APPENDIX I

COASTAL COMMAND

Order of Battle, Strength and Availability

1st March 1943

Ref: A.M. Operational Squadrons States Vol. II

No. 15 Group	Est.	Strength	Available	Remarks
Ballykelly				
No.120 - V.L.R. Liberator I, IIIA	16 + 4	14	11	Detachment in Iceland
No.220 - Fortress I and II	9 + 3	13	4	
Benbecula				
No.206 - Fortress I and II	9 + 3	14	5	
Castle Archdale				
No.201 - Sunderland II and III	6 + 3	11	4	
No.228 - Sunderland II and III	6 + 3	8	2	
No.423 (RCAF) Sunderland II and III	6 + 3	9	3	
Oban				
No.422 (RCAF) - Sunderland III	6 + 3	9	4	
No.330 (Norge) - Sunderland III	6 + 3	5	Nil	Forming
Bowmore				
No.246 - Sunderland II and III	6 + 3	9	3	
No. 16 Group				
Thorney Island				
No.86 - V.L.R. Liberator IIIA	16 + 4	17	12	
No.415 (RCAF) - Hampden I - Torpedo	16 + 4	17	12	
No.833 - F.A.A. - Swordfish	9	9	7	On loan
No.836 - F.A.A. - Swordfish	9	9	6	On loan
Bircham Newton				
No.320 (Dutch) - Hudson V and VI	16 + 4	13	9	
No. 53 - Whitleys/Libs.	16 + 4	Nil	Nil	Re-equipping
North Coates				
No.143 - Beaufighter II (fighters)	16 + 4	20	9	To re-equip Mk.XIC
No.236 - Beaufighter IC and VI (fighters)	16 + 4	21	3	Re-equipping
No.254 - Beaufighters VI (torpedo)	16 + 4	22	14	To re-equip Mk.X
No. 18 Group				
Sullom Voe				
No.190 - Catalina IB	6 + 3	9	4	
Wick				
No.489 (RNZAF) Hampden I - Torpedo	16 + 4	25	15	
No.612 - Whitley/L/L Wellington	16 + 4	18	9	Re-equipping
No.407 - Wellington X and XI	16 + 4	20	9	To re-equip L/L
Leuchars				
No. 144 - Beaufighter VIC (Torpedo)	16 + 4	20	16	
No.235 - Beaufighter VIC (Fighter)	16 + 4	20	14	
No.455 (RAAF) - Hampden I - Torpedo	16 + 4	20	12	To re-equip to Mk.X
Woodhaven				
No.1477 Flight (Norge) - Catalina IB	3 + 0	2	1	Special duties

No. 19 Group	Est.	Strength	Available	Remarks
Mt. Batten				
No. 10 (RAAF) - Sunderland II & III	6 + 3	9	4	
Pembroke Dock				
No.119 - Sunderland II and III	6 + 3	10	5	
No.210 - Catalina IB	6 + 3	4	3	Half at Gibraltar
Hamworthy				
No.461 (RAAF) - Sunderland II & III	6 + 3	9	4	
Chivenor				
No.172 - L/L Wellington VIII & XII	16 + 4	20	7	
No.547 - Wellington VIII - Torpedo	6 + 2	10	Nil	Training at Tain
No. 59 - Fortress IIA	9 + 3	10	7	
No.404 (RCAF) Beaufighter II (fighter)	16 + 4	19	5	To re-equip to Mk.XIC
Talbenny				
No.311 (CZECH) - Wellington IC	16 + 4	17	12	To re-equip to Mk.X
Dale				
No.304 (Pole) - Wellington IC	16 + 4	19	9	To re-equip to Mk.X
St. Eval				
Nos.1 & 2 (USAAF) - Liberator	24	13	10	On loan - Left for Morocco 5/3/43.
No. 10 O.T.U. (B.C.) - Whitley	26	20	15	On loan
No.502 - Halifax II	9 + 3	12	1	Non-op. till end Mch.
Predannock				
No.248 - Beaufighter VI (fighters)	16 + 4	20	14	
Exeter				
No.834 (F.A.A.) - Swordfish	9	9	6	On loan
Holmsley South				
No.58 - Halifax II	9 + 3	11	2	Non-op. till mid Mch.
Beaulieu				
No.224 - Liberator II, III and V	9 + 3	6	2	
Iceland				
Reykjavik				
Detachment of No.120 V.L.R. Liberators	-	7	3	
Detachment of No.330 (Norge) - Northrop F/P.	-	9	4	
No. 84 (USN) - Catalina (P.B.Y.5A)	12	12	8	On loan
Kaldadarnes				
No.269 - Hudson III	20 + 4	23	16	
Gibraltar				
New Camp				
No.202 - Catalina IB	12 + 0	15	10	
No.210 - Catalina IB	-	7	5	
North Front				
No. 48 - Hudson VI	16 + 4	23	17	
No.233 - Hudson III	16 + 4	20	12	
No.179 - L/L Wellington VIII	16 + 4	21	6	
Coastal Command Sqdns. - 42 plus one flight.	513 + 145 658	637	323*	
(* Three squadrons were forming and still non-operational and three more were out of the line for training or re-equipment)				
Squadrons on loan - 7	89	71	52	

Photographic Reconnaissance	Est.	Strength	Available	Remarks
Benson				
No.540 - Mosquito - various Marks	18 + 4	22	10	Detachment at Leuchars
No.541 - Spitfires - various Marks	14 + 4	14	9	
No.542 - Spitfires - various Marks	14 + 4	22	15	
No.543 - Spitfires - various Marks	14 + 4	16	10	Detachment at St. Eval
No.544 - Spitfires, Wellingtons and Anson	7 + 2	9	6	Detachment at Gib.
Air Sea Rescue				
Bircham Newton				
No.279 - Hudson III	16 + 4	12	7	
No.280 - Anson I	16 + 4	22	17	
Meteorological				
Bircham Newton				
No.521 Sqn. - Mosquito, Hampden, Gladiator, Spitfire	17 + 8	19	14	Detachment at Gib.
Aldergrove				
No.1402 Flt. - Hampden, Gladiator Spitfire	9 + 5	14	8	
St. Eval				
No.1404 Flt. - Hampden, Hudson	4 + 2	9	5	
Wick				
No.1406 Flt. - Hampden, Spitfire	6 + 3	9	2	
Iceland				
No.1407 Flt. - Hampden, Hudson	4 + 2	2	1	

APPENDIX I

Coastal Command

Order of Battle, Strength and Availability

10th May 1943

Ref: C.C. O.R.B. appendices for May and A.M. operational Squadrons States Vol.12

No.15 Group	Est.	Strength	Available	Remarks
Aldergrove				
No. 86 - V.L.R. Liberator IIIA & V	12 + 3	15	8	
No. 59 - V.L.R. Liberator V	12 + 3	14	1	Partly operational
Benbecula				
No.206 - Fortress IIA	12 + 3	14	6	
No.220 - Fortress IIA	12 + 3	16	4	
Castle Archdale				
No.201 - Sunderland II and III	9 + 3	12	4	
No.423 (RCAF) - Sunderland III	9 + 3	11	3	
Oban				
No.330 (Norge) - Sunderland II & III	9 + 3	10	5	
No.422 (RCAF) - Sunderland III	9 + 3	11	6	Moving to Bowmore
No.16 Group				
Docking				
No.304 (Pole) - Wellington IC & X	16 + 4	17	7	Re-equipping
North Coates				
No.143 - Beaufighter XIC (fighters)	16 + 4	16	13	
No.236 - Beaufighter VIC (fighters)	16 + 4	19	12	
No.254 - Beaufighter VIC & X (torpedo)	16 + 4	20	15	
Thorney Island				
No.415 (RCAF) - Hampden I - Torpedo	16 + 4	17	14	Detachment at Docking
No.18 Group				
Leuchars				
No.333 (Norge) - Mosquito II Flight	4 + 2	6	4	
No.235 - Beaufighter VIC (fighters)	16 + 4	16	8	
No.455 (RAAF) - Hampden I - Torpedo	16 + 4	15	8	
Tain				
No.144 - Beaufighter VIC & X (torpedo)	16 + 4	16	Nil	Out of the line prior to going to the Med.
Skitten				
No.618 - Mosquito IV modified	20 + 0	12	Nil	Non-operational
Wick				
No.404 (RCAF) - Beaufighter XIC (fighters)	16 + 4	20	17	
No.489 (RNZAF) - Hampden I - Torpedo	16 + 4	20	13	
Woodhaven				
No.333 (Norge) - Catalina IB Flight	3 + 0	3	2	
Sullom Voe				
No.190 - Catalina IB	9 + 3	10	10	
No. 19 Group				
Mt. Batten				
No.10 (RAAF) - Sunderlands II & III	9 + 3	12	8	
Pembroke Dock				
No.228 - Sunderlands II & III	9 + 3	12	5	
No.461 (RAAF) - Sunderlands II & III	9 + 3	11	5	

No.19 Group (Contd.)	Est.	Strength	Available	Remarks
Hamworthy				
No.210 - Catalina IB	9 + 3	12	7	
Chivenor				
No.172 - L/L Wellington XII	12 + 3	14	9	
No.407 (RCAF) - L/L Wellington XII	12 + 3	14	9	Partly operational
No.547 - Wellington VIII & XI Torpedo	16 + 4	21	6	Torpedo training
Talbenny				
No.311 (Czech) - Wellington IC & X	12 + 3	17	9	
Davidstow Moor				
No.612 - Whitley/L/L Wellington XII	12 + 3	13	4	Re-equipping
St. Eval				
No.10 O.T.U. (B.C.) - Whitley	26	27	16	On loan
Beaulieu				
No.224 - Liberator V - (L.R.)	12 + 3	19	5	Operating from St. Eval
No.53 - Liberator III & V(L.R.)	12 + 3	2	Nil	re-equipping
Holmsley South				
No.58 - Halifax II	12 + 3	17	6	Operating from St. Eval
No.502 - Halifax II	12 + 3	17	5	Operating from St. Eval
Predannock				
No.248 - Beaufighter VIC (fighters)	16 + 4	20	13	
Iceland				
Reykjavik				
No.120 - V.L.R. Liberator I & III	12 + 3	19	8	
No.84 (USN) - Catalina (P.B.Y.5A)	12	11	8	On loan
Kaldadarnes				
No.269 - Hudson III	16 + 4	20	14	
Gibraltar				
New Camp				
No.202 - Catalina IB	9 + 3	13	8	
North Front				
No.48 - Hudson VI	16 + 4	22	11	
No.233 - Hudson III	16 + 4	16	15	
No.179 - L/L Wellington VIII	12 + 3	16	6	
Coastal Command Sqdns - 41	525 +134, 659	617	313*	
(* Two squadrons were out of the line and two more only partly operational while re-equipping, one non-operational)				
Squadrons on loan - 2	38	38	24	
Photographic Reconnaissance				
Benson				
No.540 - Mosquito - various Marks	18 + 4	22	12	Detachment at Leuchars
No.541 - Spitfires - various Marks	14 + 4	17	9	
No.542 - Spitfires - various Marks	14 + 4	18	13	
No.543 - Spitfires - various Marks	14 + 4	19	13	Detachment at St. Eval
No.544 - Spitfires - Wellington, Maryland	4 + 1	6	6	Detachment at Gib.

Air Sea Rescue	Est.	Strength	Available	Remarks
Bircham Newton				
No.279 - Hudson	16 + 4	19	10	
No.280 - Anson	16 + 6	22	13	
Meteorological				
Bircham Newton				
No.1401 Flt. - Hampden - Gladiator - Spitfire	14 + 5	14	9	Detachment at Gib.
Aldergrove				
No.1402 Flt. - Hampden, Gladiator, Spitfire	9 + 5	9	7	
St. Eval				
No.1404 Flt. - Hampden	4 + 2	5	2	
Wick				
No.1406 Flt. - Hampden, Spitfire	6 + 3	9	6	
Iceland				
No.1407 Flt. - Hampden	4 + 2	5	1	
Gibraltar				
No.1403 Flt. - Hampden, Gladiator	5 + 0	3	3	

COASTAL COMMAND

Order of Battle, Strength and Availability

23rd August 1943

Ref: C.C. Conspectus.

No. 15 Group	Unit Equipment	Strength	Available	Remarks
Aldergrove				
No.86 - V.L.R. Liberator V and IIIA	15	16	6	
No.59 - V.L.R. Liberator V	15	16	6	
Benbecula				
No.206 - Fortress IIA	15	15	3	
No.220 - Fortress IIA	15	14	2	
Castle Archdale				
No.201 - Sunderland III	12	10	4	
No.423 (R.C.A.F.) - Sunderland III	12	13	4	
Bowmore				
No.422 (R.C.A.F.) - Sunderland	12	12	4	
No. 16 Group				
North Coates				
No.143 - Beaufighter XI C (fighters)	20	19	NIL	Detachment at St. Eval
No.236 - Beaufighter X (rocket projectile)	20	19	15	
No.254 - Beaufighter X (torpedo)	20	21	15	
Thorney Island				
No.53 - V.L.R. Liberator V	15	15	NIL	Ops. from St. Eval
No.415 (R.C.A.F.) - Hampden I - Torpedo	20	24	4	Detachment at St. Eval on A/U OPS.
No. 18 Group				
Leuchars				
No.333 (Norge) - Mosquito II Flight	6	3	NIL	Re-arming Mosquito IV
No.235 - Beaufighter X (rocket projectile)	20	21	NIL	Re-equipping
No.455 (R.C.A.F.) - Hampden I - Torpedo	20	20	12	
Tain				
No.144 - Beaufighter X (torpedo)	20	-	-	Still in Med.
Wick				
No.404 (R.C.A.F.) - Beaufighter XIC (fighters)	20	22	NIL	re-equipping to Mk. X
No.489 (R.N.Z.A.F.) - Hampden I	20	18	7	
No.618 - Mosquito IV - Special duty	20	23	NIL	Training non-operational
Woodhaven				
No.333 (Norge) - Catalina IB flight	3	3	3	
Sullom Voe				
No.190 - Catalina IB	12	12	2	5 a/c fitted L/L.
No.330 (Norge) - Sunderland III	12	11	4	
No. 19 Group				
Mt. Batten				
No.10 (R.A. A.F.) - Sunderland II and III	12	12	3	
Pembroke Dock				
No.228 - Sunderland III	12	12	6	
No.461 (R.A.A.F.) - Sunderland III	12	12	3	
No.63 (U.S.N.) - Catalina (P.B.Y.V.) - M.A.D.	12	14	8	On loan
Hamworthy				
No.210 - Catalina IB	12	10	6	Fitted with L/L

No. 19 Group (Contd.)	Unit Equipment	Strength	Available	Remarks
Chivenor				
No.172 - L/L Wellington XII	15	13	8	
No.407 (R.C.A.F.) - L/L Wellington XII - and XIV	15	14	11	
No.612 - L/L Wellington XII and XIV	15	14	8	
Davidstow Moor				
No.304 (Pole) - Wellington XIII	20	20	12	
No.547 - Wellington XI	20	19	12	
St. Eval				
No.53 - V.L.R. Liberator V	-	-	7	Detachment from T.I.
No.415 (R.C.A.F.) - Hampden I - with D.C.s	-	-	4	Detachment from T.I.
No.103 (U.S.N.) - Liberator (B.24D)	12	12	NIL	Training. On loan
No.224 - Liberator V	15	15	6	
No.143 - Beaufighter XIC (fighters)	-	-	11	Detachment from N.C.
Holmesley South				
No.58 - Halifax II	15	14	1	Fitting Mk. III Sight
No.502 - Halifax II - Mk. XIV Sight	15	16	6	
Beaulieu				
No.311 (Czech.) - Liberator V	15	13	8	Re-equipping from Wellingtons
Dunkeswell				
No.4 (U.S.A.A.F.) - Liberator (B.24 D)	12	17	8	On loan
No.19 (U.S.A.A.F.) - Liberator (B.24 D)	12	14	10	On loan
N.B. Nos. 6 and 22 Squadrons (U.S.A.A.F.) were at Dunkeswell but not yet operational.				
Predannock				
No.248 - Beaufighter X (fighter)	20	20	13	
Iceland				
Reykjavik				
No.120 - V.L.R. Liberator I and III	15	14	8	
No.84 (U.S.N.) - Catalina - (P.B.Y.5A)	12	10	7	On loan Last ops. 4/9/43
No.269 - Hudson III and IIIA	20	20	14	
Gibraltar				
New Camp				
No.202 - Catalina I B	12	9	5	5 a/c fitted L/L
North Front				
No.48 - Hudson - Fitted Rocket Projectile	20	23	15	
No.233 - Hudson -	20	20	13	Half fitted with R.P.
No.179 - L/L Wellington VIII and XIV	15	18	7	
Coastal Command Squadrons - 41	659	635	278*	
(* 3 Squadrons out of the line training or re-equipping and 1 squadron in the Mediterranean. 1 squadron non-operational)				
Squadrons on loan - 5	60	67	33@	
(@+1 Squadron out of the line training)				

Photographic Reconnaissance	Unit Equipment	Strength	Available	Remarks
Benson				
No.540 - Mosquito - various marks	22	24	7	Detachment at Leuchars
No.541 - Spitfire - various marks	18	18	1	
No.542 - Spitfire - various marks	18	20	17	
No.543 - Spitfire - various marks	18	19	7	Detachment at St. Eval
No.544 - Wellington, Spitfire, Anson	9	7	NIL	Detachment at Gibraltar.
Air Sea Rescue				
Bircham Newton				
No.279 - Hudson	20	18	9	Detachment at Harrowbeer
No.280 - Anson/Warwick I	20	24	10	Re-equipping
Meteorological				
St. Eval				
No.517 (ex 1404 Flt.) - Hampden-Hudson	24	7	3	Re-equipping to Halifax V
Stornoway				
No.518 - Halifax V	16	5	NIL	
Wick				
No.519 (ex 1406 Flt.) - Hampden - Spitfire	15	9	6	Re-equipping to Venturas.
Bircham Newton				
No.521 (ex 1401 Flt.) - Hampden, Gladiator, Spitfire.	11	12	10	Re-equipping to Venturas.
Aldergrove				
No.1402 Flt. - Gladiator, Spitfire.	8	8	3	
Iceland				
No.1407 Flt. - Hampden - Hudson.	6	5	NIL	Re-equipping to Venturas.
Gibraltar				
No.520 (ex 1403 Flt.) - Hudson, Gladiator.	10	4	3	Re-equipping to Halifax V.

COASTAL COMMAND

Order of Battle, Strength and Availability

1st January 1944

Ref: C.C. Conspectus

No. 15 Group	Unit Equipment	Strength	Available	Remarks
Ballykelly				
No.86 - V.L.R. Liberator V and IIIA	15	18	4	
No.59 - V.L.R. Liberator V	15	14	7	
Castle Archdale				
No.201 - Sunderland III	12	12	4	
No.422 (R.C.A.F.) - Sunderland III	12	12	3	
No.423 (R.C.A.F.) - Sunderland III	12	11	3	
No. 16 Group				
Bircham Newton				
No.415 (R.C.A.F.) - (Wellington XIII	10	10	5	
No.415 (R.C.A.F.) - (Albacore	15	14	8	Albacores on C.C.I. detachments at Manston and Thorney Island.
North Coates				
No.236 - Beaufighter X - Fitted R.P.	20	18	12	
No.254 - Beaufighter X - (torpedo)	20	18	12	
Thorney Island				
No.547 - Liberator V	15	12	NIL	Re-equipping
No. 18 Group				
Leuchars				
No.333 (Norge) - Mosquito VI flight	6	5	2	
No.455 (R.A.A.F.) - Beaufighter X (fitting R.P.)	20	16	NIL	Training and re-equipping.
No.489 (R.N.Z.A.F.) - Beaufighter X (torpedo)	20	21	NIL	Training and re-equipping. (from Hampdens)
Wick				
No.144 - Beaufighter X (torpedo)	20	21	10	
No.404 (R.C.A.F.) - Beaufighter X Fitted R.P.	20	20	4	
No.618 - Mosquito IV - Special duty	20	14	NIL	Non-operational
No.1693 Flight - Anson	6	5	2	
Woodhaven				
No.333 (Norge) - Catalina IB flight	3	2	1	
Sullom Voe				
No.190 - L/L Catalina IB and IV	12	13	2	Being withdrawn prior to reform as No. 210 Sqdn.
No.330 (Norge) - Sunderland II and III	12	13	3	
No. 19 Group				
Mt. Batten				
No. 10 (R.A.A.F.) - Sunderland II and III	12	13	4	
Pembroke Dock				
No.228 - Sunderland III	12	11	5	
No.461 (R.A.A.F.) - Sunderland III	12	11	4	
Chivenor				
No.172 - L/L Wellington XIV	15	15	1	Detachment in Azores.
No.407 (R.C.A.F.) - L/L Wellington XII and XIV	15	15	6	
No.612 - L/L Wellington XIV	15	15	4	

No. 19 Group (Contd.)	Unit Equipment	Strength	Available	Remarks
St. Eval				
No.224 - L/L Liberator V	15	13	3	1 a/c fitted R.P.
Dunkeswell				
No.103 (U.S.N.) - Liberator (PB4Y)	12	11	6	on loan
No.105 (U.S.N.) - Liberator (PB4Y)	12	12	7	on loan
No.110 (U.S.N.) - Liberator (PB4Y)	12	12	7	on loan
St. Davids				
No. 58 - Halifax II	15	16	6	
No.502 - Halifax II	15	14	4	
Beaulieu				
No.311 (Czech.) - Liberator V	15	12	8	10 a/c fitted R.P.
No.53 - V.L.R. L/L Liberator V	15	16	7	1 a/c fitted R.P.
Predannock				
No.304 (Pole) - L/L Wellington XIV	15	15	5	
(Beaufighter X (fighters)	20	11	9	re-equipping to Mosquito VI
No.248 - (Mosquito XVIII (6 pdr. gun) flight	2	2	1	
Portreath				
No.143 - Beaufighter XI C - (fighters)	20	18	12	
No.235 - Beaufighter X (fighters) and XIC	20	19	7	
Iceland				
Reykjavik				
No.120 - V.L.R. Liberator I, III and V	15	18	4	All Mk. V a/c fitted with L/L
Gibraltar				
New Camp				
No.202 - L/L Catalina I B and IV	12	12	9	L/L fitted in all a/c.
North Front				
No.48 - Hudson III, IIIA and VI (R.P.)	20	20	10	
No.233 - Hudson III and IIIA (R.P.)	20	17	3	Detachment in Azores.
No.179 - L/L Wellington XIV	15	14	5	
No.247 Group Azores				
Lagens				
No.206 - Fortress II and IIA	15	16	4	
No.220 - Fortress II and IIA	15	16	5	
No.233 - Hudson III and IIIA (R.P.)	-	-	8	Detachment from Gibraltar.
No.172 - L/L Wellington XIV	-	-	2	Detachment from Chivenor
Coastal Command Squadrons - 40 plus 1 Flight	630	598	218*	
(* 1 Squadron non-operational, 3 squadrons training and re-equipping and 1 squadron for reform)				
Squadrons on loan - 3	36	35	20	
Photographic Reconnaissance				
Benson				
No.540 - Mosquito IX	20	18	10	Detachment at Leuchars
No.541 - Spitfire XI and XIII	20	22	16	Detachment at St. Eval and Gibraltar
No.542 - Spitfire IV, XI and XIII	20	21	13	
No.544 - Mosquito IX	20	17	11	

Air Sea Rescue	Unit Equipment	Strength	Available	Remarks
Bircham Newton				
No.279 - Hudson III, V and VI	20	16	7	
Thornaby				
No.280 - Warwick I	20	21	4	
No.281 - Warwick I	20	16	NIL	
Iceland				
No.269 - Hudson III flight	2	2	2	
Meteorological				
St. Davids				
No.517 - Halifax V	23	8	NIL	Re-equipping
Tiree				
No.518 - Halifax V	14	15	2	
Wick				
No.519 - Ventura V and Spitfire VI	17	15	4	
Bircham Newton				
No.521 - Ventura V and Gladiator	9	8	2	
Aldergrove				
No.1402 Flight - Gladiator, Spitfire	8	7	5	
Iceland				
No.1407 Flight - Ventura V	6	-	-	Re-equipping from Hudsons
Gibraltar				
No.520 - Halifax V and Gladiator	9	1	-	Re-equipping from Hudsons

COASTAL COMMAND

Order of Battle, Strength and Availability

28th March 1944

Ref: C.C. Conspectus

No. 15 Group	Unit Equipment	Strength	Available	Remarks
Ballykelly				
No.59 - V.L.R. Liberator V	15	12	5	
No.120 - V.L.R. Liberator V (L/L)	15	15	4	All a/c fitted for L/L
Castle Archdale				
No.201 - Sunderland III	12	12	3	
No.422 (R.C.A.F.) - Sunderland III	12	11	7	
No.423 (R.C.A.F.) - Sunderland III	12	11	5	
St. Angelo				
No.235 - Beaufighter X and XIC - (fighters)	20	21	14	
Limavady				
No.407 (R.C.A.F.) - L/L Wellington XIV	15	13	5	
No.16 Group				
Bircham Newton				
No.415 (R.C.A.F.) (Wellington XIII	10	8	9	
No.415 (R.C.A.F.) (Albacore	15	14	9	
North Coates				
No.143 - Beaufighter X and XIC (fighters)	20	23	18	
No.236 - Beaufighter X - (R.P.)	20	20	18	
No.254 - Beaufighter X (torpedo)	20	19	17	
No. 18 Group				
Leuchars				
No.333 (Norge) - Mosquito VI flight	6	6	4	
No.455 (R.A.A.F.) - Beaufighter X (R.P.)	20	19	8	
No.489 (R.N.Z.A.F.) - Beaufighter X (torpedo)	20	19	12	
Wick				
No.144 - Beaufighter X (torpedo)	20	17	12	
No.404 (R.C.A.F.) - Beaufighter X (R.P.)	20	20	14	
No.618 - Mosquito IV - special duty	20	25	NIL	Non-operational Training and trials
No.1693 Flight - Anson	6	6	6	
Woodhaven				
No.333 (Norge) - Catalina IB flight	3	3	1	
Sullom Voe				
No.210 - Catalina IV	12	10	4	10 a/c fitted L/L
No.330 (Norge) - Sunderland II and III	9	8	3	
No. 19 Group				
Mt. Batten				
No.10 (R.A.A.F.) - Sunderland III	12	12	7	
Pembroke Dock				
No.228 - Sunderland III	12	12	7	
No.461 (R.A.A.F.) - Sunderland III	12	12	3	

No. 19 Group (Contd.)	Unit Equipment	Strength	Available	Remarks
Chivenor				
No.172 - L/L Wellington XIV	15	14	1	Detachment in Azores
No.304 (Pole) - L/L Wellington XIV	15	14	5	to re-equip with Mk. VI A.S.V.
No.612 - L/L Wellington XIV	15	19	6	
St. Eval				
No.224 - L/L Liberator V	15	17	9	
No.53 - L/L Liberator V	15	14	4	
No.547 - L/L Liberator V	15	15	4	Re-equipping to Mk. VI
Dunkeswell				
No.103 (U.S.N.) - Liberator (PB4Y)	12	12	10	on loan
No.105 (U.S.N.) - Liberator (PB4Y)	12	11	10	on loan
No.110 (U.S.N.) - Liberator (PB4Y)	12	12	5	on loan
St. Davids				
No.58 - Halifax II	15	14	4	
No.502 - Halifax II	15	13	5	
Davidstow Moor				
No.206 - Fortress/Liberator VI	15	10	NIL	out of the line re-arming
Portreath				
No.248 - (Mosquito VI - (fighters)	20	13	4	
(Mosquito XVIII (6 pdr. gun)	4	2	1	
Predannock				
No.311 (Czech.) - Liberator V - R.P.	15	14	4	Re-equipping to Mk. VI
Iceland				
Reykjavik				
No.86 - V.L.R. Liberator IIIA	15	16	3	
No.162 (R.C.A.F.) - Canso (Catalina IIIA)	15	15	6	
Gibraltar				
New Camp				
No.202 - Catalina IV	15	14	8	5 a/c fitted L/L
North Front				
No.179 - L/L Wellington XIV	15	15	7	
No.52 - Baltimore	16	17	10	on loan
No. 247 Group - Azores				
Lagens				
No.220 - Fortress II and IIA	20	17	9	
No.172 - L/L Wellington XIV	-	-	4	Detachment from Chivenor
Coastal Command Squadrons - 38 plus 1 flight	612	584	276*	
(* 1 squadron non-operational, 1 squadron re-arming and 3 squadrons re-equipping)				
Squadrons on loan - 4	52	52	35	
Photographic Reconnaissance				
Benson				
No.540 - Mosquito IX	20	16	9	
No.541 - Spitfire XI and XIII	20	22	14	Detachment at Gibraltar and St. Eval
No.542 - Spitfire XI and XIII	20	21	15	
No.544 - Mosquito IX and XVI	20	17	10	Detachment at Leuchars.

