numbers: 578, 579, 583, 584

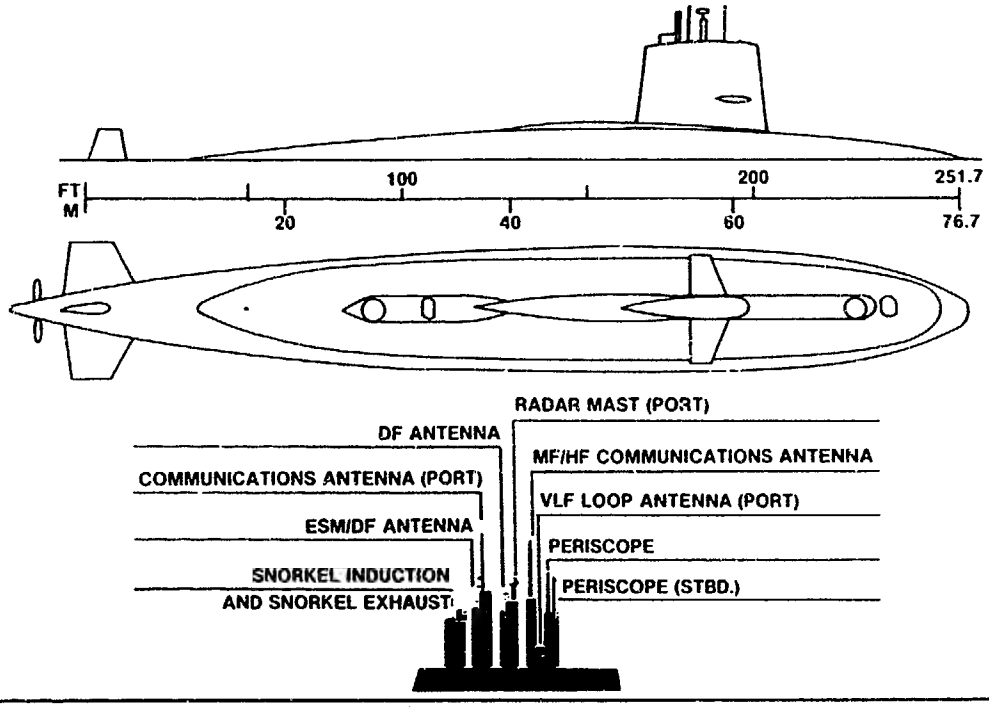
REMARKS:

SKATE Class submarines were the first nonexperimental nuclear units to enter service. The four units in this class were built between 1955 and 1959, and are smaller versions of the USS NAUTILUS.

US SKIPJACK SSN



SKIPJACK SSN — US



MAJOR RECOGNITION FEATURES:

SKIPJACK's configuration is completely streamlined and lacks projections. All equipment is either recessed or retractable. The class has a rectangular-shaped sail situated forward of amidships. The leading edge and trailing edges are slightly raked outward toward the deckline. The trailing edge of the sail blends with a thin mound or knuckle on top of the after deck. This feature is unique to SKIPJACK. Sail planes are located near the leading edge of the sail. The hull is whale-shaped, having no flat deck area. The hull curves into the waterline both fore and aft, obscuring both bow and stern below the waterline. The stern extremity, however, can be located by a prominent fin protruding above the waterline.

CHARACTERISTICS:

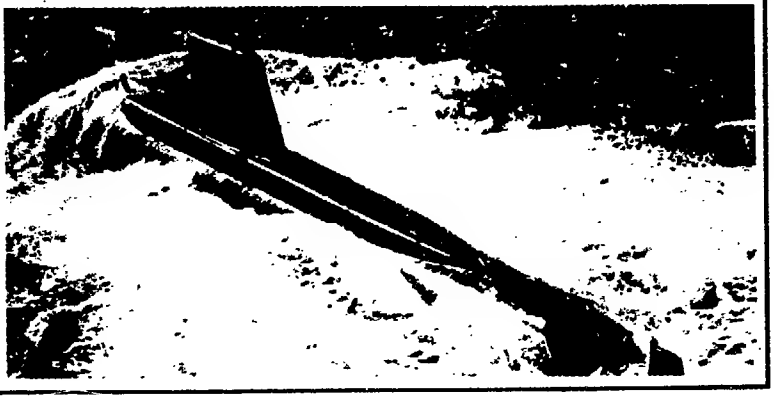
Displacement, tons: 3,075 surfaced; 3,513 submerged
Dimensions, feet (meters): 251.7 x 31.5 x 29.4 (76.7 x 9.6 x 8.9)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Propulsion: Nuclear; 1 reactor; 2 steam turbines; 1 shaft
Speed, knots: 16+ surfaced; 30+ submerged
Pennant numbers: 585, 588, 590 thru 592

REMARKS:

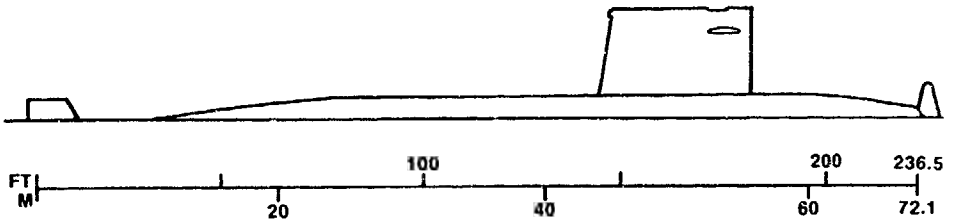
The SKIPJACK Class are the first nuclear submarines to incorporate the teardrop hull design. These units have a single propeller shaft, and the diving planes are mounted on sail structures to improve underwater maneuverability. There are presently five active units.

FR SNA-72 SSN

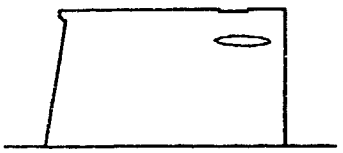
Additional Views Desired



SNA-72 SSN **FR**



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the SNA-72 Class is forward of amidships. The leading edge is vertical, the topline is flat with a lip at the trailing edge. The trailing edge is raked. The bow is rounded and a sonar dome is located just aft of the bow. The forward weatherdeck is flat while the aft weatherdeck gradually slopes to the waterline. A rectangular stern fin is present and is approximately the height of the aft weatherdeck.

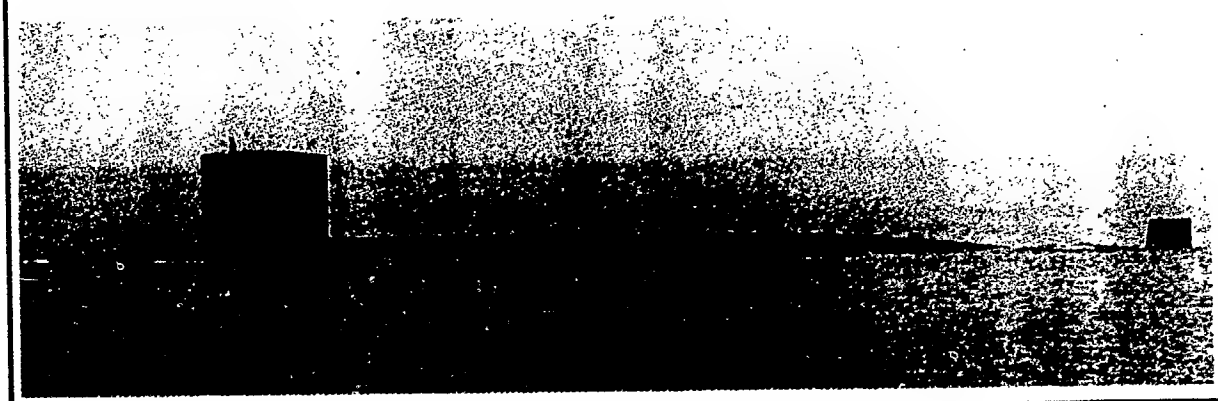
CHARACTERISTICS:

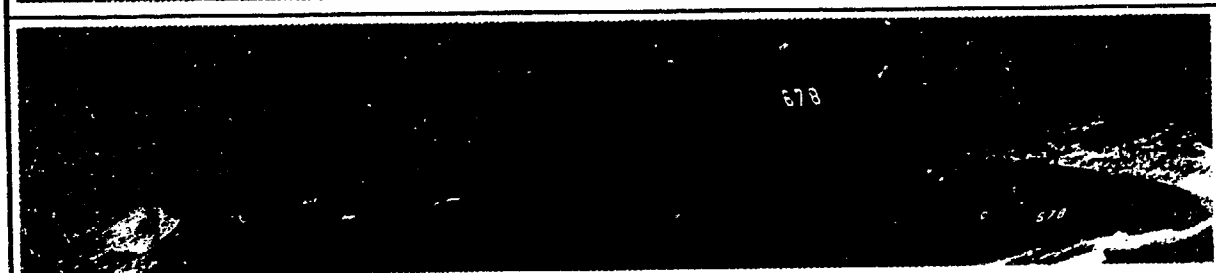
Displacement, tons: 2,385 surfaced; 2,670 submerged
Dimensions, feet (meters): 236.5 x 24.9 x 21 (72.1 x 7.6 x 6.4)
Torpedo tubes: 4 x 17.9 in (45.5 cm)
Missiles: Tube-launched SM 39 EXOCET
Propulsion: Nuclear; 1 reactor; 2 turbo alternators; 1 main electric motor; 1 shaft with secondary electric motor
Speed, knots: 15 surfaced; 26 submerged
Pennant number: S601

REMARKS:

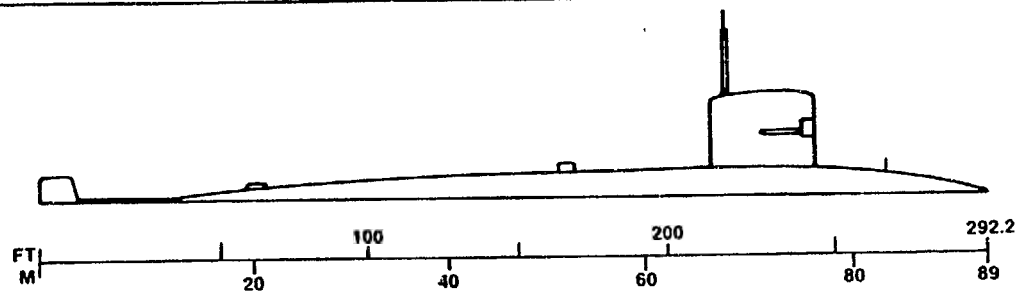
The SNA-72 Class, first unit named RUBIS, began sea trials in 1981, and is expected to join the French fleet in early 1982. A second unit named SAFFIR was launched in late 1981. A total of five units are planned.

US STURGEON SSN

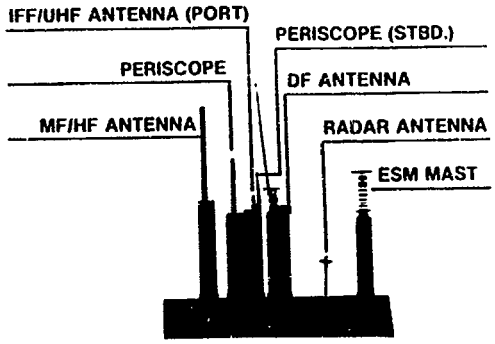




STURGEON SSN US



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the STURGEON Class is well forward of amidships. The leading and trailing edges are vertical while the topline is slightly curved giving it a convex appearance. Sail planes are located in the middle of the sail and just aft of the leading edge. The bow and stern slope gradually to the waterline. A rectangular stern fin approximately as high as the after weatherdeck is prominent. Some small protuberances on the weatherdeck are noticable; one forward of the stern, one aft of the sail, and one aft of the bow. The STURGEON Class is similar to the PERMIT Class, however, the STURGEON has a higher sail and the sail planes are mounted halfway up the sail--on the PERMIT, the sail planes are closer to the top of the sail.

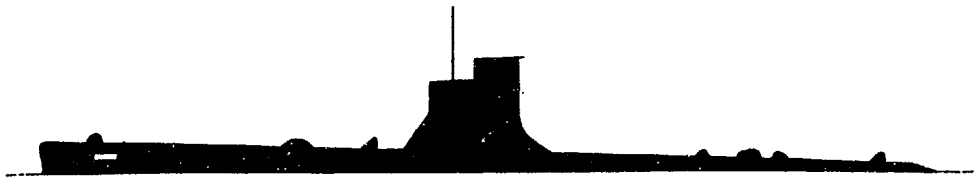
CHARACTERISTICS:

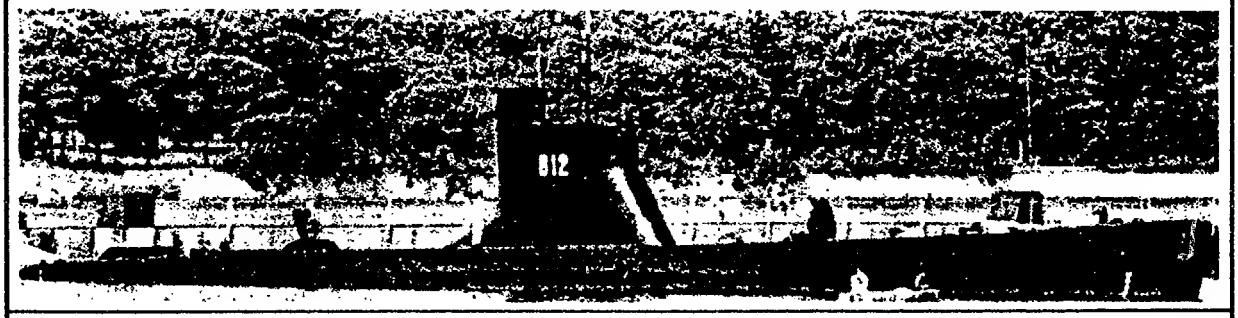
Displacement, tons: Unknown surfaced; 4,640 submerged
Dimensions, feet (meters): 292.2 x 31.7 x 26 (89 x 9.5 x 7.9)
Torpedo tubes: 4 x 21 in (53.3 cm) (amidships)
Missiles: Fitted or being fitted for HARPOON
Propulsion: Nuclear; 1 reactor; 2 steam turbines; 1 shaft
Speed, knots: 20+ surfaced; 30+ submerged
Pennant numbers: 637 thru 639, 646 thru 653, 660 thru 670, 672 thru 684, 686, 687

REMARKS:

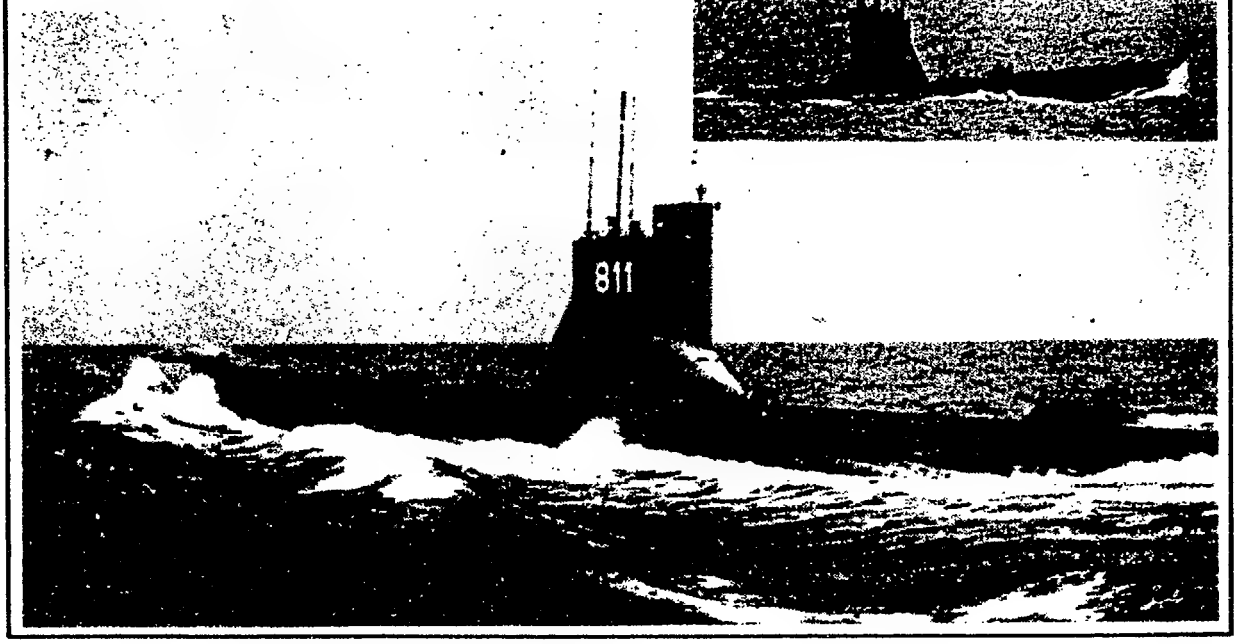
The STURGEON Class submarines are slightly enlarged and improved versions of the preceding PERMIT Class. There are currently thirty-seven active units.

YO SUTJESKA SS

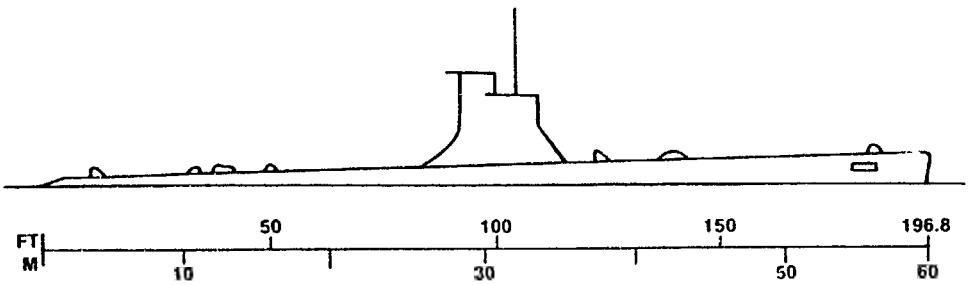




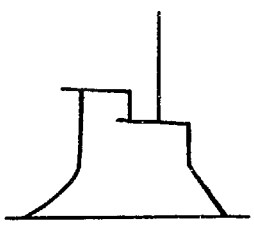
Additional Views Desired



SUTJESKA SS YO



Top View Desired



MAJOR RECOGNITION FEATURES:

SUTJESKA Class submarines are distinctive in appearance due to the sail configuration. The top of the sail evidences a pronounced upward step aft. The base of the sail flares outward toward the deck, with the fore and aft lines having different angles of rake. The bow is raked. The weatherdeck slopes gradually from bow to stern. Bow planes are located well aft of the bow and when stowed are level with the weatherdeck.

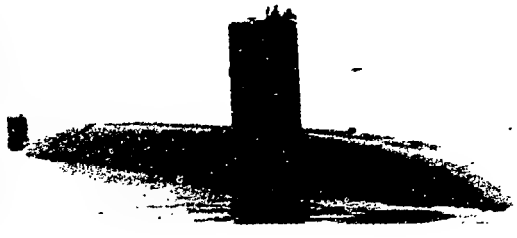
CHARACTERISTICS:

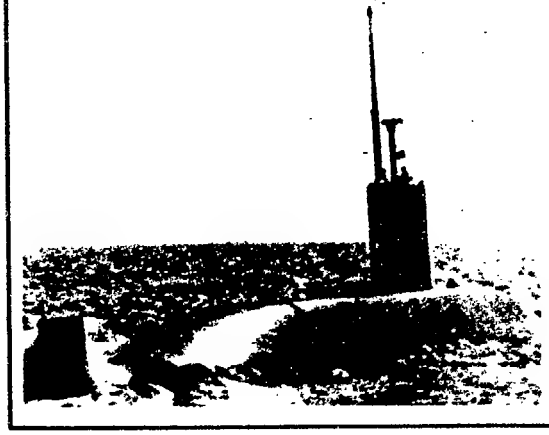
Displacement, tons: 820 surfaced; 945 submerged
Dimensions, feet (meters): 196.8 x 22.3 x 16.1 (60 x 6.8 x 4.9)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Propulsion: Diesel-electric; diesels; electric motors
Speed, knots: 14 surfaced; 9 submerged
Pennant numbers: 811, 812

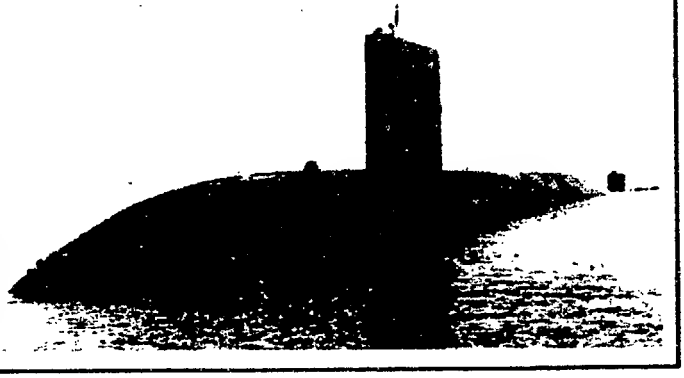
REMARKS:

The SUTJESKA was the first class of submarines to be built in a Yugoslav yard. There are two units in this class which were commissioned in 1960 and 1962.