Air Sea Rescue	Unit Equipment	Strength	Available	Remarks
Bircham Newton				
No.279 - Hudson III, IIIA, V and VI	22	21	12	Detachment in Iceland
Thornaby				
No.280 - Warwick I	20	20	9	
Tiree				
No.281 - Warwick I	20	20	10	Detachments at Wick and Davidstow Moor
Davidstow Moor				
No.282 - Warwick I	20	19	7	Just formed
Azores				
No.269 - Hudson IIIA, Walrus, Anson, Martlet	13	6	3	
Meteorological				
St. Davids				
No.517 - Halifax V	23	12	NIL	Re-equipping
Tiree				
No.518 - Halifax V	14	14	6	
Wick				
No.519 - Venture V, Spitfire VI	17	17	9	
Bircham Newton				
No.521 - Venture V, Gladiator	9	8	3	
Aldergrove				
No.1402 Flight - Spitfire VI, Gladiator	8	9	6	
Iceland				
No.1407 Flight - Venture, Hudson III	6	4	2	
Gibraltar				
No.520 - Halifax V, Gladiator	9	9	3	

COASTAL COMMAND

Order of Battle, Strength and Availability

5th June 1944

Ref: C.C. Conspectus

No. 15 Group	Unit Equipment	Strength	Available	Remarks
Ballykelly				
No.59 - V.L.R. Liberator V	15	17	7	
No.120 - V.L.R. Liberator V	15	14	10	All a/c fitted L/L
Castle Archdale				
No.422 (R.C.A.F.) - Sunderland III	12	15	5	
No.423 (R.C.A.F.) - Sunderland III	12	13	4	
No. 16 Group				
Bircham Newton				
No.415 (R.C.A.F.) - (Wellington XIII	10	10	5	
No.415 (R.C.A.F.) - (Albacore	20	21	13	Detachments at Manston, Thorney Island and Winkleigh.
North Coates				
No.236 - Beaufighter X - (R.P.)	20	18	17	
No.254 - Beaufighter X - (torpedo)	20	22	20	
Langham				
No.455 (R.A.A.F.) - Beaufighter X - (R.P.)	20	19	15	
No.489 (R.N.Z.A.F.) - Beaufighter X (torpedo)	20	19	15	
Manston				
No.143 - Beaufighter X - (fighters)	20	20	18	
No.819 (F.A.A.) - Swordfish - (torpedo)	12	14	12	on loan
No.848 (F.A.A.) - Avenger	12	15	12	on loan
Hawkinge				
No.854 (F.A.A.) - Avenger II	12	11	9	on loan
No.855 (F.A.A.) - Avenger II	12	11	11	on loan
No. 18 Group				
Leuchars				
No.333 (Norge) - Mosquito VI flight	6	7	5	
Wick				
No.1693 Flight - Anson	8	8	6	
No.618 - Mosquito IV - special duty	20	25	NIL	Non-operational Trials and training.
Woodhaven				
No.333 (Norge) - Catalina I B flight	3	3	3	
Sullom Voe				
No.210 - L/L Catalina IV	12	10	4	
No.330 (Norge) - Sunderland III	9	8	3	
No. 19 Group				
Mt. Batten				
No.10 (R.A.A.F.) - Sunderland III	12	11	10	
Pembroke Dock				
No.228 - Sunderland III	12	16	10	
No.461 (R.A.A.F.) - Sunderland III	12	14	10	
No.201 - Sunderland III	12	15	11	

No. 19 Group (Contd.)	Unit Equipment	Strength	Available	Remarks
Chivenor				
No.172 - L/L Wellington XIV	15	15	9	
No.407 (R.C.A.F.) - L/L Wellington XIV	15	15	8	
No.612 - L/L Wellington XIV	15	15	12	
No.304 (Pole) - L/L Wellington XIV	15	15	10	
St. Eval				
No.224 - L/L Liberator V	15	16	10	
No.53 - L/L Liberator V	15	15	9	
No.547 - L/L Liberator V	15	15	6	
No.206 - Liberator VI	20	12	5	
Dunkeswell				
No.103 (U.S.N.) - Liberator (PB4Y)	12	15	7	on loan
No.105 (U.S.N.) - Liberator (PB4Y)	12	15	15	on loan
No.110 (U.S.N.) - Liberator (PB4Y)	12	15	11	on loan
St. Davids				
No.58 - Halifax II	15	15	9	
No.502 - Halifax II	15	15	6	
Davidstow Moor				
No.524 - Wellington XIII	10	10	6	Anti-E-boat operations.
No.144 - Beaufighter X - (torpedo)	20	17	17	
No.404 (R.C.A.F.) - Beaufighter X - (R.P.)	20	18	13	
Predannock				
No.311 (Czech.) - Liberator V - R.P.	15	16	12	
No.179 L/L/Wellington XIV	15	13	11	
Portreath				
No.248 - (Mosquito VI - (fighters)	20	20	16	
(Mosquito XVIII - (6 pdr. gun)	4	5	2	
No.235 - Beaufighter X and XIC (fighters)	20	20	18	
Perranporth				
No.816 (F.A.A.) - Swordfish	12	13	10	on loan
No.849 (F.A.A.) - Avenger I	12	15	11	on loan
No.850 (F.A.A.) - Avenger I	12	15	11	on loan
Harrowbeer				
No.838 (F.A.A.) - Swordfish	12	12	11	on loan
Iceland				
Reykjavik				
No.86 - V.L.R. Liberator IIIA	15	14	4	Detachments at Tain and Ballykelly
No.162 (R.C.A.F.) - Canso (Catalina IIIA)	15	12	5	Detachment at Wick
Gibraltar				
New Camp				
No.202 - Catalina IV	16	16	15	9 a/c fitted L/L
North Front				
No.500 - Ventura Detachment	6	6	4	on loan
No.247 Group - Azores				
Lagens				
No.220 - Fortress II and IIA	20	18	9	
Coastal Command Squadrons - 39 plus 1 flight	635	632	403*	
(* 1 squadron non-operational)				
Squadrons on loan - 11 plus 1 flight	138	157	120	

Photographic Reconnaissance	Unit Equipment	Strength	Available	Remarks
Benson				
No.540 - Mosquito IX and XVI	20	17	14	
No.541 - Spitfires of various marks	20	33	20	Detachments at St. Eval and Gibraltar
No.542 - Spitfires of various marks	24	30	21	
No.544 - Mosquito IX and XVI	20	18	11	
Air Sea Rescue				
Bircham Newton				
No.279 - Hudson III, IIIA, V and VI	20	22	12	Detachment in Iceland
Strubby				
No.280 - Warwick I	20	21	13	
Tiree				
No.281 - Warwick I	20	20	10	Detachments at Leuchars and Limavady
Davidstow Moor				
No.282 - Warwick I	20	20	9	
Azores				
No.269 - Hudson IIIA, Walrus, Anson, Martlet and Spitfire V B	18	19	9	Combined A.S.R. and Met. duties.
Meteorological				
St. Davids				
No.517 - Halifax V	23	10	4	
Tiree				
No.518 - Halifax V	14	14	4	
Wick				
No.519 - Ventura V, Spitfire VI.	17	18	11	
Bircham Newton				
No.521 - Ventura V, Gladiator	9	9	5	
Aldergrove				
No.1402 Flight - Spitfire VI, Gladiator	8	8	5	
Iceland				
No.1407 Flight - Ventura, Hudson III	6	7	NIL	
Gibraltar				
No.520 - Halifax, Gladiator	10	8	1	

APPENDIX II

Allied Maritime Air Forces available for the U-boat War against shipping in the Atlantic - February 1943

N.B. This excludes aircraft for the two U-boat transit areas.

EASTERN SIDE OF THE ATLANTIC						
Location	V.L.R.	L.R.	M.R.	S.R.	Total No. of Sqdns.	Approx. Strength
Iceland	9	11	12	24	3½	56
No. 15 Group	9	60	-	-	6½	69
Gibraltar and Morocco	-	43	20	42	6 + 1 flight	105
West Africa	-	18	-	20	4	38
South Africa	-	-	-	32	2	32
TOTAL	18	132	32	118	22 + 1 flight	300

WESTERN SIDE OF THE ATLANTIC						
Greenland	-	2	8	4	3 flights	14
Newfoundland and Canada	-	34	24	70	12 + 2 flights	128
Bermuda	-	12	-	-	1	12
Eastern Sea Frontier	-	70	100	144	25 + 4 flights	314
Gulf Sea Frontier	-	12	24	56	6 + 5 flights	92
Caribbean Sea Frontier	-	30	108	70	12 + 16 flights	208
Brazilian Coast	-	20	20	12	3 + 3 flights	52
TOTAL	Nil	180	284	356	59 + 33 flights	820

Note: The Western Atlantic figures include both U.S.N. and U.S.A.A.F. aircraft and included in the Eastern Atlantic figures are two squadrons of U.S.N. flying boats in Morocco and one in Iceland.

APPENDIX III

ROCKET PROJECTILES

Introduction.

The use of rockets for war purposes did not originate during the Second World War; a small number were fired from aircraft, without much success, during the First World War.

The modern rocket was developed by the Research Department of the War Office during the years immediately preceding 1939 and was intended for the attack of aircraft from the ground or as an alternative to the anti-aircraft gun. The War Office formed a Projectile Development Establishment for the development of rockets, and a three inch diameter anti-aircraft rocket for ground to air use was put into production early in the war.

During the Battle of Britain, in July 1940, the Air Staff formulated a requirement for a rocket that could be fired from fighter aircraft to break up formations of enemy bombers. A scheme to fire the standard three inch anti-aircraft rocket from the gun bay of a Beaufighter was proposed, but the success of the existing fighters during this period made the applications of rockets unnecessary and the investigation was dropped.

Various methods of attacking armoured fighting vehicles (A.F.V.) from the air were investigated by the Air Staff during 1941.(1) Trials of the Vickers 40 mm 'S' gun were arranged and the Director of Projectile Development (D.P.D.) in the Ministry of Supply was consulted as to the possibility of using rocket projectiles agaist A.F.Vs. On the advice of D.P.D. preliminary trials of armour penetration and aiming dispersion were made with the standard three inch rockets fitted with solid armour piercing heads weighing 25 lbs. These experiments were so successful that it was decided to proceed with more comprehensive trials. As the rocket was originally an Army weapon, the design and development of the R.A.F. rockets was carried out jointly by the Ministry of Aircraft Production and Ministry of Supply. In general the Royal Aircraft Establishment (R.A.E.) was responsible for the design of the launching apparatus and the installation of the rocket in aircraft. The Projectile Development Establishment was responsible for the design and development of the rocket motors and ground projection. The Armament Design Department designed the rocket heads and the Armament Research Department developed the rocket propellants. Air trials and performance tests, together with a certain amount of development work, were carried out at the Aircraft and Armament Experimental Establishment at Boscombe Down.

It was originally decided to develop two types of rocket
(a) the three inch rocket with a solid armour piercing head.

(b) the two inch rocket with a hollow charge head.

Some difficulty was experienced in developing a head for the two inch rocket which would give the penetration required, and work on this size ceased in the early stages and development was concentrated on the larger type. These rockets were known in the Army as 'U.Ps' (Unrotated Projectiles); in the

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(1) A.M. File C.S.12512/1.

R.A.F. the name was changed to 'R.Ps' (Rocket Projectiles).

The Motor Charge.

One of the first difficulties with the original Army rocket was the fact that the motor had a tubular charge of cordite, with an upper firing limit of 86°F. (1) Above this temperature limit, bursting of the tube occurred due to high peak pressure. This upper temperature limit was considered too low for general air use, and the development of a modified charge was undertaken by the Research Department of the Ministry of Supply.

The charge developed was of cruciform section and had an upper temperature limit for safe firing of 135°F, which was regarded as adequate for all service conditions. It also contained a small percentage of cryolite which made the gas jet non-luminous, and thus eliminated the blinding effect of the jet on the pilot in night firing. This modified charge was used in operations throughout the war, first in the Mark II motor, and later in the Mark III motor. The latter mark of motor differed from the earlier in having a weak link pigtail which allowed the leads to be blown clear of the aircraft on ignition, thus avoiding the danger of them fouling the ailerons.

No further modifications were made to motors used in operations. The Marks II and III motors had an inferior performance to the original army type, due to the fact that with the cruciform shape only eleven and a half pounds of cordite could be accommodated in the tube as against twelve and a half for the original tubular charge. This meant a reduced velocity, longer time of flight and increased curvature of trajectory.

The Rocket Head.

Two types of head were designed for use with the three inch motor; a 25 lbs. Armour Piercing (A.P.) solid shot of 3.44 inches diameter and a 60 lbs. High Explosive/Semi Armour Piercing (H.E./S.A.P.) shell of 6 inches diameter. Originally the A.P. shot was intended for the attack of A.F.Vs., and the 60 lb. head for the attack of merchant ships and submarines. (1) Operational experience showed, however, that the H.E./S.A.P. head was only effective against shipping in the event of a dry hit. If the rocket hit the water before reaching the ship, the head broke away from the motor. With the A.P. head, however, the shot remained intact on hitting the water and had a long, upward curving trajectory which was ideal for offsetting range aiming errors. The chance of hitting a ship with the A.P. head was therefore much greater than with the H.E./S.A.P. head.

Trials carried out at Pendine in November 1942, using a 25 lb. mild steel (S.A.P.) head against a target representing the hull of a submarine, showed that the S.A.P. shot was capable of inflicting lethal damage with one hit on a pressure hull. (2) The results also indicated that about 30 per cent. hits could be obtained on the pressure hull of a full sized U-boat of the 517 ton class. In consequence it was decided to use the 25 lb. A.P. head for anti-ship operations in place of the 60 lb. head as originally intended.

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(1) A.M. File C.S.12512/1
(2) A.M. File C.S.12512/3

Meanwhile early operational experience against A.F.Vs. showed that a direct hit on a tank by a 60 lb. H.E. head was lethal and that a near miss damaged the tracks sufficiently to put the tank out of action. Moreover the H.E. head was more effective against general land targets, such as gun positions, concrete emplacements, buildings and personnel. In consequence it was decided to use the 60 lb. H.E. head against A.F.Vs. and other land targets, thus completely reversing the use as originally intended for the two types of head.

When used against comparatively small targets such as tanks and lorries, considerable difficulty was experienced in aiming rockets owing to the large allowance necessary for drift. Unlike a bullet, the rocket tends to follow the aircraft line of flight rather than the line of sight, owing to its good weathercock stability. This difficulty was overcome by special training of pilots.

The 25 lb. A.P. and the 60 lb. H.E./S.A.P. head were the standard weapons used on operations throughout the war. Other types of head, however, were used for special purposes. The 25 lb. S.A.P. head was similar to the 25 lb. A.P. except that it was later used for practice firing only. Owing to the shortage of steel, concrete practice shots were designed to represent both the 25 lb. and 60 lb. heads. A flare head, containing a parachute and flare, and a smoke container head, were designed, and put into production for Naval use towards the end of the war.

Fuze for the H.E. head.

Some trouble was experienced in obtaining a satisfactory fuze for the 60 lb. H.E. head, the main difficulty being to devise a safe method of arming the fuze. The first type used was armed by the gas pressure generated by the burning cordite, but this was not satisfactory and after one had exploded on the aircraft during air firing trials, this type of fuse was discontinued.

The fuze finally adopted was a percussion base fuze known as the No. 865 Mark I. It was armed by a thermal initiator which was operated by the heat generated by the burning propellant. Another fuze, the No. 878 Mark I was also used, being identical with the No. 865, except that the delay pellet was omitted. Much development work was done on other types such as electrically operated and areodynamically armed fuzes, but none of these was ever used on operations.

The Rocket Projector.

The provision of a suitable projector for aircraft rockets proved to be a more difficult matter than the modification of the Army three inch rocket. The Army projector was a heavy and clumsy affair, quite unsuitable for installation on an aircraft. A special projector aircraft was designed by the R.A.E. and consisted of a 10 S.W.G. steel blast plate to protect the aircraft wing from damage due to rocket blast or burst motor. Under this plate were two rails - 6 feet 8 inches long and the rocket was suspended from these rails by means of saddles attached to the front and rear of the motor. The rocket was prevented from moving forward by a lever, locked in position by a copper shear wire. The rockets were mounted in fours, and spaced ten and a half inches apart, with a common blast plate. They were fired electrically by the pilot, and could be fired either in one salvo of eight, or in four successive pairs. This projector was used for the first air

firings from a Hurricane, which carried four under each wing.

In its production form, it was known as the Mark I universal projector and was in full production by the beginning of 1943.(1) It was widely used in operations on such aircraft as the Hurricane, Swordfish and Hudson. It worked well in service, but was heavy, and its high drag caused a considerable drop in the top speed of the aircraft carrying it. (In a Hurricane the top level speed was reduced from 260 m.p.h. to 228 m.p.h.) Most subsequent designs of projectors were intended to reduce the weight and drag of the installation rather than improve the performance as a projector. The Mark I was designed before any experience had been obtained with airborne rockets.

From subsequent air firing trials, it was concluded that the length of the projector rails could be greatly reduced. A projector, known as a 'Zero length' projector, was produced in which the rocket was carried on two streamline struts and had a controlled travel of only a few inches. This was known as the Mark II projector, and was fitted experimentally, on Swordfish and Hurricane aircraft. The drag, although reduced, was still considerable due to the retention of the blast plate. Ballistic trials of this projector showed that the dispersion was greater than with Mark I, and as the reduction in drag was not considered worth the increase in dispersion, the Mark II projector was not put into production.

Early in 1943, a third design commenced, based on the Mark I, and was intended to reduce the weight and drag and also to be easier to produce. The projector consisted of a single rail 7 feet 10½ inches long made from extruded light alloy sections. Experience with the Mark I had shown that the rocket blast would not damage the wing provided the rockets were carried not less than nine inches from its under surface. In addition improvements in the manufacture of rocket motor tubes, and the introduction of cruciform cordite, had practically eliminated the chance of the rocket motor bursting. This new projector was introduced as Mark III and was used on Mosquito, Typhoon and Tempest aircraft. It was only half the weight of the Mark I and had considerably less drag.

During 1944, further experiments with zero length projectors were carried out and it was found that the extra dispersion was considerably reduced on high speed aircraft. A new type of zero length projector was therefore designed, known as the Mark VIII, and was put into production towards the end of the war but was not used on operations. It was only one quarter of the weight of the Mark III and had considerably less drag, making a reduction of only 4 m.p.h. in the top speed of a Tempest aircraft.

Increase in Number of Rockets Carried.

In the summer of 1944, an urgent request was made by 2nd T.A.F. for some means of increasing the number of rockets carried by fighter bombers. It was obviously impossible to carry out any drastic modification to the projector or aircraft at this stage, but by using a special type of double saddle, it was found that two rockets, one slung under the other, could be carried on the standard projector. This enabled the load of the fighter bomber to be increased from eight rockets to sixteen In the first design the two rockets had to be fired together, but this was not altogether very satisfactory, and the saddle was further modified to enable the lower rocket to be fired independently of the upper rocket, the saddles acting as a zero

(1) A.M. File C.S.12512/1.

length projector. This system was widely used during the operations in Europe during 1944 and 45.

Other Types of Rocket.

Although the three inch motor with the 60 lb. and 25 lb. heads were the only rockets used in operations, a considerable amount of experimental work was carried out on other designs, none of which had reached the production stage by the end of the war. Several schemes were investigated for using heavier heads than the 60 lb. H.E. propelled by several standard motors, among which was the firing of a 250 lb. G.P. bomb propelled by seven three inch motors. This was originally intended as an anti-shipping weapon and was abandoned in favour of the 'Uncle Tom' scheme. Some work was done on spin stablised rockets, but development had not got very far by the end of the war.

'Uncle Tom'.

In August 1944 the Air Staff formulated a requirement for a large calibre rocket for the attack of ships. After some investigation it was decided to develop a rocket consisting of a motor 10.25 inches diameter weighing 400 lb. to which was attached a head 10.5 inches diameter and weighing 600 lb. The complete rocket weighed approximately 1,030 lb. and had an overall length of 8 feet 8 inches. This weapon was given the code name 'Uncle Tom'. A considerable amount of experimental work was done on this project including under-water and air firing trials. It was still under development when the war ended.

ANNEX I TO APPENDIX III

Rocket Projectors - Nomenclature

Mark I.	This was the original standard rocket projector with four box beams attached by forks to a blast plate.
Mark IA.	The Mark IA installation was applicable to Typhoon aircraft only, and consisted of a Mark I beam modified for Typhoon, and removeable fittings for Typhoon.
Mark IB.	As Mark IA but for Mosquito aircraft.
Mark IIIA.	Consisted of Mark IIIA beams and removeable fittings applicable to particular aircraft.
Mark IIIB.	Applicable to Typhoon 1B aircraft only. The beams differed from the Mark IIIA in that they had different strut attachment lugs and were provided with an electrical connection plug.
Mark IV. Type I.	Designed to carry one projectile, weighing up to 680 lb. per wing, and was attached by means of a bomb release mechanism, incorporated in the projector, to a lug on the wing surface. This projector was jettisonable.
Mark IV. Type 2.	This projector has the same function as the Type I, except that it was attached to wing bomb carriers by means of a lug incorporated in the projector.
Mark V.	Jettisonable projector carrying four standard rocket projectiles and was for American wing bomb carriers.
Mark VI. Type I.	Similar to the Mark V and was applicable to aircraft where it was not possible to fit the projector to a bomb carrier. It was attached to a lug on the wing surface by means of a bomb release mechanism incorporated in the projector.
Mark VI. Type 2.	Similar to the Type I except that its attachment was by means of a lug to wing bomb carriers.
Mark VII. Type I.	Similar to the Mark VI Type I, but designed with a greater range of elevation and azimuth adjustment as required for Naval aircraft.
Mark VII. Type 2.	Similar to Mark VI Type 2, except that it had Naval requirements for adjustment.
Mark VIII.	A new type of projector giving a minimum of drag. It consisted of two pylons to which the rocket was attached, no beam being used.

ANNEX II TO APPENDIX III

Particulars of Rockets used in the R.A.F.

1942 - 1945

MOTORS

Nomenclature	Weight	Diameter	Length	Remarks
Motor Rocket aircraft 3 inch No. 1 Mark I.	30.21 lb.	3.25 ins.	55.2 ins.	Tubular cordite charge.
Motor Rocket aircraft 3 inch No. 1 Mark II.	28.5 lb.	3.25 ins.	55.2 ins.	Cruciform cordite charge.
Motor Rocket aircraft 3 inch No. 1 Mark III.	28.5 lb.	3.25 ins.	55.2 ins.	Cruciform cordite charge.
Motor Rocket aircraft 3 inch No. 1 Mark IV.	28.5 lb.	3.25 ins.	55.2 ins.	Special for tier carriage.

HEADS

Nomenclature	Weight	Diameter	Length	Remarks
Shot A.P. 25 lb.	24.75 lb.	3.44 ins.	9.4 ins.	
Shot S.A.P. 25 lb.	24.75 lb.	3.44 ins.	9.4 ins.	Mild Steel.
Shell S.A.P. 60 lb.	60.0 lb.	5.98 ins.	19.72 ins.	
Shot Practice 25 lb.	25 lb.	5.0 ins.	11.6 ins.	Concrete.
Shot Practice 60 lb.	60 lb.	6.0 ins.	21 ins.	Concrete.

Analysis of flying hours on Ocean Convoy Escort and Support from the United Kingdom, Iceland, Gibraltar and Azores (after Oct. 1943)

Month Year	Day or Night	Effective Hours	Base to Base Hours	A/C lost	U-boat		Results	
					Sightings	Attacks	Sunk	Dam
JAN 1943	Day	2,823	4,557	2	12	8	1	-
	Night	85 ord	652 ord	-	-	-	-	-
		15 L/L	30 L/L	-	-	-	-	-
FEB 1943	Day	1,988	3,560	1	25	14	4	3
	Night	345 ord	1,179 ord	-	3 N	2 N	1 N	1 N
		7 L/L	21 L/L	-	-	-	-	-
MCH 1943	Day	3,295	6,119	5	53	30	2	5
	Night	111 ord	950 ord	-	1 N	0 N	-	-
		90 L/L	156 L/L	-	1 L/L	0 L/L	-	-
APR 1943	Day	3,209	5,951	1	63	28	3	2
	Night	94 ord	626 ord	-	3 N	1 N	-	-
		41 L/L	85 L/L	-	-	-	-	-
MAY 1943	Day	3,563	6,813	2	80	48	7 + 2 sh	4
	Night	208 ord	931 ord	-	2 N	0 N	-	-
		25 L/L	34 L/L	-	-	-	-	-
JUNE 1943	Day	2,769	5,585	3	18	11	3	4
	Night	87 ord	688 ord	2 N	-	-	-	-
		20 L/L	50 L/L	-	-	-	-	-
JULY 1943	Day	2,030	4,405	-	4	3	-	-
	Night	105 ord	623 ord	-	-	-	-	-
		52 L/L	169 L/L	1 L/L	-	-	-	-
AUG 1943	Day	1,478	2,922	-	-	-	-	-
	Night	37 ord	449 ord	-	-	-	-	-
		1 L/L	33 L/L	-	-	-	-	-
SEP 1943	Day	876	1,909	1	9	5	2	3
	Night	47 ord	368 ord	-	-	-	-	-
OCT 1943	Day	1,751	3,210	5	35	30	10 + 1 sh	4
	Night	89 ord	689 ord	-	1 N	1 N	-	-
		2 L/L	20 L/L	-	-	-	-	-
NOV 1943	Day	1,659	3,183	4	4	2	2	-
	Night	90 ord	596 ord	-	-	-	-	-
		249 L/L	404 L/L	2 L/L	9 L/L	7 L/L	2 L/L	-
DEC 1943	Day	1,588	2,660	-	1	1	-	1
	Night	224 ord	808 ord	1 N	-	-	-	-
		291 L/L	424 L/L	-	4 L/L	3 L/L	-	-
JAN 1944	Day	1,730	2,917	1	7	6	2	3
	Night	695 ord	1,662 ord	1 N	1 N	0 N	-	-
		782 L/L	1,231 L/L	1 L/L	5 L/L	2 L/L	1 L/L	-
FEB 1944	Day	2,378	4,102	-	3	3	1	2
	Night	790 ord	2,038 ord	1 N	2 N	2 N	-	-
		816 L/L	1,681 L/L	2 L/L	15 L/L	12 L/L	2 L/L	-
MCH 1944	Day	2,057	3,925	1	5	5	1 + 1 sh	2
	Night	302 ord	1,087 ord	1 N	-	-	-	-
		864 L/L	1,340 L/L	2 L/L	7 L/L	6 L/L	1 sh L/L	-
APR 1944	Day	1,720	2,978	1	2	2	2	-
	Night	227 ord	688 ord	-	-	-	-	-
		21[illegible] L/L	348 L/L	-	1 L/L	1 L/L	-	-
MAY 1944	Day	1,533	2,795	-	1	0	-	-
	Night	236 ord	535 ord	-	1 N	0 N	-	-
		68 L/L	93 L/L	-	-	-	-	-

The development of Magnetic Detection of submerged U-boats and the ultimate tactics with the American equipment

Originally magnetic detection of submarines was developed by Professor E. J. Williams and was first fitted experimentally in a Sunderland flying boat in February 1941 under the name of Magnetic Detector Submarines (M.D.S.). The idea employed the principle that when a coil (carried in the aircraft) is passed through a magnetic field (caused by the submarine) a current is momentarily induced in that coil and can be indicated by a galvanometer. An M.D.S. contact could of course equally well be obtained from wrecks on the bottom or from surface craft in addition to submarines.

C.C.D.U.
O.R.B.
Appendices

Trials were carried out during February and March by the Coastal Command Development Unit with disappointing results as the 200 feet minimum range of detection required on operations was the highest possible range expected by Professor Williams to be attained under perfect conditions. On 24 April 1941 it was decided that no further trials should be made but that one of the latest Mark II sets should be sent to Messrs. Short Brothers for installation on the production line in a new Sunderland. As no increase in range eventuated, the Coastal Command requirement for M.D.S. was allowed to lapse.

Extract from the June 1944 U.S. Fleet A/S Bulletin pages 44, 45.

The idea was taken up in the United States but based on a slightly different principle. This was the fact that an iron or steel object, such as the hull of a submarine, causes a disturbance or anomaly in the pattern of the earth's magnetic field. Development was undertaken by the National Defence Research Committee, and the Naval Ordnance and Bell Telephone Laboratories. Functionally the two equipments were similar in that each made use of a magnetically positioned detector coil maintained in the direction of the total intensity of the earth's magnetic field like a compass needle. Each measured anomalies or disturbances in this field caused by the aircraft's passage over submarines, wrecks or surfaced vessels. Early in 1942, sets from both these sources were being installed in U.S.N. Blimps using the initial letters M.A.D. as a classification. The full name of the equipment varied between Magnetic Anti-submarine Detector, Magnetic Anomaly Detector and Magnetic Airborne Detector. Ultimately the latter became the universal nomenclature.

C.C. Committee on A/U Warfare 1st meeting 8/5/42 and 2nd meeting 17/6/42.

ibid 4th meeting 26/8/42

Admty A/U Committee 27th meeting 9/9/42

At about the same time, interest over here in M.D.S. was revived and by the first week in May 1942, ten Whitleys of No.502 Squadron had been fitted with either Mark I or Mark II M.D.S. Trials were carried out off Dartmouth against a British submarine but they gave poor results and M.D.S. was written off as unsatisfactory as fitted in Whitleys. However, forty sets of Mark I and sixty of Mark II M.D.S. remained on order. By the end of August 1942 we were losing interest in the equipment and when the matter was raised in committee on 9 September it was considered that, in view of American experience and better development facilities, the idea should be left to them to exploit.

In the United States further advance had been achieved and the equipment was being installed in Catalina flying boats as well as certain landplanes. Ultimately the two American sources of supply varied in the positioning of the detector

coil in order to avoid the magnetism in the aircraft. (1) In November 1942, a set was sent to the United Kingdom and installed in a British Catalina. Trials were made against a large 'T' class British submarine in the Irish Sea. A range of 350 feet was obtained and in one stage of the trial, the submarine was accurately tracked for 20 minutes while proceeding submerged at 60 feet depth. Further trials against a smaller 'H' class submarine, however, gave very poor results and the decision was taken to leave this device entirely to the Americans.

C.C. Committee on A/U Warfare 8th meeting 16/12/42

ibid 9th meeting 15/1/43

Meanwhile in the United States a weapon had been designed to go with the equipment and a further refinement was developed in case a magnetic contact was lost. The magnetic indication of a submerged submarine was momentary and occurred when the aircraft was almost directly above it. The usual method of release in which the weapon had the forward travel due to the aircraft's speed was therefore useless. Explosive release was designed in which bombs were propelled backwards at the same velocity as the aircraft's speed thus resulting in a vertical drop. To provide a spread corresponding to a conventional stick of bombs, these retro-bombs were shot out at various angles to fall in a pattern and were made to explode on contact only. Trial had established a weight of 65 lb as the optimum and 25 were carried as the normal load in a Catalina.

Test of M.A.D. Mk.6 at Key West May 1943 C.C/S.7050/8 Part I encl.112B

and

Extracts from a U.S.N. publication on Patrol Squadron No. 63 and Operational Order M.A.O.P. II issued by the Flag Officer Gibraltar

The full procedure in the case of a suspected submerged U-boat was for the aircraft to fly over the spot and release a retro-fired smoke float when a magnetic indication was obtained. The aircraft then circled quickly and released another smoke-float on the next indication until the growing line of smoke floats showed a definite track. When this track was clearly defined the aircraft flew down the line and fired a pattern of retro-bombs either on magnetic indication or just ahead of the last smoke float. If no explosion followed, the hunt could continue by another aircraft or could be taken up by surface craft if they were present.

If there was difficulty in obtaining the first magnetic indication or if it was subsequently lost the further device was brought into action. This consisted of a number of Expendable Radio Sono Buoys (E.R.S.B.). They could be launched by hand from the aircraft and were 45 inches long by six inches in diameter. They contained a hydrophone which released on the buoy striking water and became suspended some 24 feet below it. A W/T transmitting set within the buoy automatically sent signals of the sounds picked up by the hydrophone which could be listened to by a receiver carried in the aircraft. Six buoys were supplied each painted a different colour and each transmitting on a different frequency so that the aircraft after laying a pattern of buoys around the suspected position of a submerged U-boat could confirm its presence and tell which buoy it was nearest to. The life of the buoy was between four and eight hours after which it automatically sank. The range of transmission and reception was about ten to twenty miles when the aircraft was flying up to 3,000 feet.

This seemingly protracted procedure had certain very definite advantages:-

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(1) In the Mark 6, the magnetic field of the carrying aircraft was compensated for by placing interconnected detector coils in the wing tips whereas in the Mark 10, the detector coil itself was housed in a small streamlined non-magnetic body and towed beneath the aircraft on a cable about 80 to 100 feet long.

1. Ignorance by the U-boat that it was being hunted until an actual hit by a contact bomb took place.

2. A fairly accurate and visible tracked position of which surface craft could take full advantage on arrival.

ibid

3. Supericrity over asdic location in waters confused by temperature or density layers.

There were equally definite disadvantages which, in practice, were found to limit M.A.D. efficacy to particular areas notably the Strait of Gibraltar.

1. It was of no use against a surface U-boat because of its speed, probable flak accuracy and danger to the aircraft of contact bomb hits.

2. If the U-boat chose to submerge below 400 feet it was outside the range of detection.

3. If an effective range was to be attained the aircraft had to fly below 100 feet altitude and on long sweeps in the open sea this was impracticable.

4. Certain areas off the United Kingdom were fouled by numerous wrecks and others were highly magnetic which swamped the sensitivity of the detector coil.

No.63 U.S.N. Catalina Squadron, which formed part of the American re-inforcement to the Bay operations in July 1943, was fitted with M.A.D. The characteristics of this equipment were not suitable for the extended patrols in the deep and open waters of the Outer Bay. The squadron was moved to the Moroccan Sea Frontier in January 1944 and immediately showed the full advantages of M.A.D. when used against submerged U-boats attempting to penetrate the Strait of Gibraltar. Three U-boats were sunk or shared with surface craft by mid-May 1944 and the block patrols carried out by this squadron were a major contribution to Doenitz's decision to abandon attempts to re-inforce the U-boat numbers in the Mediterranean.

The subsequent use of this M.A.D. squadron in the last months of the war against schnorchelling U-boats inshore around the United Kingdom proved a failure due to the wrecks and magnetic areas found in these waters particularly in the Irish Sea and English Channel though one last kill was effected on 30 April 1945 in the S.W. Approaches.

COASTAL COMMAND ANTI-SUBMARINE TACTICAL INSTRUCTION
C.C.T.I. No. 41

INTRODUCTION.

This Anti-Submarine Tactical Instruction is issued with the primary object of enabling aircraft to destroy U/Boats All other results from attacks, such as killing members of the crew, superficial damage by machine-gun fire or forcing the U/Boat to dive, are of secondary importance.

2. A number of separate instructions on Anti-Submarine Tactics has been issued by this Headquarters from time to time and numerous amendments added. These instructions have been revised and consolidated into one, which cancels all Coastal Command Tactical Instructions previously issued on this subject i.e. Nos. 31, 33, 35, 36 and 40. In future, variations in tactical procedure will be issued as amendments or addenda. Amplification of the instructions contained herein will be found in Coastal Command Tactical Memoranda.

3. To kill U/Boats, crews must have a sound theoretical knowledge of:-

(i) The best means of sighting U/Boats.

(ii) The correct method of attack,

(iii) The correct procedure after attack.

4. The successful application of this theoretical knowledge is dependent on continual practice. But neither theoretical perfection or practical proficiency will be of any avail if, when the critical moment comes in a real attack, the release mechanism for some reason or other fails to function correctly. All Junior Commanders and Captains of aircraft should, therefore, continually bear in mind:-

(i) The vital importance of air crews being given continual training in delivering attacks.

(ii) The absolute necessity for eliminating any possibility of failures due either to defective maintenance or faulty crew drill.

VISUAL LOOKOUT.

5. Good visual lookout by day and night is of outstanding importance in all A/S operations. In order to bring their crews to maximum efficiency, captains of aircrafts must carefully organise a watch system and train individual members in both how and where to look.

6. There must always be at least two A/S lookouts who must keep a continuous watch while on duty. They should cover a 180° sector, i.e., from ahead to 90° on either side of the aircraft and one of them must invariably be provided with Binoculars. Lookouts should be changed every half hour whenever this is possible.

7. The area of sea to be searched must be at a sufficient range from the aircraft - dependent on height and visibility - to give the crew a good chance of sighting the U/Boat before the aircraft is itself observed.

8. Full details of how an efficient lookout can best be organised and maintained are given in Coastal Command Tactical Memorandum No.50.

A.S.V. LOOKOUT.

9. In addition to a visual lookout, it is essential that, subject to the restrictions detailed in para. 10 below, that an efficient A.S.V. watch should always be kept. The proper use of A.S.V. by day can be expected to increase appreciably the total number of U/Boats sighted and by night is indispensable.

MK. II A.S.V.

10. There is no restriction on the use of A.S.V. Mk II by night, but except when specially ordered, it is not to be used by day on A/S patrols unless:-

(i) Visibility is under three miles.

(ii) Aircraft is flying above cloud in sufficient quantity to make sighting of U/Boat unlikely at over three miles. A.S.V. should be switched off at least 10 minutes before descending through cloud.

(iii) Required for navigational purposes.

11. When a Mk.II A.S.V. Blip fades and the operator is reasonably certain that it was caused by a U/Boat, the following procedure should be adopted, except (a) at night and (b) on convoy escorts:-

(i) Switch off A.S.V.

(ii) Leave area to a distance of at least 20 miles.

(iii) 20 to 30 minutes after leaving area, return without using A.S.V. at height which will ensure maximum degree of surprise.

(iv) Should no sighting follow, continue duty ordered.

MKS. III, IV, V and VI, A.S.V.

12. There are no restrictions upon the use of A.S.V. Mks. III, IV, V and VI, and continuous watch by a trained WOP/AG must be maintained by day and night. In order to ensure maximum efficiency, the Captain of aircraft should carefully organise a tube watch system to enable operators to be changed at suitable intervals, and so avoid eye fatigue which results in inefficiency. Watch of the indicator should, when possible, not last more than 45 minutes, when a relief watch must take over. The operator relinquishing watch should then have a period of at least one hour on some other duty before returning to A.S.V. watch again.

HEIGHT AT WHICH TO FLY.

13. The best height at which to fly on an A/S patrol is that which gives the greatest chance of the aircraft surprising the U/Boat. In conditions of moderate or good visibility, A/S patrols should therefore, be flown as indicated below:-

(i) When there is no cloud or cloud is above 5,000 feet.

Patrol height should be 5,000 feet. Pilots may,

however, fly higher if they wish, when confident that they can lose height sufficiently quickly to make an effective attack.

(ii) When clouds are not more than 5/10ths below 5,000 feet

Patrol above cloud, but not above 5,000 feet. Aircraft flying above cloud should not normally fly directly over the cloud tops, but preferably 500 to 1,000 feet above them.

(iii) When clouds are more than 5/10ths below 5,000 feet

Cloud cover to be used to the maximum to give concealment. Aircraft should normally fly as near the cloud base as possible.

14. In conditions of low lying haze with good visibility above, U/Boats will have only a limited horizontal view, while their view, upwards, will be little affected. Aircraft should, under these conditions, fly much lower and at a height calculated to reduce to the minimum the chances of being sighted, on the assumption that an aircraft flying high will be seen by a U/Boat sooner than one flying lower.

A/S WEAPONS

15. The normal A/S weapons at present in use are the 250 lb. Torpex-filled depth charge and the 600 lb. Anti-Submarine Bomb.

Height Limitations

16. The height limitations of these two weapons are as follows:-

	Maximum Height	Minimum Height
250 lb. Depth Charge	500 feet.	No limitation.
600 lb. A/S Bomb.	5,000 feet.	500 feet.

Depth Settings

17. Pistols, in both the 250 lb. depth charge and the 600 lb. A/S Bomb should be set at the shallowest settings. These are as follows:-

250 lb. D.C.	25 feet.
600 lb. A/S Bomb	35 feet (Set during manufacture).

Stick Spacings

18. When dropping a stick of 250 lb. Depth Charges by eye, the stick spacing to be used is 100 feet, which has been proved over a period to give the best all-round results.

19. When using the Mk.II(0)A and Mk.III Low Level Bomb-sight, stick spacings for the 250 lb. D.C. are to be as follows (as soon as the necessary computor charts have been issued):-

For sticks of six D.C.'s 60 feet
For sticks of four D.C.'s 100 feet.
For sticks of two D.C.'s 100 feet (Distributor to be adjusted so that these are dropped as Nos. 2 and 3 of an imaginary stick of four).

20. The 600 lb. A/S Bomb should be employed in conjunction with the Mk. XIV Bombsight, or the Mk.II(O)A or Mk.III Low Level Bombsights. It has not yet been cleared for stick spacings less than 80 feet and will normally be dropped in sticks of three, spaced 150 feet.

METHOD OF APPROACH TO ATTACK

21. In a low level attack, height must be lost and the approach made in the quickest possible manner. In doing so, however, the pilot must appreciate -

(i) Whether, if flying direct to the target, he has time to get the bomb-doors open (when applicable) and to get in all respects ready for the attack.

(ii) Whether a direct diving approach will increase the speed of the aircraft to a point which necessitates an adjustment to the bomb distributor setting.

(iii) Although the attack may be carried out from any direction, it should be delivered as near along track of the U/Boat as is possible in the circumstances.

22. On the run-up, the pilot should aim to be not higher than 300 to 500 feet, when three-quarters of a mile to a mile from the target.

23. Pilots should keep a sharp lookout during the approach for alterations in course by the U/Boat, whether it is diving or remaining on the surface.

METHOD OF ATTACK

24. In view of the recent introduction of new weapons and new sighting devices, no standard method of attack can at present be laid down except for the low level attack, where depth charges are released by eye and in which considerable experience has now been gained.

25. The aim of the attack must be to make the centre of the depth charge stick explode within lethal range of the centre of the U/Boat. To do this, factors to be considered are, the estimated forward speed of the submarine, the time of flight of the D.C.'s and their forward travel of 40 feet after entering the water.

26. In order to reduce errors to a minimum, depth charge attacks should be delivered from low altitude. The normal height of release is 50 feet, and if possible, all Depth Charge attacks, when no sight is used, should be made from this height.

NOTE: The lethal range of the 250 lb. Depth Charge is 19 feet, and that of the 600 lb. A/S bomb 28 feet.

POINT OF AIM

27. In order to be able to make the necessary calculations quickly, regarding the point of aim, the pilot or bomb aimer, as the case may be, must be fully conversant with the following data:-

(i) The time from the release of a depth charge from 50 feet to detonation at the shallow setting (25 feet) is approximately 5 seconds (2 seconds in the air and 3 in the water).

(ii) If the U/Boat is in process of crash-diving, her speed will be approximately 6 knots (10 feet per second). Therefore, if the U/Boat is attacked while some part of the hull is visible, the centre of the stick should be aimed 5 x 10 = 50 feet ahead of the conning tower (or its estimated position, at the time of release.
(If the conning tower is itself in sight, however, at the time of release, it is desirable to make this the aiming point, although theoretically, the stick will then fall 50 feet behind it.)

(iii) If the U/Boat has dived before the depth charges are released, (see para. 32), the stick must be aimed a certain distance ahead of the swirl, the apex of which is made by the foremost end of the conning tower. This distance is, of course, that run by the submarine between its final disappearance and the time of detonation of the depth charges. Assuming that the speed of the U/Boat is 6 knots, the distances are as follows:-

Time of Submersion to release of D.C.'s -	5 secs.	10 secs.	15 secs.	20 secs.	25 secs.	30 secs.
Distance to aim ahead of swirl -	100 ft.	150 ft.	200 ft.	250 ft.	300 ft.	350 ft.

(iv) If the periscope only, is sighted, the speed of the U/Boat will probably be only about 2 knots, i.e., 3.4 feet per second, hence the stick should be aimed 5 x 3.4 = 17 feet ahead of the periscope at the time of release.

NOTE: An additional allowance must always be made for the under-water travel of the depth charges (40 feet).

28. The approximate length of a U/Boat's diving swirl is 100 feet and this can be conveniently used as a yardstick in estimating the distance ahead that the depth charges should enter the water.

29. The time lapse between submersion of the U/Boat and release of depth charges must be known exactly. It should preferably be recorded by stop-watch and counted over the inter-com. by a member of the crew previously detailed for this duty.

WHEN TO ATTACK AND WHEN NOT TO ATTACK.

30. If the aircraft cannot deliver its attack until after the U/Boat has been submerged for some time, the question always arises as to whether to attack or whether the D.C.'s should be saved for a probable second and better opportunity later.

31. The pilot must in these circumstances, always use his own judgment whether to deliver an attack or not; but it is most unlikely that an attack with 250 lb. D.C.'s will be successful if the U/Boat has been submerged for more than 30 seconds at the time of detonation, unless it happens to have been seriously damaged previously.

32. A depth charge attack should not, therefore, usually be made after this time limit, unless there is conclusive evidence of slow submersion or the U/Boat is in the pilot's opinion, threatening a convoy or other surface craft, or unless the attacking aircraft is nearing the end of its sortie. In these circumstances, an attack may be made with a view to giving the U/Boat at least a bad shaking up, and in the case of a threat to shipping, preventing it delivering its attack.

33. Owing to the increased lethal range of the 600 lb. A/S bomb and its slightly deeper depth setting, this weapon has a good chance of being effective if detonation occurs within 40 seconds of the U/Boat submerging. When using this bomb, however, allowance must of course, always be made for the increase in time of fall. The time between release from 1500 feet, for example, and detonation at 35 feet would be approximately 10 seconds. As a temporary measure, until sufficient data on which to assess the value of the 600 lb. A/S Bomb, is available, release may be made up to 40 seconds after U/Boat has submerged.

34. If a U/Boat is sighted and no attack has been made, "baiting tactics" are to be employed except when the aircraft is proceeding to escort a convoy, in which case it should continue on its way. For details of "baiting tactics", see paragraph 48 below.

35. Attacks are not to be made on oil streaks unless specifically ordered.

NUMBER OF DEPTH CHARGES TO BE RELEASED.

36. The number of depth charges to be released in any attack must always be left to the discretion of the Captain of the aircraft, according to the total load carried and other circumstances at the time, but the following is given as a general guide and should normally be adhered to:-

Aircraft on A/S Patrols or Sweeps -

37. (i) Aircraft carrying six or less depth charges should drop the whole load in one stick.

(ii) Aircraft carrying more than six depth charges should drop sticks of six leaving the remainder for subsequent use.

Aircraft on Escort Duty -

38. Aircraft on convoy or other escort duty should drop sticks of four depth charges. leaving the remainder for subsequent attacks, e.g., an aircraft carrying a total of six depth charges would drop four in the first attack leaving two for a possible second attack, and an aircraft carrying twelve depth charges will thus have sufficient for three attacks.

39. The Captain of the aircraft is, however, always at liberty to drop more than four depth charges if he considers the chances of a second sighting unlikely, e.g., when near his P.L.E. If he makes his first U/Boat sighting when returning to base, he should always drop at least a full stick of six.

40. When a U/Boat is sighted by an aircraft which is en route to escort a "threatened" convoy, an attack should be delivered only if a Class "A" Target is presented, i.e., if the U/Boat is on the surface or has submerged for less than 15

seconds, but not more than 50% of the depth charges, (and in any case a maximum of four) should be expended in these circumstances. When proceeding to a convoy not reported as "threatened", however, a full stick of four depth charges should always be dropped if the chances of a successful attack are considered good.

U/BOATS FIGHTING BACK.

41. It is evident that U/Boat Commanders are now tending, increasingly to remain on the surface and fight back with their gun armament when attacked by aircraft. It is in fact, known that they have received orders to adopt these tactics if surprised on the surface, in such a way as to be unable to dive to a safe depth before the aircraft can deliver its attack.

42. When a U/Boat remains on the surface and fires at the attacking aircraft, the decision as to the method of attack must rest with the Captain of the aircraft who will take into consideration his armament, the degree of surprise achieved, the presence or otherwise of A/S surface vessels and the extent to which he is committed to the attack when the U/Boat opens fire. In general, however, he must remember that the primary reason for his existence is, for the time being, to kill U/Boats and that a U/Boat on the surface presents a much better chance of a kill than one submerged. It is no coincidence that recently, by far the larger proportion of certain or probable kills have been U/Boats which stayed on the surface and fought back.

43. It should also be borne in mind that even a big aircraft properly handled and using its guns well presents a fleeting and difficult target for the gunners in the necessarily cramped positions of a U/Boat, which in any sort of a sea is a very poor gun platform and especially so if the sea is bean-on. While, therefore, the tactics to be employed must be left to the Captain's judgment the attack should, whenever possible, be pressed home at once, preferably from dead ahead, making full use of the front guns to kill the U/Boat's gun crews or at least to keep their heads down.

44. If, however, the Captain of aircraft considers the direct form of attack undesirable, alternative tactics are to circle the U/Boat at such a range as to bring accurate fire to bear, flying an irregular course with constant variations in height and firing with as many guns as possible, until the U/Boat's gunners are disabled or the U/Boat decides to dive; when the aircraft must be prepared to make an immediate attack. While adopting these tactics, a very careful watch through binoculars should always be maintained to ensure that the earliest possible warning is received of any intention on the part of the U/Boat to submerge.

ACTION AFTER ATTACK.

45. After carrying out an attack on a U/Boat by day, the aircraft must drop a marker beside the swirl. By night the site of the attack is to be marked by flame float, and whenever practicable, two flame floats should be dropped at the same time as the depth charges.

46. The aircraft should then keep the area of attack under observation long enough to observe results and if possible, determine the extent of the damage caused by the attack. Where there are indications, such as wreckage or

persisting oil, or air bubbles, that the U/Boat may be forced to re-surface, the aircraft is to remain over the site and maintain position and height best suited for delivering another attack.

47. On other occasions, excepting, of course, when the U/Boat is definitely sunk, and except when the aircraft is on convoy escort duty, or at night, "baiting tactics" (see para, 48 below), are to be employed. Aircraft proceeding en route to escort a convoy should not remain over the site of an attack for a period longer than fifteen minutes.

BAITING TACTICS

48. In adopting "baiting tactics" the aircraft will set course from the position of the attack to a distance of at least 30 miles and will remain outside this range for not less than 30 minutes. The aircraft should then return to the scene of the attack, taking full advantage of cloud, sun and weather conditions for concealment, in the hope that the U/Boat will have again surfaced.

PHOTOGRAPHS

49. Photographs are to be taken whenever possible and duties are to be allotted as necessary to individual members of the crew prior to take-off. The most important photographs are those recording the attack. The rear, or mirror camera is to be turned on at least five seconds before the release of the depth charges and must be kept on for a minimum of 15 seconds afterwards, throughout which period the pilot should make no alteration of course.

SIGNALS PROCEDURE.

50. The Captain of aircraft must always appreciate the situation relative to the task upon which he is engaged and bear in mind the order of precedence for the despatch of signals subsequent to the sighting and attack of a U/Boat.

51. Whenever a U/Boat is sighted by an aircraft on an A/S patrol or sweep, if there is sufficient time and opportunity without interfering with the efficiency of the attack, the Captain of aircraft will instruct the W/T operator to transmit on his operational frequency the Group 465 from the Naval section of the Air Force code. The Group is to be preceded by his own aircraft call-sign and will indicate that an attack is about to be made on a U/Boat. If it is subsequently discovered that no U/Boat is present, a cancellation must be sent immediately and an acknowledgment obtained from W/T control. This procedure does not apply to aircraft on a convoy escort, who are to make initial reports of sightings by R/T to the S.O. Escort (see para. 52 below). It may also be suspended in special circumstances, when the risk from enemy fighters is considered such as to justify wireless silence.

52. When engaged on escort duty, the Captain of Aircraft must, as soon as possible inform the Senior Officer of the surface vessel or vessels of the presence of any U/Boat sighted, giving the position as a bearing and distance relative to the vessel(s) or in the case of convoys, relative to the centre of the convoy. This report is to be made by R/T, or V/S, if R/T communication cannot be established; co-ordinates for latitude and longitude positions are not to be used. The making of this report must not, however, be allowed to prejudice the efficiency of the aircraft's attack on the U/Boat and will usually be sent after the attack has been completed.

53. When an aircraft on convoy escort estimates that it has sunk a U/Boat, the report is to be made by V/S to S.O. Escort. Only if this is impossible is R/T to be used.

54. Aircraft on protective sweeps, when from a previous sighting the position of the convoy is known and the aircraft is within 20 minutes' flying thereof, will close the convoy and inform the S.O. Escort of the presence of a U/Boat in the same way as in paragraph 52 above.

55. Signals reporting sightings and attacks of U/Boats are to be sent to base as follows, unless special instructions have been issued to the contrary:-

(i) Immediately after the attack, when on A/S patrol or sweep.

(ii) Immediately after informing S.O. Escort when on escort duty, or on a sweep where the aircraft is in sight of or in R/T communication with S.O. Escort.

(iii) While closing a convoy, when on a sweep, in the circumstances of paragraph 54 above.

56. It is essential that the relevant information be passed to base in the correct form and without delay. The signals to be sent on the completion of an attack are as follows:-

(i) The Groups 465 and 472 together.

(ii) The Group 511, denoting also the type of attack, but not giving an estimate of hits unless a direct bomb hit on the surface on a U/Boat is actually seen.

(iii) If the U/Boat is forced to the surface after the attack in an obviously damaged condition and remains there for an appreciable time, the Group 512 should be sent. If this happens immediately after the attack and before the Group 511 has been sent, the Group 512 may be sent in lieu.

(iv) If the U/Boat does not dive on being attacked, the Group 467 should be sent.

(v) If, after either 512 or 467 has been sent, the U/Boat subsequently dives, the Group 466 should be transmitted.

57. The first signal (Groups 465 and 472) should always be sent unrecoded, i.e., as it appears in the Naval section of the Air Force Code. All subsequent signals and amplifying reports are to be sent in special "SYKO".

58. All future action either by S.O. Escorts or base depends on receiving accurate reports from the aircraft. No signal is to be sent claiming the destruction of a U/Boat unless there is complete and absolute certainty. Probable destruction calls for an amplifying signal giving accurate details. Amplifying reports on U/Boats disabled on the surface must be made at intervals of not less than 15 minutes.

59. Pilots and W/T operators must be fully conversant with homing procedure and must be prepared to home either surface vessels or other aircraft to the scene of the attack with the minimum of delay.

OBSERVATION AND REPORTING OF RESULTS OF ATTACK.

60. For purposes of assessment and so that all possible lessons may be learned from every attack, it is essential that the most complete and detailed account should be available. This is only possible, whether the attack is by day or night, if the crew drill is such as to ensure that no detail has been overlooked. Captains of aircraft must, therefore, allot tasks to respective members of the crew so that each knows his duty in this respect whenever an attack is made.

61. Crews, on landing must be interrogated by the Intelligence Officer, so that the Form Orange can be completed and at the same time, paras. 1 to 11 of C.C. Form Ubat should be compiled. The remainder of this form is to be completed by the Squadron Commander or his deputy, in conjunction with the Intelligence Officer, when the crew is rested; this should normally be done within 24 hours. The story should be complete to the smallest detail and even facts which may appear irrelevant should be included. The best way to obtain such information is by informal discussion and when the whole incident has been thoroughly investigated a connected account should be written down and read by the crew. If they are satified, the Form Ubat can then be completed. It is appreciated that the Form, compiled in this way, may differ considerably from the Form Orange, but this is acceptable.

(Signed) J. C. SLESSOR
Air Marshal,
Air Officer Commanding-in-Chief,
Coastal Command.

Headquarters, Coastal Command.
Ref: CC/S.7050/8. Plans A/S.
Date:- 12th June, 1943.

Air Operations against U-boats in the Bay of Biscay Transit area

Month	Av. Strength in A/U aircraft and L.R. fighters	DAYTIME							NIGHT							A/C losses analysed					Actual number of U-boats crossing the area	Number of individual U-boats sighted	Number of individual U-boats attacked	Total Results
		Effective Day Hours	Base to Base Day Hours	A/C lost	Sightings of U-boats	Attacks on U-boats	Results		Effective Night Hours	Base to Base Night Hours	A/C lost	Sighting of U-boats	Attacks on U-boats	Results		U/B Flak	G.A.F.	Crash T.O. on landing	Cause not known	Total				
							Sunk	Dam.						Sunk	Dam.									
Jan. 1943	160 plus 40 fighters	3,136	3,856	11	5	4	-	-	451 ord 376 L/L	691 ord 449 L/L	1 N -	- 3 L/L	- 2 L/L	- -	- -	-	2	6	4	12	88	8	6	Nil
Feb. 1943	190 plus 40 fighters	4,354	5,270	6	25	11	1	2	599 ord 653 L/L	883 ord 768 L/L	1 N 1 L/L	- 4 L/L	- 2 L/L	- 1 L/L	- -	-	-	5	3	8	98	24	11	2 Sunk 2 Dam.
Mch. 1943	145 plus 40 fighters	4,342	5,343	10	28	11	-	-	534 ord 662 L/L	858 ord 830 L/L	- 2 L/L	1 N 11 L/L	0 N 7 L/L	- 1 L/L	- 2 L/L	1	3	4	4	12	119	30	16	1 Sunk 2 Dam.
Apr. 1943	160 plus 20 fighters	3,237	4,153	1	23	12	-	-	428 ord 777 L/L	629 ord 980 L/L	1 N 4 L/L	5 N 20 L/L	1 N 14 L/L	- 1 L/L	- 3 L/L	-	-	3	3	6	117	33	20	1 Sunk 3 Dam.
May 1943	210 plus 60 fighters	4,733	6,181	19	101	66	7	6	553 ord 688 L/L	402 ord 912 L/L	- 2 L/L	- 2 L/L	- 1 L/L	- -	- 1 L/L	5	6	6	2	19	120	54	45	7 Sunk 7 Dam.
June 1943	270 plus 120 fighters	6,336	8,515	16	61	28	2	8	262 ord 596 L/L	618 ord 761 L/L	- 2 L/L	- -	- -	- -	- -	4	8	4	2	18	64	26	11	2 Sunk 8 Dam.
July to 2nd Aug. including Gib. & M.S.F. flying	380 plus 80 fighters	8,318	12,384	19	93	64	18	7	494 ord 877 L/L	1,186 ord 1,285 L/L	1 N -	- 1 L/L	- 1 L/L	- 1 L/L	- -	4	8	4	4	20	86	55	39	19 Sunk 7 Dam.
Aug. 3rd to 31st including Gib. & M.S.F. flying	390 plus 80 fighters	7,535	11,150	31	4	0	-	-	571 ord 1,296 L/L	1,254 ord 1,808 L/L	- 5 L/L	- 4 L/L	- 2 L/L	- 1 L/L	- -	-	22	13	1	36	32	6	2	1 Sunk Nil Dam.