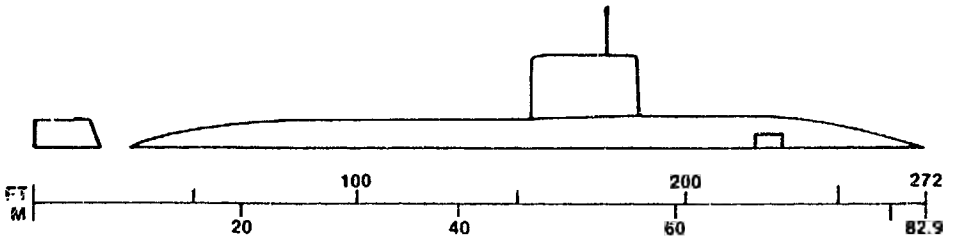
UK SWIFTSURE SSN



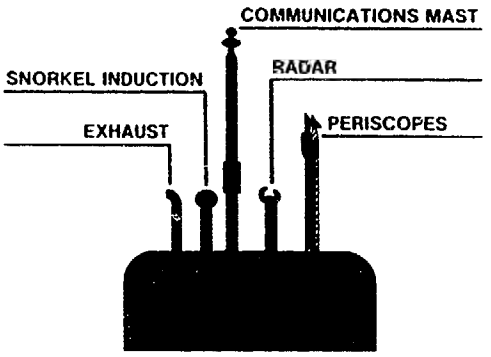




SWIFTSURE SSN — UK



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the SWIFTSURE is just forward of amidships. The sail is rectangular with vertical leading and trailing edges. Bow planes are located just aft of the bow. The weatherdeck is level and slopes gradually to the waterline at the bow and stern. A rectangular stern fin is prominent. The fin has a raked leading edge and a vertical trailing edge. It is approximately the same height as the weatherdeck.

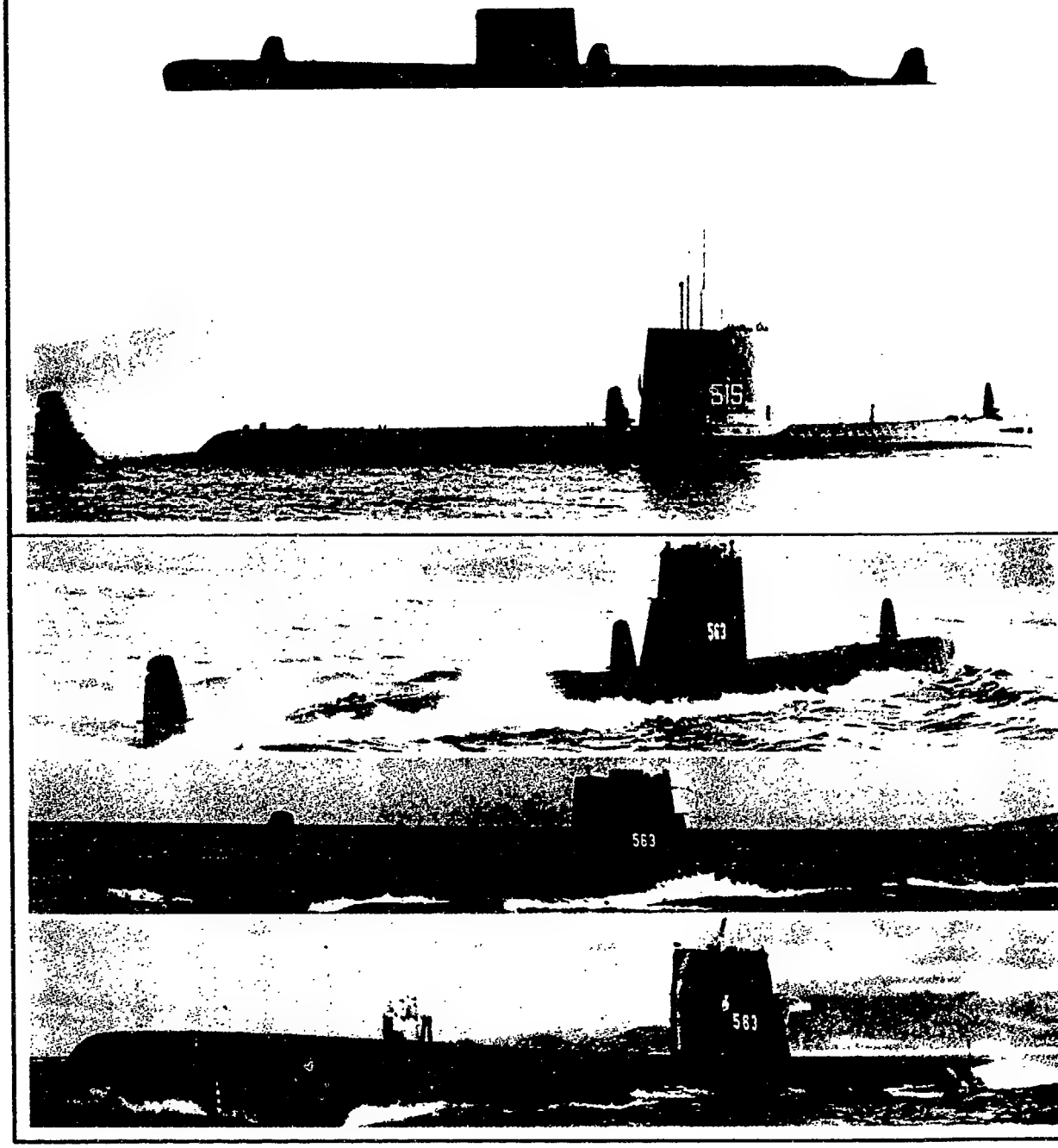
CHARACTERISTICS:

Displacement, tons: 4,200 surfaced; 4,500 submerged
Dimensions, feet (meters): 272 x 32.3 x 27 (82.9 x 9.8 x 8.2)
Torpedo tubes: 5 x 21 in (53.3 cm)
Propulsion: Nuclear; 1 reactor; geared turbines; auxiliary diesel; 1 shaft
Speed, knots: Unknown surfaced; 30 submerged
Pennant numbers: S104 thru S106, S108, S109, S126

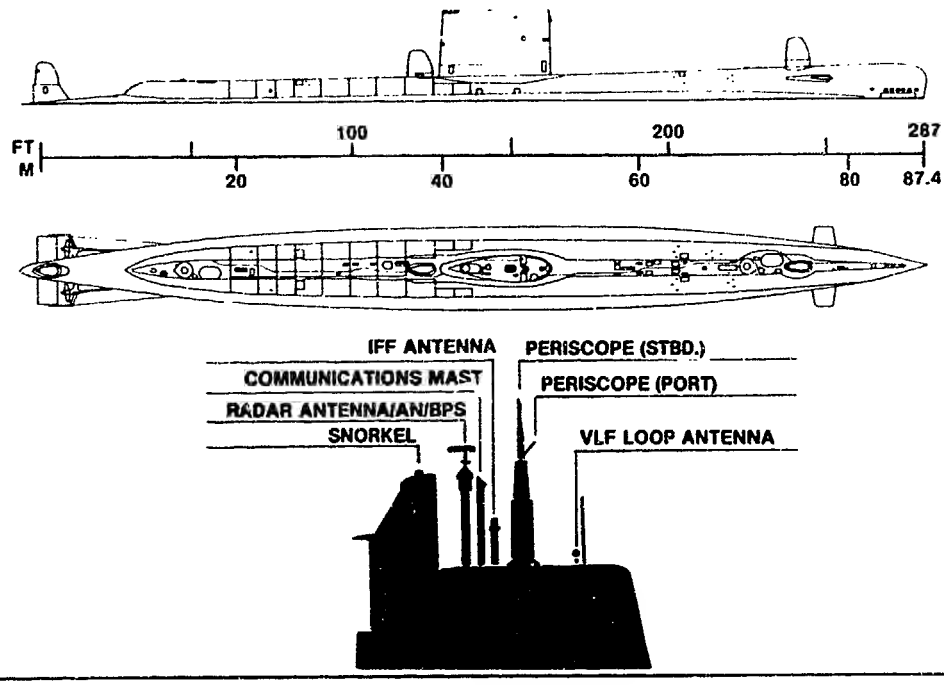
REMARKS:

The SWIFTSURE Class, first unit commissioned 1973, consists of six units. All are in service with the British Royal Navy.

IT, TU, US TANG SS



TANG SS — IT, TU, US



MAJOR RECOGNITION FEATURES:

The TANG Class sail is almost centered on the hull, it has slightly raked leading and trailing edges, and is almost rectangular in overall appearance. The sail topline is interrupted by a fixed projection, and on most units a small cutaway section in the trailing edge is apparent in near profile views; some units do not have the cutaway section. The hull line is characterized by a large flat deck and an abrupt drop near the stern sonar dome. The prow has a rounded stem that drops perpendicularly into the water. A continuous open slot begins at the after break and extends to a point midway between the sail and bow. Bow planes are retracted into a triangular slot just below the forward PUFF sonar dome. TANG Class units have a second PUFF sonar dome just aft of the sail. A third PUFF sonar dome aft gives the class the appearance of having a stern fin.

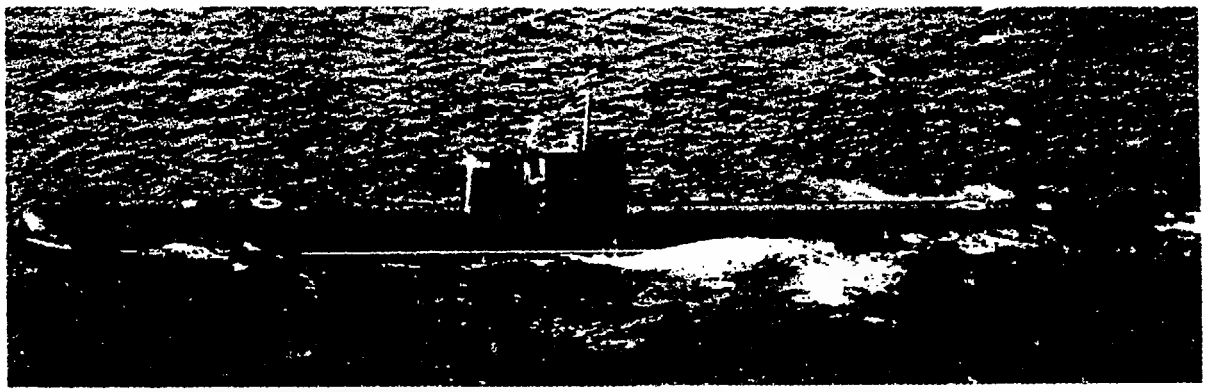
CHARACTERISTICS:

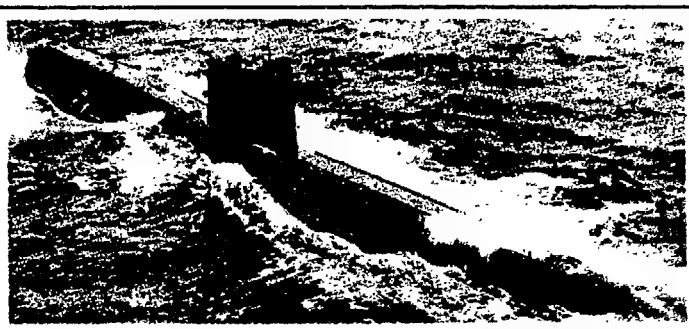
Displacement, tons: 2,050 surfaced; 2,700 submerged
Dimensions, feet (meters): 287 x 27.3 x 19 (87.4 x 8.3 x 6.2)
Torpedo tubes: 8 x 21 in (53.3 cm) (6 bow, 2 stern)
Propulsion: Diesel-electric; 3 diesels; 2 electric motors; 2 shafts
Speed, knots: 15.5 surfaced; 16 submerged
Pennant numbers: IT 515, 516; TU S343; US 565, 567

REMARKS:

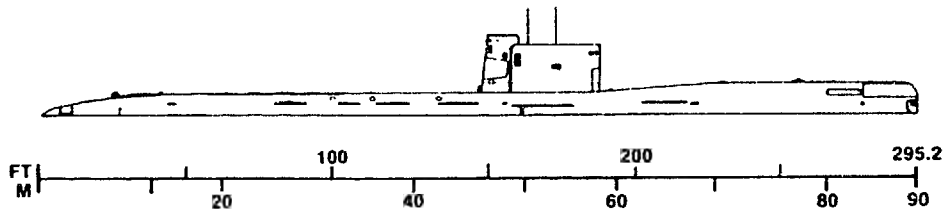
The TANG Class, first unit commissioned 1951, consists of five units. Two units are in the Italian Navy, one in the Turkish Navy, and two--one of which is in reserve--in the U.S. Navy.

UR TANGO SS

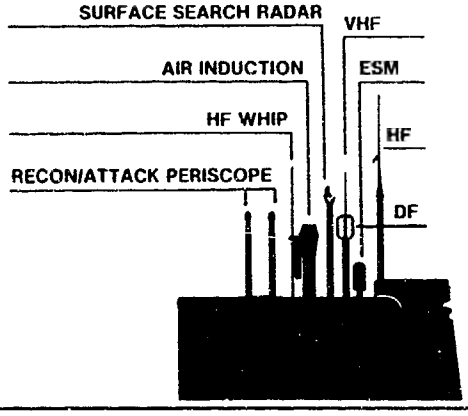




TANGO SS — UR



All Views Desired



MAJOR RECOGNITION FEATURES:

The TANGO sail, located forward of amidships, has a raised step aft to accommodate the fixed snorkel exhaust. The weatherdeck is level at the bow to a point just forward of the sail where it slopes gently and again becomes level until it slopes gradually, near the stern, into the waterline. The bow is rounded and diving planes are located just aft of the bow. A small protuberance is present aft where the weatherdeck slopes into the water.

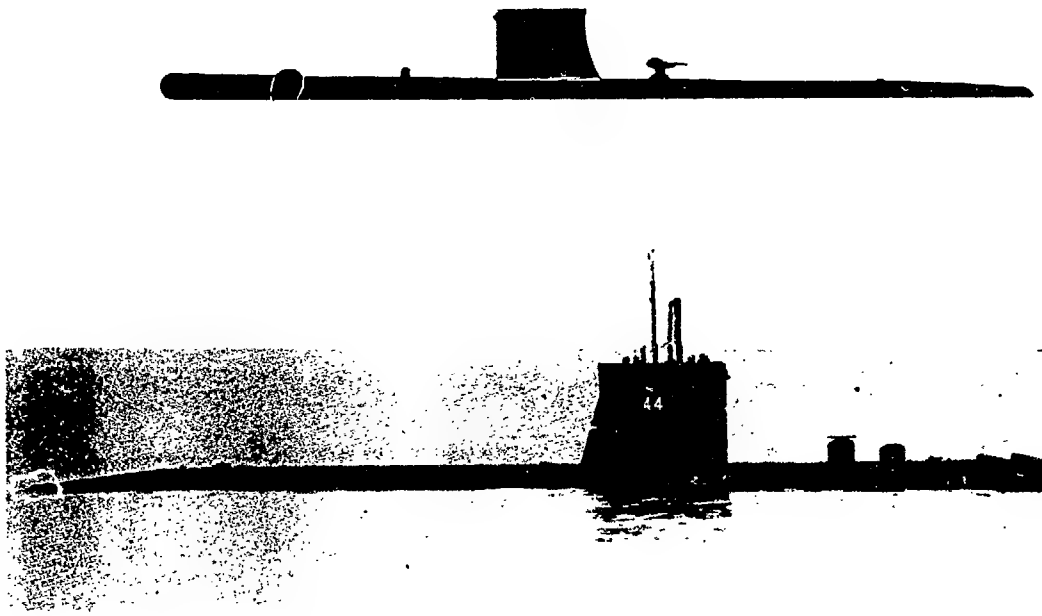
CHARACTERISTICS:

Displacement, tons: 3,000 surfaced; 3,700 submerged
Dimensions (wl), feet (meters): 295.2 x 29.5 (90 x 9)
Torpedo tubes: 8 x 21 in (53.3 cm)
Propulsion: Diesel-electric; 3 diesels; 3 electric motors; 3 shafts
Speed, knots: 20 surfaced; 16 submerged

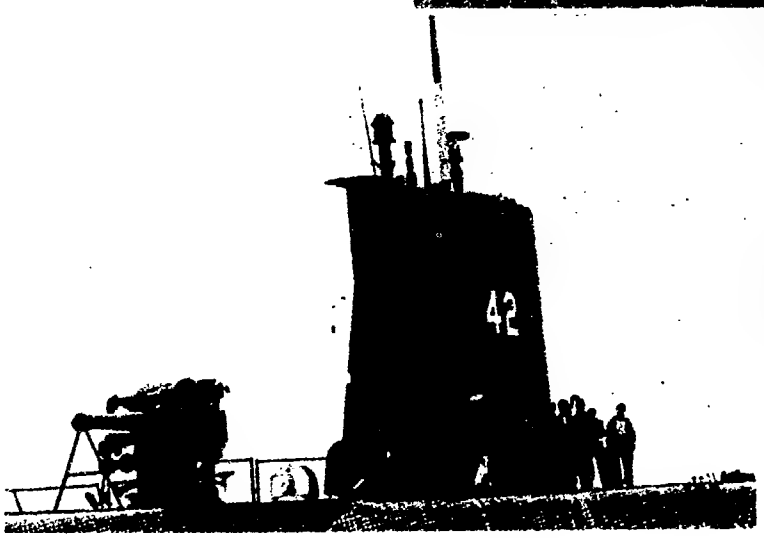
REMARKS:

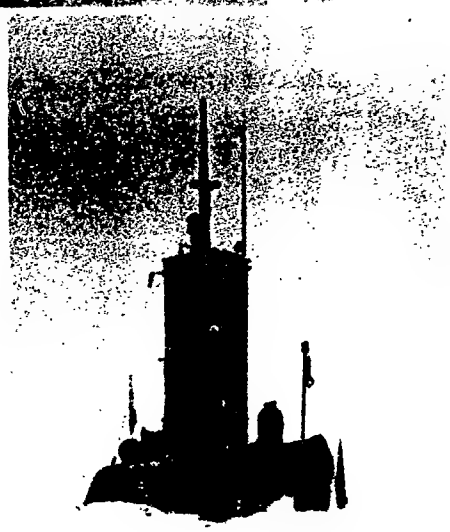
The TANGO is a new class of diesel-electric propelled, torpedo-attack submarine, apparently being produced as a successor to the FOXTROT. The first TANGO became operational in 1973 and the construction program continues.

PE TIBURON SS

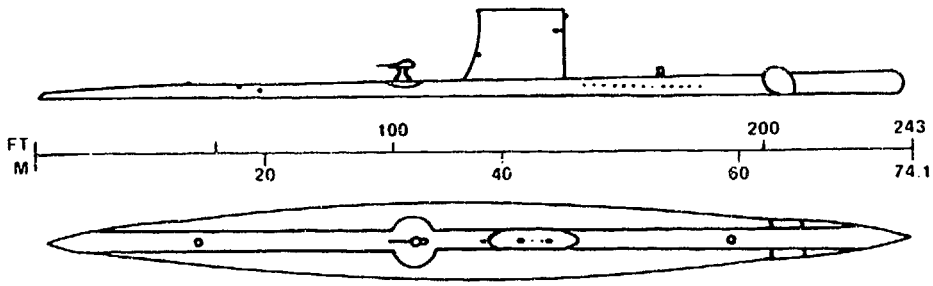


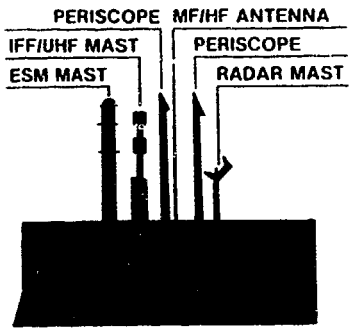
Additional Views Desired





TIBURON SS **PE**





MAJOR RECOGNITION FEATURES:

The TIBURON Class units strongly resemble the US GUPPY II types with the exception of the sail modification. The sail topline is unbroken and the trailing edge of the sail is raked aft, with the rake beginning slightly below the top of the sail. Limber holes are easily seen on either side of the hull just above the waterline. Two TIBURON units (the ABTAO and the DOS DE MAYO) are configured with a large deck gun just aft of the sail. Diving planes are bow-mounted and painted, presenting a triangular appearance when folded in the upward position.