Air Operations against U-boats in the Bay of Biscay Transit area Contd.

Month	Av. Strength in A/U aircraft and L.R. fighters	DAYTIME							NIGHT							A/C losses analysed					Actual number of U-boats crossing the area	Number of individual U-boats sighted	Number of individual U-boats attacked	Total Result
		Effective Day Hours	Base to Base Day Hours	A/C lost	Sightings of U-boats	Attacks on U-boats	Results		Effective Night Hours	Base to Base Night Hours	A/C lost	Sightings of U-boats	Attacks on U-boats	Results		U/B Flak	G.A.F.	Crash T.O. or landing	Cause not known	Total				
							Sunk	Dam.						Sunk	Dam.									
Sept including Gib. & M.S.F. flying	420 plus 120 fighters	8,180	12,048	13	10	2	1	-	953 ord 1,904 L/L	1,368 ord 2,496 L/L	- 4 L/L	- 12 L/L	- 10 L/L	- 1 L/L	- 1 L/L	1	8	4	4	17	60	16	10	2 Sunk 1 Dam.
Oct. including Gib. & M.S.F. flying	320 plus 80 fighters	5,240	7,313	7	3	2	-	-	1,908 ord 2,167 L/L	3,042 ord 2,927 L/L	1 N 1 L/L	2 N 8 L/L	2 N 6 L/L	- 1 L/L	- -	-	3	4	2	9	70	11	9	1 Sunk Nil Dam.
Nov. including Gib. & M.S.F. flying	290 plus 100 fighters	4,833	7,303	7	5	4	1	1	2,017 ord 2,571 L/L	3,120 ord 3,404 L/L	1 N 3 L/L	3 N 2 L/L	1 N 1 L/L	1 N -	- -	1	4	5	1	11	46	6	3	2 Sunk 1 Dam.
Dec. including Gib. & M.S.F. flying	270 plus 70 fighters	3,452	5,116	6	2	0	-	-	2,029 ord 2,863 L/L	3,014 ord 3,781 L/L	1 N 5 L/L	3 N 6 L/L	2 N 4 L/L	- 1 L/L	- -	-	5	5	2	12	50	7	4	1 Sunk Nil Dam.
Jan. 1944 including Gib. flying No M.S.F.	230 plus 75 fighters	1,908	2,640	2	1	1	1	-	1,754 ord 1,679 L/L	2,655 ord 2,339 L/L	2 N 1 L/L	5 N 9 L/L	11 N 11 L/L	- 1 L/L	2 N 2 L/L	1	1	2	1	5	66	20	17	2 Sunk 4 Dam.
Feb. 1944 No Gib. M.S.F. flying	156 plus 70 fighters	2,236	2,995	2	1	0	-	-	1,652 ord 1,546 L/L	2,611 ord 2,041 L/L	2 N 1 L/L	2 N 7 L/L	2 N 6 L/L	- -	- -	2	2	-	1	5	50	6	5	Nil Nil
Mch. 1944 including small effort by Gib.	220 plus 60 fighters	5,044	6,929	6	9	5	1	1	1,925 ord 2,336 L/L	3,017 ord 2,920 L/L	3 N 2 L/L	3 N 8 L/L	3 N 6 L/L	- -	- 1 L/L	4	3	1	3	11	53	14	11	1 Sunk 2 Dam.

Air Operations against U-boats in the Bay of Biscay Transit area Contd.

Month	AV. Strength in A/U aircraft and L.R. fighters	DAYTIME							NIGHT							A/C losses analysed					Actual number of U-boats crossing the area	Number of individual U-boats sighted	Number of individual U-boats attacked	Total Result
		Effective Day Hours	Base to Base Day Hours	A/C lost	Sightings of U-boats	Attacks on U-boats	Results		Effective Night Hours	Base to Base Night Hours	A/C lost	Sightings of U-boats	Attacks on U-boats	Results		U/B Flak	C.A.F.	Crash T.O. or landing	Cause not known	Total				
							Sunk	Dam.						Sunk	Dam.									
Apr. 1944 No Gib. flying	230 plus 60 fighters	3,840	5,455	7	4	3	-	-	978 ord 1,594 L/L	1,778 ord 2,040 L/L	1N 4L/L	4N 15L/L	4N 7L/L	- 1L/L	- -	3	4	3	2	12	33	13	10	1 Sunk Nil Dam.
May 1944 No Gib. flying	290 plus 40 fighters	4,318	6,174	-	-	-	-	-	562 ord 1,787 L/L	1,090 ord 2,252 L/L	1N 3L/L	2N 7L/L	2N 6L/L	- 1L/L	- 1L/L	2	-	-	2	4	20	4	4	1 Sunk 1 Dam.

Summary of the U-boat War Situation by Doenitz - 11 July 1943
Reference - B.d.U. War Diary for July - Pages 22 to 26

The Northern Atlantic

When on 24 May the decision was taken to withdraw from the Northern Atlantic, all the 15 boats still well stocked with fuel were sent to the Azores region to operate as Group Trutz against the American UG and GU convoys in an area clear of shore based air interference. The few remaining boats were kept in scattered billets making dummy radio signals to deceive the Allies and, from Radio Intelligence intercepts, this was successful for some weeks in leading the enemy to believe that there were still two or three large groups of U-boats in the northern area. It was intended to keep the number of these boats at the same level by reliefs from Germany. However, within a short time several boats had to return owing to low fuel stocks and several of the relief boats were sunk or damaged. After it became known that U.194 and 200 had been lost in the Northern Passage Area all further sailings from Germany were cancelled until quadruple flak gun mountings had been fitted and the four boats on their way up to this area were diverted to Norway and turned over the Arctic U-boat flotilla for mining operations.

These facts have led by the 7 July to the Northern Atlantic being manned by only one boat (U.667) and it is presumed that the enemy is no longer deceived as to the actual state of affairs. There is, however, no precise information on this as the English have recently changed their radio procedure for U-boat situation reports and Radio Intelligence have no intercepts.

At present the prospects of renewing the attack on convoys using the Northern Atlantic route are so slight in view of the strength of the escorting forces (surface and air both shipborne and shore based) and the problem of finding convoys with so few U-boats is so difficult that there is little purpose in sending U-boats from Biscay ports to fill the gap. The previous plan to resume convoy war at the end of July has been abandoned as by that time neither the Zaunkoenig fast acoustic torpedo nor the improved radar interception receiver will be available. If possible to provide this gear, the action will be resumed during the new moon period at the end of August.

The Azores Latitude

Operations by Group Trutz against the UG and GU convoys have failed. It is believed that the patrol line was located by high flying carrier borne aircraft and then evaded by the various east or westbound convoys. The enormous sea area permits the enemy to make extensive evading movement and from the start there were no illusions as to the difficulty of finding convoys without reconnaissance by our own aircraft.

There is no purpose in sending another group of U-boats to this area while they are unable to detect enemy aircraft radar transmissions. Apart from the uncertainty in finding these convoys, the perfect weather conditions and presence of enemy carriers with the convoys make pack tactics too difficult to hope for success. Accordingly Group Trutz was disbanded.

Subsequently the deployment into the three Geier Groups between the Azores and Portugal also failed to provide any

success and of the original 16 boats there are on the 11 July only three still in the operating area west of Cape Finisterre. All the others are returning owing to fuel shortage or damage received by the strong air activity experienced - (N.B. In fact these three boats had been sunk).

Southern Operations Areas

The employment of all available Type IXc and VIIc boats which could be supplied by U-tankers in the Caribbean and off the Brazilian and West African coasts has begun to take effect during the first ten days of July. After only a short period in their operational areas, three ships have been sunk in the Caribbean, seven off the Brazilian coast and three off West Africa. In the main, the traffic even in these remote areas is mostly in convoy but the reported experience is that the surface escort is poorly trained. The constant air activity is unpleasant but it is by no means as strong or dangerously effective as that nearer home.

The first wave of U-boats which have arrived in these areas will be relieved by a second and a third wave. Unfortunately much depends on the U-tanker situation which is at present bad. U-462, intended for the Southern Atlantic, has again had to put back to harbour through air attack in the Bay of Biscay thus only small supplies of fuel and provisions can be provided rather far north in the Azores region.

Night air escort and support to convoys

Night air escort to convoys had been given on some occasions from mid-1940 to 1942 but was restricted to conditions of clear moonlit nights. Even so it was more in the nature of moral support as the aircraft were not practised in the art of night attack indeed only one attack on a U-boat near a convoy took place up to mid-1942, and although more night flying had been done in sweeps supporting convoys there had been no attacks at all.

With the advent of the Leigh Light in June 1942, it became practicable in theory to give both escort and support irrespective of moon conditions. In fact, however, the range limitation of the Wellington, which was up to February 1943 the only aircraft so equipped, precluded their employment on this task. In addition, the role of these and the relatively few Catalinas subsequently fitted with searchlights was essentially against U-boats in the transit areas. The one area where convoy cover merged with transit operations was in the Gibraltar Command. The arrival of Leigh Light Wellingtons in December 1942 was soon followed by their increasing employment at night with local convoys. Here also the better night conditions favoured a much more general use of ordinary aircraft on convoy night support.

Throughout the war, flares from aircraft to identify A.S.V. contacts or aid attack were never permitted anywhere near Atlantic convoys and there was misgiving in naval circles about even the momentary use of the narrow beamed airborne searchlight. It was, therefore, something of an innovation when one of the first Liberators of No. 53 Squadron to be fitted with the Leigh Light was allowed to give night escort to convoy SC 143 in October 1943.

The deployment of Leigh Light Wellingtons to the Azores early in November 1943 really initiated night support to Atlantic convoys. This and the full Leigh Light availability in No. 53 Squadron operating from Cornwall made it possible to give consistent day and night cover to convoy SL 139/MKS 30 during the third week of November. Based on the experience thus gained, a special patrol diagram with suitable tactical instructions were worked out on the tactical table at Liverpool. Agreement was reached between the Western Approach and Coastal Commands, and the procedure was promulgated by signal on 26 November. As this remained the standard for the remainder of the war, it is given in full.

1. Convoy Night Air Escort applies only to aircraft engaged in close cover and not to sweeps ahead and astern of convoys.

2. Dispositions

(a) Escort vessels will be disposed in the following areas:-

C.C.
S.30 Part II
encl. 66A

Close escort in Red Area to a depth of six miles from the convoy perimeter. Support groups in White Area extending from the outer limit of Red to a depth of twelve miles from the convoy perimeter.

(b) Aircraft will be in Blue Area extending beyond the limit of white.

3. The above forces will normally operate only in their prescribed areas unless contact is made with the enemy when the division between the Blue and White areas will be abolished.

4. Aircraft are free to attack in the Blue and White areas. The Red area is only to be entered for purpose of self identification or ascertaining position.

5. Homing Procedure B will normally be ordered for aircraft joining the convoy at night and R/T used for self identification. During the period of patrol, aircraft will come under the control of the Senior Officer Close Escort.

6. On making contact with the convoy, aircraft will carry out identification procedure, signal the duration of patrol and immediately start Cobra 15 patrol unless otherwise ordered. ibid

7. U-boat sightings will first be reported on R/T to the Senior Officer Escorts indicating the position relative to the convoy. Aircraft will then carry out reporting procedure on the convoy W/T wave. A long dash is to follow the first W/T sighting report to enable escort vessels fitted with HF/DF to obtain a bearing.

8. Non-Leigh Light aircraft are to use flares to illuminate A.S.V. contacts for attack and after attacking are to climb to 1,000 feet and drop further flares or fire illuminating cartridges over the attack position to guide surface vessels. Leigh Light aircraft are to adopt the same procedure after attack.

9. R/T may be used to assist surface vessels in locating the attack markers.

10. Any escort vessel in the Blue or White area which is closed within two miles by aircraft will assume she is being attacked and will flash identification lights on both sides whereupon the aircraft must turn away and open the range.

11. Aircraft wishing to indicate their position to escort vessels will switch their downward recognition light on and off until the ship replies on R/T that the aircraft has been seen.

12. The Senior Officer Close Escort when ordering aircraft to investigate HF/DF contacts will indicate the position relative to the convoy. ibid

13. If at any time R/T communication becomes uncertain, messages are to be passed by W/T on the convoy wave.

14. On completion of patrol, aircraft will leave the Blue area direct, informing the Senior Officer Escorts by R/T.

15. Where W/T Silence has been ordered, aircraft will not identify themselves nor communicate with the convoy by W/T, R/T or V/S nor approach at any time within 15 miles of the convoy Perimeter unless contact is made with the enemy.

Coastal Command Liberator Standards

V.L.R. Standard - Liberators I, IIIA and V

Crew - 8 - All armour giving protection from the rear removed.

Range - 2,300 n.miles at 4,000 feet - Tankage 2,560 imp.gals.

obtainable in Mk.I - Full main wing tanks
in Mk.IIIA - " " " " plus two full bomb cell auxiliary tanks
in Mk.V - (prior to FL 971 as for Mk.IIIA
(subsequent - Full main tanks, full auxiliary wing tanks and one full bomb cell auxiliary tank.

Bomb Load

Mk.IIIA or V with rear turret

8 - 250 lb D.C.s or 2 - Mk.24 Mines and 3 - 250 lb D.C.s
or 2 - 600 lb A/S bombs and 4 - 250 lb D.C.s

Mk.V with NO rear turret

10 - 250 lb D.C.s or 2 - Mk.24 Mines and 5 - 250 lb D.C.s
or 2 - 600 lb A/S bombs and 6 - 250 lb D.C.s

Mk.V with NO rear turret and carrying Leigh Light

8 - 250 lb D.C.s

Mk.V with NO rear turret or Leigh Light but carrying R.P.

8 - 25 lb head R.P.s and 5 - 250 lb D.C.s

Bomb-sight

Mk. III Low Level

Gun Armament

Nose gun - One - 0.5 inch and 500 rounds
Mid-upper turret - is removed
Beam guns - each single 0.5 inch with 400 rounds
or each - twin 0.303 inch with 1,000 rounds per gun
or each - twin 0.3 inch with 500 rounds per gun
Tail Turret - is removed in Mk.V with ASG III radar
in others - four 0.303 inch with 500 rounds per gun.

L.R. Standard - Liberator Mk.V

Crew - 8

Range - 1,900 n.miles at 4,000 feet - obtainable with full main and outboard wing auxiliary tanks.

Bomb Load

Without Leigh Light

10 - 250 lb D.C.s or 2 - Mk.24 Mines and 5 - 250 lb D.C.s
or 2 - 600 lb A/S bombs and 5 - 250 lb D.C.s

With Leigh Light

8 - 250 lb D.C.s

With R.P. and NO Leigh Light

16 - 25 lb head R.P.s and 5 - 250 lb D.C.s
or 16 - 25 lb head R.P.s, one Mk.24 Mine and 3 - 250 lb D.C.s

Bomb Sight

Mk. III Low Level

Gun Armament

Nose gun - One 0•5 inch with 500 rounds
Mid-upper turret - Two 0•5 inch with 400 rounds per gun
Beam guns - each a single 0•5 inch with 400 rounds per gun or each a twin 0•303 inch with 1,000 rounds per gun.
Rear Turret - four 0•303 inch guns with 1,000 rounds per gun.

L.R. Standard - Liberator Mk.VI

Crew - 10

Range - 1,600 n.miles at 4,000 feet - obtainable with full main and outboard wing auxiliary tanks.

Bomb Load

With or Without Leigh Light

8 - 250 lb D.C.s or one Mk.24 Mine and 6 - 250 lb D.C.s

With R.P. and NO Leigh Light

16 - 25 lb head R.P.s and 3 - 250 lb D.C.s
or 16 - 25 lb head R.P.s and one Mk.24 Mine

Bomb Sight

Mk. III Low Level

Gun Armament

With NO Leigh Light

Nose Turret - Two 0•5 inch with 500 rounds per gun
Upper Turret - Two 0•5 inch with 400 rounds per gun
Beam guns - each a single free 0•5 inch with 800 rounds per gun
Tail Turret - Four 0•303 inch with 1,000 rounds per gun

With Leigh Light

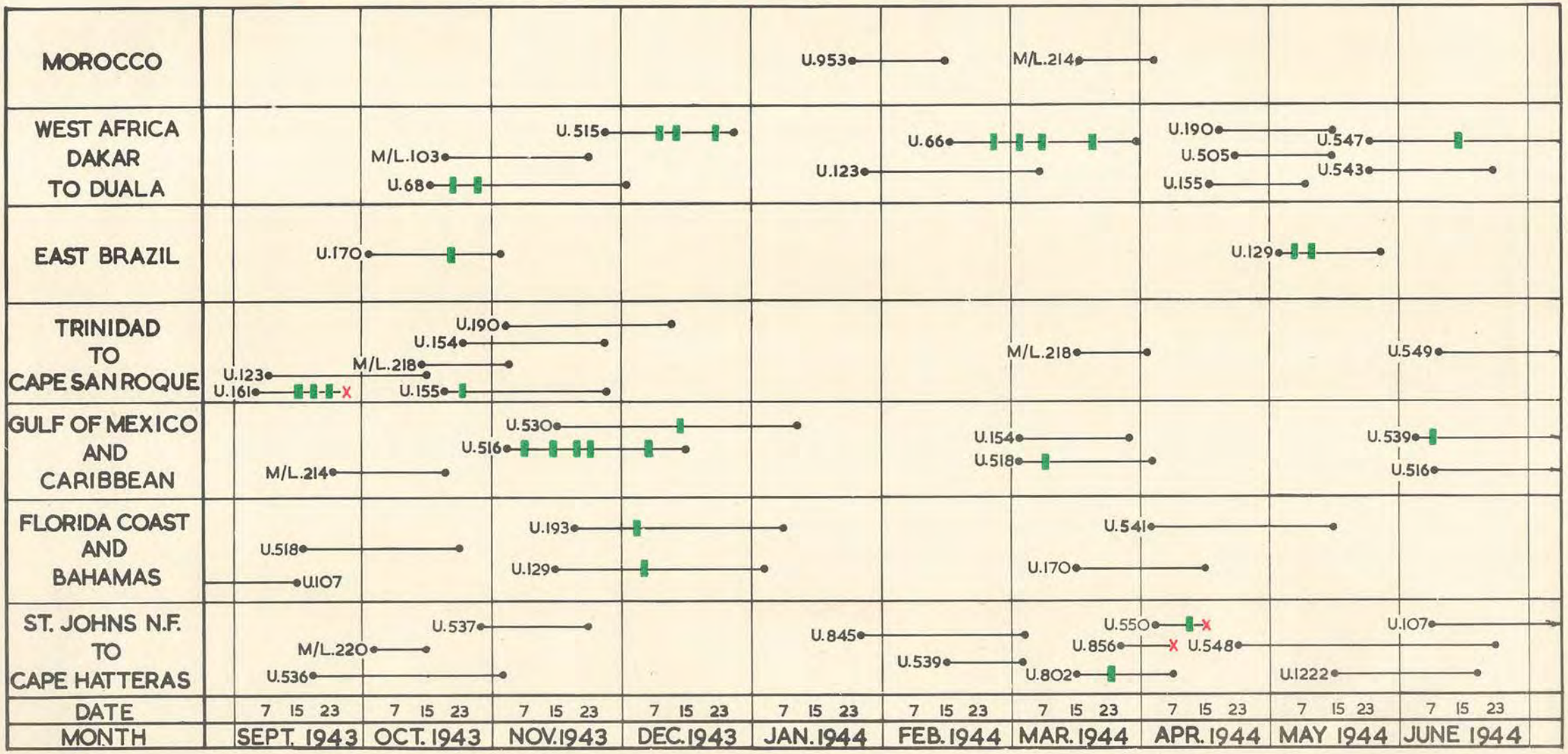
The same armament but only half the rounds per gun.

Reference - C.C./S.17245 encl.9 appendix A.B. and C.

DISTRIBUTION OF U-BOATS IN ATLANTIC OVERSEAS AREAS

SEPTEMBER 1943 TO JUNE 1944

X DENOTES U-BOAT SUNK WHILE ON PATROL ▮ DENOTES SHIPS SUNK BY THE U-BOAT WHILE ON PATROL



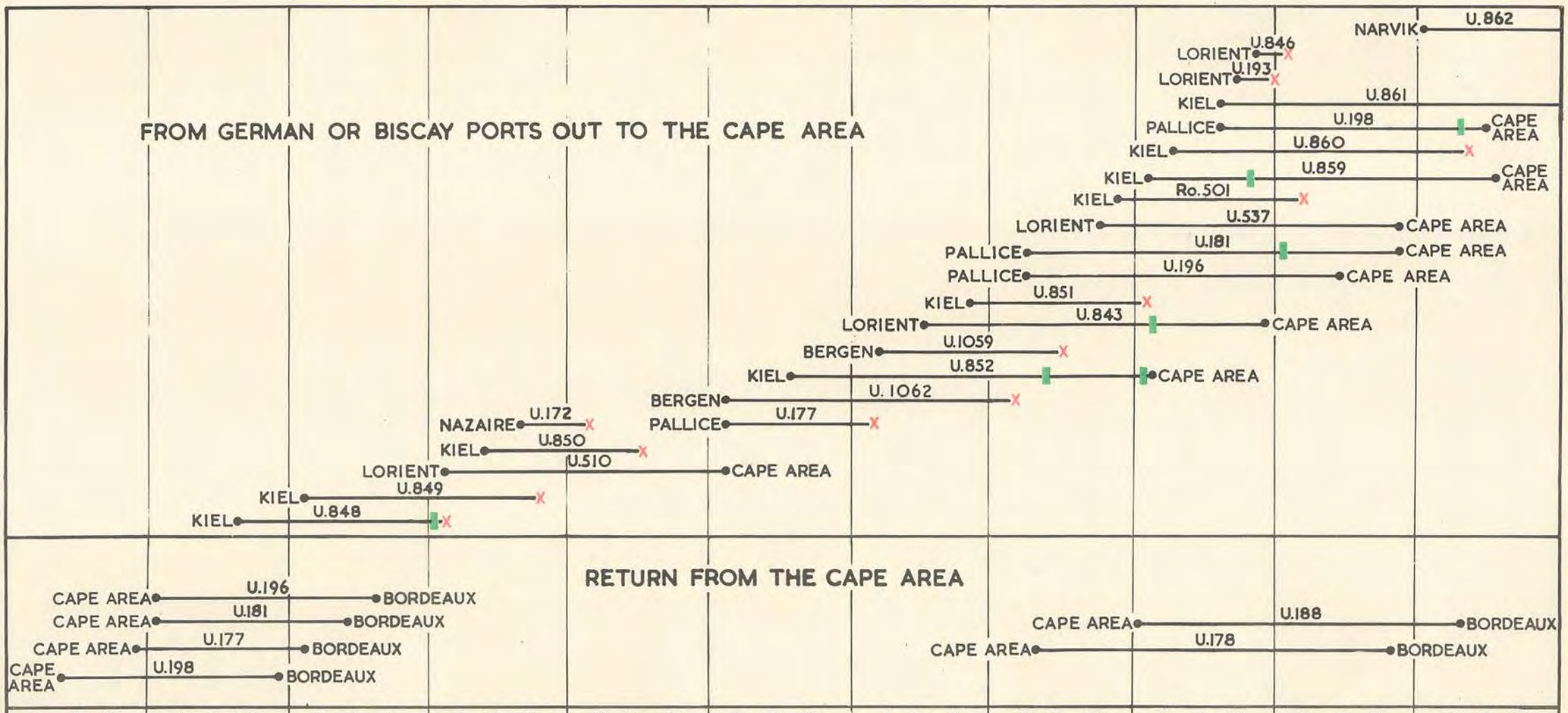
A.H.B.I. DIAG. No. 1079

APPENDIX XI

U-BOAT JOURNEYS THROUGH ATLANTIC TO AND FROM THE INDIAN OCEAN

AUGUST 1943 TO JUNE 1944

X DENOTES U-BOAT SUNK ▮ DENOTES SHIPS SUNK BY THE U-BOAT ON PASSAGE



A.H.B.I. DIAG. No. 1080

APPENDIX XII

APPENDIX XIII

Growth of the U-boat Fleet and its operational dispositions

		1943											1944					
		Feb	Mch	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mch	Apr	May	June
Based in the Atlantic		180	195	196	206	183	170	139	126	137	132	131	132	121	105	98	93	108
Based in Norway (North)		15	14	21	12	12	16	19	22	21	12	12	19	25	30	28	27	33
Based in Norway (South)		-	-	-	-	-	-	-	-	-	-	-	-	-	5	12	17	23
Based in the Mediterranean		23	19	17	18	18	17	14	13	13	13	14	13	15	18	17	14	11
Based in the Black Sea		3	3	3	3	5	6	6	6	6	6	6	6	6	6	6	6	6
Total number operational		221	231	237	239	218	209	178	167	177	163	163	170	167	164	161	157	181
Training force		64	64	69	76	78	85	89	89	83	79	92	92	93	93	92	92	93
New U-boats on test and working up in the West Baltic		128	123	124	118	124	134	146	149	158	175	168	181	188	189	192	198	175
Total U-boat Fleet		413	418	430	433	420	428	413	405	418	477	423	443	448	446	445	447	449
Number of new U-boats put into Commission		21	27	18	28	25	22	17	22	25	25	28	20	18	24	23	19	11
Number of fully trained U-boats on first war cruise from Germany		26	20	22	16	11	4	13	18	12	17	16	13	16	18	17	39	24
Average number at sea in the Atlantic		116	116	111	118	86	84	59	60	86	78	67	66	68	68	57	43	47
Average number actually on patrol in the Atlantic		48	49	35	42	27	34	10	10	21	32	31	26	31	24	16	8	10
Lost from all causes		19	15	15	41	17	37	25	9	26	19	8	15	20	25	21	23	24
Planned U-boat construction	Conventional Standard Types	20	25	18	22	24	22	22	24	23	22	23	22	22	26	19	15	15
	Prefabricated Types XXI and XXIII	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	9	12
Actual construction output	Conventional Standard Types	21	25	25	23	24	29	20	27	21	24	26	21	21	22	21	16	12
	Prefabricated Types XXI and XXIII	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2

COASTAL COMMAND OPERATIONAL INSTRUCTION No. 105/1942
BOMBER COMMAND OPERATIONAL INSTRUCTION No. 62/1942
FIGHTER COMMAND OPERATIONAL INSTRUCTION No. 13/1942
VIIIth AMERICAN BOMBER COMMAND OPERATIONAL INSTRUCTION No. 16
(Revised April 1943)

CO-OPERATION BETWEEN COASTAL, BOMBER, VIITH AMERICAN BOMBER AND FIGHTER COMMANDS IN ATTACK ON ENEMY SHIPPING IN HOME WATERS WITHIN THE RANGE OF SHORE BASED AIRCRAFT

Appendix 'A' - Definitions of Fighter Command Terms

Appendix 'B' - Sketch map of Coastal and Fighter Group boundaries.

Introduction

1. The R.A.F. shares with the Royal Navy the responsibility for the security of sea communications within the range of shore-based aircraft. The major role in this responsibility within Home Waters rests with Coastal Command, but Bomber, Fighter, Army Co-operation and VIIIth American Bomber Command will, in certain circumstances, co-operate in support of the operations of the Royal Navy and of Coastal Command. When the resources of Coastal Command or Fighter Command alone are inadequate or unsuitable to meet a particular situation, the A.O.C.-in-C. Coastal Command may call for the assistance of Bomber and/or Fighter Command.

Responsibilities

Coastal Command

2. Responsibility for the initiation and general direction of all offensive air action against enemy war vessels or merchant ships at sea rests with Coastal Command. In appropriate circumstances this responsibility will also extend to ships in harbour.

3. Coastal Command Group areas are shown in Appendix 'B' attached. The detailed co-ordination of air action against targets at sea will be delegated to A.O.C. of the Coastal Group in whose area they are except as provided in para. 4.

Fighter Command

4. Responsibility for the attack of shipping in Classes II and III (vide para. 15) in the area Manston - Ostend - Dieppe - Beachy Head is normally delegated to A.O.C. No. 11 Group. No. 11 Group operate Fighter and Fighter Bomber squadrons against shipping in this area, either in consultation with or at the request of Vice Admiral, Dover. Apart from this special commitment, Fighter Groups are responsible for operating fighters within their Group boundaries in the anti-shipping roles described in this instruction. This allocation is not intended to be rigid, but close liaison is to be maintained between Fighter Groups and other Groups operating in the same area. Fighter Command Group areas are shown in Appendix 'B' attached.

5. By night for the purpose of attacking enemy light forces approaching our convoy routes, Fleet Air Arm aircraft may be placed under the control of respective Fighter Groups to carry out in consultation with the appropriate Naval Command, controlled interception and attack on enemy surface ships plotted in the area. In such cases, the Fighter Group and

Naval Command will inform the appropriate Coastal Group of action being taken by air and naval forces respectively.