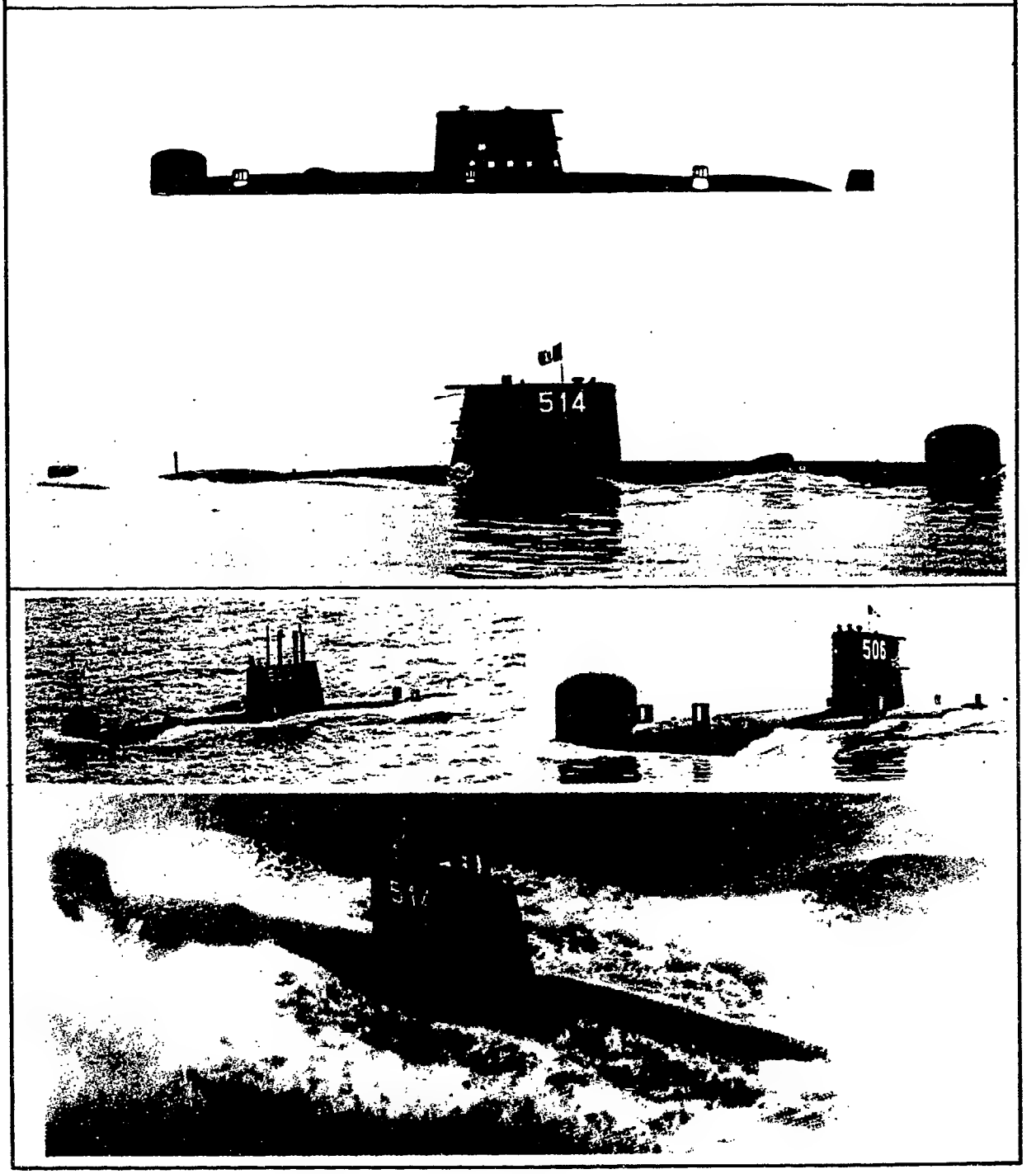
CHARACTERISTICS:

Displacement, tons: 825 surfaced; 1,400 submerged
Dimensions, feet (meters): 243 x 22 x 14 (74.1 x 6.7 x 4.3)
Torpedo tubes: 6 x 21 in (53.3 cm) (4 bow, 2 stern)
Propulsion: Diesel-electric; 2 diesels; electric motors; 2 shafts
Speed, knots: 16 surfaced; 10 submerged
Pennant numbers: 41 thru 44

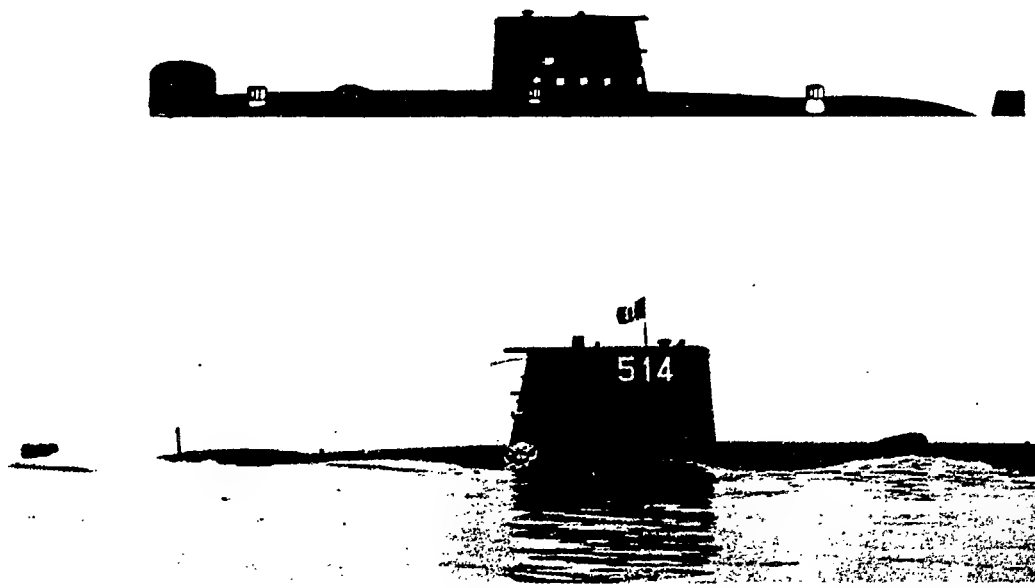
REMARKS:

The TIBURON Class is basically a modified USS MACKEREL Class. All units of this class are in service with the Peruvian Navy.

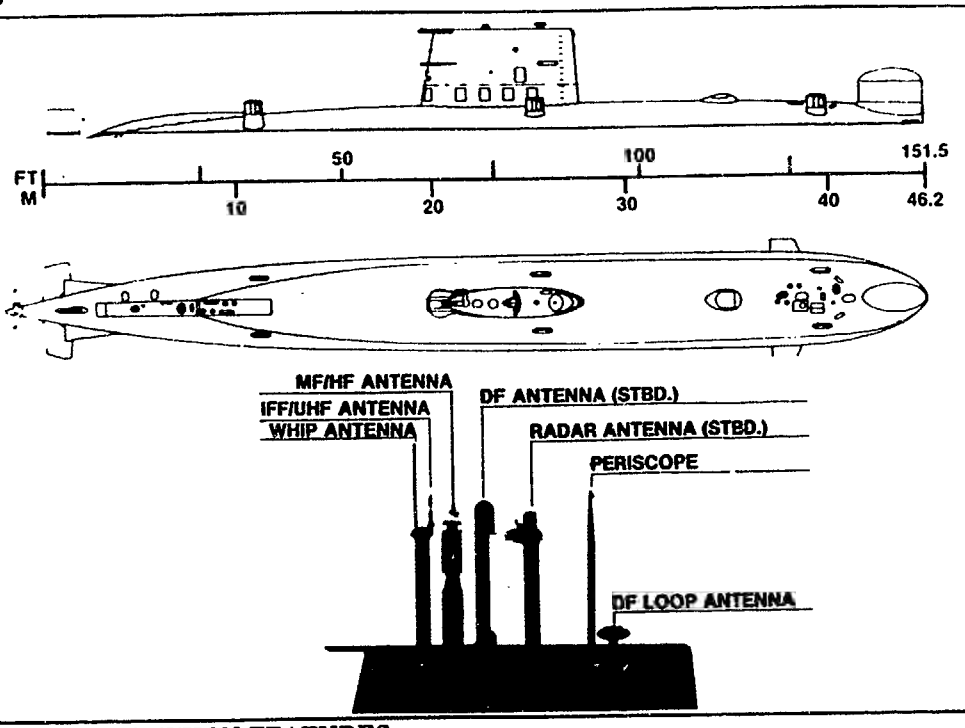
IT TOTI SS



IT TOTI SS



TOTI SS IT



MAJOR RECOGNITION FEATURES:

The most striking feature of the TOTI Class is the massive sonar dome on the bow. The sail configuration is unique in that two fixed parallel protrusions extend beyond the raked trailing edge, the upper protrusion being a fixed snorkel exhaust and the lower protrusion probably serving as a hydrodynamic surface to relieve upward water pressure on the snorkel exhaust. The sail topline is straight and horizontal and the leading edge is almost vertical. The entire rectangular sail, which is large compared to hull length, is situated amidships. The hull line in profile shows a gentle downward slope from the bow sonar to a point just forward of the stern fin. At that point there is a narrow raised section that curves into the waterline. In some views the hull is relatively clean in appearance, with the only protrusions consisting of a streamlined "blister" occurring on the forward deck midway between the bow sonar and the leading edge of the sail. Some units show six fin-like projections, three installed along each side of the submarine, which constitute part of a passive sonar ranging system.

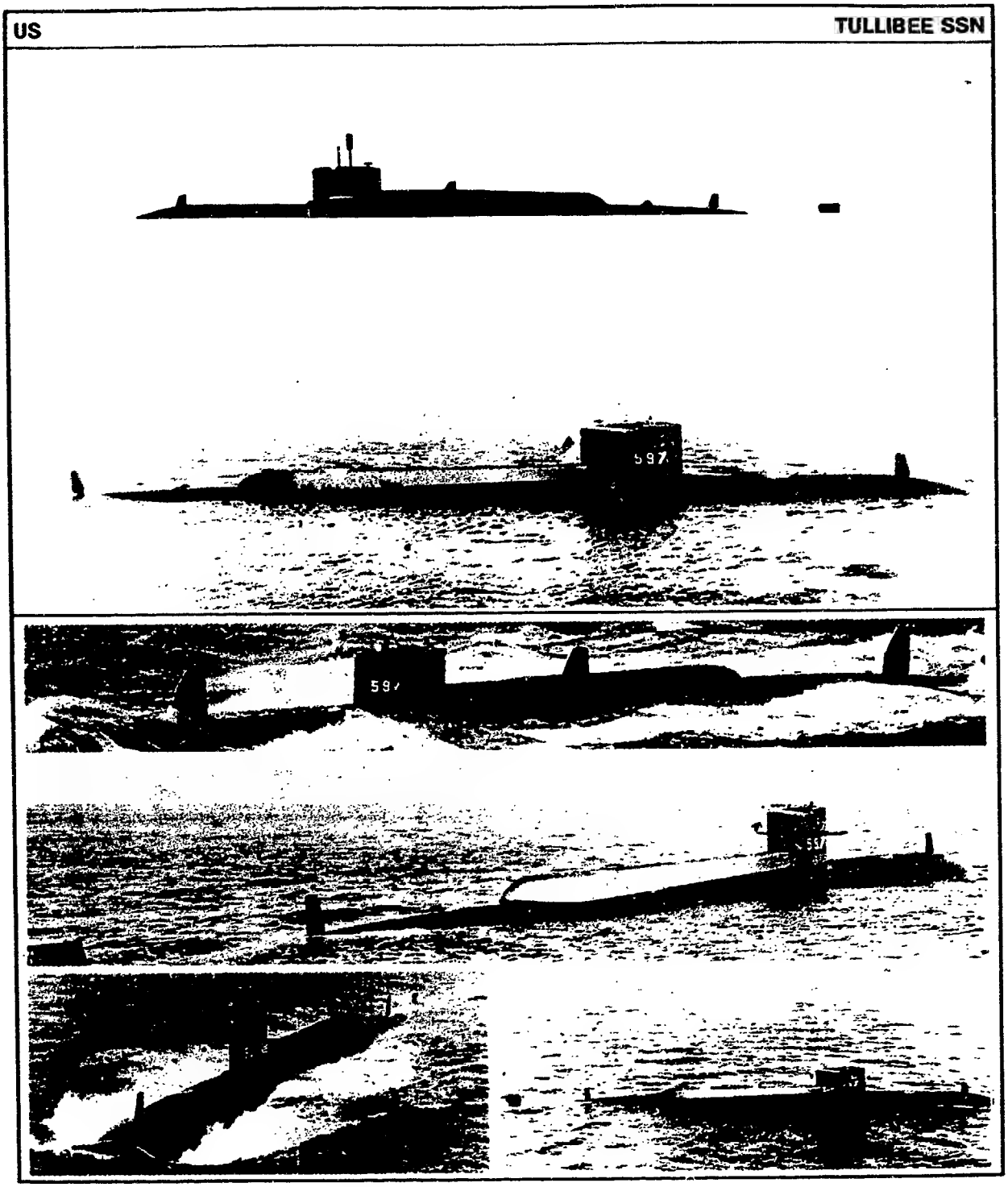
CHARACTERISTICS:

Displacement, tons: 524 surfaced; 582 submerged
Dimensions, feet (meters): 151.5 x 15.4 x 13.1 (46.2 x 4.7 x 4)
Torpedo tubes: 4 x 21 in (53.3 cm)
Propulsion: Diesel-electric; 2 diesels; 1 electric motor; 1 shaft
Speed, knots: 14 surfaced; 15 submerged
Pennant numbers: 505, 506, 513, 514

REMARKS:

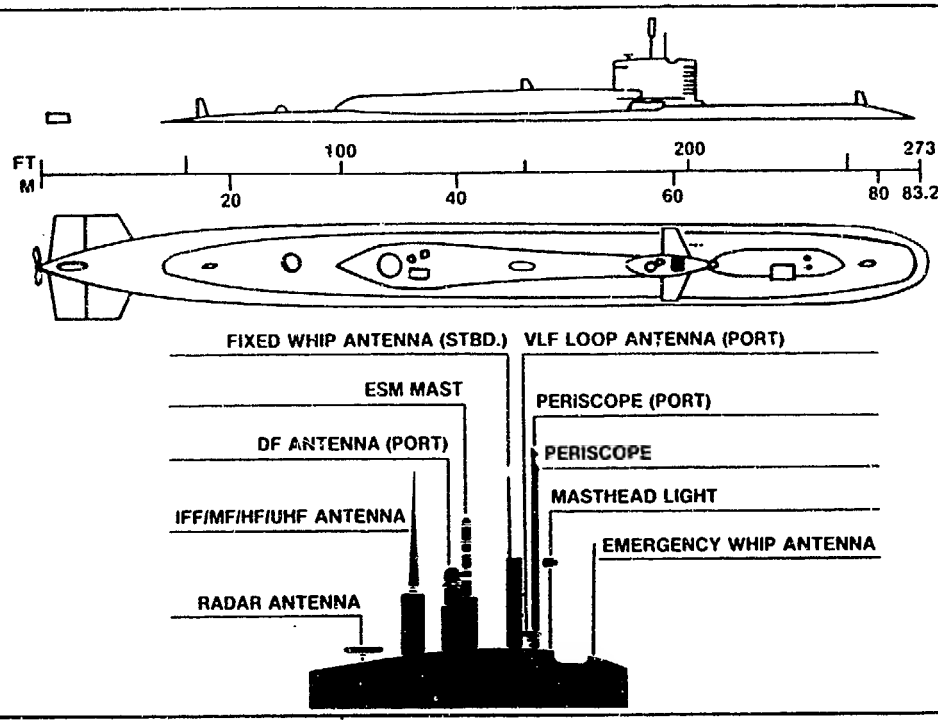
The TOTI Class was Italy's first submarine built since WW II. The first unit was commissioned in 1968. There are presently four active units in this class.

US TULLIBEE SSN



TULLIBEE SSN

TULLIBEE SSN US



MAJOR RECOGNITION FEATURES:

The TULLIBEE hull is an elongated tear-drop shape except for a prominent raised deck section which forms an extension of the sail and traverses the top of the hull from the sail for about half of the distance to the stern fin. A unique facet of this raised weatherdeck is that it is bulbous with the flared section occurring at the after extremity. A large fin-like protrusion, one of three PUFF sonar domes, is prominent between the stern fin and the after break in the hull line. Another PUFF dome is located just aft of the bow and the third is located midway on the raised deck section. The TULLIBEE sail is rectangular and located well forward of amidships. Both leading and trailing edges of the sail are perpendicular to the hull, but the trailing edge is considerably shorter than the leading edge due to the raised weatherdeck aft.

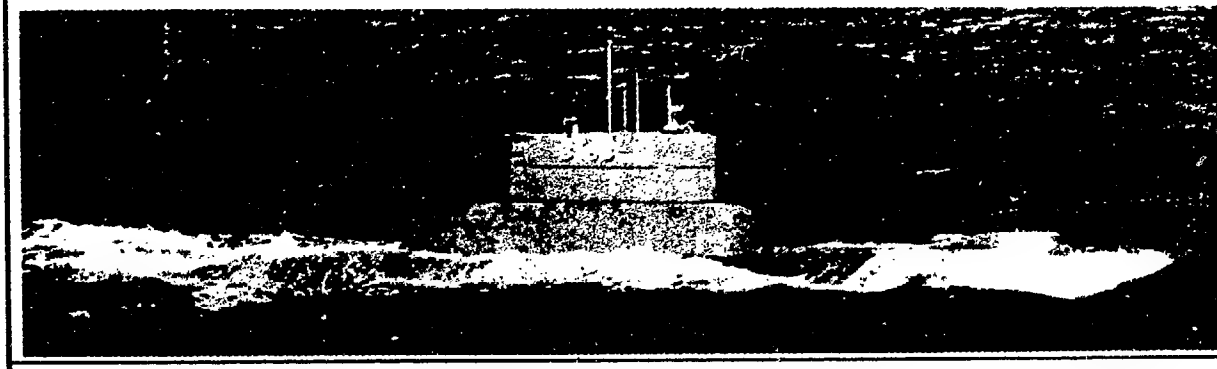
CHARACTERISTICS:

Displacement, tons: Unknown surfaced; 2,640 submerged
Dimensions, feet (meters): 273 x 23.3 x 21 (83.2 x 7.1 x 6.4)
Torpedo tubes: 4 x 21 in (53.3 cm) (amidships)
Propulsion: Nuclear; 1 reactor; turbo-electric drive with steam turbine; 1 shaft
Speed, knots: 15+ surfaced; 20+ submerged
Pennant number: 597

REMARKS:

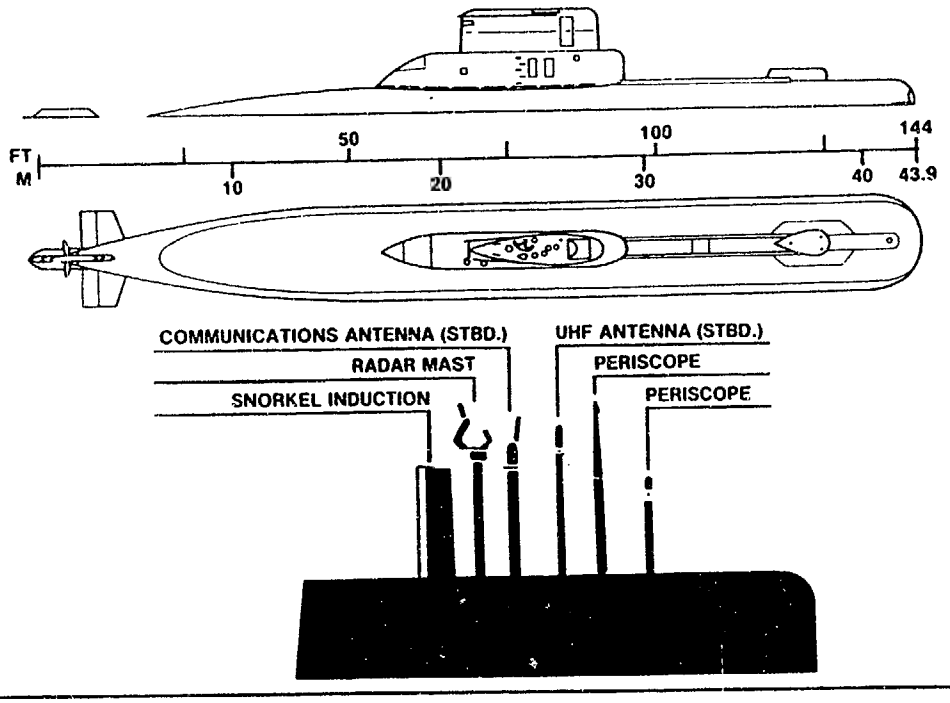
The one-of-a-kind TULLIBEE was commissioned in 1960. This unit was designed specifically for anti-submarine operations. No additional units were constructed because of the success of the larger, more versatile PERMIT Class.

DA, GE TYPE 205 SS



TYPE 205 SS

DA, GE



MAJOR RECOGNITION FEATURES:

TYPE 205 units are short with a large sail in proportion to hull size. The sail is evenly stepped-down fore and aft. They have a level deckline forward of the sail, but the "teardrop" hull tapers into the water just aft of the sail, giving the sail an appearance of sitting well aft of amidships. A raised sonar dome is located aft of the bow, about one-third of the distance to the sail. Also see the GAL Class.

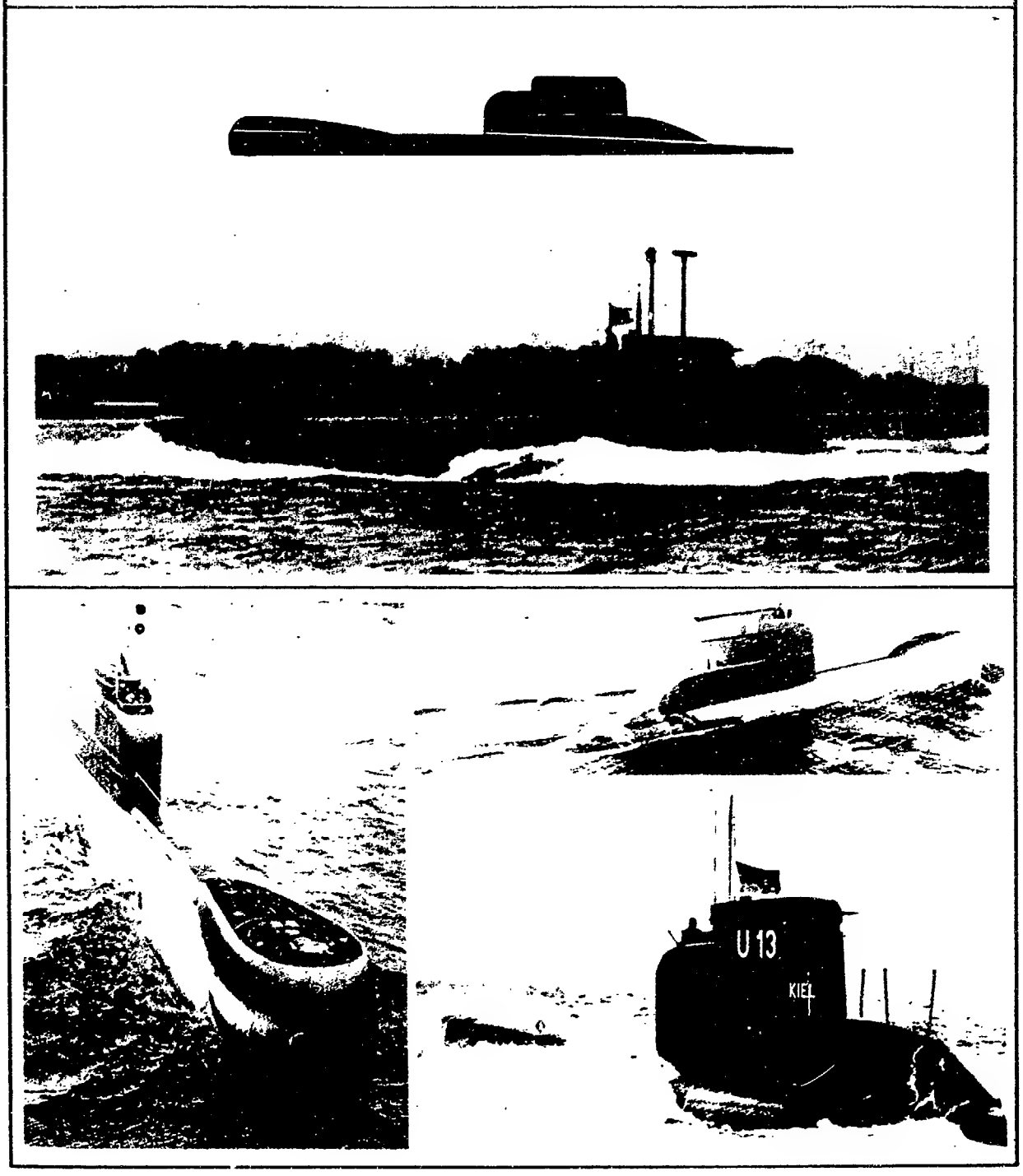
CHARACTERISTICS:

Displacement, tons: 419 surfaced; 450 submerged
Dimensions, feet (meters): 144 x 15.1 x 14.1 (43.9 x 4.6 x 4.3)
Torpedo tubes: 8 x 21 in (53.3 cm) (bow)
Propulsion: Diesel-electric; 2 diesels; 1 electric motor; 1 shaft
Speed, knots: 10 surfaced; 17 submerged
Pennant numbers: GE S180, S181, S188 thru S191; DA S320, S321

REMARKS:

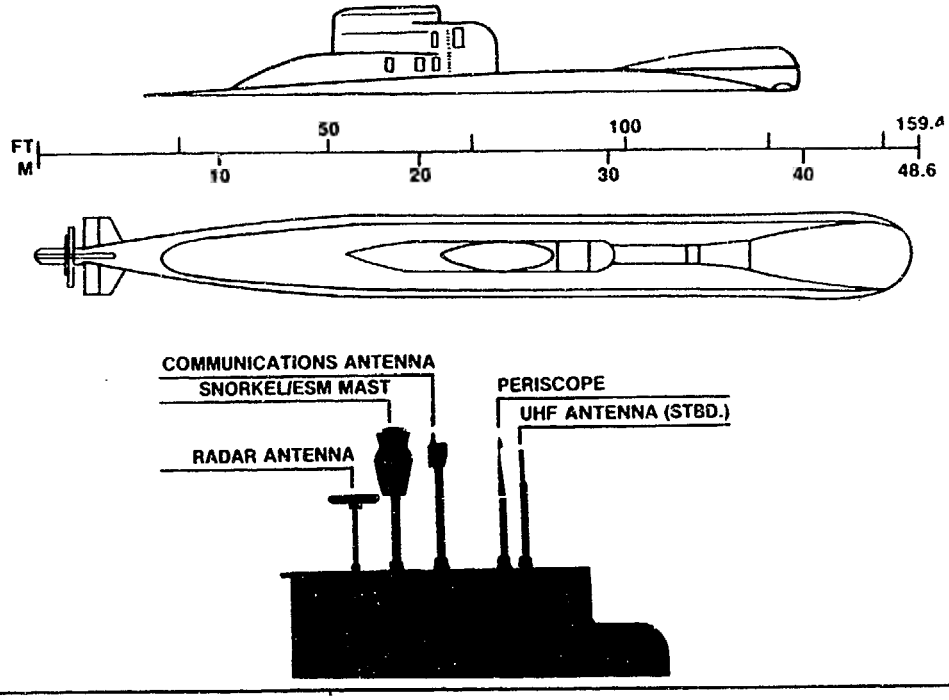
The TYPE 205 were the first submarines designed and built by the Federal Republic of Germany since the end of World War II. The first unit was commissiond in 1967 and there are a total of six units in the West German Navy. Two units, built in Denmark under license, are in service with the Royal Danish Navy. These two units are slightly longer and faster than the German version and are known as the NARHVALEN Class.

GE TYPE 206 SS



TYPE 206 SS

GE



MAJOR RECOGNITION FEATURES:

The large sail on the TYPE 206 is well aft of amidships. The sail is stepped and rounded fore and aft and the forward step is approximately three-fourths the height of the sail. The aft step is subsequently raked to the waterline. The bow is quite bulbous both vertically and horizontally. The TYPE 206's appearance is unique with a large bow preceding a flat deck followed by a large sail which is subsequently raked to the waterline without a trailing weatherdeck or stern fin.

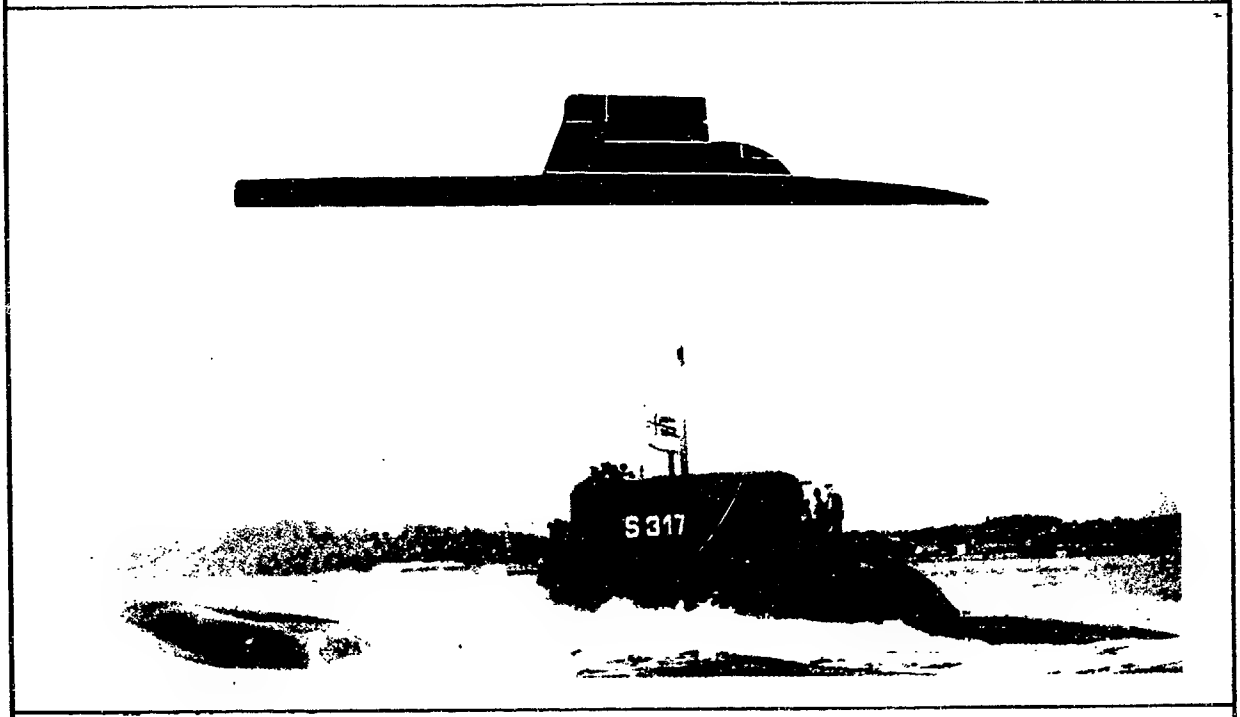
CHARACTERISTICS:

Displacement, tons: 450 surfaced; 498 submerged
Dimensions, feet (meters): 159.4 x 15.1 x 14.8 (48.6 x 4.6 x 4.5)
Torpedo tubes: 8 x 21 in (53.3 cm) (bow)
Propulsion: Diesel-electric; diesels; 1 main motor; 1 shaft
Speed, knots: 10 surfaced; 17 submerged
Pennant numbers: GE S170 thru S179, S192 thru S199

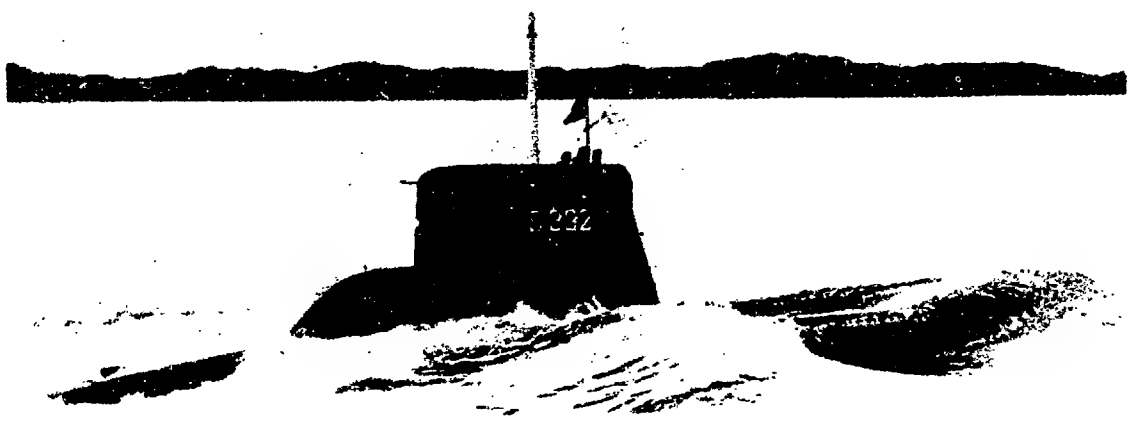
REMARKS:

The TYPE 206 Class, first unit commissioned 1973, consists of 18 units. All are in service with the West German Navy. The sail on the TYPE 206 is similar to that found on the TYPE 205 Class, the difference being the height of the forward step of the TYPE 205 Class is less than one-half of the sail height.

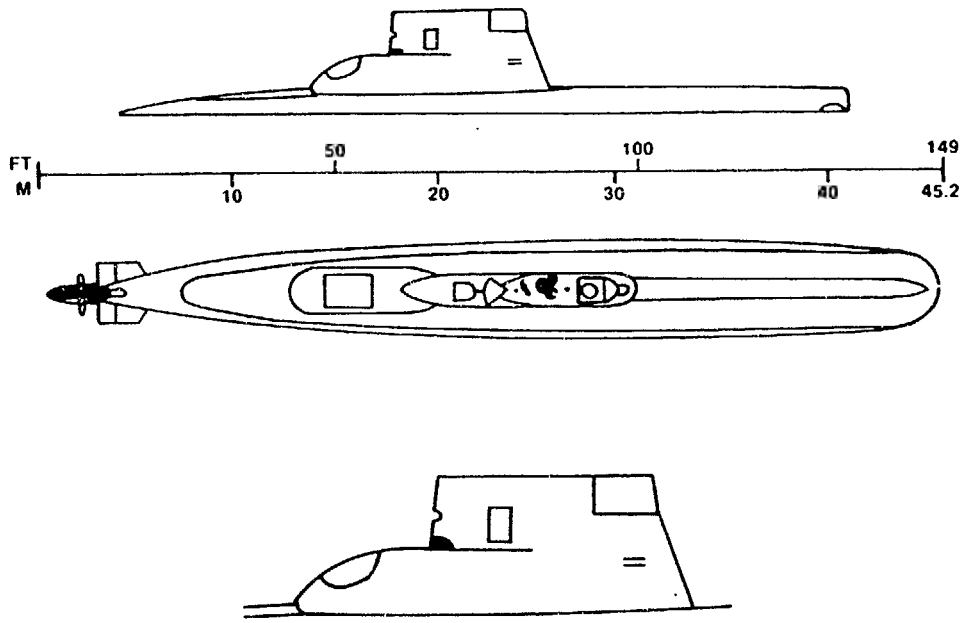
NO TYPE 207 SS



Additional Views Desired



TYPE 207 SS NO



MAJOR RECOGNITION FEATURES:

The sail on the TYPE 207 is well aft of amidships. The upper one-fourth of the leading edge is vertical and the lower three-fourths is raked. The trailing edge is vertical with a step down occurring about one-half way down the sail. The topline is level with rounded leading and trailing edges. The bow is bluntly squared. The weatherdeck slopes from the bow to the stern. The stern appears to be just aft of the sail.

CHARACTERISTICS:

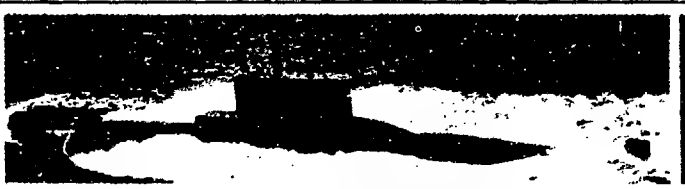
Displacement, tons: 370 surfaced; 435 submerged
Dimensions, feet (meters): 149 x 15 x 14 (45.2 x 4.6 x 4.3)
Torpedo tubes: 8 x 21 in (53.3 cm) (bow)
Propulsion: Diesel-electric; 2 diesels; electric drive; 1 shaft
Speed, knots: 10 surfaced; 17 submerged
Pennant numbers: NO S300 thru S309, S315 thru S319

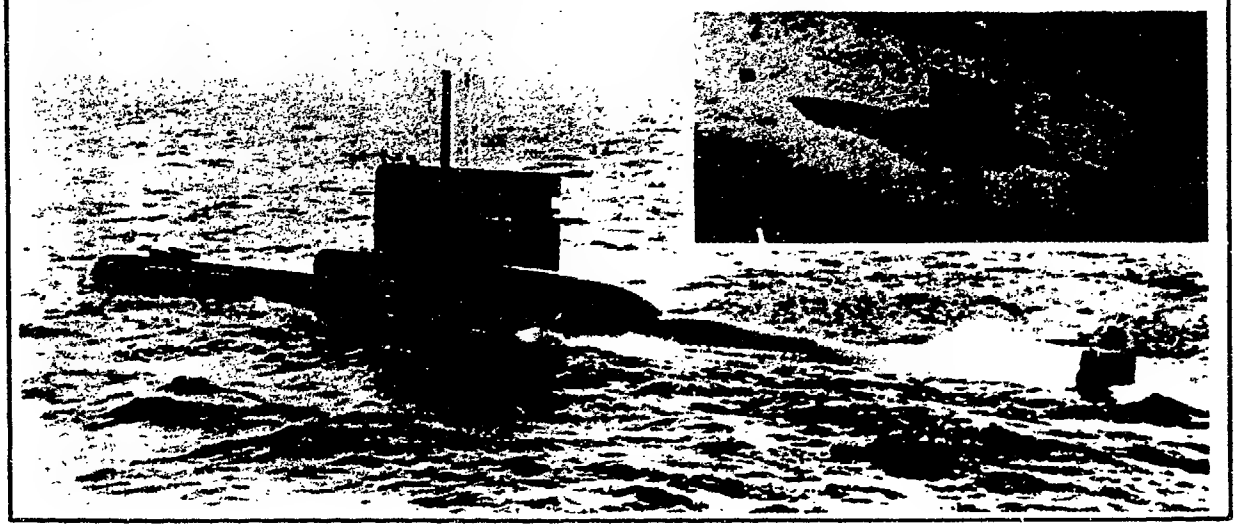
REMARKS:

The TYPE 207, built in West Germany with the first unit commissioned in 1964, consists of 15 units. All are in service with the Royal Norwegian Navy.

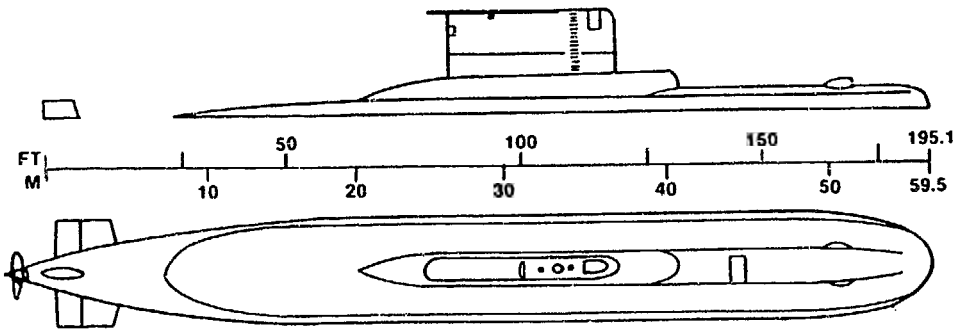
AR, CO, EC, GR, ID, PE, TU, VE

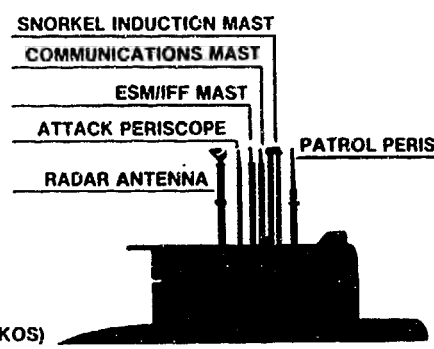
TYPE 209 SS



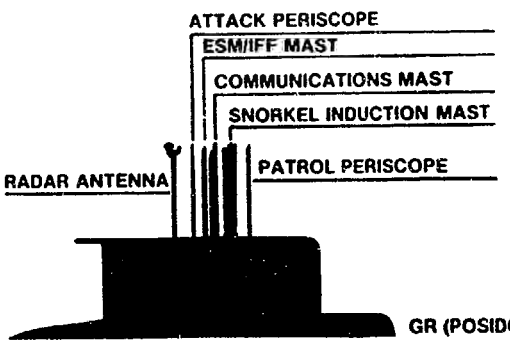


TYPE 209 SS — AR, CO, EC, GR, ID, PE, TU, VE





GR (GLAFKOS)



GR (POSIDON)

MAJOR RECOGNITION FEATURES:

The TYPE 209 has an extremely large sail in relation to visible hull size. The sail is stepped fore and aft, the lower step appearing as a streamlined tier extending beyond the limits of the upper rectangular tier on all sides. The upper tier has a vertical leading edge, a flat unbroken topline, and a vertical trailing edge. A fixed snorkel exhaust diffuser extends beyond the trailing edge at the upper corner. The hull deckline forward of the sail is also level to the blunt bow except for a bow sonar dome. The hull line aft of the sail curves into the water some distance forward of a prominent stern fin.

CHARACTERISTICS:

Displacement, tons: 1,260 surfaced; 1,390 submerged
Dimensions, feet (meters): 195.1 x 20.3 x 17.9 (59.5 x 6.2 x 5.5)
Torpedo tubes: 8 x 21 in (53.3 cm) (bow)
Propulsion: Diesel-electric; 4 diesels; 4 generators; 1 electric motor; 1 shaft
Speed, knots: 12 surfaced; 21.5 submerged
Pennant numbers: AR 31, 32; CO 28, 29; EC S11, S12; GR S110 thru S113, S116 thru S119; ID 401, 402; PE 31, 32, 45, 46; TU S347 thru S351; VE S-31, S-32

REMARKS:

The TYPE 209 was designed by West Germany specifically for export. Over thirty units have been constructed since the early 1970s. This class is active in the following countries: Argentina, Columbia, Ecuador, Greece, Indonesia, Peru, Turkey, and Venezuela. Displacement, dimensions, propulsion and speed vary among various units.

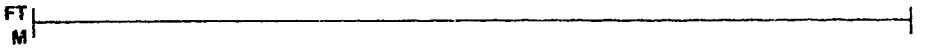
UR

TYPHOON SSBN

Beam View Desired

All Views Desired

TYPHOON SSBN UR



All Views Desired

MAJOR RECOGNITION FEATURES:

The sail on the TYPHOON is stepped-down both fore and aft. The sail is located slightly aft of amidships with the missile bay located forward of the sail. The bow is bluntly rounded. TYPHOON has a prominent stern fin.