Combined Action

Action against important enemy naval units

6. When important enemy naval units threaten passage through Home Waters, the forces of Coastal and/or Fighter Command may be unable to strike effectively without the co-operation of Bomber and/or VIIIth American Bomber Command. On these occasions, C.-in-C. Coastal Command may call upon all or any one of the other Commands to provide additional forces and will in the first instance consult with the respective Commanders-in-Chief as to the degree of assistance which is necessary and which can be provided. If, in their opinion, the assistance asked for cannot be given without prejudice to other primary commitments or for any other reason, reference is to be made immediately by C.-in-C. Coastal Command to Air Ministry (A.C.A.S.(Ops.)) who will issue such directions as may be appropriate in the light of the operational situation at the time.

Special operations against enemy warships

7. As a result of appreciations made by the Admiralty or by the Air Officer Commanding-in-Chief, Coastal Command, it may be necessary for other R.A.F. and U.S.A.A.F. Commands to make special preparations and plans for major operations against enemy war vessels. Representations for the need of such preparations and plans are to be made in the first instance by the Air Officer Commanding-in-Chief, Coastal Command.

Bomber Command

8. No striking force is normally maintained by Bomber Command for anti-shipping duties, but No. 2 Group has a special commitment in addition to that of normal bombing support for the Army and for combined operations. They are prepared to answer calls for support of Coastal Command in the attack of certain classes of enemy shipping in the area between Cherbourg and Wilhelmshaven, normally excluding shipping in Classes I(d), II and III in the area Manston - Ostend - Dieppe - Beachy Head which is the responsibility of the A.O.C. No. 11 Group. The light bombers provided by No. 2 Group will not at present be required to take off or land at night. They do not normally stand by for immediate use against shipping and must be expected to require at least three hours from time of warning to time of take-off, unless they have previously been stood to at shorter notice. Furthermore, unless detached to Northern or South Western aerodromes, they will only be able to operate in the area stated above.

VIIIth American Bomber Command

9. No striking force is normally maintained by VIIIth American Bomber Command for anti-shipping duties, but forces of this Command will be prepared to answer calls for the support of Coastal Command in the attack of certain classes of enemy shipping. Action at short notice will have to be confined to targets within range of their own bases normally excluding shipping in Class I(d), II and III in the area Manston - Ostend - Dieppe - Beachy Head. The force provided by VIIIth Bomber Command is limited to operations which are begun and completed in daylight.

Reconnaissance

10. Coastal Command is responsible for reconnaissance but may call upon Fighter Command for reconnaissance by day in the area Manston - Ostend - Dieppe - Beachy Head.

11. The area in which No. 11 Group normally carry out daylight reconnaissance without special request is the coastal waters between Ostend and the mouth of the Somme. Weather permitting, these patrols will be carried out at about two-hourly intervals.

12. In addition, No. 16 Group may ask Fighter Groups to make special reconnaissance as follows:-

(i) No. 11 Group - The sea areas Manston - Ostend - Dieppe - Beachy Head.

(ii) No. 12 Group - The coastal waters between Ostend and Texel.

Fighter Command Groups may seek the assistance of Army Co-operation Command for reconnaissance outside the range of their own aircraft.

13. If assistance is required by Coastal Command for day reconnaissance outside these areas, they may also request such assistance direct from Fighter Command. If Fighter Command finds that they are not able to render this assistance without prejudice to their own operations, Coastal Command are then to refer to the Air Ministry (D.O.N.C. or Duty Group Captain) who will obtain a decision. In emergency, however, a Coastal Command Group may apply for such assistance direct to the Fighter Group concerned. In this case, Coastal Command and Fighter Command should be informed at the earliest opportunity of the action taken.

Reconnaissance Reports and Photographs

14. Shipping reconnaissance reports made by fighters are to be handled in accordance with Fighter Command Operational Instruction No. 11/1942. Results of photographic reconnaissance by Fighter Command in the area Manston - Ostend - Dieppe - Beachy Head will be communicated immediately to Vice Admiral, Dover, who will inform Headquarters, No. 11 Group, what action should be taken. The responsibility for initiating action depends upon the class of enemy ship, and is laid down in paras. 18 - 22 of this Instruction.

Targets

15. Coastal Command is responsible for passing information regarding targets to A.C.A.S. (Ops), Bomber, Fighter and VIIIth American Bomber Commands indicating the degree of importance of the target.

16. The importance of ship targets has been classified as follows:-

Class I

(a) Important Naval Units (Battleships, aircraft carriers, cruisers)

(b) Armed raiders.

(c) Convoys containing three or more ships of over 3,000 tons (300 ft.).

(d) Four or more destroyers.

(e) Certain other specially valuable ships included in Class I by special request of the Admiralty.

Class II

(a) Three or less destroyers, formations of six or more E or R Boats.

(b) Convoys other than Class I.

(c) Single merchant ships of over 3,000 tons (300 ft.).

Class III

(a) Small formations of E and R Boats (less than six).

(b) Armed trawlers or minesweepers.

(c) Single merchant ships of under 3,000 tons (300 ft.).

Class I Targets

17. Unless special orders have been issued to the contrary, neither Bomber Command nor VIIIth American Bomber Command is to be called upon to attack targets other than belonging to Class I.

Class I(a) Targets

18. When considering the co-operation of heavy bombers against Class I(a) targets, the following characteristics of these aircraft must be taken into account:-

(i) Amount of Warning

It is doubtful if the exact date of sailing of a major Naval unit will be known. It may be possible to obtain from Intelligence sources information that sailing is likely within two or three days or that a major Naval Unit has already sailed.

(ii) Type of Aircraft

The only bomber aircraft likely to inflict decisive damage on major units are heavy bombers but on special occasions other types of bombers may be used in combination. Heavy bombers require considerable notice for bombing up, marshalling, collection and briefing of crews, etc., and unless they have previously been standing by cannot be expected to be airborne in any numbers in less than five to six hours from the time of issue of the order. If heavy bomber squadrons are required to operate from other than their home stations, 24 to 36 hours warning will be required, according to the time of year and time of day at which warning is issued.

(iii) Except on bright moonlight nights with good visibility, bomber attacks on ships at sea are only worth undertaking by daylight.

(iv) Shipping on the enemy coast from Stavanger to Bordeaux including the Skaw area is within range of our heavy bombers based on their own aerodromes. Attacks in other areas would necessitate a move to other aerodromes. By day in heavily defended areas outside the range of our shore based fighters it will only be possible to employ heavy bombers of VIIIth American Bomber Command.

(v) Meteorological Conditions

For an attack by high level heavy bombers, a cloud base of at least 8,000 feet and preferably 15,000 feet to 20,000 feet is required.

Class I(b), I(c), I(d) and I(e) Targets

19. The bomber aircraft to be used against these targets will usually be light bombers of No. 2 Group, because they are the most suitable for this class of target. Targets in this Class may, however, be dealt with by Fighters of Fighter Command using bombs, cannon or the R.P. weapon. Mosquito squadrons may be made available for formation bombing of important convoys or armed raiders outside the range of fighter protection.

20. In the event of a target in any of these Classes entering the area Manston - Ostend - Dieppe - Beachy Head, control of all air action against it will be assumed by A.O.C. No. 16 Group, who will be responsible for the timing of the attack, co-ordination of attack by Fighter, Bomber, Fleet Air Arm and Coastal Command aircraft and of attacks by all classes of aircraft with action by our Naval surface vessels.

Class II and III Targets

21. Attack on Class II and III targets will normally be made by Coastal Command aircraft except in the area Manston - Ostend - Dieppe - Beachy Head where special facilities are such that targets in these classes can usually be dealt with more quickly and effectively by aircraft of No. 11 Group.

22. Responsibility for dealing with Class II and III targets in that area is therefore delegated to A.O.C. No. 11 Group, who will operate in conjunction with V.A. Dover. On the rare occasions when Class II and III targets in the Dover Straits are of sufficient importance to warrant a heavier scale of attack than Fighter Command can bring to bear (i.e. torpedo attack) control will be assumed by A.O.C. 16 Group on the lines laid down for Class I(b) and (c) targets in the preceding paragraphs.

23. The area in which S.E. fighter cover and escort can be afforded extends from the Texel to Brest, and SE. fighter escort will be confined to the hours in which fighters can take off and land in daylight.

Homing

24. Bomber aircraft will be homed on to the target by one of the methods laid down in Coastal Command Operational Instruction No. 111 (Operation Visible).

Timing

25. Against Class I(a) targets Bomber and Torpedo attacks should whenever possible be undertaken at the same time; this form of attack requires careful co-ordination and timing and some skeleton exercises are essential. Because they are equipped with R.D.F., major naval units are unlikely to be surprised either by bomber or torpedo aircraft.

26. When aircraft of Bomber or VIIIth Bomber Command are engaged in conjunction with torpedo aircraft, the Bomber and Torpedo aircraft will be taking off from different aerodromes and flying to the target at very different heights and speeds; it will not, therefore, be practicable for them to fly out in company. The Bomber aircraft are to be given a time over target during which to complete their attack. The torpedo aircraft must be timed to reach the vicinity of the target at the beginning of the Bombers' time over target and should attack as soon as the Bombers' attack begins. The aim should be to attack with bomb and torpedo simultaneously, but with the high level attack beginning first.

Passing Information

27. Information from Coastal Command Groups may be passed direct to Headquarters Fighter Command and to the Headquarters of the appropriate Fighter Groups in addition to Headquarters, Coastal Command.

28. Coastal Command is responsible for keeping Bomber Command and VIIIth American Bomber Command informed regarding the position, course and speed of the target and the Coastal Command effort allotted to it, and when applicable, for co-ordinating offensive action by Coastal Command with that of Bomber, VIIIth American Bomber and Fighter Command.

29. The local Naval Authorities are to be informed by the Coastal and Fighter Group Headquarters concerned, of any attacks ordered or contemplated.

Readiness

30. When circumstances warrant it, striking forces of Bomber Command aircraft may be ordered by the Air Ministry to be brought to stand-by with certain states of readiness for operations against enemy warships. The size and state of readiness of this force will be determined by the Air Officer Commanding-in-Chief, Bomber Command, after full consultation with the Air Officer Commanding-in-Chief, Coastal Command, and if necessary, after reference to Air Ministry (A.C.A.S. (Ops)).

Fighter Co-operation

31. Requests for fighter co-operation for daylight strike operations are to be made direct between Coastal Command Groups and the appropriate Fighter Groups. When Bomber and Coastal Command Groups both require Fighter protection, their strikes are to be timed as far as possible to enable the fighter effort available to cover the activities of both Groups. This co-ordination will be made by Headquarters, Coastal Command, in consultation with Fighter Command if two or more Fighter Groups are involved.

32. When fighter escort is to be provided, a definite time to set course from a specific departure point (rendezvous) is to be agreed and in no circumstances is the striking force

to orbit the departure point after the agreed time of departure. The estimated track from rendezvous and E.T.A. over target is to be passed to the Fighter Group concerned.

33. If it becomes apparent in advance that the Fighter escort cannot be provided at the agreed time and place, the Group controlling the striking force will be informed by the Fighter Group at least 10 minutes before E.T.D. It should always be decided prior to the operation whether the strike is to carry on or not in the event of the fighters failing to make contact. If no signal is received by the striking force before E.T.D. it is to be understood that the fighter co-operation is being provided, and the striking force is to go in the expectation of the fighters joining up later.

34. When fighter cover is to be provided, no rendezvous is required between striking force and fighters, but the Group Headquarters of the striking force is to tell the Fighter Group concerned of the area where air superiority is required and the times between which it is to be maintained.

35. This instruction cancels combined Instructions of similar numbers dated 14th January 1943.

(Signed) J. C. SLESSOR

Air Marshal,
Commanding-in-Chief,
COASTAL COMMAND

CC/S.7010/20/7/Plans
7th April, 1943

APPENDIX 'A'
to
COASTAL COMMAND OPERATIONAL INSTRUCTION No. 105/1942
BOMBER COMMAND OPERATIONAL INSTRUCTION No. 62/1942
FIGHTER COMMAND OPERATIONAL INSTRUCTION No. 13/1942
(Revised - 20 December 1942)

DEFINITION OF THE ROLE OF FIGHTER UNITS ENGAGED IN AN OPERATION WITH OUR BOMBERS

1. It has been decided to use standard definitions to describe the role of the various component parts of a large fighter force engaged in an operation such as 'CIRCUS'. Thus the various fighter components (all or some of which may be included) will in future be referred to as follows:-

Escort
Escort Cover
Target Cover
Free Lance
Forward Cover
Rear Cover

These terms, though devised principally for 'CIRCUS' operations, may be conveniently used for other types of operation when applicable. The role of each of the components named above is briefly as follows:-

(i) Escort - The role of an escort is the direct protection of the bombers. The term Close Escort may be introduced to indicate a formation allotted to maintain position in the immediate vicinity of the bombers.

(ii) Escort Cover - The role of an Escort Cover is to cover the bombers and their escort from attack throughout the operation.

(iii) Target Cover - The role of a Target Cover is to establish air superiority over the Target Area a few minutes before the bombers and their escort and escort cover are due to arrive, and subsequently to cover their withdrawal.

(iv) Free Lance - The role of a Free Lance is to seek out and destroy enemy aircraft in an allotted area of operations.

(v) Forward Cover - The role of a Forward Cover is to follow up an operation and cover the withdrawal of the bombers and their escort in a forward area.

(vi) Rear Cover - The role of a Rear Cover is to cover the final phase of the withdrawal of the bombers and their escort to this country.

(vii) Cover - Fighter Cover implies the maintenance of air superiority in a given area for a given time, in order to give freedom of action to a striking force.

Diversions

2. A diversionary operation consisting of a smaller force of fighters and possibly bombers, if available, which is staged in conjunction with operations such as 'CIRCUS'.

Feint

3. A small force of fighters, possibly accompanied by bombers, which approaches the enemy coastline and withdraws before becoming engaged with enemy fighters. The purpose of this operation is to maintain the enemy's defences at the highest possible state of preparedness.

APPENDIX XV

MINISTRY OF ECONOMIC WARFARE

18.8.43

THE IMPORTANCE TO GERMANY OF THE UNRESTRICTED USE OF ROTTERDAM AND THE EFFECTS OF RECENT SEVERE CURTAILMENT OF TRAFFIC TO THAT PORT ON THE ENEMY ECONOMY

INTRODUCTION

We have been requested by the Naval Staff to state a case, as seen from the point of view of Economic Warfare, for the continuation of the present scale of air attack on enemy shipping moving along the Dutch coast. In the accompanying paper we endeavour to shew:-

1. The importance to the enemy's economy of seaborne supplies from Scandinavia.

2. The part played by the North Sea ports (Hook to the Elbe) and Rotterdam, in particular, in the handling of these supplies as dictated by:-

   (a) geographical considerations.
   (b) war needs.

3. The extent to which these attacks have already interfered with the enemy's plans.

In this note we summarize our findings on 1, 2 and 3 and state our conclusions as to the desirability of maintaining air strikes on the convoys moving along the Dutch Coast.

1. Supplies from Scandinavia, and in particular high-grade Swedish iron ore are essential to the German economy. In steel content the German imports of Swedish ore amount to 25 per cent of the total resources. Further, the special needs of Germany's Arms Industries are largely catered for by this ore.

Developments in the war situation both long and short-term have tended to increase rather than decrease the demand for these supplies. Although it might have been thought that the effect of bombing on steel production would have led to a decline in the demand for ore, no slackening in demand has materialized in practice. This is doubtless due to the enemy's chronic shortage of coke, production of which has also been affected by the bombing, since the use of Swedish ore permits, ton for ton, the production of a better grade of steel for a smaller consumption of coke than the other ores available to him.

2. As between the North Sea and Baltic ranges of ports Germany has little freedom of choice for the importation of these bulk supplies. Water communications between the German Baltic ports and the Ruhr are few, of limited capacity and circuitous - hence the terminal ports with the exception of Stettin (which serves Silesian heavy industries) have never been equipped to deal with these bulk cargoes. Thus the Baltic ports are most inconveniently placed to handle any of this traffic except what is destined for Silesia. The natural and most convenient channel of entry and exit to the Ruhr is the Rhine with Rotterdam as the port of transhipment. From Rotterdam to Duisburg there is unrestricted navigation for barges of up to 4,000 tons d.w.t. The next most important channel of entry and exit for the Ruhr is provided by the ports of Emden and Bremen and their satellites which are linked to the Ruhr by the Dortmund-Ems Canal, the Weser River, and the Ems-Weser Canal. Canals which are navigable by barges of 1,500 d.w.t., 1,000 d.w.t. and 1,000 d.w.t. respectively. By reason, however, of the number of locks throughout this system and in particular at the

bottleneck of the Lower Dortmund-Ems Canal and the fact that barges of over 1,500 d.w.t. cannot be employed, these routes are less convenient than the Lower Rhine. Hamburg has only a devious connection with the Ruhr and Rhineland by means of the Elbe and Mitteland Canals.

3. Hence some 65 per cent of all seaborne supplies from Scandinavia and 68 per cent of the imports of Swedish ore are handled in the German North Sea ports, whilst Germany planned to concentrate in the port of Rotterdam some 30 per cent of her ore imports from Scandinavia and 40 per cent of her exports of coal and coke to this area. To achieve and maintain this plan in 1942 the Germans had to counter the increasing reluctance of the Swedes on whose tonnage they had become dependent for the carriage of approximately 50 per cent of Swedish iron ore, by the liberal payment of Special Risk Bonuses and other indemnities. Sweden's need for coal, comparable to Germany's need of iron ore, was also exploited to the same end by the concentration in Rotterdam of the larger part of all coal and coke destined to that country.

4. Germany certainly planned to continue this arrangement during the present year. The plan was, however, initially frustrated by a number of successful strikes in March and April, which, together with losses from mining and attacks by surface craft, caused Swedish private interests to refuse to send their shipping south of Borkum. Although this decision was finally over-ridden by the Swedish Government, the number of Swedish ships proceeding to Rotterdam has in fact declined and continues to be small. The Swedish Government now insist that if vessels are to be sent to this port they must be supplied with return cargoes of return coal and coke, a requirement which the Germans are at present unable to meet owing to bombing in the interior.

Conclusions

(i) The limiting factors in this traffic are:-

(a) the effective volume of shipping tonnage available,

(b) the adequacy of the various German internal transport routes feeding the North German ports.

(ii) The effective volume of shipping tonnage available depends upon the number of ships available and the efficiency with which the German Shipping Administration is able to operate them. The former is highly dependent on the continued use of Swedish ships; the number of these in German employment cannot now be increased so that any further sinkings will result in a shrinkage of the total tonnage available to the enemy. The efficient operation of the available ships demands the avoidance of port congestion which in turn requires ability to distribute the various classes of traffic at will among the ports best equipped to handle them.

(iii) The urge to obtain the maximum efficiency of operation in order to make the best use of the available tonnage and the urge to use the main waterways of Western Germany (the Rhine and the Dortmund-Ems Canal) for the distribution of bulk traffic so as to relieve the strain on the railways, together exercise the strongest pressure on the German Shipping Administration to continue the use of the North Sea ports. The capacity of the Baltic ports and of their inland communications is so limited that the enemy could abandon the use of North Sea ports only at the cost of a serious decline in effective carrying capacity, due to increased congestion; curtailment of the total traffic; and greatly increased pressure on the railway system. Hence, provided that attacks on the traffic of the North Sea ports are maintained the enemy is faced with the unenviable choice of continuing to use these ports at the cost of the inevitable attrition of his overseas trade and shipping or of abandoning them at the expense of a severe and immediate curtailment of this trade.

(iv) The enemy has secured temporary relief from the losses occasioned by the use of the Rotterdam route by diverting traffic to Emden and Hamburg. The use of Hamburg for this purpose has been seriously handicapped by the severe bombing of the port. If the use of Emden should also be restricted by the destruction of port facilities there for the ore trade or the interruption of inland water transport on the Dortmund-Ems Canal, the dilemma outlined in (iii) would confront the enemy in the most urgent and severe forms.

(v) Continuation of air attacks on German shipping off the Dutch Coast is therefore essential to the maintenance of pressure on the enemy's shipping traffic with Scandinavia. The effect of these attacks would, however, be greatly augmented if the enemy were denied the relief which he has recently obtained by increased use of the port of Emden.

(vi) The substantial reduction of this trade as a whole, at a time when the whole German supply position is strained to the utmost, would (at least) add seriously to the burden on the now very restricted manpower of Continental Europe and further embarrass the already overburdened transport system.

OBJECTIVES/SEA
18. 8. 43.

APPENDIX XVI

FAR EASTERN BLOCKADE RUNNING - FAR EAST TO EUROPE - ENEMY SHIP AND CARGO MOVEMENTS

Season	Ship	Sailed	Arrived	Total Loss		Total Cargo				Author of loss
				Date	Cause	Type	Despatched	Delivered	Lost	
1941/42	Ermland	Jan/41	3 Apl/41	-	-					
	Regensburg	Apl/41	27 June/41	-	-					
	Elbe	Apl/41	-	6 June/41	Carrier A/C					H.M.S. Eagle
	Anneliese Essberger	June/41	10 Sept/41	-	-					
	Odenwald	19 July/41	-	6 Nov/41	Captured by U.S. Task Force	Edible Fats	44,000	32,600	11,400	U.S.S. Omaha and Somers
	Burgenland	Oct/41	9 Dec/41	-	-					
	Elsa Essberger	Nov/41	12 Jan/42	-	-	Rubber	44,450	32,650	11,800	
	Cortellazo	Nov/41	27 Jan/42	-	-					
	Spreewald	Dec/41	-	31 Jan/42	German U/boat	Ore	3,650	2,700	950	U.333
	Pietro Orseolo	Dec/41	24 Feb/42	-	-					
	Orsorno	Jan/42	19 Mar/42	-	-	Miscellaneous	9,675	7,050	2,625	
	Rio Grande	Feb/42	10 Apl/42	-	-					
	Fusijama	Feb/42	26 Apl/42	-	-					
	Munsterland	11 Feb/42	17 May/42	-	-					
	Portland	Mar/42	10 May/42	-	-					
	Totals:-	15	12	3			101,775	75,000	26,775	
1942/43	Tannenfels	8 Aug/42	2 Nov/42	-	-					
	Kulmerland	26 Aug/42	7 Nov/42	-	-					
	Dresden	8 Sept/42	3 Nov/42	-	-	Edible Fats	54,500	16,500	38,000	
	Rhakotis	5 Nov/42	-	1 Jan/43	Surface Force (Royal Navy)					H.M.S. Scylla
	Ramses	23 Nov/42	-	10 Dec/42	Scuttled on Intercept by S/F	Rubber	43,000	7,600	35,400	H.M.A.S. Adelaide and Dutch Cruiser Heemskerck
	Hohenfriedburg (ex. Herborg)	19 Dec/42	-	26 Feb/43	Surface Force (Royal Navy)					H.M.S. Sussex
	Doggerbank	15 Jan/43	-	3 Mar/43	German U/boat	Ore	10,600	1,900	8,700	U - ?
	Karin (ex. Kota Nopan)	4 Feb/43	-	10 Mar/43	Surface Force (U.S. Task Force)					U.S.S.
	Regensburg	6 Feb/43	-	30 Mar/43	Scuttled on Intercept by S/F	Miscellaneous	14,800	3,600	11,200	H.M.S. Glasgow
	Pietro Orseolo	16 Feb/43	1 Apl/43	-	-					
	Irene (ex. Silvaplana)	22 Feb/43	-	10 Apl/43	Scuttled on Intercept by S/F					H.M.S. Adventure
	Totals:-	11	4	7			122,900	29,600	93,000	
1943/44	Osorno	15 Oct/43	26 Dec/43	-	-					
	Alsterufer	15 Oct/43	-	27 Dec/43	Shore based Aircraft	Edible Fats	2,273	223	2,050	Liberator H/311 Sqdn (Czech)(C.C.)
	Weserland (ex. Ermland)	22 Nov/43	-	3 Jan/44	Surface Force (U.S. Navy)	Rubber	17,637	3,944	13,693	U.S.S. Somers
	Rio Grande	22 Nov/43	-	4 Jan/44	Surface Force (U.S. Navy)	Ore	1,212	180	1,032	U.S.S. Omaha and Jouett
	Burgenland	22 Nov/43	-	5 Jan/44	Scuttled on Intercept by S/F	Miscellaneous	11,973	2,543	9,430	U.S.S. Omaha and Jouett
	Totals:-	5	1	4			33,095	6,890	26,205	

1941/1944 Totals:-	31	17	14	Carrier A/C - 1 Shore based A/C - 1 Captured by Surface Force - 1 German U/boat - 2 Surface Force - 5 Scuttled on Intercept by S/F - 4	257,770	111,490	146,280

APPENDIX XVI

FAR EASTERN BLOCKADE RUNNING - EUROPE TO FAR EAST - ENEMY SHIP AND CARGO MOVEMENTS

Season	Ship	Sailed	Arrived	Total Loss		Total Cargo				Author of loss
				Date	Cause	Type	Despatched	Delivered	Lost	
1941/42	Rio Grande	17 Sept/41	6 Dec/41	-	-	Engines, Engine Parts, Commercial goods, Chemical products	32,540	32,540	-	
	Portland	Oct/41	Jan/42	-	-					
	Doggerbank	21 Jan/42	19 Aug/42	-	-					
	Regensburg	12 Feb/42	7 July/42	-	-					
	Dresden	Mar/42	23 June/42	-	-					
	Tannenfels	16 Mar/42	23 June/42	-	-					
	Totals:-	6	6	Nil			32,540	32,540	Nil	
1942/43	Uckermark (ex. Altmark)	1 Sept/42	4 Nov/42	30 Nov/42	Explosion in port	War materials, Commercial products, Oil	33,829	24,447	9,382	Yokohama
	Weserland (ex. Ermland)	7/8 Sept/42	2 Dec/42	-	-					
	Brake	27 Sept/42	8 Dec/42	-	-					
	Pietro Orseolo	24 Sept/42	11 Nov/42	-	-					
	Burgenland	9 Oct/42	30 Nov/42	-	-					
	Rio Grande	10 Oct/42	30 Nov/42	-	-					
	Irene (ex. Silvaplana)	11 Oct/42	28 Nov/42	-	-					
	Anneliese Essberger	5 Nov/42	-	22 Nov/42	Scuttled on Intercept by S/F					U.S.S. Milwaukee
	Karin (ex. Kota Nopan)	5 Nov/42	22 Jan/43	-	-					
	Cortellazo	29 Nov/42	-	1 Dec/42	Surface Force (Royal Navy)					H.M.S. Redoubt
	Germania	11 Dec/42	-	12 Dec/42	Scuttled on Intercept by S/F					H.M.S. Egret and Tanatside
	Alsterufer	29 Mar/43	May/43	-	-					
	Portland	29 Mar/43	-	10 Apl/43	Surface Force (French Navy)					French Cruiser Georges Leygues
	Osorno	29 Mar/43	13 May/43	-	-					
	Totals:-	14	10	5			33,829	24,447	9,382	
1943/44	Pietro Orseolo	-	-	18 Dec/43	Shore based Aircraft					At Anchor off Concarneau. No.254 and 248 Sqdns(C.C.) No.183 Sqdn(F.C.)
	Elsa Essberger	-	-	25 Aug/44	Scuttled in port	-	-	-	-	River Gironde
	Osorno	-	-	25 Aug/44	Scuttled in port					River Gironde
	Himalaya	-	-	25 Aug/44	Scuttled in port	-	-	-	-	River Gironde
	Dresden	-	-	25 Aug/44	Scuttled in port					River Gironde
	Fusijama	-	-	25 Aug/44	Scuttled in port	-	-	-	-	River Gironde
	Tannenfels	-	-	25 Aug/44	Scuttled in port					River Gironde
	Kulmerland	-	-	Mid Aug/44	Scuttled in port	-	-	-	-	In Nantes
	Spichern	-	-	31 Aug/44	Scuttled in port					In Brest
	Totals:-	Nil	Nil	9			Nil	Nil	Nil	
	1941/1944 Totals:-	20	16	14	Explosion - 1 Scuttled on Intercept by S/F - 2 Surface Forces - 2 Shore based Aircraft - 1 Scuttled in port - 8		66,369	56,987	9,382	

APPENDIX XVII

MONTHLY SUMMARY (BY SEASONS) OF THE AIR EFFORT EMPLOYED AGAINST FAR EASTERN BLOCKADE RUNNING

Season	Month	No.19 Group											No.15 Group			Gibraltar			West Africa			Azores			Bomber(5) Command Mines Laid in "Deodar"(3)	
		Recce and Strike – At Sea			A-U boat A/C – Diverted in Flight			Strike – In Port			P.R.U.(5)		Recce and Strike – At Sea			Recce and Strike – At Sea			Recce and Strike – At Sea			Recce and Strike – At Sea				
	1941	Desp.	Attkd	Wstge	Diverted	Attkd	Wstge	Desp.	Attkd	Wstge	Desp.	Wstge	Desp.	Attkd	Wstge	Desp.	Attkd	Wstge	Desp.	Attkd	Wstge	Desp.	Attkd	Wstge		
	April/Dec.(1)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		Elbe sunk by F.A.A. A/c from H.M.S. Eagle
	1942																									
First	January	32	–	–	–	–	–	–	–	–	2	–	2	1	–	6	–	–	–	–	–	–	–	–	5	
	February	32	–	–	–	–	–	–	–	–	3	–	1	–	–	2	–	–	–	–	–	–	–	–	–	
	March	38	–	1	–	–	–	–	–	–	3	–	–	–	–	1	–	–	–	–	–	–	–	–	36	
	April	26	–	–	–	–	–	–	–	–	3	–	1	–	–	5	–	–	–	–	–	–	–	–	47	
	May	30	1	–	–	–	–	–	–	–	5	–	–	–	–	6	–	–	–	–	–	–	–	–	67	
	Totals:–	158	1	1	Nil	Nil	Nil	Nil	Nil	Nil	16	Nil	4	1	Nil	20	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	155	
	August	15	–	–	–	–	–	–	–	–	40	–	–	–	–	8	–	–	–	–	–	–	–	–	95	
	September	44	4	3	4	–	–	11	10	–	57	–	–	–	–	–	–	–	–	–	–	–	–	–	73	
	October	59	6	1	31	13	–	–	–	–	57	–	–	–	–	10	–	–	–	–	–	–	–	–	120	
	November	145	22	5	46	20	–	19	8	1	21	–	–	–	–	10	–	–	2	–	–	–	–	–	182	
	December	46	–	–	14	5	–	–	–	–	17	–	–	–	–	11	–	–	Occasional Combined Anti-Ship/A-U/boat Sorties						132	
Second	1943																									
	January	44	2	–	2	1	–	25	16	–	8	–	–	–	–	11	–	–	–	–	–	–	–	–	230	
	February	38	–	2	–	–	–	–	–	–	17	–	–	–	–	14	–	–	–	–	–	–	–	–	149	
	March	51	4	–	6	1	–	–	–	–	7	–	–	–	–	6	–	–	15	–	–	–	–	–	103	
	April	72	3	4	6	–	–	–	–	–	27	–	–	–	–	12	–	–	6	–	–	–	–	–	322	Himalaya damaged by bomb
	May	16	–	–	–	–	–	–	–	–	12	–	–	–	–	15	–	–	–	–	–	–	–	–	209	
	Totals:–	530	41	15	109	40	–	55	34	1	263	–	Nil	Nil	Nil	97	Nil	Nil	23	Nil	Nil	Nil	Nil	Nil	1,615	
																										Kulmerland damaged(4) by air raid 23/9/43
	October	2	–	–	–	–	–	–	–	–	15	–	–	–	–	–	–	–	6	–	–	–	–	–	81	
	November	1	–	–	–	–	–	–	–	–	14	1	–	–	–	3	–	–	1	–	–	–	–	–	106	Dresden damaged by mine
Third	December	67	15	3	37	8	2	52(2)	25	3	20	–	7	4	–	19	–	–	–	–	–	80	–	–	58	Pietro Orseolo sunk in harbour
	1944																									Alsterufer sunk at sea
	January	–	–	–	–	–	–	–	–	–	8	–	–	–	–	3	–	–	–	–	–	6	–	–	84	
	Totals:–	70	15	3	37	8	2	52	25	3	57	1	7	4	Nil	25	Nil	Nil	7	Nil	Nil	86	Nil	Nil	329	

Notes:– (1) During this period there was no specific detail of aircraft for anti-blockade running duties.
(2) Includes thirteen aircraft despatched by No.2 Group, all of which attacked. Three aircraft were lost.
(3) Aerial Minelaying area off the mouth of the River Gironde.
(4) U.S.A.A.F. delivered two daylight attacks on Nantes on 16 and 23 September 1943, on naval targets of importance (See Chapter XII).
(5) During the close seasons, P.R.U., continued to fly anti-blockade runner sorties, and Bomber Cd. continued to lay mines in the appropriate area.