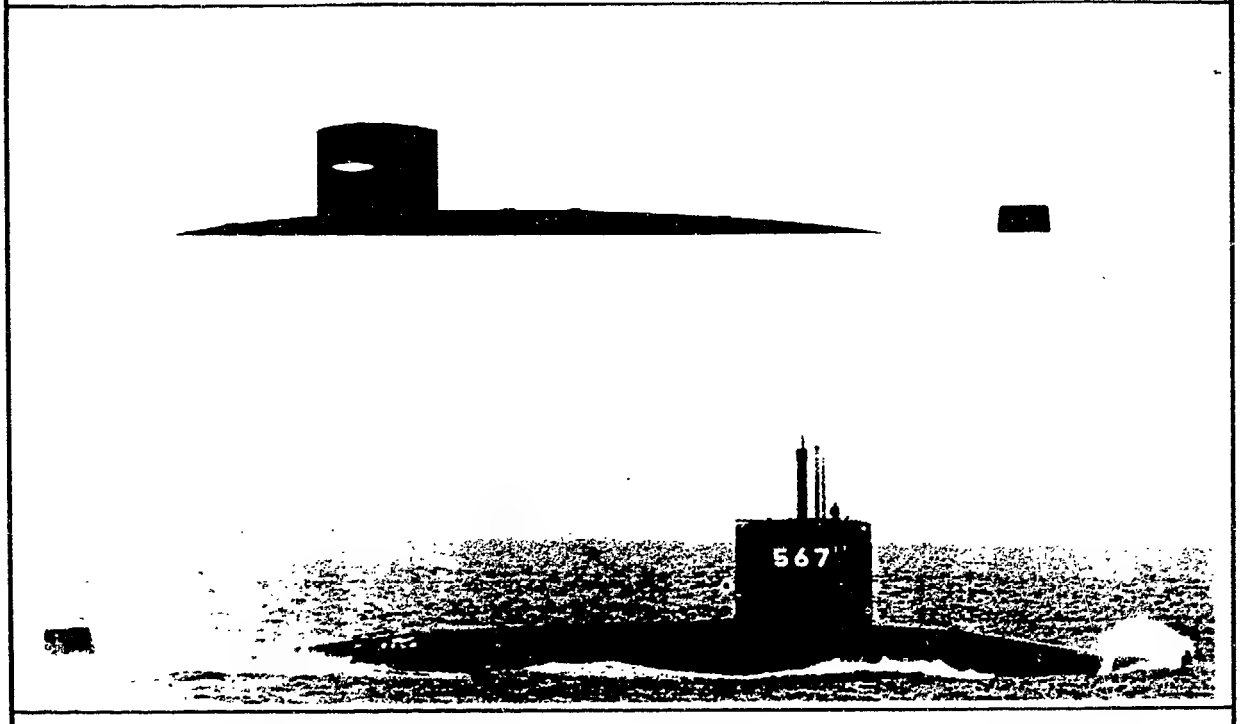
CHARACTERISTICS:

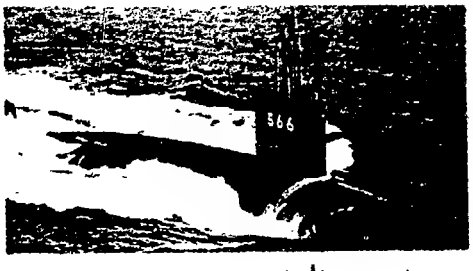
Displacement, tons: 25,000 submerged
Dimensions (wl), feet (meters): 560 (170)
Torpedo tubes: Unknown
Missiles: 20 tubes for SS-NX-20
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 24+ submerged

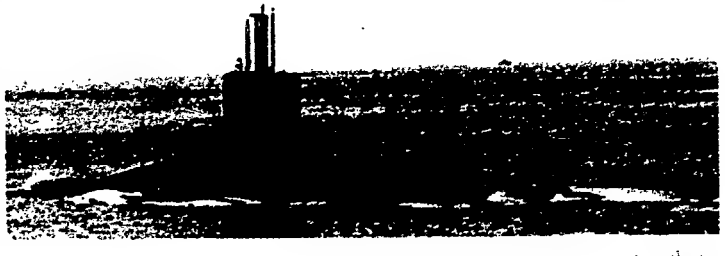
REMARKS:

The TYPHOON Class, the largest submarine ever constructed, was launched in 1980. Only one unit has been launched so far.

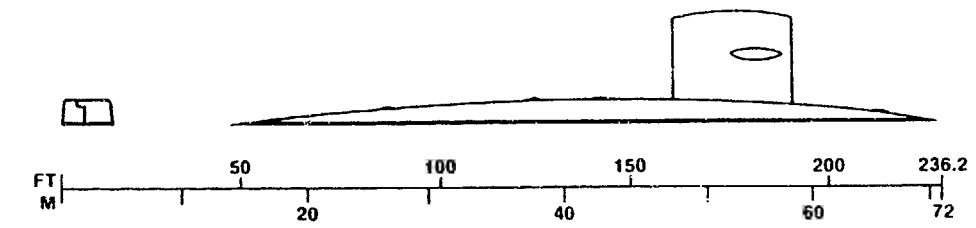
JA UZUSHIO SS



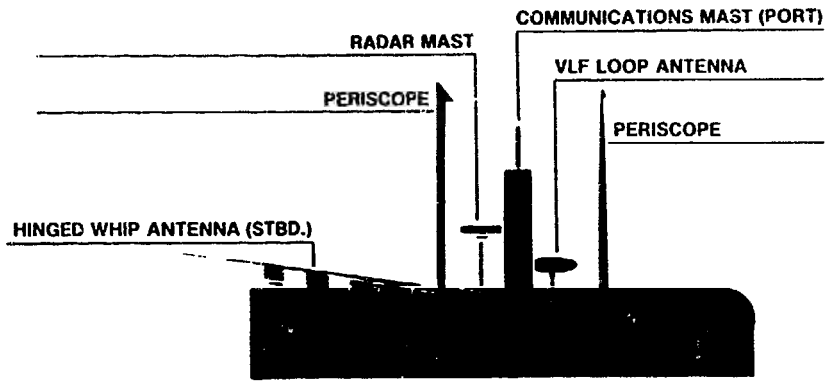




UZUSHIO SS JA



Top View Desired



MAJOR RECOGNITION FEATURES:

The UZUSHIO's rectangular sail with a convex topline is placed well forward on a teardrop-shaped hull which slopes gently into the water fore and aft without any break. A blunt stern fin and sail planes (located at the front midpoint of the sail) further define UZUSHIO. The primary recognition features of the UZUSHIO are virtually identical with those of the USS BARBEL Class. One of the principal ways of differentiating the UZUSHIO Class from the BARBEL Class is by comparing the pattern of the free-flooding ports. UZUSHIO uses the broken and irregular slot pattern; whereas, the BARBEL has a continuous line slot on each side of its hull.

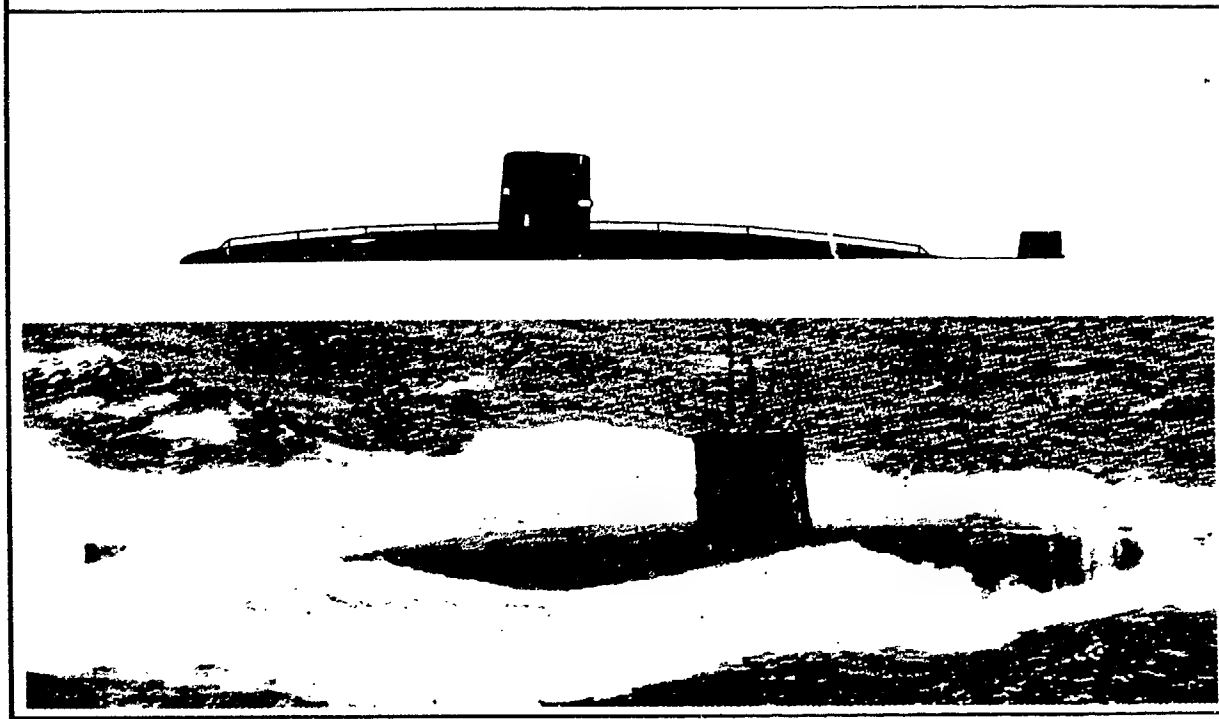
CHARACTERISTICS:

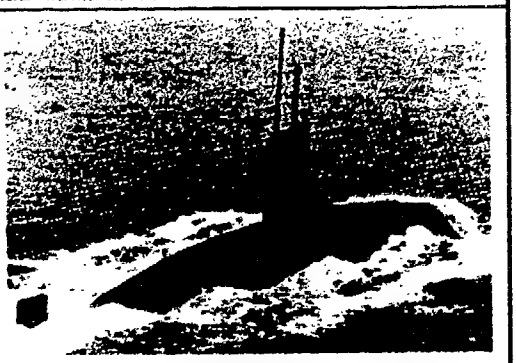
Displacement, tons: Unknown surfaced; Unknown submerged
Dimensions, feet (meters): 236.2 x 29.5 x 24.6 (72 x 9 x 7.5)
Torpedo tubes: 6 x 21 in (53.3 cm) (amidships)
Propulsion: Diesel-electric; 2 diesels; 1 electric motor; 1 shaft
Speed, knots: 12 surfaced; 20 submerged
Pennant numbers: 566 thru 572

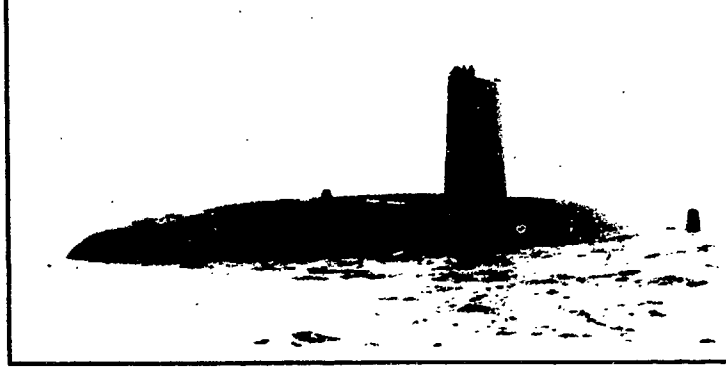
REMARKS:

The UZUSHIO Class, first unit commissioned in 1980, consists of seven units. All are in service with the Japanese Maritime Self-Defense Force.

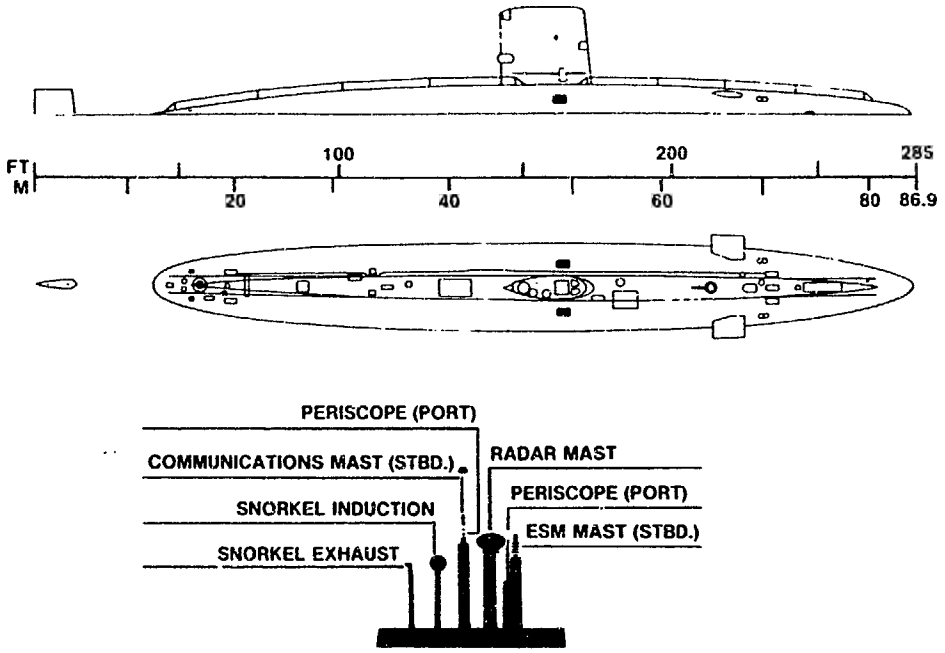
UK VALIANT SSN







VALIANT SSN UK



MAJOR RECOGNITION FEATURES:

The tall sail on the VALIANT Class is slightly forward of amidships. It has a slightly raked leading edge and a vertical trailing edge. The weatherdeck slopes gradually to the waterline both fore and aft. Bow planes, located midway between the bow and sail, are almost flush with the top of the weatherdeck. There is a prominent rectangular stern fin.

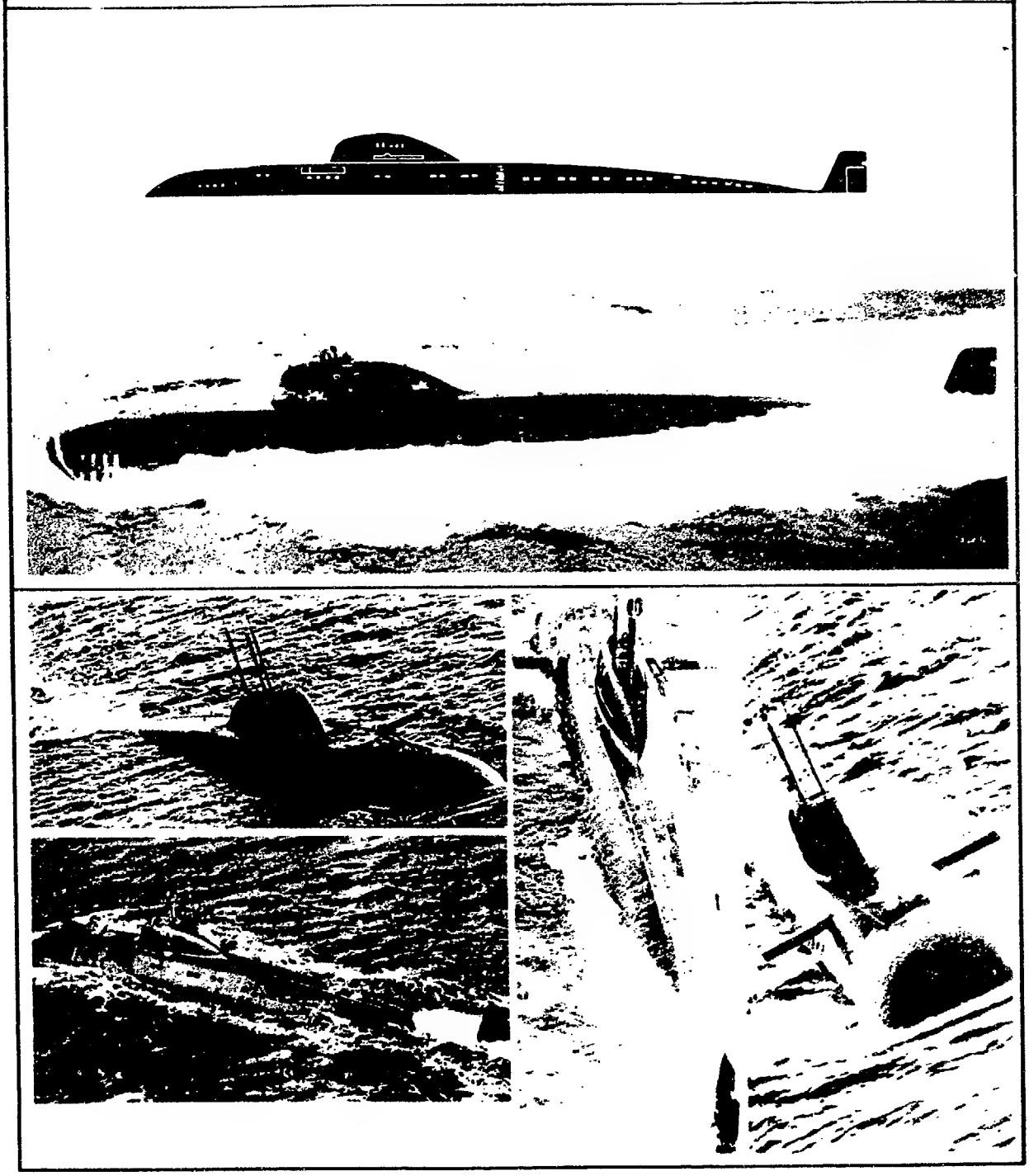
CHARACTERISTICS:

Displacement, tons: Unknown surfaced; 4,900 submerged
Dimensions, feet (meters): 285 x 33.2 x 27 (86.9 x 10.1 x 8.2)
Torpedo tubes: 6 x 21 in (53.3 cm)
Propulsion: Nuclear; 1 reactor; geared steam turbines; 1 shaft
Speed, knots: Unknown surfaced; 28 submerged
Pennant numbers: S46, S48, S50, S102, S103

REMARKS:

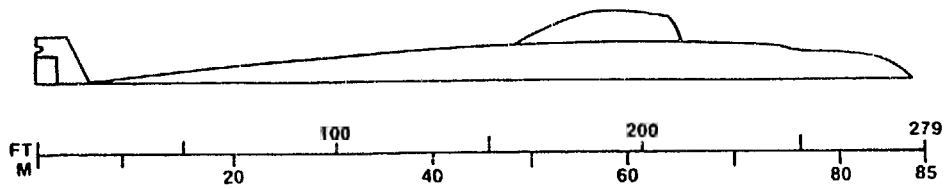
The British VALIANT Class, first unit commissioned in 1966, consists of five units. The last three units commissioned are also called the CHURCHILL Class. All are in service with the British Royal Navy.

UR VICTOR I SSN

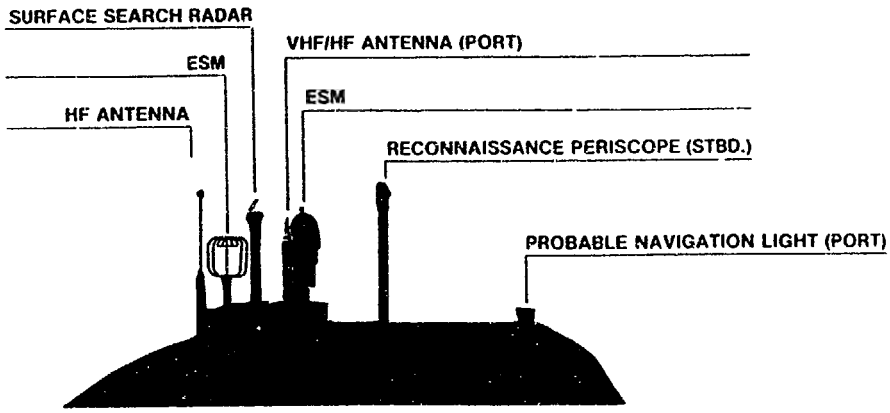


VICTOR I SSN

VICTOR I SSN UR



Top View Desired



MAJOR RECOGNITION FEATURES:

VICTOR I Class units have a streamlined "turtleback" sail in which the sloping leading and trailing edges blend with the deckline without forming a knuckle or corner. The sail is located forward of amidships. The class has a high, prominent tail fin and a broad, rounded bow; the overall appearance is short and stubby. A slight dip occurs on the weatherdeck midway between the sail and the bow. This feature does not appear on either the VICTOR II or the VICTOR III.

CHARACTERISTICS:

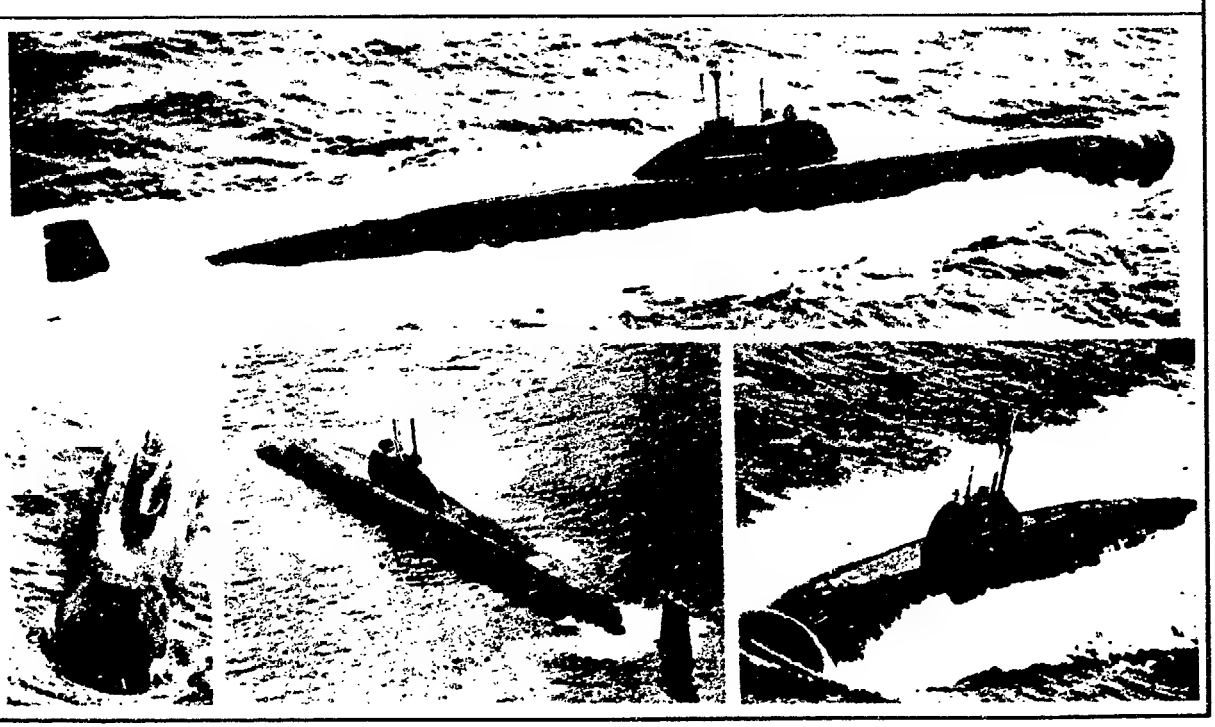
Displacement, tons: 4,300 surfaced; 5,100 submerged
Dimensions (wl), feet (meters): 279 x 32.8 (85 x 10)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 32 submerged

REMARKS:

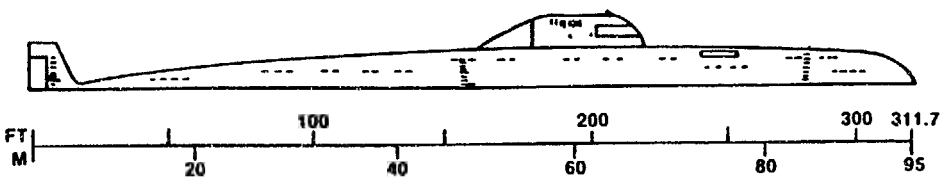
The first VICTOR I Class was completed by the Soviet Union in 1967. This high-speed attack submarine was developed as a follow-on to the NOVEMBER Class, and was the first Soviet submarine with an ALBACORE type hull. A total of sixteen units have been produced.

UR VICTOR II SSN

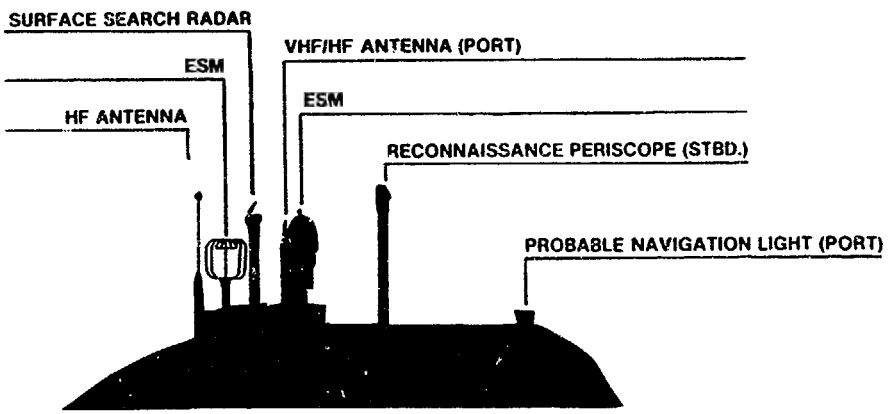
Beam View Desired



VICTOR II SSN UR



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the Soviet VICTOR II, located forward of amidships, is of the turtleback design. The bow is rounded. The weatherdeck is almost level and aft of the sail it begins to slope gradually to where it rounds up to a prominent stern fin at the waterline. Bow planes are located near the top of the weatherdeck midway between the bow and the center of the sail. VICTOR II does not have a dip in the forward weatherdeck which is a feature of the VICTOR I.

CHARACTERISTICS:

Displacement, tons: 4,600 surfaced; 5,680 submerged
Dimensions (wl), feet (meters): 311.7 x 32.8 (95 x 10)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 31 submerged

REMARKS:

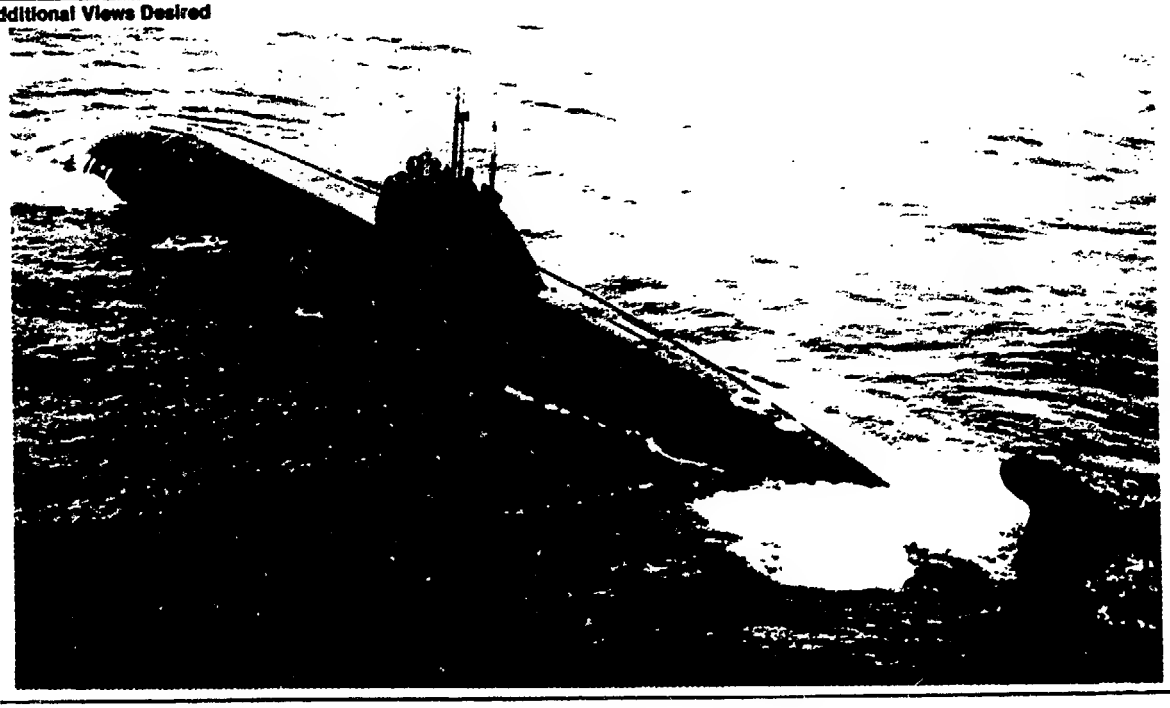
The VICTOR II Class is an enlarged (15 feet longer) version of the VICTOR I Class. Approximately seven units are now in service, having first appeared in 1972.

UR

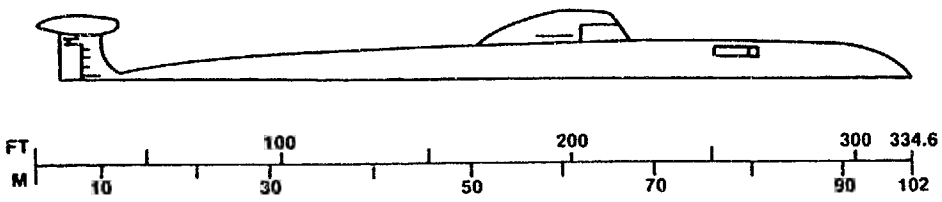
VICTOR III SSN

Beam View Desired

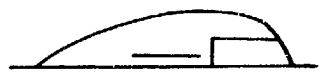
Additional Views Desired



VICTOR III SSN **UR**



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the VICTOR III, located forward of amidships, is of the turtleback design. The bow is rounded. The weatherdeck is almost level. Aft of the sail it begins to slope down gradually to the waterline where it rounds up to a prominent stern fin. A distinctive chamber is mounted atop the stern fin. Bow planes are located near the top of the weatherdeck between the bow and the sail.

CHARACTERISTICS:

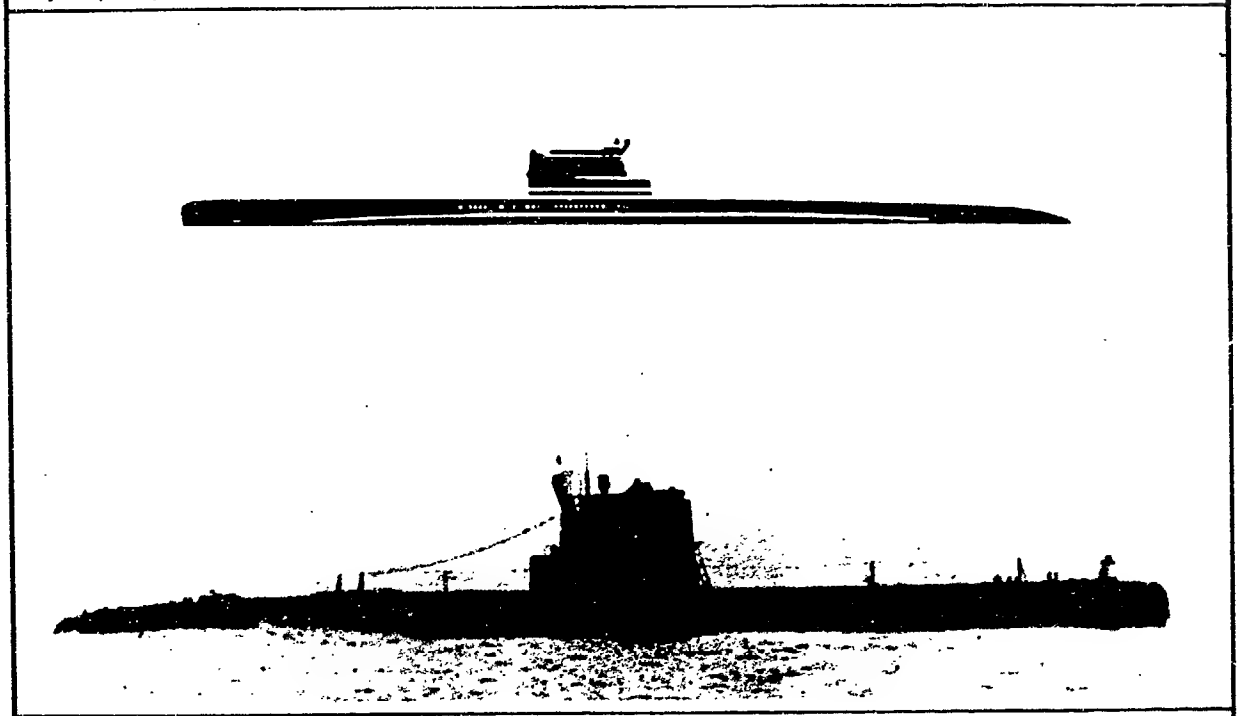
Displacement, tons: 4,900 surfaced; approximately 6,200 submerged
Dimensions (wl), feet (meters): 334.6 x 32.8 (102 x 10)
Torpedo tubes: 6 x 21 in (53.3 cm) may be fitted for SS-N-15
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 31 submerged

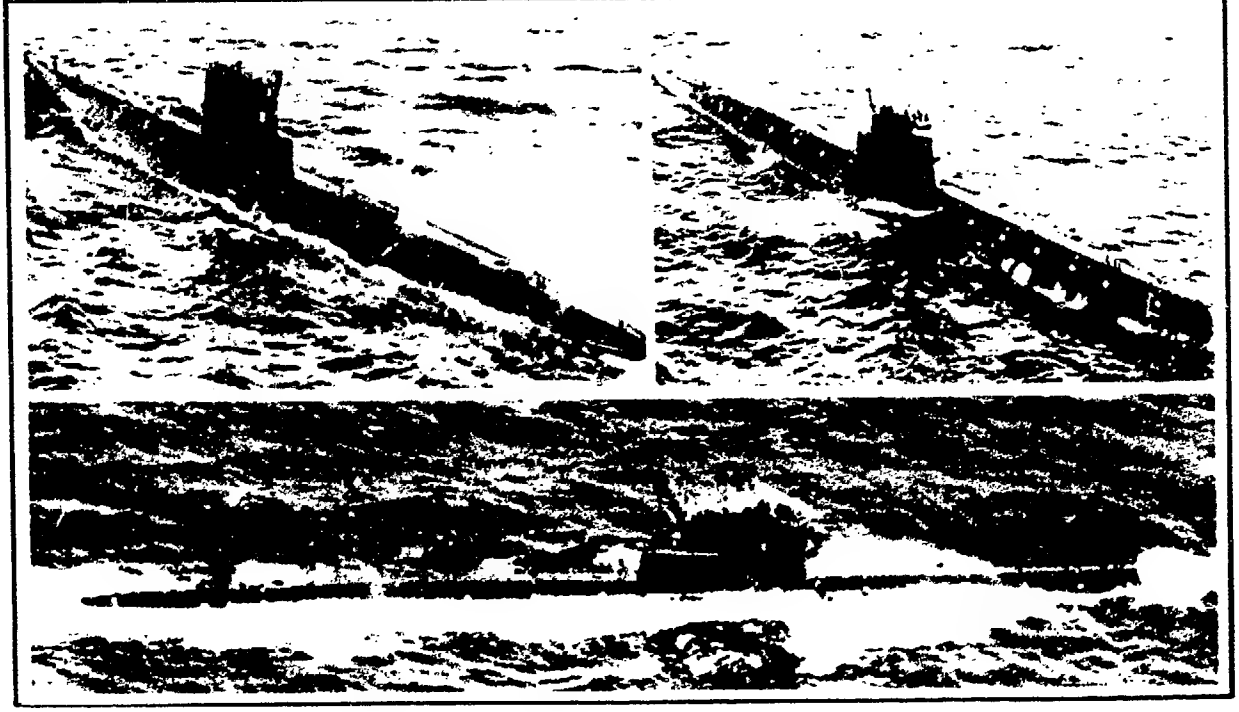
REMARKS:

The VICTOR III Class, first unit completed in 1979, is an improvement on the VICTOR II Class. Very similar in appearance to the VICTOR II Class, the stern stabilizer chamber feature of VICTOR III is unique.

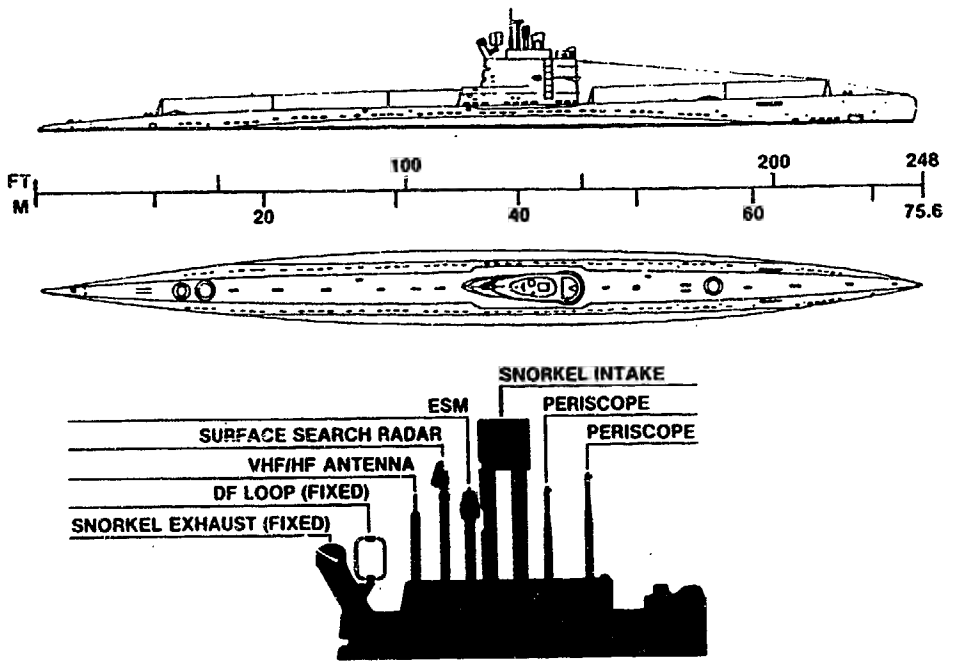
AL, BU, CH, CU, EG, ID, KN, PL, UR

WHISKEY SS





WHISKEY SS — AL, BU, CH, CU, EG, ID, KN, PL, UR



MAJOR RECOGNITION FEATURES:

The sail of the WHISKEY Class submarine is located forward of amidships. Except for a few early units which had steps fore and aft on the sail, all have a near-vertical leading edge and a stepped-down trailing edge. A fixed snorkel exhaust angles upward at the after extremity of the upper tier. The bow is rounded and the weatherdeck slopes gradually from bow to stern. Retractable bow planes are located high on the weatherdeck well back of the stem.

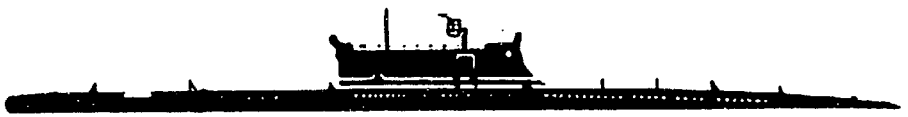
CHARACTERISTICS:

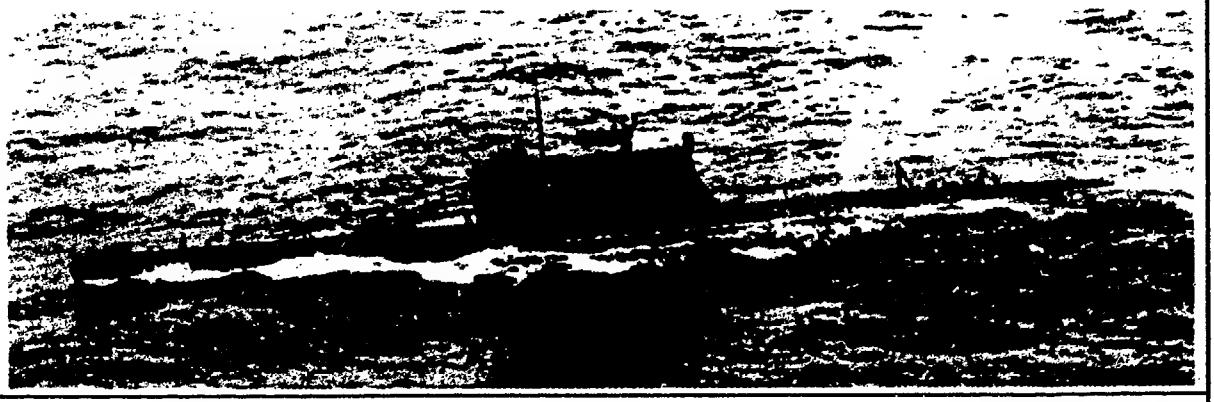
Displacement, tons: 1,080 surfaced; 1,350 submerged
Dimensions (wl), feet (meters): 248 x 19 (75.6 x 5.8)
Torpedo tubes: 4 x 21 in (53.3 cm) (bow), 2 x 16 in (40.6 cm) (stern)
Propulsion: Diesel-electric; 2 diesels; 2 electric motors; 2 shafts
Speed, knots: 18 surfaced; 14 submerged
Pennant numbers: AL 512, 514, 516; BU 11, 12; CH 119, 120, 122, 123, 127, 129, 131, 201 thru 208, 221, 241, 243, 244, 265, 266; EG 415, 418, 421, 432, 455, 477; ID 410, 412; PL 292 thru 295

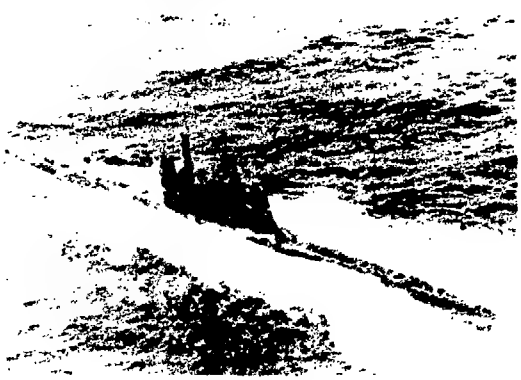
REMARKS:

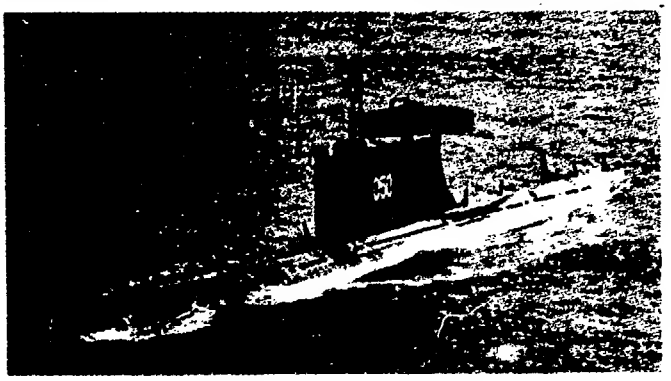
Over two hundred and thirty WHISKEY Class submarines were constructed during the 1950s by the Soviet Union. Approximately fifty units were transfered to the navies of Albania, Bulgaria, China, Cuba, Egypt, Indonesia, North Korea, and Poland.