APPENDIX XVIII

Fleet Recce by the R.A.F. and Movements of German major naval units to and from German waters - 1939/45

Name	Journey	Date	Should R.A.F. recce have sighted the movement?	Whether sighted by R.A.F. recce at sea	Whether R.A.F. attacked at sea	Remarks
Graf Spee	From Germany to Atlantic	22 August 1939	No - Pre-hostilities	-	-	
Deutchland/Lutzow	From Germany to Atlantic	25 August 1939	No - Pre-hostilities	-	-	
Gneisenau) Koln)	From Germany to S.W. Norway and return via Skaw	8 October 1939	Yes	Yes	No	
Deutchland/Lutzow	From Atlantic to Germany	14 November 1939	Yes	No	No	
Scharnhorst) Gneisenau)	From Germany to Iceland/Faeroes area and return	22 and 26 November 1939	Yes	No	No	A.M.C. Rawalpindi sunk
Nuremberg) Leipsig) Koln)	From Germany to North Sea in support to enemy minelaying from destroyers off Norfolk	12/13 December 1939	Yes	No	No	Nuremberg and Leipsig hit and damaged severely by Br. S/M
Scharnhorst) Gneisenau) Hipper)	From Germany to Bergen and return	18 to 20 February 1940	Yes	No	No	To attack Br. convoys between Norway and Shetlands but nothing was seen
Scharnhorst) Gneisenau)	From Germany to Vestfjord and into Arctic waters	7 to 10 April 1940	Yes	Yes	Yes	No damage.
Hipper	From Germany to Trondheim	7 and 8 April 1940	Yes	Yes	Yes	No damage.
Konigsberg) Koln)	From Germany to Bergen	8 April 1940	Yes	No	No	Spotted in Bergen by R.A.F. recce. Bombed same night by R.A.F. Konigsberg sunk next day by F.A.A.
Karlsruhe	From Germany to Kristiansand	8 April 1940	Yes	No	No	Sunk when leaving by Br. S/M Truant.
Koln	From Bergen to Germany	11 April 1940	Yes	No	No	
Scharnhorst) Gneisenau) Hipper)	From Arctic waters and Trondheim to Germany	12 April 1940	Yes	Yes	No	
Scharnhorst) Gneisenau)	From Germany to Arctic Waters	6 June 1940	Yes	No	No	H.M.S. Glorious sunk. Scharnhorst hit and damaged by torpedo from H.M.S. Acasta.
Hipper) Nuremberg)	From Germany to Arctic Waters	6 June 1940	Yes	No	No	
Scharnhorst	From Trondheim to Stavanger	21 June 1940	Yes	Yes	Yes	No damage.
Scharnhorst	From Stavanger to Germany	22 June 1940	Yes	No	No	
Gneisenau) Nuremberg)	From Trondheim to Germany	26 and 27 July 1940	Yes	No	No	Gneisenau had been damaged on 20 June by BR. S/M.
Hipper	From Trondheim to Arctic and return	25 July to 9 August 1940	No - Too distant	-	-	
Hipper	From Trondheim to Germany	15 August 1940	Yes	No	No	

Name	Journey	Date	Should R.A.F. recce have sighted the movement?	Whether sighted by R.A.F. recce at sea	Whether R.A.F. attacked at sea	Remarks
Hipper	From Germany to S.W. Norway and return	21 September 1940	Yes	No	No	Turned back because of engine defects.
Von Scheer	From Germany to Atlantic	28 October to 1 November 1940	Yes	No	No	
Hipper	From Germany to Atlantic	1 to 7 December 1940	Yes	No	No	
Hipper	From Atlantic into Brest	27 December 1940	Yes	No	No	
Scharnhorst) Gneisenau)	From Germany to Bergen and return	28 December 1940 to 1 January 1941	Yes	No	No	Gneisenau sustained damage by heavy seas and both ships turned back.
Scharnhorst) Gneisenau)	From Germany to Atlantic	22 January to 4 February 1941	Yes	No	No	
Hipper	From Brest to Atlantic	1 February 1941	Yes	No	No	
Hipper	From Atlantic to Brest	14 February 1941	Yes	No	No	
Hipper	From Brest to Germany	15 to 23 March 1941	Yes	No	No	
Scharnhorst) Gneisenau)	From Atlantic to Brest	21 March 1941	Yes	Yes+	No	+ In Bay of Biscay.
Von Scheer	From Atlantic to Germany	28 to 31 March 1941	Yes	No	No	
Bismarck) Prinz Eugen)	From Germany to Atlantic	20 to 22 May 1941	Yes	No+	No	+ Spotted in Grimstadt by P.R.U.
Bismarck	From Atlantic towards Brest	24 and 26 May 1941	Yes	Yes	No	
Prinz Eugen	From Atlantic to Brest	31 May 1941	Yes	No	No	
Lutzow	From Germany to Norway and return	11 to 13 June 1941	Yes	Yes	Yes	Lutzow torpedoed by R.A.F.
Scharnhorst	From Brest to La Pallice and return	21 to 24 July 1941	Yes	Yes	Yes	Damaged at La Pallice.
Von Scheer	Germany to Oslo and return	5 September 1941	Yes	Yes	No	
Tirpitz	From Germany to Trondheim	15 and 16 January 1942	Yes	No	No	
Scharnhorst) Gneisenau) Prinz Eugen)	From Brest up Channel to Germany	12 February 1942	Yes	Yes - late in journey	Yes No damage	Gneisenau was so badly damaged by R.A.F. raid on Kiel 27/28 February that she was paid off.
Tirpitz	From Trondheim to Arctic waters to attack convoy to Russia. Return to Narvik.	6 to 9 March 1942	Yes	No	No	
Tirpitz	From Narvik to Trondheim	12 and 13 March 1942	Yes	No	No	
Hipper	From Germany to Trondheim	19 to 21 March 1942	Yes	Yes	No	
Prinz Eugen	From Trondheim to Germany	17 May 1942	Yes	Yes	Yes	No damage.

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Name	Journey	Date	Should R.A.F. recce have sighted the movement?	Whether sighted by R.A.F. recce at sea	Whether R.A.F. attacked at sea	Remarks
Lutzow	From Germany to Trondheim	16 to 20 May 1942	Yes	Yes	No	
Von Scheer	From Trondheim to Narvik	8 and 9 May 1942	Yes	No	No	
Lutzow	From Trondheim to Narvik	24 and 25 May 1942	Yes	No	No	
Tirpitz) Hipper)	From Trondheim to Narvik	3 July 1942	Yes	No	No	
Lutzow) Von Scheer)	From Narvik to Altenfjord	3 July 1942	No - Too distant	-	-	
Tirpitz) Hipper)	From Narvik to Altenfjord	4 July 1942	No - Too distant	-	-	
Tirpitz) Hipper)	From Altenfjord to attack PQ.17 and return	5 July 1942	No - Too distant	-	-	
Tirpitz) Lutzow) Von Scheer) Hipper)	From Altenfjord to Narvik	7 and 8 July 1942	No - Too distant	Yes - by P.R.U. sortie	-	
Lutzow	Narvik to Trondheim	11 and 12 July 1942	Yes	No	No	
Koln	From Germany to Narvik	8 to 10 July 1942	Yes	No	No	
Von Scheer	From Narvik against Arctic shipping and return	16 to 25 August 1942	No - Too distant	-	-	
Lutzow	From Trondheim to Germany	9 to 12 August 1942	Yes	Yes+	No	+ The sighting aircraft was shot down by Lutzow.
Scheer) Hipper) Koln)	From Narvik to Altenfjord	9 to 10 September 1942	No - Too distant	-	-	
Hipper	From Altenfjord minelaying in Arctic and return	24 to 28 September 1942	No - Too distant	-	-	
Tirpitz) Scheer) Hipper)	From Altenfjord to Narvik	mid-October 1942	No - Too distant	-	-	
Tirpitz	From Narvik to Trondheim	By 28 October 1942	No - Too distant	-	-	
Von Scheer	From Narvik to Trondheim	By 31 October 1942	No - Too distant	-	-	
Hipper	From Narvik minelaying in Arctic and return	5 to 9 November 1942	No - Too distant	-	-	
Von Scheer	From Trondheim to Germany	6 to 9 November 1942	Yes	No	No	Thereafter in German waters only.
Nuremberg	From Germany to Narvik	13 to 15 November 1942	Yes	No	No	
Lutzow	From Germany to Narvik	9 to 12 December 1942	Yes	No	No	
Lutzow) Hipper) Nuremberg)	From Narvik to Altenfjord	About 26 December 1942	No - Too distant	-	-	

APPENDIX XVIII

Name	Journey	Date	Should R.A.F. recce have sighted the movement?	Whether sighted by R.A.F. recce at sea	Whether R.A.F. attacked at sea	Remarks
Lutzow) Hipper)	From Altenfjord to attack JW.51B and return	30 and 31 December 1942	No - Too distant	-	-	
Scharnhorst) Prinz Eugen)	From Germany to Norway	11 January 1943	Yes	Yes	No	Both ships turned back when sighted.
Scharnhorst) Prinz Eugen)	From Germany to Norway	25 January 1943	Yes	Yes	No	Both ships again turned back when sighted. Thereafter P.E. in German waters only.
Hipper) Koln)	From Altenfjord to Narvik	24 to 26 January 1942	No - Too distant	-	-	
Hipper) Koln)	From Narvik to Trondheim	28 to 30 January 1943	No - Too distant	-	-	
Hipper) Koln)	From Trondheim to Germany	4 to 7 February 1943	Yes	No	No	Thereafter in German waters only.
Lutzow) Nuremberg)	From Altenfjord to Narvik	Early in March 1943	No - Too distant	-	-	
Scharnhorst	From Germany to Narvik	6 to 9 March 1943	Yes	No	No	
Tirpitz	From Trondheim to Narvik	12 to 13 March 1943	No - Too distant	-	-	
Nuremberg	From Narvik to Trondheim	28 to 29 April 1943	No - Too distant	-	-	
Nuremberg	From Trondheim to Germany	30 April to 2 May 1943	Yes	Yes	No	Thereafter in German waters only.
Tirpitz) Scharnhorst) Lutzow)	From Narvik to Altenfjord	May 1943	No - Too distant	-	-	
Tirpitz) Scharnhorst)	From Altenfjord to Spitzbergen and return	6 to 9 September 1943	No - Too distant	-	-	Tirpitz crippled by midget s/ms - 22 September.
Lutzow	From Altenfjord to Germany	23 to 30 September 1943	Yes	Yes	No	Thereafter in German waters only.
Scharnhorst was sunk by Naval Action in Arctic waters on 26 December 1943, leaving only the crippled Tirpitz outside German waters.						

R.A.F. Reconnaissance against enemy major warships

Air Sea Reconnaissance against the moves of enemy major naval units was one of the primary functions of R.A.F. Coastal Command. During the 1939/45 War, there were 79 movements made by these warships either out to and return from the Atlantic or to and from Norwegian ports. 21 of these moves were at too great a distance from R.A.F. bases to expect any interception at sea. Of the 58 moves that should have been detected only 20 were actually sighted and of these, only seven led to air attacks at sea. Of these seven attacks, one was successful in damaging a major unit. (Lutzow torpedoed off S.W. Norway - 13/6/41).

Details of Mining Gardens. April 1943 to May 1944

No.1 Area. W- Baltic, Belts, Sound, Kattegat

Asparagus — In all suitable waters bounded:-

on the North by 55° 22'N
on the East by 11° 10'E
on the South by 55° 10'N
on the West by 11° 00'E

Broccoli — In all suitable waters bounded:-

on the North by 55° 22'N
on the East by 11° 00'E
on the South by 55° 10'N
on the West by 10° 50'E

Carrots I — All suitable waters in the Little Belt between the vertical of 09° 50'E and the parallel of 55° 30'N

Carrots II — All suitable waters in the Little Belt between the parallel of 55° 30'N and 55° 25'N.

Daffodil I — In an area bounded:-

on the North by 55° 33'N
on the East by 5 fathom soundings and 12° 50'E
on the South by 55° 15'N
on the West by 5 fathom soundings.

Daffodil II — In an area bounded on the North by a line joining 55° 17'N, 13° 10'E to 55° 20'N, 13° 00'E thence in direction 270° to 5 fathom soundings and by 5 fathoms soundings.

on the East by 13° 10'E
on the South by 55° 15'N
on the West by 12° 50'E

Daffodil III — In an area bounded on the North by 55° 15'N
on the East by 12° 50'E
on the South by 54° 50'N
on the West by 5 fathom soundings.

Endive — All suitable waters in the Little Belt between 55° 25'N and 55° 11.5'N.

Forget-me-not — In an area bounded on the North by 54° 40'N
on the East by 11° 00'E
on the South by 5 fathom soundings
on the West by 10° 10'E

Geranium I — In an area bounded on the North by 54° 20'N, on the East by a line joining 54° 20'N, 14° 12'E to South Oder Bank Buoy and 14° 25'E, on the South and West by 5 fathom soundings.

Geranium II	In an area bounded on the North by a line joining South Oder Bank Buoy to 54° 16'N 14° 45'E, on the East by 14° 45'E, on the South by 5 fathom soundings, on the West by 14° 25'E.
Hollyhock	In an area bounded on the North by 5 fathom soundings, on the East by 11° 20'E, on the South and West by 5 fathom soundings.
Jasmine	In an area bounded on the North by 54° 20'N on the East by 12° 12'E on the South by 5 fathom soundings on the West by 11° 20'E
Kraut	In an area bounded on the North by 57° 10'N on the East by 11° 00'E on the South by 56° 40'N on the West by 5 fathom soundings.
Lettuces	The area mined was between:- 54° 08'N, 09° 21'E and 54° 11'N, 09° 26'E
Nasturtium	In an area bounded on the North by 56° 08'N on the East by Swedish waters on the South by 55° 45'N on the West by 5 fathom soundings.
Pollock	In an area bounded on the North by a line joining Hammeren Point to 55° 00'N, 14° 27'E on the East by 14° 46'E and 5 fathom soundings, on the South by 54° 48'N, on the West by 14° 27'E.
Privet I	In an area bounded on the North by 54° 30'N on the East by 19° 00'E on the South and West by 5 fathom soundings.
Privet II	In an area bounded on the North by 54° 30'N on the East and South by 5 fathom soundings on the West by 19° 00'E
Pumpkin I	All suitable waters in Great Belt between parallels of 55° 55'N and 55° 35'N
Pumpkin II	All suitable waters in Great Belt between 55° 35'N and 55° 22'N.
Quince North	In all suitable waters in Langelands Belt between 55° 10'N and 54° 55'N.
Quince South	In an area bounded on the North by 5 fathom soundings and 54° 45'N, on the East by 5 fathom soundings and 11° 00'E, on the South by 54° 40'N, on the West by 10° 30'E.
Radish I	In an area bounded on the North by 5 fathom soundings on the East by 11° 20'E on the South by 5 fathom soundings on the West by 5 fathom soundings and 11° 00'E.

Radish II	In an area bounded on the North by 5 fathom soundings on the East by 11° 50'E on the South by 54° 20'N on the West by 11° 20'E
Silverthorn I	Along a line extending for 5 miles in a direction 179° from 57° 40'N, 10° 41'30"E.
Silverthorn II	Within a circle of radius 3 miles described about 56° 37' 11° 09'30"E.
Silverthorn III	Along a line extending for 3 miles in a direction of 227° from 56° 03'N, 11° 07'30"E.
Silverthorn IV	Within a circle of radius 4 miles described about 56° 28'30"N, 11° 34'45"E.
Silverthorn V	Within a circle of radius 3 miles described about 56° 15'N, 12° 15'E.
Silverthorn VI	Within a circle of radius 2 miles described about 56° 45'N, 11° 59'E.
Silverthorn VII	Within a circle of radius 2 miles described about 57° 36'N, 11° 06'E.
Silverthorn VIII	An area bounded by lines joining:- (a) 56° 52'N, 10° 57'E (b) 56° 52.5'N, 11° 49.5'E (c) 56° 49'N, 11° 51'E (d) 56° 49.3'N, 11° 00'E.
Silverthorn IX	An area bounded by lines joining:- (a) 56° 09.5'N, 11° 14'E (b) 56° 10.2'N, 11° 48.4'E (c) 56° 08'N, 11° 50'E (d) 56° 05.8'N, 11° 15.7'E.
Silverthorn X	In an area bounded on the North by 57° 45'N " " " East by 11° 15'E " " " South by 57° 30'N " " " West by 5 fathom soundings.
Silverthorn XI	In an area bounded on the North by 57° 10'N, on the East by a line joining 57° 10'N, 11° 50'E to 57° 00'N, 12° 05'E to 56° 45'N, 12° 05'E, on the South by 56° 45'N and on the West by 11° 00'E.
Silverthorn XII	In an area bounded on the North by 56° 45'N " " " East by 12° 10'E " " " South by 56° 20'N " " " West by 11° 00'E.
Silverthorn XIII	In an area bounded on the North by 56° 20'N " " " East by 12° 10'E " " " South by 56° 05'N " " " West by 11° 00'E.

Silverthorn XIV	In an area bounded on the	North by 56° 18'N
	" " "	East by Swedish waters
	" " "	South by 56° 08'N
	" " "	West by 12° 10'E.
Silverthorn XV	In an area bounded on the	North by 56° 05'N
	" " "	East by 11° 15'E
	" " "	South by 55° 55'N
	" " "	West by 10° 40'E.
Spinach I	In an area bounded on the	North by 54° 42'N
	" " "	East by 19° 00'E
	" " "	South by 54° 30'N
	" " "	West by 5 fathom soundings.
Spinach II	In an area bounded on the	North by 55° 00'N
	" " "	East by 19° 00'E
	" " "	South by 54° 42'N and 5 fathom soundings.
	" " "	West by 18° 22'E.
Sweet Pea I	In an area bounded on the	North by 54° 40'N
	" " "	East by 5 fathom soundings and 12° 30'E.
	" " "	South by 54° 20'N
	" " "	West by 4 fathom soundings and 11° 50'E.
Sweet Pea II	In an area bounded on the	North by 54° 50'N
	" " "	East by 12° 50'E
	" " "	South by 5 fathom soundings
	" " "	West by 12° 30'E.
Tangerine I	In an area bounded on the	North by 54° 45'N
	" " "	East by 5 fathom soundings
	" " "	South by 54° 35'N
	" " "	West by 19° 45'E.
Tangerine II	In an area bounded on the	North by 55° 00'N
	" " "	East by 20° 00'E and 5 fathom soundings
	" " "	South by 54° 30'N
	" " "	West by 19° 00'E.
Verbena	In an area bounded on the	North by 55° 45'N
	" " "	East by Swedish waters
	" " "	South by 55° 33'N
	" " "	West by 5 fathom soundings.
Wallflower	In an area bounded on the	North by 54° 51'N
	" " "	East by 5 fathom soundings and 10° 30'E
	" " "	South by 54° 40'N
	" " "	West by 5 fathom soundings and 10° 00'E.

Willow I	In an area bounded on the North by 54° 50'N " " " East by 13° 25'E " " " South by 5 fathom soundings " " " West by 12° 50'E.
Willow II	In an area bounded on the North by 54° 50'N " " " East by 13° 40'E " " " South by 5 fathom soundings. " " " West by 13° 25'E.
Willow III	In an area bounded on the North by 54° 50'N " " " East by a line joining 54° 50'N, 13° 50'E to West Oder Bank Buoy to 54° 20'N., 14° 12'E. " " " South by 54° 20'N " " " West by 5 fathom soundings and 13° 40'E.

No.2 Area - Haugesund and Oslo Fjord

Bottle	The area to be mined was in the Karmoysund, south of the port of Haugesund round position:- 59° 21'42"N, 05° 18'12"E.
Onions I	There were two areas:- (a) In the Vestre Lob. Suitable waters between a line joining 59° 53.5'N, 10° 41.1'E and 59° 53.25'N, 10° 41.1'E and a line joining 59° 54.35'N, 10° 43.15'E and 59° 53.9'N, 10° 44.4'E. (b) In the Skibs Lob. Suitable waters bounded on the West by a line joining 59° 52.75'N, 10° 42.3'E and 59° 52.65'N, 10° 42.5'E, then between the islands of Lindoen and Graesholm, Hovedoen and Blekoen, to the five fathom sounding off the mainland on the East and extending to the North between Hovedoen and the mainland to a line joining 59° 54.05'N, 10° 45.5'E and 59° 53.95'N, 10° 44.5'E.
Tomatoes I	An area extending from the parallel of 59° 09.8'N up Vesterelven towards Fredrikstad to approximately 59° 11.5'N.

No.3 Area - North Sea Coast of Germany and the Low Countries

Cypress	In the Rade de Dunkirk between the meridians of 02° 15'24"E and 02° 22'12"E.
Eglantines	The area enclosed by lines joining:- (a) 54° 00'00"N, 08° 19'36"E (b) 53° 59'36"N, 08° 19'00"E (c) 54° 02'12"N, 08° 14'00"E (d) 53° 59'00"N, 08° 08'12"E

Eglantines (contd)

(e) 53° 59'24"N, 08° 07'42"E
(f) 54° 04'24"N, 08° 16'12"E
(g) 54° 04'00"N, 08° 17'00"E
(h) 54° 02'36"N, 08° 14'48"E.

Hawthorn I

An area bounded:-

On the North by latitude 55° 50'N
On the East by the five fathom line.
On the South by latitude 55° 02'30"N
On the West by longitude 07° 05'E.

Hawthorn II

An area which extends for 5 miles westward of the Coast of Jutland between latitude 56° 50'N and 56° 30'N.

Hawthorn III

An area bounded as follows:-

(a) On the North and West by lines joining the following positions:-

(i) 57° 20'N. 09° 00'E.
(ii) 57° 12'N. 08° 30'E.
(iii) 57° 00'N. 08° 14'E.
(iv) 56° 50'N. 08° 05'E.

(b) On the East by longitude 09°E and the five fathom line.

(c) On the South by latitude 56° 50'N.

Iris II

In all suitable water enclosed by a line joining:-

51° 22'N. 03° 15'E.,
51° 30'N. 03° 15'E.,
51° 30'N. 03° 24'E.

Iris V

In all suitable water enclosed by a line joining:-

51° 56'N. 04° 00'E.,
51° 56'N. 03° 40'E.,
52° 03'N. 04° 00'E.,
52° 00'N. 04° 07'E.

Limpets I

In the Breewijd between the parallels of 52° 57'48"N and 52° 55'42"N to the Eastward of longitude 04° 37'30"E in the waters enclosed by the 6 fathom line.

Limpets II

In all suitable water bounded:-

On the North by latitude 53° 04'N.
On the East by the five fathom line.
On the South by latitude 53° 00'N
On the West by longitude 04° 30'E.

Nectarines I and II — An area bounded by lines joining:-

(a) 53° 26'24"N. 05° 20'E
(b) 53° 29'N. 05° 20'E
(c) 53° 25'N. 05° 00'E
(d) 54° 05'N. 05° 00'E
(e) 54° 05'N. 07° 45'E
(f) 54° 00'N. 07° 45'E
(g) 54° 00'N. 08° 00'E
(h) 53° 50'30"N. 08° 00'E.
thence along the five fathom line to position (a).

The above area was divided into two sections:-

Section 1. West of longitude 06° 30'E
Section 2. East of longitude 06° 30'E.

Nectarines Plus - The area was bounded by lines joining:-

53° 50'N. 05° 00'E.,
54° 15'N. 05° 00'E.,
54° 15'N. 06° 00'E.,
54° 05'N. 06° 00'E.,
54° 05'N. 05° 30'E.

Rosemary I — An area bounded on the North by 54° 20'N
" " West by 07° 45'E
" " South by 54° 00'N
" " East by the 5 fathom line.

Rosemary II — An area bounded on the North by 54° 40'N
" " West by 07° 39'E
" " South by 54° 20'N
" " East by the 5 fathom line.

Rosemary III — An area bounded on the North by 55° 02'30"N
" " East by the five fathom line
" " South by 54° 40'N
" " West by longitude 07° 07'E.

Rosemary IV — An area extending $\frac{1}{4}$ mile either side of a line joining:-

54° 00'N, 07° 51'E and 54° 14'N, 07° 14'E.

Trefoil — In an area bounded:-

On the North by latitude 52° 52'N.,
On the East by the 5 fathom line,
On the South by latitude 52° 38'N.,
On the West by longitude 04° 29'E.

Whelks — In an area bounded by lines joining:-

52° 31'00"N. 04° 26'30"E.,
52° 30'00"N. 04° 34'30"E.,
52° 25'30"N. 04° 32'30"E.,
52° 26'30"N. 04° 24'30"E.

No.4 Area. The North Coast of France

Greengage — In an area bounded:-

On the North by latitude 49° 43'N.,
On the East by longitude 01° 35'W.,
On the South by the coast
On the West by longitude 01° 41'W.

Hyacinth — There were two areas:-

(A)(Inner) In the Channel between Le Grand Jardin and Le Buron Light.
(B)(Outer) Within ½ mile radius of 48° 41'24"N. 02° 06'45"W.

Scallops — In an area bounded:-

On the North by latitude 49° 32'N.,
On the West by longitude 00° 05'E.,
On the South by latitude 49° 26'N.,
On the East by the coast.

Upas Tree — There were two areas:-

A. Within a circle of radius 4 cables described about position 48° 43'00"N. 03° 53'42"W.
B. Within a circle of radius 4 cables described about position 48° 43'00"N. 03° 51'54"W.