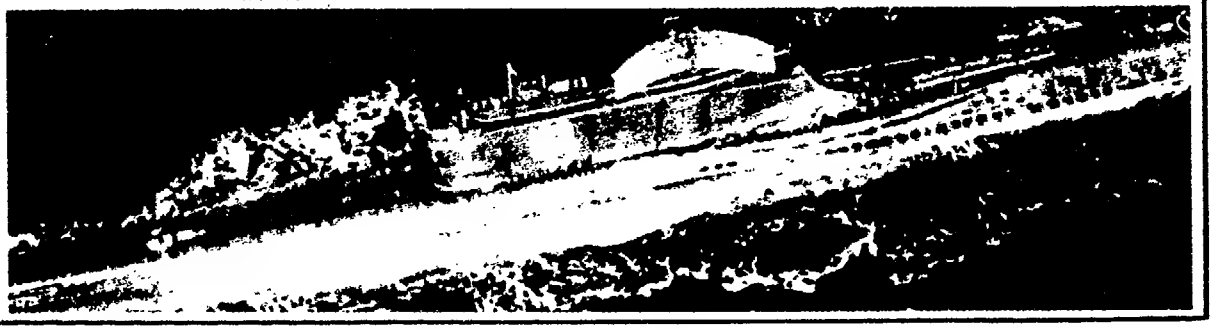
UR WHISKEY CANVAS BAG SSR



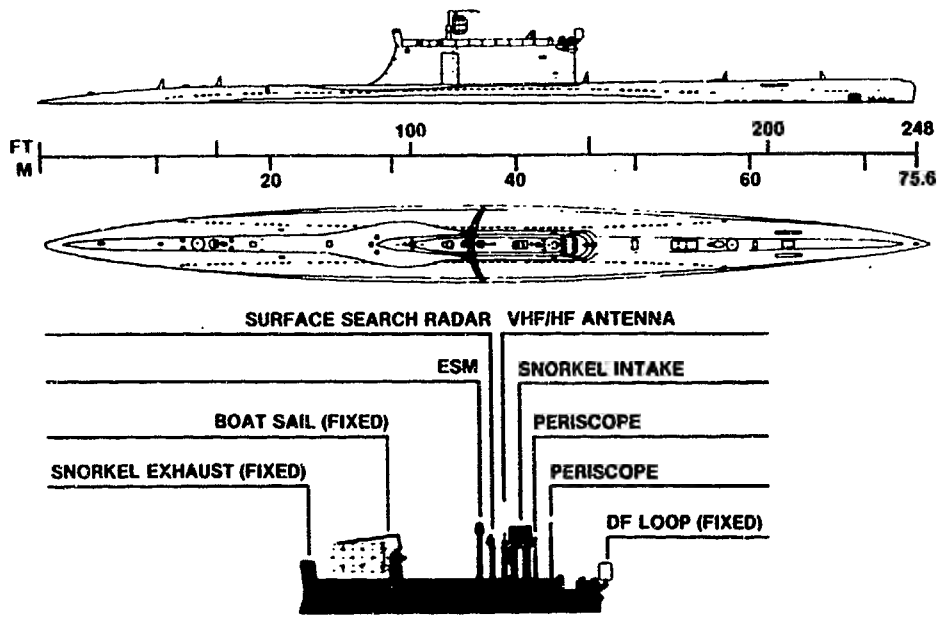








WHISKEY CANVAS BAG SSR UR



MAJOR RECOGNITION FEATURES:

WHISKEY CANVAS BAG is readily identified by its uniquely modified sail, which is amidships, and the permanently affixed radar antenna atop the sail. The radar can be rotated and folded, but not retracted. The sail step aft has been eliminated, the projecting fixed snorkel exhaust moved further aft, and the trailing edge modified to form a concave curve. The bow is rounded. The weatherdeck slopes gradually from bow to stern.

CHARACTERISTICS:

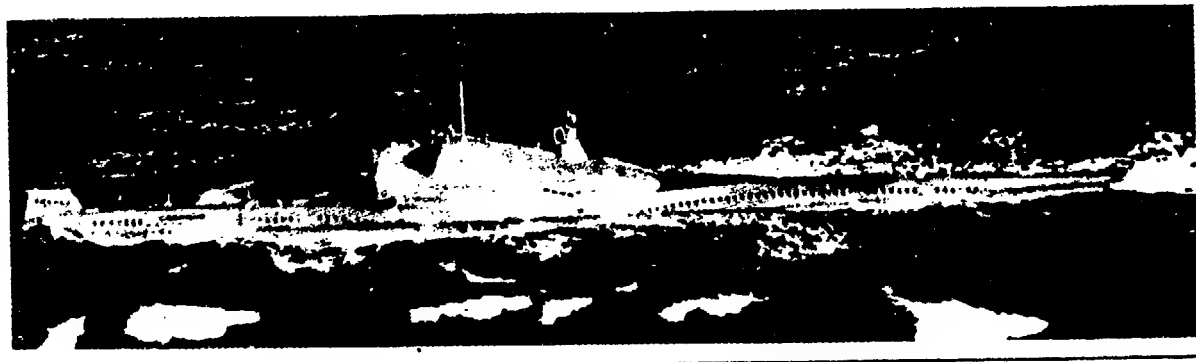
Displacement, tons: 1,050 surfaced; 1,350 submerged
Dimensions (wl), feet (meters): 248 x 19 (75.6 x 5.8)
Torpedo tubes: 4 x 21 in (53.3 cm) (bow); 2 x 16 in (40.6 cm) (stern)
Propulsion: Diesel-electric; 2 diesels; 2 electric motors; 2 shafts
Speed, knots: 18 surfaced; 14 submerged

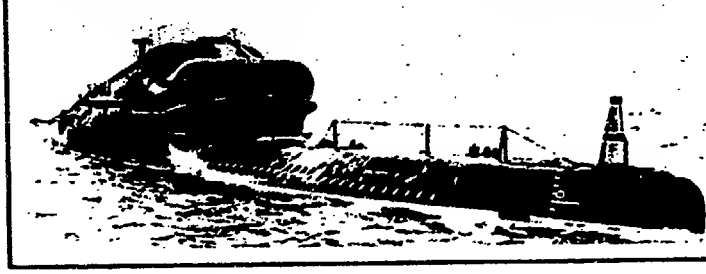
REMARKS:

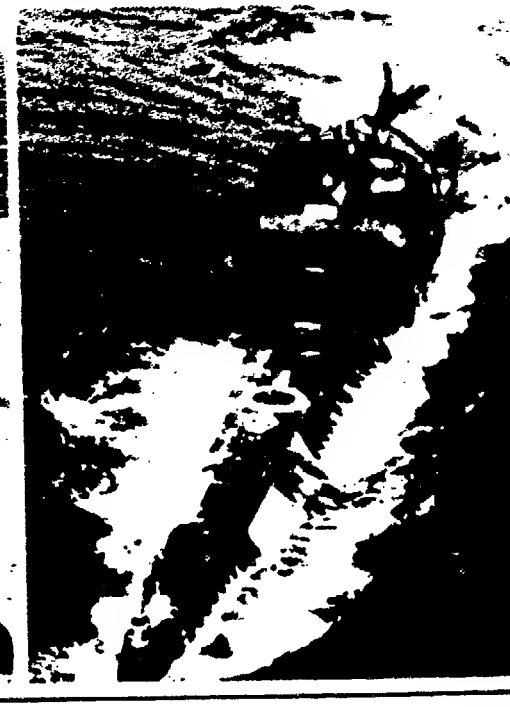
Five WHISKEY Class attack submarines were converted to radar pickets in the late 1950s and early 1960s. This class of submarines derived its name from the fact that when it was first seen the radar antenna was covered with canvas. The antenna is hinged and can be folded in the middle prior to diving.

UR

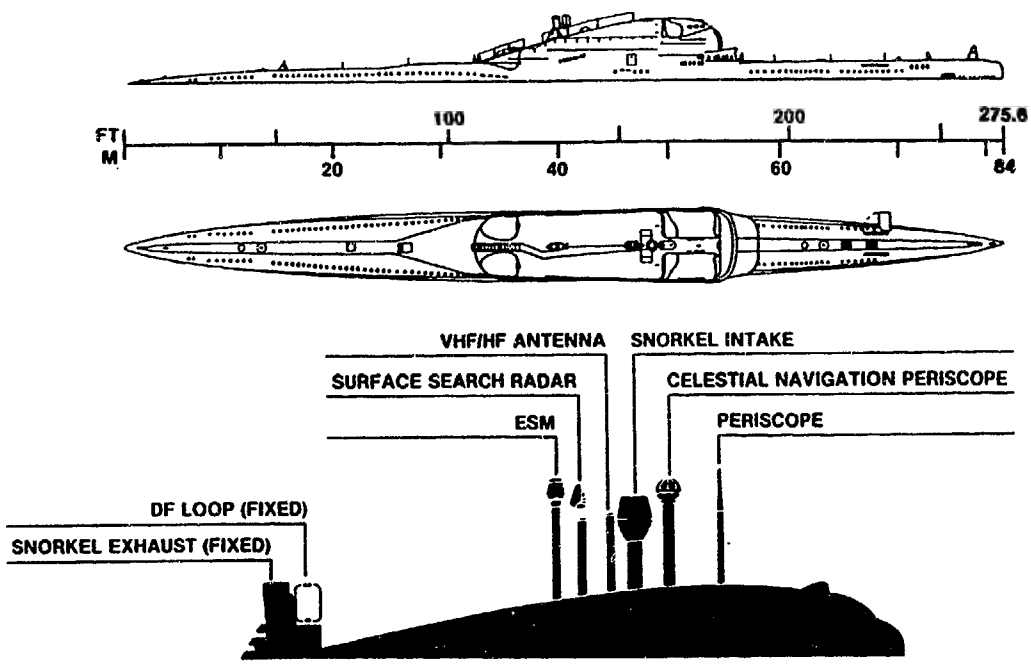
WHISKEY LONG BIN SSG







WHISKEY LONG BIN SSG UR



MAJOR RECOGNITION FEATURES:

WHISKEY LONG BIN conversions are such oddities that identification should pose no problem. The enlarged sail of LONG BIN is a unique identification feature. The sail which is amidships extends about one-third of the entire submarine length. The topline slopes gently downward aft to join the deckline. The forward portion of the sail is nearly vertical in profile, but most views reveal large cavities and an angular wave deflector forward. A large fixed installation near the after end of the sail projects above the sail proper and houses the snorkel exhaust.

CHARACTERISTICS:

Displacement, tons: 1,200 surfaced; 1,500 submerged
Dimensions (wl), feet (meters): 275.6 x 21.3 (84 x 6.5)
Torpedo tubes: 4 x 21 in (53.3 cm) (bow)
Missiles: 4 tubes for SS-N-3
Propulsion: Diesel-electric; 2 diesels; electric motors; 2 shafts
Speed, knots: 18 surfaced; 12 submerged

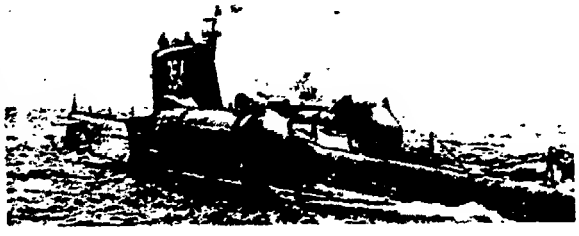
REMARKS:

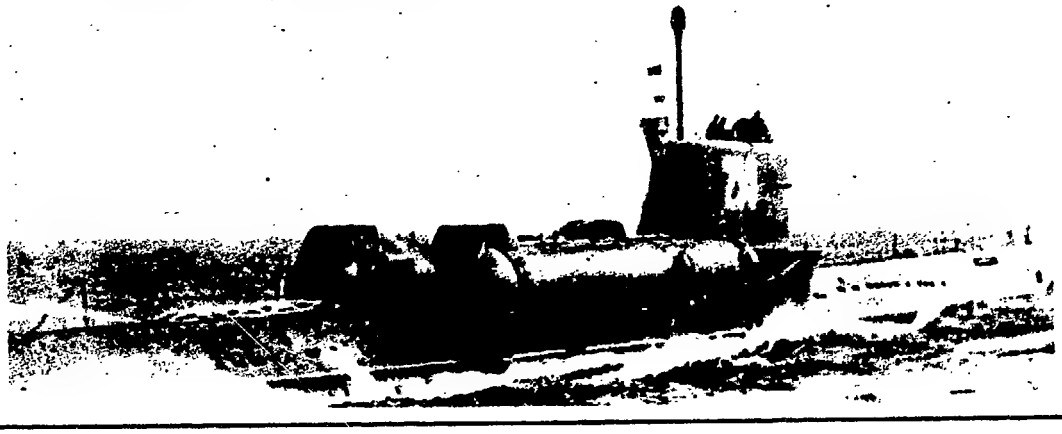
Seven WHISKEY Class diesel attack submarines underwent extensive conversion for surface-to-surface missile operations in the late 1950s and early 1960s. Four SS-N-3 missiles are mounted in the sail in a permanently elevated position. The submarine must surface to fire its missiles. Three units are operational.

UR

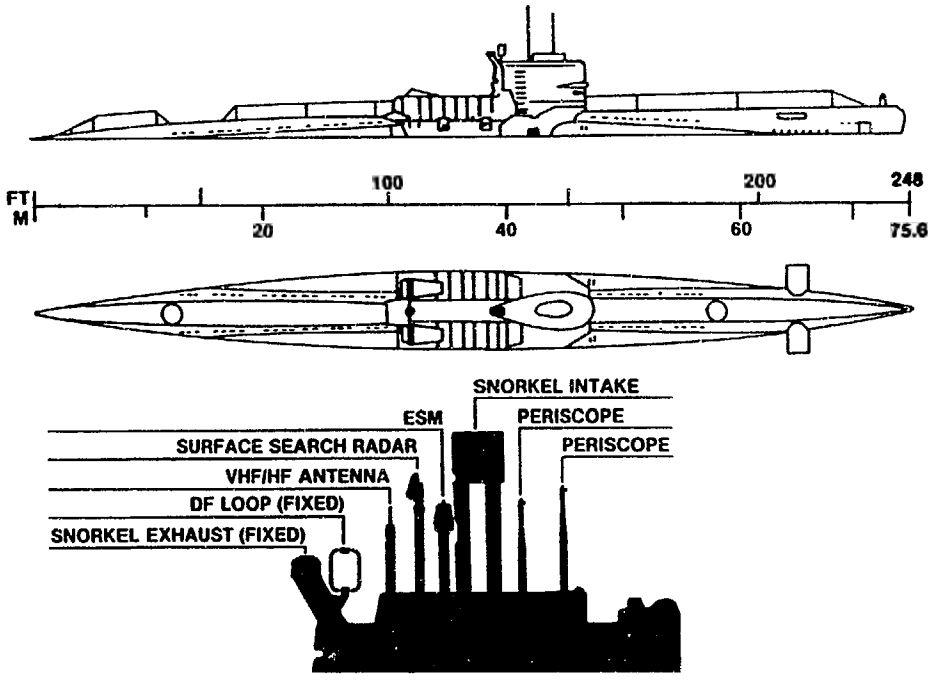
WHISKEY TWIN CYLINDER SSG

Beam View Desired





WHISKEY TWIN CYLINDER SSG UR



MAJOR RECOGNITION FEATURES:

WHISKEY TWIN CYLINDER conversion units are such oddities that identification should pose no problem. TWIN CYLINDER has a conventional WHISKEY sail with its projecting snorkel exhaust, but the profile is drastically altered by a pair of huge missile tubes installed on the deck aft of the sail. Large fairings at the bow end of the missile tubes protect the tubes from wave action and deflect the missile exhaust upward. No other submarine has a similar appearance.

CHARACTERISTICS:

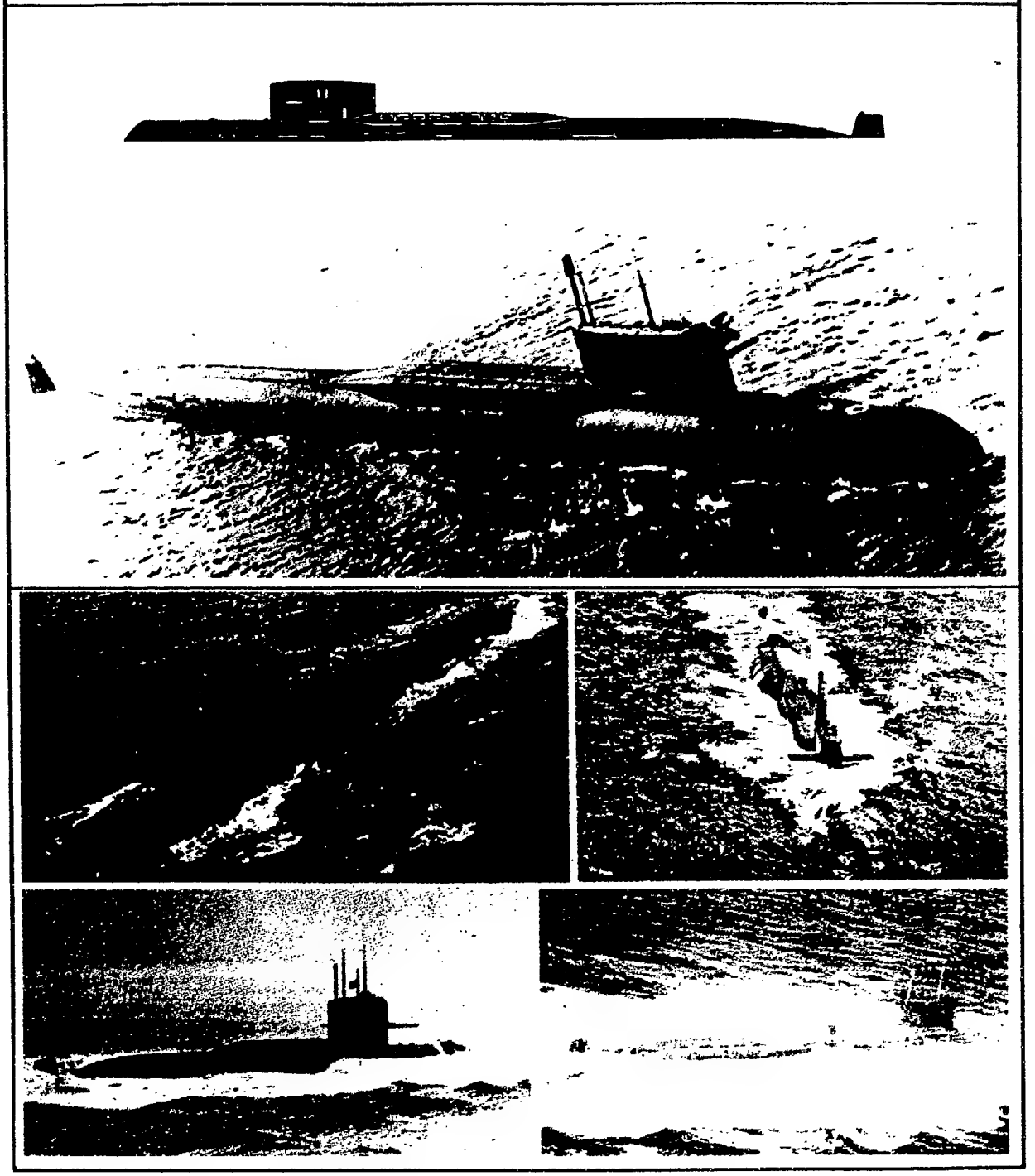
Displacement, tons: 1,050 surfaced; 1,400 submerged
Dimensions (wl), feet (meters): 248 x 23 (75.6 x 7)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Missiles: 2 tubes for SS-N-3
Propulsion: Diesel-electric; 2 diesels; electric motors
Speed, knots: 18 surfaced; 13 submerged

REMARKS:

Five WHISKEY SSs underwent conversion to the WHISKEY TWIN CYLINDER Class in the late 1950s. Two SS-N-3 cruise missile launch tubes were affixed to the hull, one on either side of the sail. The WHISKEY TWIN CYLINDER must surface to fire its missiles, which are the only surface-to-surface missiles fired over the stern of a Soviet submarine. Two units are active.

UR

YANKEE I SSBN



YANKEE I SSBN

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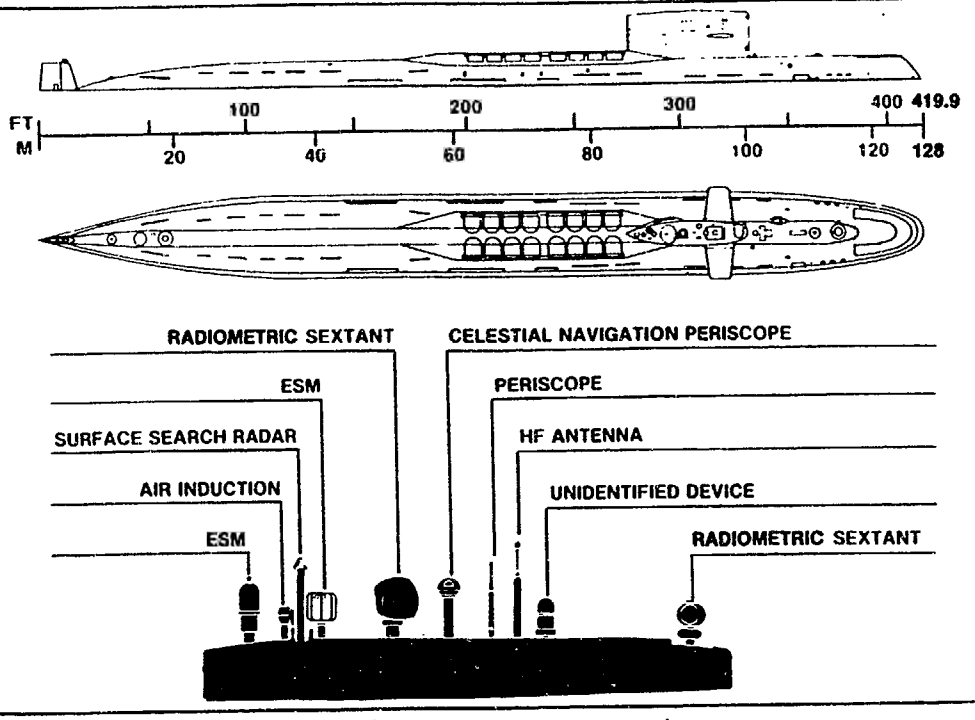


MAJOR RECOGNITION FEATURES:

The YANKEE I Class has a streamlined appearance and a torpedo-shaped bow. The rectangular sail is situated well forward of amidships and has sail planes which are just aft of the leading edge and located approximately one-half way up the sail. There is a turtleback on the hull aft of the sail which covers the missile compartment, and a prominent vertical stabilizer/rudder appears at the hull waterline. The YANKEE I is very similar in appearance to the DELTA Class, but differs in the height of the turtleback aft of the sail; the YANKEE I's turtleback is lower.

CHARACTERISTICS:

Displacement, tons: 7,800 surfaced; 9,300 submerged
Dimensions (wl), feet (meters): 419.9 x 36 (128 x 11)
Torpedo tubes: 6 x 21 in (53.3 cm)
Missiles: 16 tubes for SS-N-6 SLBMs
Propulsion: Nuclear
Speed, knots: Unknown surfaced; 30 submerged

REMARKS:

The YANKEE I, which became operational in 1968, was the first modern-design SSBN in the Soviet Navy. Several YANKEE Is were converted to SSNs by removing the missile section which shortened the length by approximately 95 feet. These units are known as YANKEE SSNs.

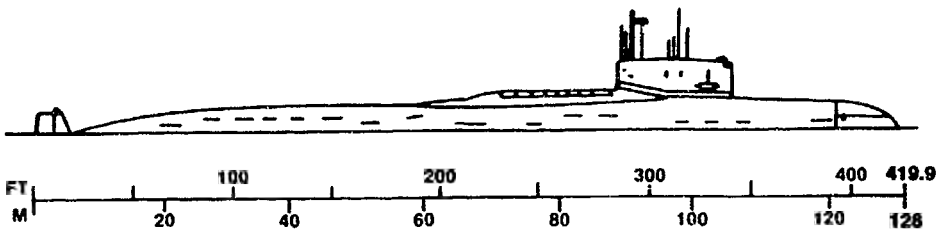
UR

YANKEE II SSBN

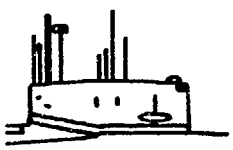
Beam View Desired

All Views Desired

YANKEE II SSBN UR



Top View Desired



MAJOR RECOGNITION FEATURES:

The rectangular sail on the YANKEE II is situated well forward of amidships and has sail planes which are just aft of the leading edge and located approximately one-half way up the sail. There is a turtleback on the hull, aft of the sail, which covers the missile compartment and a prominent vertical stabilizer/rudder appears at the hull waterline. The bow rounds down to the waterline.

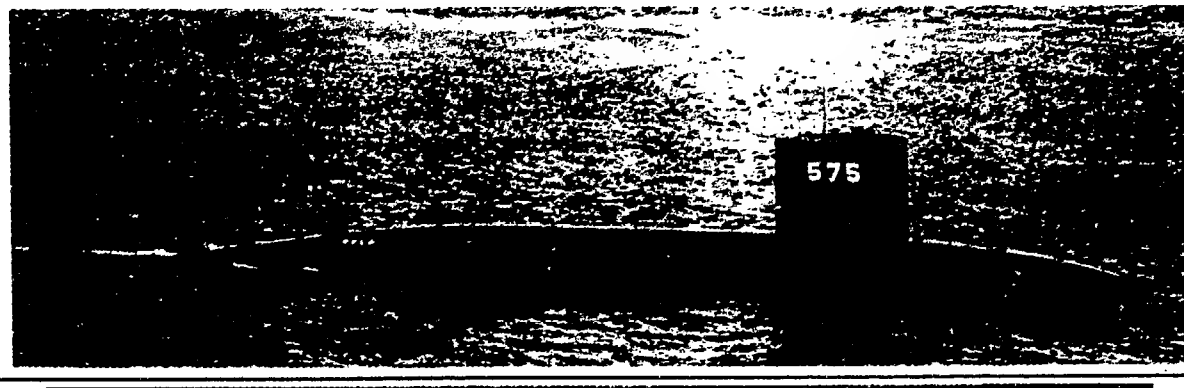
CHARACTERISTICS:

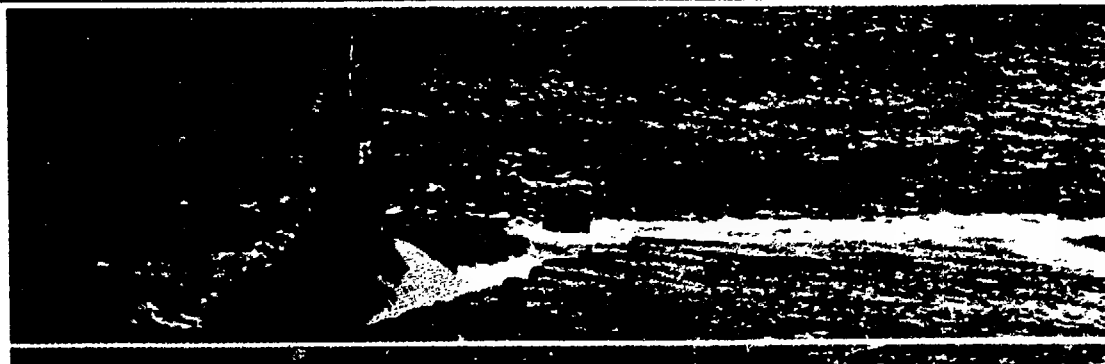
Displacement, tons: 7,800 surfaced; 9,300 submerged
Dimensions (wl), feet (meters): 419.9 x 36 (128 x 11)
Torpedo tubes: 6 x 21 in (53.3 cm)
Missiles: 12 tubes for SS-NX-17 SLBMs
Propulsion: Nuclear
Speed, knots: 20 surfaced; 26.5 submerged

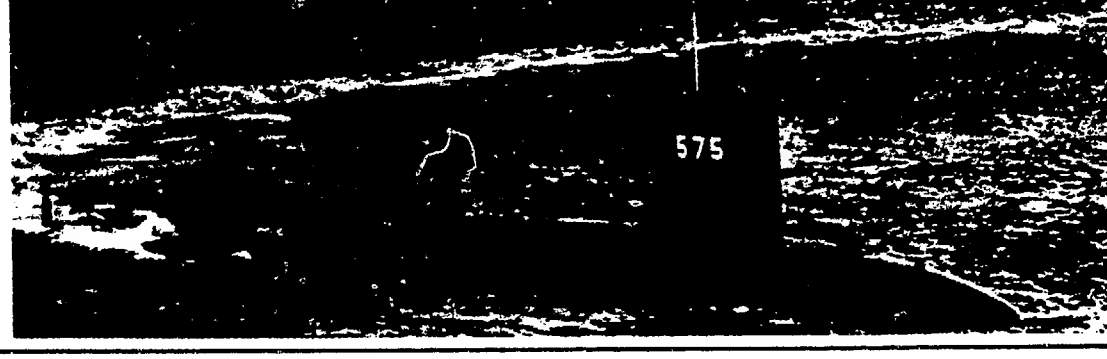
REMARKS:

The one-of-a-kind YANKEE II is a conversion which was completed in the mid-1970s. It is probably being employed in a developmental role.

JA YUUSHIO SS

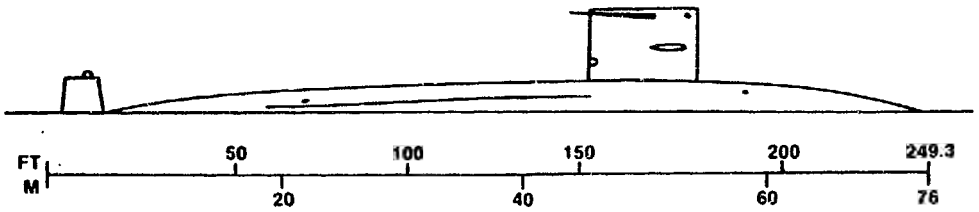




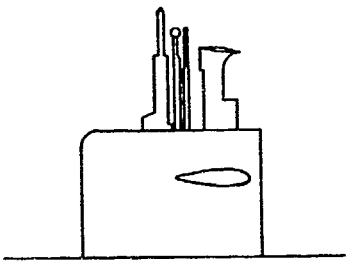


YUUSHIO SS

JA



Top View Desired



MAJOR RECOGNITION FEATURES:

The sail on the YUUSHIO Class is well forward of amidships. The sail has vertical leading and trailing edges and a rounded topline. Sail planes are located just aft of the leading edge and halfway up the sail. The weatherdeck is clear and slopes gradually to the waterline fore and aft. There is a prominent stern fin aft. The sail planes are a primary distinguishing feature between the YUUSHIO and UZUSHIO Classes. The UZUSHIO Class sail planes are located closer to the leading edge. Another distinguishing feature between YUUSHIO and UZUSHIO Classes is that the YUUSHIO is fourteen feet longer between the sail's trailing edge and the leading edge of the stern fin. The YUUSHIO also has a protrusion on sail trailing edge. See UZUSHIO Class.

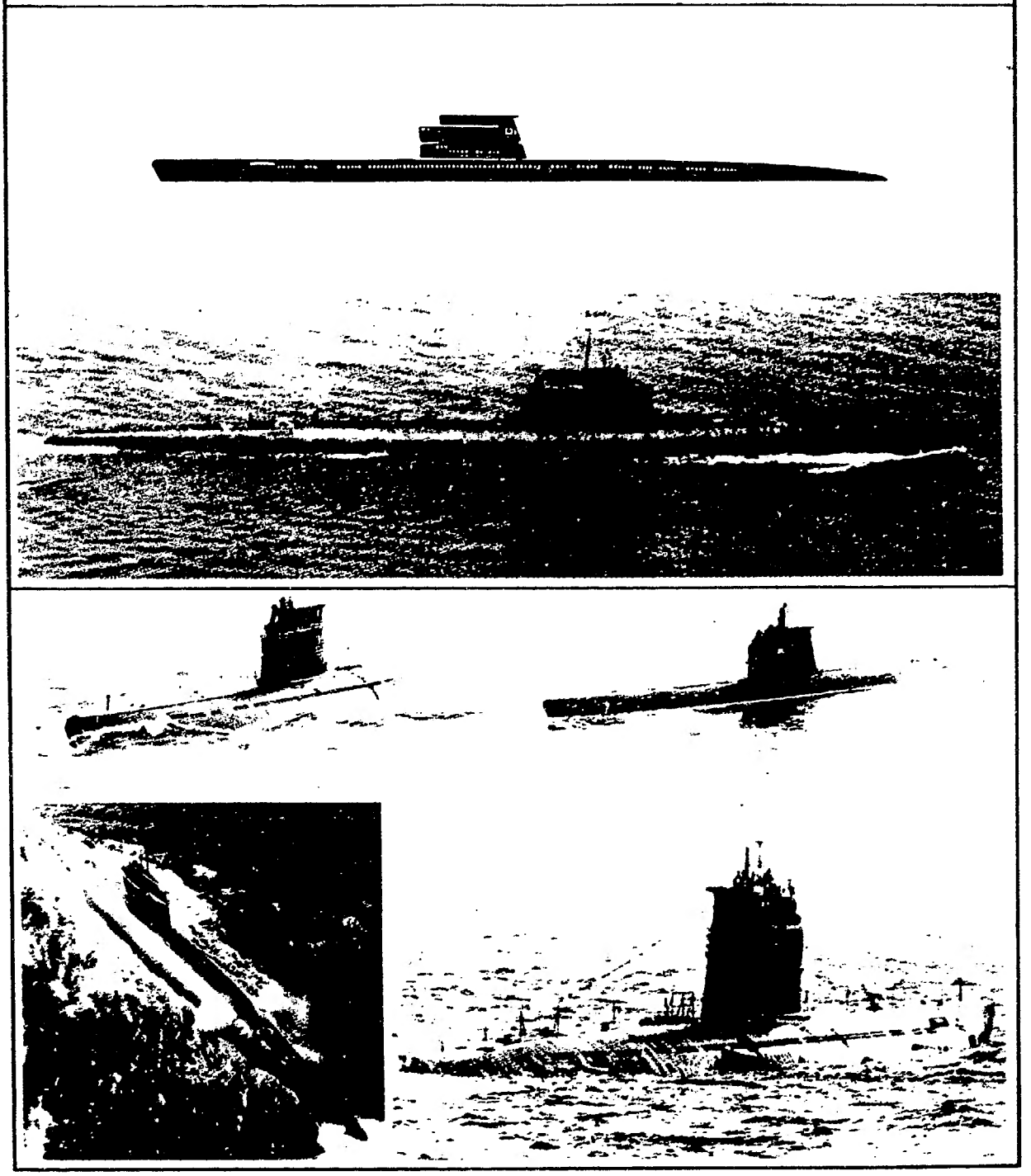
CHARACTERISTICS:

Displacement, tons: 2,200 surfaced; unknown submerged
Dimensions, feet (meters): 249.3 x 32.5 x 24.6 (76 x 9.9 x 7.5)
Torpedo tubes: 6 x 21 in (53.3 cm) (amidships)
Propulsion: Diesel-electric; 2 diesels; 1 electric motor; 1 shaft
Speed, knots: 13 surfaced; 20 submerged
Pennant numbers: 573 thru 575

REMARKS:

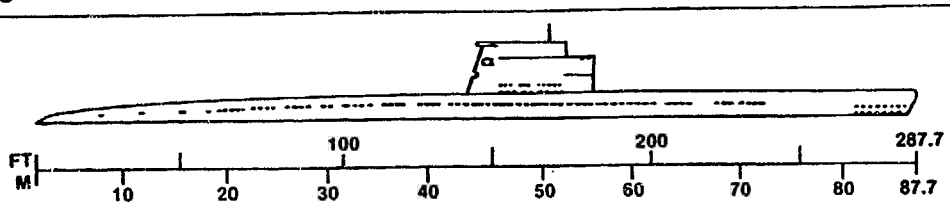
The YUUSHIO Class, first unit commissioned in 1980, is an enlarged version of the UZUSHIO Class. There are presently three units in this class. All are in service with the Japanese Maritime Self-Defense Force.

UR ZULU IV SS

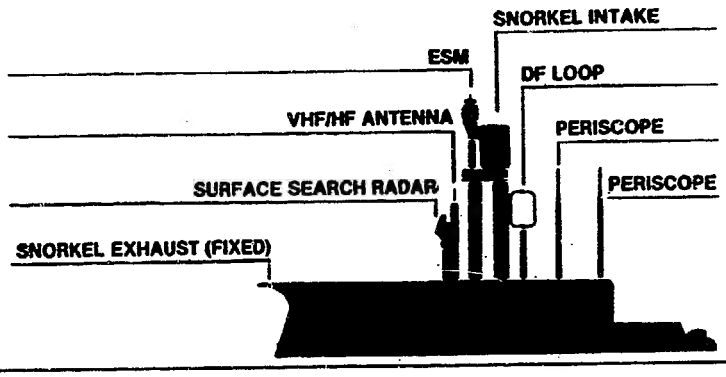


ZULU IV SS

UR



Top View Desired



MAJOR RECOGNITION FEATURES:

The ZULU IV has a stepped and tiered sail with the upper segment housing a horizontally fixed snorkel exhaust which extends beyond the trailing edge. The upper tier of the sail extends about two-thirds the sail length. The sail is located forward of amidships. The bow is raked and pointed (except for those experimental models that have been fitted with a bulbous bow). Bow planes are located well aft of the bow. The weatherdeck is level from the bow aft until it gradually slopes to the waterline.

CHARACTERISTICS:

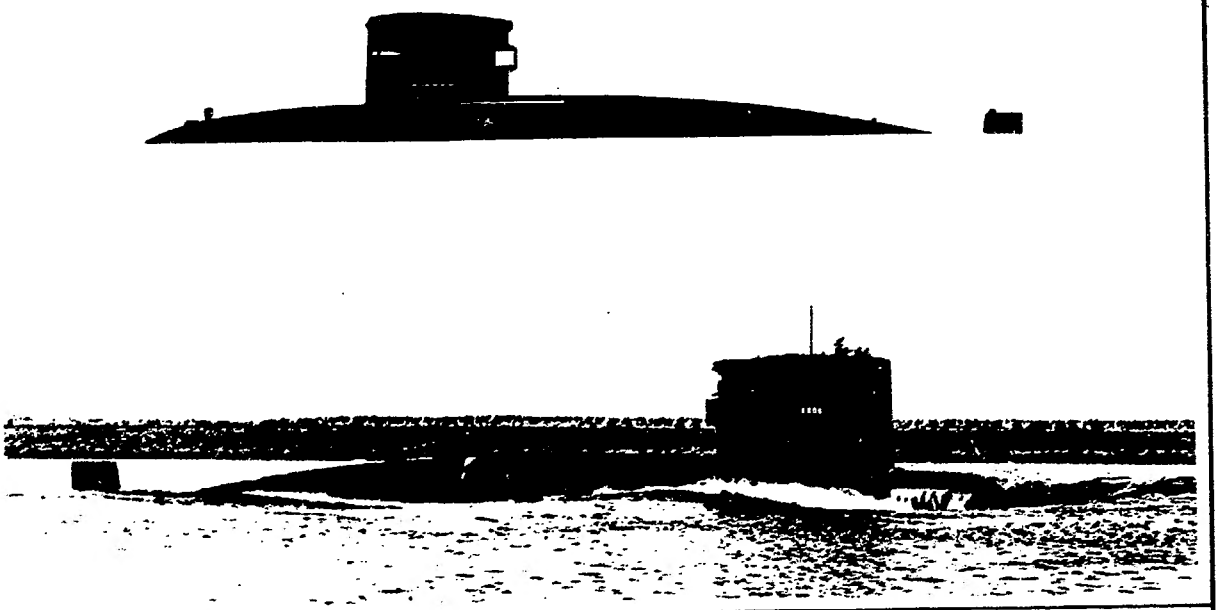
Displacement, tons: 1,950 surfaced; 2,300 submerged
Dimensions (wl), feet (meters): 287.7 x 24.3 (87.7 x 7.4)
Torpedo tubes: 10 x 21 in (53.3 cm) (6 bow, 4 stern)
Propulsion: Diesel-electric; 3 diesels; 3 electric motors; 3 shafts
Speed, knots: 18 surfaced; 16 submerged

REMARKS:

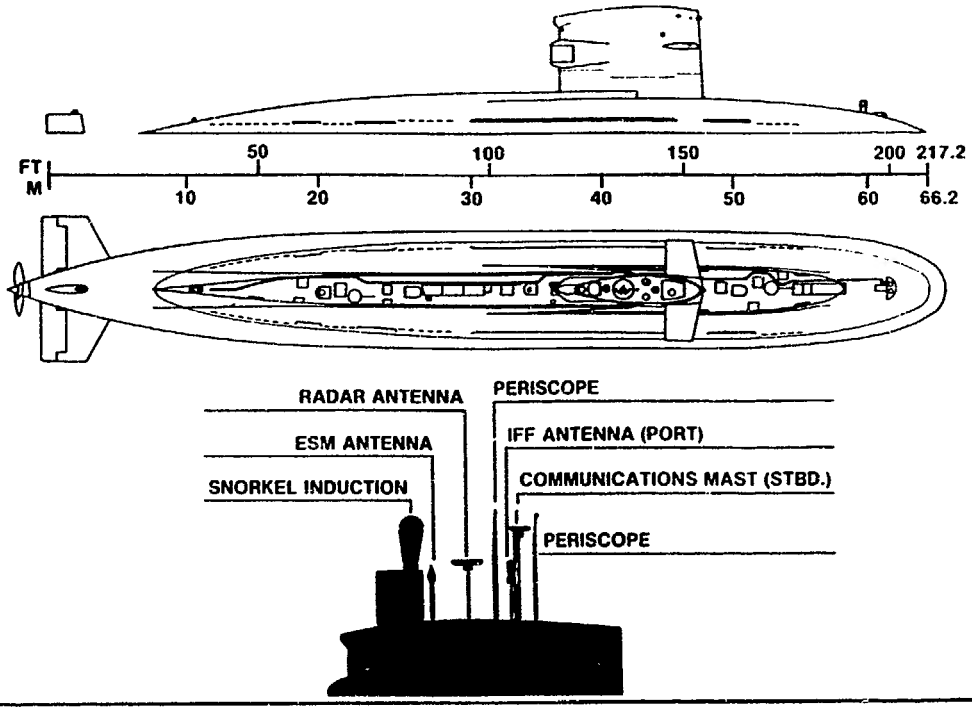
About 26 ZULU Class submarines were produced by the Soviet Union from 1952 to 1955. The ZULU is a long-range version of the WHISKEY SS fitted with more torpedo tubes. Most ZULU Class submarines have been phased out of service in favor of the later FOXTROT Class.

NL

ZWAARDVIS SS



ZWAARDVIS SS NL



MAJOR RECOGNITION FEATURES:

ZWAARDVIS Class submarines closely resemble the USS BARBEL Class. It has a rectangular sail situated well forward on a teardrop hull, a stern fin, and a bow which slopes gently to the waterline. One of the two features which distinguish ZWAARDVIS is the large, rectangular protuberance emerging from the rear of the sail. This smooth rectangular protuberance projects horizontally a short distance from the trailing edge and the sides of the sail. Also, the snorkel exhaust on the top rear of the sail projects horizontally outward to a noticeable degree. Sail planes are located slightly above the vertical center and begin at the sail's leading edge.

CHARACTERISTICS:

Displacement, tons: 2,350 surfaced; 2,640 submerged
Dimensions, feet (meters): 217.2 x 33.8 x 23.3 (66.2 x 10.3 x 7.1)
Torpedo tubes: 6 x 21 in (53.3 cm) (bow)
Propulsion: Diesel-electric; 3 diesel generators; 1 shaft
Speed, knots: 13 surfaced; 20 submerged
Pennant numbers: S806, S807

REMARKS:

The ZWAARDVIS Class consists of two units which were built in the Netherlands. Both units were commissioned in 1972 and are in service with the Royal Netherlands Navy.