No.5 Area. Off the Biscay Ports

Artichoke — In all suitable waters lying North and East of a line joining the positions:-

47° 46'00"N. 03° 35'00"W
47° 40'00"N. 03° 35'00"W
47° 35'00"N. 03° 30'00"W
47° 35'00"N. 03° 10'00"W

Beech — In all suitable water between the coast on the North and East and bounded on the West by longitude 02° 30'W and on the South by latitude 47° 05'N.

Cinnamon I — There were two areas:-

(i) In the Coureau de la Pallice bounded:-

On the West by the meridian of 01° 17'00"W
On the North by the 3 fathom line
On the East by the 5 fathom line
On the South by the parallel of 46° 06'30"N.

(ii) In the Rade de l'Ile d'Aix between Port Bouard and Pte. Ste. Catherine.

Cinnamon II	In all suitable water bounded:- On the North by the coast On the East by longitude 01° 25'W On the South by latitude 46° 00'N On the West by longitude 01° 40'W.
Deodars	An area within an arc of 12 miles radius, centre:- 45° 39'N, 01° 11'W to the South of latitude 45° 43'N.
Elderberry	An area bounded by lines joining:- (a) 43° 33'40"N 01° 32'00"W (b) 43° 32'45"N 01° 30'30"W (c) 43° 29'40"N 01° 33'00"W (d) 43° 31'00"N 01° 35'00"W.
Furze	An area within an arc of 1 mile radius, centre:- 43° 24'N. 01° 40'30"W.
Jellyfish	In all suitable water bounded:- On the West by longitude 04° 46'W. On the South by latitude 48° 16'N. On the North and East by the coast.
Sultana	In all suitable waters bounded:- On the North by latitude 48° 27'N., On the East by the coast. On the South by latitude 48° 23'N., On the West by a line joining 48° 27'N. 04° 52'W and 48° 23'N, 04° 50'W.

APPENDIX XIX

THE MINELAYING CODE

Bayonne	Elderberry
Bornholm	Pollock
Brest	Jellyfish
Cadet Channel - W. Baltic	Sweet Peas
Cherbourg	Greengages
Copenhagen	Verbena
Danzig	Privet
Dunkirk	Cypress
Esbjerg and Jutland Coast	Hawthorn
Fehmarn Belt	Radishes
Frisian Islands	Nectarines
Gdynia	Spinach
Gironde River Mouth	Deodar
Great Belt (North)	Pumpkins
Great Belt (South)	Asparagus
Great Belt (South)	Broccoli
Haugesund	Bottle
Heligoland Bight	Rosemary
Ijmuiden	Whelks
Kattegat (various areas)	Silverthorns
Kiel Bay	Quince
Kiel Canal	Lettuces
Kiel Harbour	Forget-me-nots
Kiel Harbour	Wallflowers
La Pallice	Cinnamon
Le Havre	Scallops
Lim Fjord (Aalborg to Hals)	Krauts
Little Belt	Carrots
Little Belt	Endive
Lorient	Artichokes
Morlaix	Upas Tree
Oslo Fjord (Frederikstadt)	Tomatoes
Oslo harbour	Onions
Pillau	Tangerine
River Elbe Estuary	Eglantines
St. Jean de Luz	Furze
St. Malo	Hyacinth
St. Nazaire	Beech
Sassnitz	Willow
Swinemunde	Geranium
Texel (north)	Limpets
Texel (south)	Trefoils
The Sound (northern end)	Nasturtium
The South (southern end)	Daffodils
Travemunde	Hollyhock
Ushant	Sultanas
Warnemunde	Jasmin
West Scheldt and Hook of Holland	Iris

Artichokes	Lorient
Asparagus	Great Belt (South)
Beech	St. Nazaire
Bottle	Haugesund
Broccoli	Great Belt (south)
Carrots	Little Belt
Cinnamon	La Pallice
Cypress	Dunkirk
Daffodil	The Sound (southern end)
Deodar	Gironde river mouth
Eglantines	River Elbe Estuary
Elderberry	Bayonne
Endive	Little Belt
Forget-me-nots	Kiel harbour
Furze	St. Jean de Luz
Geranium	Swinemunde
Greengages	Cherbourg
Hawthorn	Esbjerg and Jutland Coast
Hollyhock	Travemunde
Hyacinth	St. Malo
Iris	West Scheldt and Hook of Holland
Jasmine	Warnemunde
Jellyfish	Brest
Krauts	Lim Fjord (Aalborg to Hals)
Lettuces	Kiel Canal
Limpets	Texel (north)
Nasturtium	The Sound (Northern end)
Nectarines	Frisian Islands
Onions	Oslo harbour
Pollock	Bornholm
Privet	Danzig
Pumpkins	Great Belt (North)
Quince	Keil Bay
Radishes	Fehmarn Belt
Rosemary	Heligoland Bight
Scallops	Le Havre
Silverthorns	Kattegat (various areas)
Spinach	Gdynia
Sultanas	Ushant
Sweet Peas	Cadet channel-west Baltic
Tangerine	Pillau
Tomatoes	Oslo Fjord (Frederikstadt)
Trefoils	Texel (south)
Upas Tree	Motlaix
Verbena	Copenhagen
Wallflowers	Kiel harbour
Whelks	Ijmuiden
Willow	Sassnitz

SECRET

MONTHLY SUMMARY OF MINES LAID BY BOMBER COMMAND BY AREAS

	Bay of Biscay								N. France				Belgium and Netherlands					N. German Coast				S. Norway		Kattegat		The Sound and Belts							Kiel Canal and ~~Belts~~ Bay				Western Baltic								Total Laid	Mines Jettisoned	Mines Lost	No. of sorties	A/c Lost
	Furze	Elderberry	Deodars	Cinnamon	Beech	Artichokes	Jellyfish	Sultanas	Upas Tree	Hyacinth	Greengages	Scallops	Cypress	Iris	Whelks	Trefoils	Limpets	Nectarines	Rosemary	Eglantines	Hawthorn	Bottle Onions	Tomatoes	Kraut	Silverthorns	Asparagus	Broccoli	Carrots	Daffodil	Endive	Nasturtium	Pumpkins	Verbena	Forget-me-nots	Lettuces	Quince	Radishes	Wallflowers	Geranium	Hollyhocks	Jasmine	Pollock	Privet	Spinach	Sweet Peas	Tangerine	Willow					
Apr. '43	54	145	322	84	90	78	66	-	-	-	-	-	-	-	-	30	-	347	12	6	2	5	-	-	229	6	3	10	53	8	20	7	20	14	-	16	22	10	-	18	18	12	20	4	48	-	30	1809	77	109	673	33
May	24	47	209	85	46	44	42	-	-	-	-	-	-	-	-	-	-	646	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1148	41	28	363	8
June	-	-	309	136	112	121	65	-	-	-	-	-	-	-	-	12	4	415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1174	36	26	426	7
July	-	-	109	62	81	85	52	-	-	-	-	-	-	-	-	20	-	489	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	927	27	26	313	6
Aug.	-	-	170	89	120	117	78	-	-	-	-	-	-	-	-	66	10	433	14	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1103	71	24	501	10
Sept.	-	-	139	65	57	64	62	-	-	-	-	-	-	-	-	30	-	626	6	-	-	-	-	9	69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28	15	-	18	-	1188	56	12	396	3
Oct.	-	-	81	41	34	33	20	-	-	-	-	-	-	-	-	36	-	514	20	-	18	-	-	44	201	-	-	-	12	-	-	-	-	6	-	-	12	-	-	-	-	-	-	-	-	-	4	1076	54	12	367	4
Nov.	6	29	106	116	66	74	82	-	-	-	36	51	-	-	-	29	12	335	-	-	-	-	-	5	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	976	38	22	352	8
Dec.	-	18	58	66	8	24	7	-	-	-	11	23	-	-	-	18	12	514	-	-	6	-	-	3	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800	34	25	256	5
Total	84	239	1503	744	614	640	474	-	-	-	47	74	-	-	-	241	38	4319	57	41	26	5	-	61	560	6	3	10	65	8	20	7	20	20	-	16	34	10	-	18	18	12	48	19	48	18	34	10201	434	284	3647	84
Jan. '44	12	27	84	40	34	32	67	-	-	-	12	18	-	-	-	37	22	217	272	-	51	-	-	-	21	-	-	-	-	-	-	-	-	130	-	-	-	-	25	-	-	-	-	-	-	-	-	1101	42	9	363	3
Feb.	3	41	101	96	51	54	42	-	29	36	36	36	-	-	-	-	-	275	5	-	-	-	20	10	-	78	-	-	-	84	-	-	-	644	-	-	-	18	-	-	-	-	-	2	-	-	1661	120	25	673	9
Mch.	19	30	163	76	46	30	42	34	17	57	28	63	-	-	-	30	41	32	443	-	2	-	-	-	-	-	-	-	-	-	-	-	-	254	-	-	65	-	-	-	-	-	-	-	-	-	1472	42	15	518	3
Apr.	6	12	66	122	89	120	89	12	27	33	36	31	-	-	-	74	73	391	97	-	8	-	-	-	71	-	-	-	131	-	-	-	-	176	-	-	118	-	224	-	-	12	120	187	127	143	48	2643	81	77	855	19
May	-	6	121	104	154	135	163	96	79	77	103	121	50	46	43	26	22	403	340	-	-	-	-	-	104	92	-	-	-	-	-	-	-	464	11	-	-	-	-	-	-	-	-	-	-	-	2760	44	42	812	9
Total	40	116	535	438	374	371	403	142	152	203	215	269	50	46	43	167	158	1318	1157	-	61	-	20	10	104	262	-	-	-	215	-	-	-	1668	11	-	183	18	249	-	-	12	120	187	129	143	48	9637	329	168	3221	43
Grand Total	124	355	2038	1182	988	1011	877	142	152	203	262	343	50	46	43	408	196	5637	1214	41	87	5	20	10	165	822	6	3	10	280	8	20	7	20	1688	11	16	217	28	249	18	18	24	168	206	177	161	82	19838	763	452	6868	127

Flying hours and results on Ocean Convoy Escort and Support in the Northern Atlantic - January to March incl. 1944

Month	Group	Convoy escort							Convoy support							Escort craft and carriers		Merchant Vessels	
		Effective hours	Total hours	A/C lost	U-Boats S.	U-Boats A.	U-Boats Sunk	U-Boats Dam.	Effective hours	Total hours	A/C lost	U-Boats S.	U-Boats A.	U-Boats Sunk	U-Boats Dam.	U/Bs sunk or damaged by surface craft	U/Bs sunk or damaged by carriers	M/Vs sunk	No. of M/Vs crossing the area
January	No.15 Group and Iceland	Day 273 Night 70(N) 36 L/L	570 429(N) 105 L/L	-	- - 2 L/L	- - 0 L/L	-	-	158 261(N) 232 L/L	306 398(N) 423 L/L	-	2 - -	2 - -	- - -	1 - -				
	No.19 Group	Day Night NIL	NIL						387 225(N) 362 L/L	560 365(N) 457 L/L	- 1 N -	3 - -	3 - -	2 - -	1 - -	4 sunk	1 Dam.	1	1,028 in 37 convoys
	Azores	Day 34 Night 10(N) 6 L/L	93 44(N) 16 L/L	- - -	- - -	- - -	- - -	- - -	747 80(N) 145 L/L	1,160 260(N) 229 L/L	1 - 1 L/L	2 1 N 3 L/L	1 0 2 L/L	- - 1 L/L	1 - -				
February	No.15 Group and Iceland	Day 178 Night 60(N) 33 L/L	404 255(N) 87 L/L	- 1 N -	- - 5 L/L	- - 3 L/L	- - -	- - -	616 78(N) 403 L/L	1,358 508(N) 1,014 L/L	- - 1 L/L	2 - 8 L/L	2 - 7 L/L	- - 2 L/L	- - -	9 Sunk	1 Sunk		
	No.19 Group	Day 29 Night 21(N) 28 L/L	100 75(N) 92 L/L	- - -	- - 1 L/L	- - 1 L/L	- - -	- - -	706 425(N) 232 L/L	939 702(N) 290 L/L	- - 1 L/L	- 2 N 1 L/L	- 2 1 L/L	- - -	- - -	1 Dam.		1	1,107 in 31 Convoys
	Azores	Day 46 Night 16(N) 15 L/L	116 51(N) 49 L/L	- - -	- - -	- - -	- - -	- - -	707 150(N) 105 L/L	1,008 300(N) 147 L/L	- - -	- - -	- - -	- - -	- - -				
March	No.15 Group and Iceland	Day 375 Night 36(N) 30 L/L	900 250(N) 62 L/L	- - -	1 - 1 L/L	1 - 1 L/L	- - -	- - -	1,000 168(N) 525 L/L	1,819 551(N) 762 L/L	1 - 1 L/L	2 - 3 L/L	2 - 2 L/L	1 - -	- - -	5 Sunk			
	No.19 Group	Day 24 Night Nil 11 L/L	77 1(N) 42 L/L	- - -	- - -	- - -	- - -	- - -	48 8(N) 104 L/L	99 12(N) 164 L/L	- - -	- - 2 L/L	- - 2 L/L	- - -	- - -	2 Shared Sunk	1 Shared Sunk	1	1,224 in 37 Convoys
	Azores	Day 16 Night Nil 9 L/L	41 8(N) 15 L/L	- - -	- - -	- - -	- - -	- - -	402 36(N) 205 L/L	647 102(N) 294 L/L	- - 1 L/L	2 - 1 L/L	2 - 1 L/L	1 Shared - -	- - -	1 Dam.			
	Grand Total	Day 975 Night 213(N) 168 L/L	2,301 1,113(N) 468 L/L	- 1 N -	1 - 9 L/L	1 - 5 L/L	- - -	- - -	4,771 1,431(N) 2,313 L/L	7,896 3,198(N) 3,780 L/L	2 1 N 5 L/L	13 3 N 18 L/L	12 2 N 15 L/L	3 + 1 Sh. - 3 L/L	3 - -	18 Sunk 2 Shared Sunk 2 Dam.	1 Sunk 1 Shared Sunk 1 Dam.	3	3,359 in 105 Convoys

No.16 GROUP TACTICAL INSTRUCTION No.1/1944
(A.L.s Nos.1 - 5 incorporated)

NIGHT TORPEDO ATTACK: USING FLARES DROPPED BY SPECIAL AIRCRAFT

OPERATION "GILBEY"

1. The following tactical instructions are issued in respect of the above operation, and are to be read in conjunction with 16 Group OPERATIONAL INSTRUCTION No.2/1944.

EXECUTION

2. The operation will be originated by A.C.H.Q. Chatham who will decide the times of take-off of Wellington and Torbeau aircraft and the approximate position at which attack will take place. There will be two alternative methods of assembling the attacking force in this position, which will cover the two cases:-

Case 1 An afternoon reconnaissance by a Beaufighter locates a convoy and reports it.

Case 2 A.C.H.Q. has reason to suspect that a convoy will be out during hours of darkness.

3. Case 1

(i) A.C.H.Q. will estimate the convoy's position soon after last light and will lay down in the Form Green a time at which it will be practicable for Beaufighters to be despatched to rendezvous with the Wellington flare carrying aircraft after it has located the convoy and dropped its flame floats. The flame carrying Wellington will be despatched to an estimated position 20 miles astern of the convoy, from which it will carry out a Radar sweep along the convoy route. On making Radar contact the Wellington will close the convoy, and if possible identify visually.

(ii) Having established the fact that the convoy has been picked up, the Wellington is to send a sighting report by W/T in accordance with 16 Group Tactical Memorandum No.3. This report will include the mean wind-velocity found by the Wellington on its outward track with the aid of Gee. The Wellington will then fly to a position 60° on the sea-ward bow of the convoy and 10 miles from it using Radar and D.R. navigation, arriving at this position at the time which was detailed on the Form Green. A stick of 3 to 6 marine markers will then be laid parallel to the convoy's track and the Wellington will orbit this rendezvous, with rooster switched on at a height of 2,000 feet or just below cloud base.

(iii) The Torbeaus will be despatched by A.C.H.Q. to arrive at the anticipated position of the rendezvous 15 minutes after the Wellington. It may be that the time and distance factor will not allow the striking forces to be held on the ground until the Wellington sighting report is received; in this case, the strike aircraft will be despatched to the estimated position of the convoy at the time the aircraft are due to arrive on the convoy route. They will keep careful radio watch in order that they may receive the Wellington sighting report and wind-velocity as calculated by the Navigator of the Wellington: on receipt of this, they will adjust their course for the rendezvous as necessary and will home on to the Wellington's rooster.

4. Case 2

(i) A Wellington is despatched to carry out a reconnaissance of the enemy convoy route, over an area determined by A.C.H.Q. When the convoy is located the Wellington will proceed out to sea, climb, and transmit a sighting report, including wind-velocity, as in paragraph 3 (ii).

(ii) On receiving the report, A.C.H.Q. will instruct the Wellington the time and place at which to rendezvous. The Wellington will continue to shadow the convoy until half an hour before the time of rendezvous, when it will proceed there, drop flame floats and turn on its rooster 15 minutes before the estimated time of arrival of the Torbeaus.

(iii) A.C.H.Q. will estimate the position and time of the rendezvous, and four Torbeaus will be despatched to it, homing onto the Wellington's rooster.

5. When the rendezvous is located, Torbeaus will orbit on a left hand circuit at their briefed heights, and transmit 491 followed by aircraft letter on W/T, and the code word 'CONTACT' followed by aircraft letter on V.H.F. The Wellington will acknowledge these signals.

6. When 60 per cent of 491's or 'CONTACTS' have been received, the Wellington will climb to 4,000 feet, and close the convoy using 'Homing' Radar aerials. A signal will be transmitted on W/T and R.T. to indicate the course steered. This is to give the Torbeaus an idea of the direction in which the convoy lies.

7. The Wellingtor will fly in the opposite direction to the convoy, and drop a stick of four flares from the flare chute, parallel to the enemy's course and approximately one mile up wind of target, according to the strength of the wind. It will then turn onto reciprocal and make a bombing run, dropping 13-500 M.C. bombs. Torbeaus will continue to orbit the rendezvous, keeping a look out for four flares and the bomb explosions. Immediately after bombing, the Wellington will again approach the convoy from ahead.

8. At the correct range a course will be set to cross the bows of convoy, five miles ahead of leading ship. After a suitable time, allowing for wind, the aircraft will make a turn towards the convoy, homing on the leading ship with Radar. This approach should be made at approximately 45° on the landward bow. As the aircraft turns in it will transmit 'READY' on V.H.F. and 632 on W/T, and at the same time commencing to drop flares. These will be dropped in a straight stick of 12, at five seconds intervals, and should fall 1 - 2 miles on landward side of convoy. The aircraft will complete a circuit of the convoy and drop another stick, visually, correcting if possible any errors made in the first. A third stick will be dropped by hand launching from flare chute.

9. If, after 632 and 'READY' have been transmitted, the Wellington is for some reason unable to release flares, it will transmit 'REPEAT RUN' on V.H.F. and 'AS' on W/T. Torbeaus then wait until 'READY' and '632' are given again.

10. When Torbeaus hear the signal 'NOW', pilots will look out for first flare. As the flares descend, pilots will fly towards them and, if necessary, fly parallel to them until the ships can be seen silhouetted. As soon as a suitable target is seen, they will turn in, lose height, and attack.

SECRET

APPENDIX XXII

No.16 GROUP OPERATION INSTRUCTION No.6/1943

OPERATION 'DEADLY'

Appendix 'A' - Signals Organisation
Appendix 'B' - Own surface Forces. (Officer Commanding R.A.F. Station, Bircham Newton only).
Appendix 'C' - Air Patrols

INFORMATION

1. The long hours of darkness during the winter months favour the employment of E-boats against our East Coast trade routes, either for minelaying or the attack of shipping.

2. E-boats normally prefer to operate on dark nights when the sea conditions are suitable. Their endurance allow them to operate anywhere in the Nore Command (Flamborough Head to North Foreland). The limits of their activities so far recorded are however, 51.50N to 53.50N.

3. Our own coastal forces based at Felixstowe, Lowestoft and Yarmouth consist of M.G.Bs (large), M.G.B's (small), M.T.Bs, M.Ls, and R.M.Ls, only M.G.Bs, (s) have an advantage in speed over the E-boats but at present all M.G.Bs are more heavily armed. M.Ls and R.M.Ls are slow and are chiefly useful for giving warning of the approach of E-boats.

Own Anti-E boat Dispositions

4. Destroyers and Corvettes normally patrol the convoy route from Sherringham to the Sunk, details of these patrols will be given under separate cover addressed to Officer Command, R.A.F. Station, Bircham Newton, only.

5. Coastal Forces are stationed in units of two or sometimes in the case of M.G.Bs (s) three boats on the outer and inner 'Z' lines of which details also will be given under separate cover to Officer Commanding R.A.F. Station, Bircham Newton, only. The positions to be occupied are signalled daily. The number of units available each night is usually between 9 and 12.

INTENTION

6. To locate enemy light surface forces and vector our light surface forces on to them.

METHOD OF EXECUTION

7. 415 Squadron are to maintain 3 serviceable aircraft at Bircham Newton w.e.f. 27 October, 1943. They are to be prepared to fly any two of the patrols detailed in Appendix 'C' whenever the weather conditions favour the employment of E-boats against our Eastern Coast trade routes at night.

8. The patrols detailed at Appendix 'C' have been designed with a view to providing approximately $\frac{1}{2}$ to $\frac{3}{4}$ of an hour's warning of the approach of enemy forces to our 'Z' lines. In the case of the 'A' patrol rather less warning is given.

9. First sighting reports are to be made by V.H.F. using self-evident code, unrecoded. It is important that the time of the voice fix be recorded accurately and passed as received to A.C.H.Q. as quickly as possible. The voice fixing report is to be followed by a W/T signal on Group Reconnaissance frequency giving the composition, course and speed

but not the position of the forces. This report is to be made to A.C.H.Q. in order that the light coastal forces may be given as much warning as possible of impending action.

10. The H.F.D/F. stations at Bircham Newton and Felixstowe will obtain bearings, which are to be forwarded to A.C.H.Q. as an additional fixing safeguard.

11. When the aircraft is fitted with 'Gee' a first sighting report will be made as in para 9 above, but the aircraft will not climb above the height at which radar contact with the enemy can be maintained. A 'Gee' fix will then be obtained when the aircraft is in the immediate vicinity of the enemy force, and a W/T signal made as soon as possible on Group Reconnaissance frequency giving

(a) The enemy's position in 'Gee' co-ordinates. Two four figure groups.

(b) The enemy's course.

(c) Enemy's speed.

12. The aircraft is to continue to shadow the enemy force, remaining as nearly as possible over them and switching on Rooster until our own light coastal forces and enemy forces are seen together on the screen, when the aircraft is to drop a flare and continue to illuminate the enemy. It is essential that voice fixes be obtained at least every 15 minutes (more often if practicable) while the E-boats are being shadowed in order that coastal forces may be moved to suitable positions from which they could intercept the E-boats as early as possible. It is important that the fixes should be accurate and the reports passed to A.C.H.Q. quickly so that early dispositions may be made to intercept the enemy, the final homing on the enemy being made on the aircraft's Rooster. In order to eliminate all possible errors it is important that the voice fixing should be done when the aircraft is directly over the E-boats.

13. Aircraft are not to close within 5,000 yards of our own coastal forces as it has been found that within this distance they swamp the echo given by E-boats to the coastal forces Radar. Voice fixing is to continue for as long as possible during the run-in of our own forces to the attack.

COMMUNICATIONS

14. Signals Appendix attached at Appendix 'A'.

15. Acknowledge.

Air Vice-Marshal,
Air Officer Commanding,
No.16 Group,
ROYAL AIR FORCE

24 October, 1943.
MS/5278/107/Ops.

16 GROUP OPERATION INSTRUCTION No. 6/1943

SIGNALS ORGANISATION

1. 415 Squadron aircraft will be used fitted with:-

V.H.F. TR 1143 T. 1154B/R1155
Marconi W/T and R/T Transmitters.

The V.H.F. Sets will be fitted as follows:-

CHANNEL	FUNDAMENTAL FREQUENCY	PURPOSE
A	670 Kcs.	Coastal Command Guard
B	6680 Kcs.	Docking Homer
C	6025 Kcs.	Coltishall Fixer
D	6575 Kcs.	12 Group Guard 1.

The 1154 is to be calibrated on foll; frequencies: 3845, 3955 and 356 for W/T.

3. Signals Organisation

When over the enemy force, captain of the aircraft is to make the sighting report on V.H.F. using Channel 'C', allowing Coltishall to fix the aircraft position on that transmission. The aircraft Rooster is to be switched on, to enable our own forces to home onto the aircraft orbiting the enemy force.

First sighting report is then to be made by W/T on Group Recco. Frequency under Organisation 1. This sighting report will be received at A.C.H.Q. and passed to Duty Operations Officer with a copy to Naval Duty Signals Officer.

Amplifying reports will be made by captains of aircraft on V.H.F. Channel 'C' and he will originate amplifying reports for transmission by W/T on organisation 1.

4. Fixing

Coltishall will fix the position of the aircraft when the first sighting report is made by V.H.F. and pass the position to A.C.H.Q. Chatham over land lines by quickest possible route. This may be Coltishall - 12 Group - Chatham, or Coltishall - Bircham Newton - Chatham. An H.F. fix will be obtained by bearings on the W/T first sighting report by Felixstowe H.F. D/F, Bircham H.F. D/F and one other where possible. These bearings will be telephoned to D.S.O. Chatham. The Bearings obtained will be converted into a fix position by the D.S.O. and passed to the Duty Operations Officer.

5. Call signs

W/T normal operational call sign for the Squadron and Day concerned.

R/T - the Station aircraft call sign is to be allotted by Bircham Newton and Duty Signals Officer Chatham to be informed immediately allocation is made.

W/T call sign for surface craft will be allotted by C.-in-C. Nore and passed to Bircham Newton by the D.S.O. Chatham.

R/T call signs - Coltishall homer - MANLOVE
Coltishall fixer - LARGETYPE
Bircham Newton - COSTPRICE

(INCORPORATES AMENDMENTS NOS. 1 AND 2)

 APPENDIX 'C' TO APPENDIX XXII

16 GROUP OPERATIONAL INSTRUCTION No.6/1943

Air patrols

PATROL 'A'

53°21'N	02°00'E
53°02'N	03°03'E
52°52'N	02°47'E
53°31'N	02°17'E

PATROL 'B'

53°06'N	02°49'E
52°26'N	03°11'E
52°26'N	02°49'E
53°06'N	03°11'E

PATROL 'C'

52°28'N	02°40'E
51°47'N	02°00'E
51°53'N	02°12'E
52°23'N	03°00'E

PATROL 'D'

52°47'N	02°49'E
52°05'N	02°48'E
52°10'N	02°27'E
52°43'N	03°11'E

The positions are in the order in which they should be flown.

(INCORPORATES AMENDMENTS NOS. 1 and 2)

16 GROUP OPERATIONAL INSTRUCTION NO. 4/1944

OPERATION 'DEADLY'

(Revised 5th April, 1944)

APPENDICES: 'A' Inter-communication

'B' Own Surface Forces (Officer Commanding, R.A.F. Station, Bircham Newton only).

'C' Air Patrols

INFORMATION

Enemy

1. E-Boats employed against our East Coast shipping either attack convoys with torpedoes or lay mines in the swept channels. Their endurance allows them to operate anywhere in the Nore Command (Flamborough Head to North Foreland) but the short nights of summer usually prevent them going north of 53°N in that season. In winter they have been known to reach 53° 50'N. The most southerly limit of their activities so far recorded is 51° 50'N.

2. IJMUIDEN and the HOOK are the bases from which they operate. They normally prefer dark nights and have been known to come over on nights when the wind has been force 5.

3. Our own coastal forces based at Felixstowe, Lowestoft and Yarmouth consist of M.T.Bs (L, large) and (s, small), and M.Ls. Only M.T.Bs (s) have an advantage of speed over the E-Boats. M.Ls are slow and are chiefly used for giving warning of the approach of E-Boats.

4. Destroyers and Corvettes normally patrol the convoy route from Sherringham to the Sunk, details of these patrols have been given under separate cover, addressed to Officer Commanding, R.A.F. Station, Bircham Newton only.

5. Coastal Forces are stationed in units of two or three boats on the outer and inner 'Z' lines of which details also have been given under separate cover to Officer Commanding, R.A.F. Station, Bircham Newton only. The positions to be occupied are signalled daily. The number of units available each night is usually between 9 and 12.

Own Air Forces

6. A Flight of No.415 Squadron, equipped with Wellington aircraft, is available at R.A.F. Station, Bircham Newton. These aircraft are fitted with Marconi W/T., V.H.F., A.S.V. (Mk.II) and Gee.

INTENTION

7. (i) To locate and report enemy light surface forces.

(ii) On certain occasions (see para 20) to attack enemy light surface forces with bombs when so ordered by A.C.H.Q.

EXECUTION

8. No.415 Squadron are to maintain three serviceable aircraft at Bircham Newton. Whenever the weather conditions favour the employment of E-Boats against our Eastern Coast trade routes at night, the Duty Operations Officer at this Headquarters will order No.415 Squadron to fly any of the patrols detailed in Appendix 'C' hereto.

Aircraft fitted with 'Gee'

9. The aircraft is to fly the patrol ordered with its A.S.V. operating continuously. On making A.S.V. or visual sighting of the enemy a 'Gee' fix is to be obtained and a special First Sighting Report is to be made by W/T on the Group Reconnaissance Frequency using the Self-Evident code. This special First Sighting Report is to include the following information:-

(i) N.R. Number.

(ii) Priority, IMMEDIATE.

(iii) Group 414 (in the case of A.S.V. contact) OR Group 425 followed by type of Enemy in Self Evident Code (in the case of visual contact).

(iv) 'Position of enemy given in lettered co-ordinates followed by the appropriate suffix'.

(v) Course of enemy (in case of Visual Contact).

(vi) Speed (in case of Visual Contact).

(vii) Time of Origin.

10. On making an A.S.V. contact the aircraft is to close in and try to make a Visual Contact. A flare or flares may be dropped if necessary to identify the craft located. When it is identified as hostile the aircraft is to switch on Rooster, which should only be kept switched on while the aircraft is orbitting the enemy.

11. The aircraft is to continue to shadow the Enemy Force, either visually or by Radar, remaining as nearly as possible over it. For navigation purposes a 'Gee' fix is to be obtained at least once every 15 minutes and more often if practicable. In order to eliminate all possible errors, it is essential that the 'Gee' fixing should be done when the aircraft is in the immediate vicinity of the enemy.

12. Once every 20 minutes or in the event of any change in the disposition of the enemy force, such as alteration of course or speed, or the group splitting up into several smaller units, an amplifying report is to be made by W/T. This signal is to be in accordance with para.9. Whenever a signal is made concerning an enemy force that has already been reported it is essential that this signal should refer to time of origin of the previous report in order that A.C.H.Q. shall not be left in doubt as to whether the new signal refers to the same enemy or to a new one.

Illuminating the Enemy for our Forces

13. A succession of flares is to be dropped to eastward of the enemy when ordered by A.C.H.Q. or, in the event of no such order being received, when our own coastal forces and the enemy are seen on the A.S.V. screen. In this event Rooster is to be switched off.

14. The aircraft is not to close within 5,000 yards of our own coastal forces as within this distance they swamp the echo given by E-Boats to the coastal forces Radar.

Naval action on receipt of aircraft reports

15. When necessary C.-in-C. Nore will re-dispose coastal force units on the Z line to cover the approach course of the reported E-Boats. As these approach the Z line any unit making contact by radar or sighting the enemy in the light of the flares will close in and attack.

Action in the event of W/T failure

16. If W/T contact cannot be obtained with A.C.H.Q. on the Group Reconnaissance Frequency or on the MF/DF Frequency, the aircraft is to transmit First Sighting and amplifying Reports on V.H.F. R/T to Coltishall. These reports are to include the essential information referred to in para.9 above using the Codes contained in A.P.1927 Naval Section, No.I.

Action in the event of 'Gee' Failure

17. In the event of 'Gee' failure it will not be possible for the aircraft itself to check accurately its D/R navigational position. In this case the position included in the enemy reports is to be followed by the suffix 'U' in order that there should be no doubt amongst co-operating forces that the position is not absolutely reliable. However, in the event of a 'Gee' failure, the aircraft is to transmit amplifying reports on V.H.F. as well as on W/T in order to enable fixes to be taken by the Coltishall Sector who will forward then to A.C.H.Q. These fixes will not normally be passed to the aircraft.

Action in the event of failure of both 'Gee' and V.H.F. R/T and A.S.V.

18. In the event of failure of:-

(i) 'Gee' and V.H.F. R/T together

(ii) A.S.V.

the aircraft is to report to A.C.H.Q. and await instructions.

Action taken in the event of Losing Contact with the Enemy

19. In the event of losing Visual or Radar Contact a report is to be made by W/T on the Group Reconnaissance Frequency using the Self-Evident Code. The Report is to include the Group 406. Rooster is to be switched off and the aircraft is to resume patrol.

Attack on E-Boats by Wellington Aircraft

20. Aircraft are to carry eight 100 lb A.S. Bombs with instantaneous fuses. If enemy forces are definitely identified and if none of our own surface forces are able to effect an interception and attack the enemy, on receipt of W/T instructions from A.C.H.Q. the Wellington is to attack the enemy with bombs. It is emphasised that bombing is NOT to be carried out except upon receipt of W/T instructions from this Headquarters, and that it is always secondary to reporting the enemy.

21. The bombing is to be carried out using the Mark XIV Bombsight, if possible from 4,000 ft. Bombs are to be dropped in a stick spaced at 100 ft.

INTER-COMMUNICATION

22. See Appendix 'A'.

ADMINISTRATIVE

23. This Instruction supersedes No.16 Group Operational Instruction No. 4/1944 dated 11th March, 1944.

24. ACKNOWLEDGE

Headquarters, No.16 Group

5th April, 1944

(Sgd.) F. L. Pearce

Group Captain,
Senior Air Staff Officer

APPENDIX XXIII

APPENDIX 'A' TO NO.16 GROUP OPERATIONAL INSTRUCTION NO.4/1944 OPERATION 'DEADLY' (Revised 5th April, 1944)

INTER - COMMUNICATION

Equipment

1. Aircraft to be used are fitted as follows:-

Marconi 1154/1155
VHF TR.1143
A.S.V. MK.II
'Gee'
'Speckled Band' (to be introduced later)

W/T Frequencies

2.

Org. 1A	3845 K/Cs
Org. 1B	3955 K/Cs
M.F.D/F	356 K/Cs

V.H.F. Frequencies

3. The V.H.F. Sets are to be fitted as follows:-

Channel	Fundamental TX Frequency	Purpose
Channel A	6700 K/Cs Coastal Command Guard	Homing to Coastal Command Stations
Channel B	6680 K/Cs Docking Homer	Homing to Docking
Channel C	6025 K/Cs Coltishall Fixer	For obtaining fixes
Channel D	6450 K/Cs World Guard	Homing to Night Fighter Stations in an emergency

W/T Reports

4. If no acknowledgement is received for a W/T Report on the Group Reconnaissance Frequency after the second transmission the aircraft is to revert to MF/DF. If no acknowledgement is received after the second transmission on MF/DF the aircraft is to revert to V.H.F. R/T and send the report to Coltishall.

Fixing

5. W/T: Felixstowe and Bircham Newton H.F.D/F Stations are to listen out on Group Reconnaissance Frequency (3845 K/Cs) and obtain bearings on all aircraft transmissions. These bearings are to be passed by telephone to the Duty Signals Officer at A.C.H.Q. who is to convert them into a fixed position and pass to the Duty Operations Officer.

6. 'Gee' If the aircraft is fitted with 'Speckled Band' the 'Gee' Sendback is to be switched on when 'Gee' fixes are being obtained. These fixes will be received by A.C.H.Q. and Bircham Newton. Bircham Newton is to forward all 'Gee' fixes obtained from 'Speckled Band' to A.C.H.Q. by telephone.

7. V.H.F. R/T: Coltishall will obtain V.H.F. fixes from R/T transmissions, and pass them to A.C.H.Q. by telephone.

Call Signs

8. W/T: Normal operational call sign for the Squadron and day concerned.

9. R/T: (i) The Station aircraft call sign is to be allotted by Bircham Newton and the Duty Signals Officer, Chatham, is to be informed immediately allocation is made.

(ii) Other Call Signs are:-

Coltishall Homer - MANLOVE

Coltishall Fixer - LARGETYPE

Bircham Newton - COSTPRICE

Docking - PINFEATHER

Headquarters No.16 Group,
5th April 1944.

APPENDIX XXIII

APPENDIX 'C' TO NO.16 GROUP
OPERATIONAL INSTRUCTION
NO.4/1944
OPERATION 'DEADLY'
(Revised 5th April 1944)

AIR PATROLS

PATROL 'A'

53°21'N	02°00'E
53°02'N	03°03'E
52°52'N	02°47'E
53°31'N	02°17'E

PATROL 'B'

53°06'N	02°49'E
52°26'N	03°11'E
52°26'N	02°49'E
53°06'N	03°11'E

PATROL 'C'

52°28'N	02°40'E
51°47'N	02°32'E
51°53'N	02°12'E
52°23'N	03°00'E

PATROL 'D'

52°47'N	02°49'E
52°05'N	02°48'E
52°10'N	02°27'E
52°43'N	03°11'E

PATROL 'P'

53°20'N	03°05'E
53°20'N	03°28'E
52°30'N	03°05'E
52°30'N	03°28'E

PATROL 'Q'

52°36'N	03°09'E
52°28'N	03°29'E
51°54'N	02°25'E
51°45'N	02°46'E

PATROL 'X'

53°20'N	02°49'E
53°20'N	03°12'E
52°30'N	02°49'E
52°30'N	03°12'E

PATROL 'Y'

52°39'N	02°43'E
52°34'N	03°05'E
51°52'N	02°14'E
51°47'N	02°36'E

Note: 1. These patrols have been designed with a view to providing half-an-hour to three-quarters of an hour's warning of the approach of enemy forces on our 'Z' lines. In the case of 'A' patrol, rather less warning is given.

2. The positions are in the order in which they should be flown.

Headquarters, No.16 Group,
5th April, 1944.

APPENDIX XXIV

AIR DEFENCE OF ALLIED SHIPPING IN HOME WATERS AGAINST GERMAN E-BOATS 1940-1941

Month	COASTAL COMMAND(1)			COASTAL AND BOMBER(1)			FIGHTER COMMAND(1)						GERMAN E-BOATS(2)				ALLIED MVS SUNK BY E-BOAT TORPEDO(3)				R.N. SHIPS SUNK BY E-BOAT TORPEDO(4)				Remarks
	At Sea			In Port			At Sea			In Port			Operations at Sea			In Port	British Coastal Waters		Continental Coastal Waters		British Coastal Waters		Continental Coastal Waters		
	Desp.	Attkd	Wstge	Desp.	Attkd	Wstge	Desp.	Attkd	Wstge	Desp.	Attkd	Wstge	Torpedo	Mining	Wstge	Wstge	No.	Tons	No.	Tons	No.	Tons	No.	Tons	
1940													S. (A)	S. (M/L)	(By A/C)	(By A/C)									
January	-	-	-	-	-	-	-	-	-	-	-	-	- -	- -	-	-	-	-	-	-	-	-	-	-	From 1-1-40 to 29-2-40, 1st and 2nd Flotillas - Docking periods and trials.
February	-	-	-	-	-	-	-	-	-	-	-	-	- -	- -	-	-	-	-	-	-	-	-	-	-	
March	-	-	-	-	-	-	-	-	-	-	-	-	- -	- -	-	-	-	-	-	-	-	-	-	-	From 1-3-40 to 15-3-40 ice conditions delayed working-up processes. 14 boats ready.
April	-	-	-	-	-	-	-	-	-	-	-	-	- -	- -	-	-	-	-	-	-	-	-	-	-	E-boats took part in first operation of the war during invasion of Norway.
May	133	16	2	6	6	-	-	-	-	-	-	-	36 (36)	- -	-	-	-	-	1	6,878	2	2,435	-	-	First E-boat operation from Borkum 20-5-40. Later from Hook of Holland and Rotterdam.
June	35	9	-	10	10	-	-	-	-	-	-	-	58 (29)	- -	-	-	3	6,856	-	-	2	1,090	-	-	4 Boats of 2nd Flotilla to Boulogne - 12-6-40. 3 Boats of 1st Flotilla to Cherbourg - 27-6-40.
July	37	7	-	7	3	-	-	-	-	-	-	-	79 (20)	42 (107)	-	-	6	13,302	-	-	-	-	-	-	
August	7	1	-	21	12	2	-	-	-	-	-	-	26 (7)	19 (68)	-	-	2	1,583	-	-	-	-	-	-	
September	19	-	-	18	18	-	-	-	-	-	-	-	54 (30)	3 (9)	-	-	7	14,951	-	-	-	-	-	-	
October	-	-	-	5	5	-	-	-	-	-	-	-	51 (5)	27 (87)	-	-	1	1,595	-	-	-	-	-	-	
November	-	-	-	1	1	-	-	-	-	-	-	-	16 (3)	- (-)	-	-			-	-	-	-	-	-	
December	-	-	-	1	1	-	-	-	-	-	-	-	44 (19)	- (-)	-	-	2	8,853	-	-	1	358	-	-	
1940 Totals:-	231	33	2	69	56	2	Nil	Nil	Nil	Nil	Nil	Nil	364(139)	91(271)	Nil	Nil	21	47,140	1	6,878	5	3,883	Nil	Nil	
1941																									
January	-	-	-	-	-	-	-	-	-	-	-	-	39 (-)	- (-)	-	-	-	-	-	-	-	-	-	-	
February	7	-	-	2	2	-	-	-	-	-	-	-	39 (25)	- (-)	-	-	3	2,979	-	-	1	1,000	-	-	
March	75	8	2	-	-	-	-	-	-	-	-	-	109 (49)	- (-)	-	-	9	20,361	-	-	-	-	-	-	
April	74	-(1)	-	16	12	-	-	-	-	-	-	-	11 (11)	35 (158)	-	-	3	4,239	-	-	-	-	-	-	
May	61	-	3	15	14	1	-	-(4)	-	-	-	-	- (-)	- (-)	-	-	-	-	-	-	-	-	-	-	
June	57	3(2)	-	6	5	1	-	-(4)	-	-	-	-	12 (8)	16 (30)	-	-	-	-	-	-	-	-	-	-	
July	17	-(2)	1	1	1	-	-	-(2)	-	-	-	-	- (-)	31 (163)	-	-	-	-	-	-	-	-	-	-	
August	12	-	-	-	-	-	-	-(16)	-	-	-	-	14 (9)	- (-)	-	-	2	3,519	-	-	-	-	-	-	
September	24	-	-	-	-	-	-	-(13)	-	-	-	-	51 (11)	5 (10)	-	-	3	6,676	-	-	-	-	-	-	
October	23	1	-	-	-	-	-	- (8)	-	-	-	-	14 (6)	- (-)	-	-	2	3,305	-	-	-	-	-	-	
November	3	-	-	-	-	-	-	-(10)	-	-	-	-	32 (14)	3 (18)	-	-	7	17,715	-	-	-	-	-	-	
December	10	-	-	-	-	-	-	- (-)	-	-	-	-	11 (11)	27 (156)	-	-	-	-	-	-	-	-	-	-	
1941 Totals:-	363	12(5) (5)	6	40	34	2	Nil	Nil(57) (5)	Nil	Nil	Nil	Nil	332(146)	117 (535)	Nil	Nil	29	58,854	Nil	Nil	1	1,000	Nil	Nil	

NOTES:- (1) The figures in these columns have been compiled from Command and Group Operations Record Books. (R.A.F.).

(2) The figures in these columns have been compiled from the German E-boat Command's War Diary (Admiralty X.237/48 - TSD/FDS).

(3) The figures in these columns have been compiled from Admiralty BR.1337. "British and Foreign Merchant Vessels lost or damaged by enemy action".

(4) The figures in these columns have been compiled from Admiralty "Ships of the Royal Navy Statement of Losses during the Second World War."

(5) The number of attacks shown in brackets are those made by aircraft not specifically engaged in the Anti-E-boat role.

APPENDIX XXIV

AIR DEFENCE OF ALLIED SHIPPING IN HOME WATERS
AGAINST GERMAN E-BOATS 1942-MAY 1944

Month	COASTAL COMMAND(1)			COASTAL AND BOMBER(1)			FIGHTER COMMAND(1)						GERMAN E-BOATS(2)				ALLIED MVS SUNK BY E-BOAT TORPEDO(3)				R.N. SHIPS SUNK BY E-BOAT TORPEDO(4)				Remarks
	At Sea			In Port			At Sea			In Port			Operations at Sea			In Port	British Coastal Waters		Continental Coastal Waters		British Coastal Waters		Continental Coastal Waters		
	Desp.	Attkd	Wstge	Desp.	Attkd	Wstge	Desp.	Attkd	Wstge	Desp.	Attkd	Wstge	Torpedo	Mining	Wstge	Wstge	No.	Tons	No.	Tons	No.	Tons	No.	Tons	
1942													S. (A)	S. (M/Ld)	(By A/C)	(By A/C)									
January	6	-	-	-	-	-	-	-(2)	-	-	-	-	21 (8)	13 (78)	-	-	-	-	-	-	-	-	-	-	
February	1	-	-	-	-	-	11	11	2	-	-	-	44 (-)	35 (209)	-	-	-	-	-	-	-	-	-	-	
March	8	-	-	-	-	-	16	-(20)	-	-	-	-	29 (12)	23 (120)	-	-	1	951	-	-	1	1,090	-	-	
April	7	-	-	-	-	-	-	-	-	-	-	-	9 (-)	26 (156)	-	-	-	-	-	-	-	-	-	-	
May	2	-	-	-	-	-	4	4	-	-	-	-	10 (5)	27 (142)	-	-	-	-	-	-	-	-	1	35	
June	5	-	-	-	-	-	26	16	-	-	-	-	7 (7)	63 (383)	-	-	-	-	-	-	-	-	-	-	
July	-	-	-	-	-	-	7	1(14)	-	-	-	-	20 (16)	40 (180)	-	-	5	12,242	-	-	1	314	-	-	
August	-	-	-	-	-	-	20	3	-	-	-	-	77 (31)	45 (262)	-	-	-	-	-	-	-	-	-	-	
September	2	-	-	-	-	-	-	-	-	-	-	-	37 (12)	36 (205)	-	-	-	-	-	-	-	-	-	-	
October	5	2	-	-	-	-	-	-	-	24	8	-	56 (39)	13 (78)	-	-	3	7,576	-	-	3	921	-	-	
November	16	-	-	-	-	-	28	-	-	8	-	-	100 (39)	8 (48)	-	-	4	5,371	-	-	1	555	-	-	Albacores of F.A.A. commence operations under operational control of Fighter Cd.
December	20	-	-	-	-	-	26	18	-	-	-	-	43 (25)	- (-)	-	-	6	7,696	-	-	2	1,646	-	-	
1942 Totals:-	72	2	Nil	Nil	Nil	Nil	138	53(36)(5)	2	32	8	Nil	453 (200)	329 (1,862)	Nil	Nil	19	33,836	Nil	Nil	8	4,526	1	35	
1943																									
January	2	-	-	2	2	-	15	-	-	4	-	-	31 (-)	- -	-	-	-	-	-	-	-	-	-	-	
February	14	1	-	-	-	-	45	4	-	-	-	-	31 (26)	12 (72)	-	-	1	4,858	-	-	2	1,149	-	-	
March	11	-	-	-	-	-	70	10 (6)	-	-	-	-	63 (30)	5 (30)	1(S.75)+	-	-	-	-	-	-	-	-	-	+ By Fighter Command Spitfires (Cannon).
April	13	-	-	-	-	-	106	14 (8)	2	-	-	-	29 (14)	32 (92)	-	-	1	1,742	-	-	2	2,054	-	-	
May	-	-	-	-	-	-	82	18 (5)	2	23	23	1	- (-)	43 (228)	-	-	-	-	-	-	-	-	-	-	
June	-	-	-	-	-	-	59	11(22)	-	-	-	-	4 (-)	36 (216)	-	-	-	-	-	-	-	-	-	-	
July	-	-	-	-	-	-	48	5 (-)	-	-	-	-	- (-)	- (-)	-	2(S.46)+ (S.65)	-	-	-	-	-	-	-	-	+ By U.S. VIII B.C. at Kiel (Air Raid).
August	-	-	-	-	-	-	98	17(10)	2	28	8	-	13 (7)	12 (72)	-	1(S.121)+	-	-	-	-	1	338	-	-	+ By Fighter Command Whirlibombers at Landedo.
September	-	-	-	-	-	-	118	14(21)	-	29	-	-	22 (7)	42 (206)	-	-	-	-	-	-	1	314	-	-	
October	-	-	-	-	-	-	54	5 (8)	-	24	-	-	28 (28)	29 (126)	-	-	-	-	-	-	1	235	-	-	
November	77+	5	1	-	-	-	84+	1 (-)	-	-	-	-	18 (18)	29 (174)	1(S.74)†	-	4	8,538	-	-	-	-	-	-	+ No.415(R.C.A.F) Sqdn. commence operations. † By Beaufighters of Coastal Cd. (Cannon).
December	71	-	-	-	-	-	52	- (-)	-	-	-	-	27 (18)	- (-)	-	-	-	-	-	-	1	296	-	-	
1943 Totals:-	188	6	1	2	2	Nil	831	99(80)(5)	6	108	31	1	266 (148)	240 (1,316)	2	3	6	15,138	Nil	Nil	8	4,386	Nil	Nil	
1944																									
January	17	-	-	-	-	-	40	4	1	-	-	-	48 (24)	5 (30)	-	-	5	6,420	-	-	2	1,090	-	-	
February	20	-	-	-	-	-	38	5	1	-	-	-	99 (26)	49 (174)	-	-	1	2,085	-	-	1	500	-	-	
March	43	5	-	-	-	-	64	3	-	-	-	-	102 (-)	- (-)	-	2(S.93† (S.129)	-	-	-	-	-	-	-	-	+ By U.S. IX B.C. at Ijmuiden (Air Raid).
April	43	3	-	-	-	-	43	7	-	-	-	-	79 (15)	57 (56)	-	-	-	-	-	-	1	468+	-	-	+ Also 2 U.S. LSTs sunk by E-boat in Channel.
May	39	18	-	-	-	-	56	5	-	-	-	-	16 (10)	65 (133)	1(S.87)+	-	-	-	-	-	-	-	-	-	+ By F.A.A. Swordfish (Bombs) under operational control of H.Q.C.C.
1944 Totals:-	162	26	Nil	Nil	Nil	Nil	241	24	2	Nil	Nil	Nil	344 (75)	176 (393)	1	2	6	8,505	Nil	Nil	4	2,058	Nil	Nil	

NOTES:- For the explanation of Notes (1), (2), (3), (4) and (5) see page 1.

APPENDIX XXV

AIR DEFENCE OF ALLIED SHIPPING IN HOME WATERS. AGAINST GERMAN AIR FORCE - JANUARY 1942 to MAY 1944

Month	German Air Force[1]					Allied Shipping Sunk by Direct Attack[2]										Royal Air Force[3]						Claims - E/Ac.[4]			
	Recce. and Attack at sea				Minelaying	Merchant						Fishing		Naval		Fighter				Coastal		By Aircraft		By Ship's Guns	
	Despatched		Attacked		Despatched	Day		Night		Unrecorded		Unrecorded		Unrecorded		Despatched	Wastage			Despatched	Wastage				
	Day	Night	Day	Night	Night	No.	Tonnage	No.	Tonnage	No.	Tonnage	No.	Tonnage	No.	Tonnage	Day	Night	E/Actn	Non-E/Actn			Destd	P/Dstd	Destd	P/Dstd
1942																									
January	314	138	12	20	180	1	5,626	2	3,636	-	-	-	-	1	276	3,260	324	-	1	59	-	1	-	2	1
February	491	153	30	11	160	1	3,431	1	269	-	-	-	-	2	1,076	4,246	442	-	1	84	3	6	-	1	3
March	465	220	13	18	190	-	-	1	793	-	-	1	91	-	-	3,370	389	1	5	109	5	-	-	3	1
April	486	106	8	2	227	-	-	-	-	-	-	-	-	-	-	3,994	448	1	1	67	-	2	1	1	-
May	515	133	24	6	230	-	-	-	-	-	-	-	-	-	-	3,680	208	-	4	68	-	7	2	3	-
June	419	170	5	7	220	-	-	1	345	-	-	-	-	1	1,120	4,066	269	2	3	90	1	2	2	2	2
July	628	200	19	5	93	1	1,109	1	351	-	-	2	408	-	-	4,009	173	1	4	88	1	6	-	1	-
August	649	238	8	3	28	-	-	-	-	-	-	-	-	2	203	3,054	144	-	-	55	1	-	-	7	1
September	480	187	20	3	11	-	-	-	-	-	-	-	-	1	387	2,737	108	-	-	64	-	-	-	-	-
October	574	122	21	-	12	-	-	-	-	-	-	-	-	-	-	2,178	63	-	1	33	-	-	-	-	-
November	417	40	3	-	14	-	-	-	-	-	-	-	-	-	-	1,879	94	1	1	35	3	3	-	1	-
December	340	33	18	-	70	-	-	-	-	-	-	-	-	-	-	1,549	47	1	-	26	3	-	-	-	-
Totals:-	5,778	1,740	181	75	1,435	3	10,166	6	5,494	Nil	Nil	3	499	7	3,062	38,022	2,710	7	21	778	17	27	5	21	8
1943																									
January	362	41	5	-	95	-	-	-	-	-	-	-	-	-	-	1,384	2	-	2	32	-	-	-	1	-
February	323	25	2	1	98	-	-	-	-	-	-	-	-	-	-	1,599	5	-	2	32	-	4	3	-	-
March	565	75	7	2	52	-	-	-	-	-	-	-	-	-	-	1,596	-	-	2	16	1	-	-	1	1
April	443	110	-	-	70	-	-	-	-	-	-	-	-	-	-	770	3	-	2	23	-	-	-	6	1
May	399	119	2	-	58	-	-	-	-	-	-	-	-	-	-	269	-	-	1	24	-	-	-	5	-
June	413	114	1	-	25	-	-	-	-	-	-	-	-	-	-	768	-	-	1	16	-	-	-	-	-
July	465	146	-	-	70	-	-	-	-	-	-	-	-	-	-	571	-	-	2	14	-	-	-	1	-
August	530	96	-	-	30	-	-	-	-	-	-	-	-	-	-	300	-	-	1	14	-	-	-	-	1
September	474	74	-	-	180	-	-	-	-	-	-	-	-	-	-	322	-	1	-	13	-	-	-	2	-
October	387	97	-	-	120	-	-	-	-	-	-	-	-	-	-	298	-	-	-	6	-	-	-	2	1
November	423	90	-	-	20	-	-	-	-	-	-	-	-	-	-	374	10	-	-	20	-	-	-	-	-
December	354	95	-	-	5	-	-	-	-	-	-	-	-	-	-	188	2	-	1	17	2	-	-	-	-
Totals:-	5,138	1,082	17	3	823	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	8,439	22	1	14	227	3	4	3	18	4
1944																									
January	379	37	-	-	-	-	-	-	-	-	-	-	-	-	-	244	-	1	-	10	-	-	-	1½	-
February	446	10	-	-	-	-	-	-	-	-	-	-	-	-	-	376	2	-	1	106	-	1	-	2	1
March	553	45	-	-	43	-	-	-	-	-	-	-	-	-	-	587	6	-	-	42	-	1	-	2	-
April	435	31	-	-	35+	-	-	-	-	-	-	-	-	-	-	194	-	1	1	10	-	1	-	1	-
May	535	97	-	-	67+	-	-	-	-	-	-	-	-	-	-	188	-	-	-	24	-	2	-	-	-
Totals:-	2,328	220	Nil	Nil	145+	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1,589	8	2	2	192	Nil	5	Nil	6½	1

NOTES:- (1) All the figures for the German Air Force are estimations by Fighter Command as German records do not give a breakdown into types of operation.

(2) The figures in these columns have been compiled from Admiralty BR.1337 and "Ships of the Royal Navy, Statement of Losses during second World War".

(3) The figures in these columns have been compiled from Command and Group Forms 540.

(4) The figures in these columns have been compiled from Fighter and Coastal Command Forms 540 and the Daily Summary of Naval Events.

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(The suffix letter 'n' denotes a footnote)

N.B. Named ships and submarines mentioned in the text are given alphabetically arranged under either the Royal Navy, the U.S. Navy or the German Navy

patrols and increased flying, particularly at night, all fail to intercept more than a very few of the U-boats on passage, 214-217; introduction of the Tsetse 6 pdr. gun Mosquitoes, 221; in spite of the concentration of Percussion areas and the emphasis on the density of air patrols with better A.S.V. efficiency the collapse of the Bay Offensive continued up to the end of 1943, 222-225; flying hours, results and the U-boat traffic during November and December, 224, 225n; a spate of sightings and attacks early in January 1944, 467, 468; the U-boats then become more cautious but on occasions fight successfully with new flak armament, 468, 469; flying hours, results and U-boat traffic for the first two months of 1944, 468, 468n, 469, 469n; early March saw attacks on a heavily escorted Japanese submarine, 474; but neither a new Percussion area nor increased flying produced a better ratio of sightings to U-boats on passage, 475, 476, 476n; special training with H.M. S/M Viking to improve the efficiency of night location, 476-478; after a full scale Viking trial a single compact Percussion area was instituted, 479; during April the U-boats were being held in a harbour reserve resulting in a considerable drop in passage traffic which happened to coincide with less flying so that April results were poor, 479, 479n; traffic again dwindled in May but the latter weeks saw the first use of schnorchel fitted U-boats on patrol off the north coast of Brittany, 480, 481n; this date marks the end of organised air patrols in the Bay of Biscay and a summary of all the flying, results and U-boat traffic between July 1941 and May 1944 inclusive is given, 481, 481n, 482; detailed analysis of the Bay Operations from January 1943 to May 1944, App. VII.

The Northern Transit U-boat area, policy and events: reduced flying allows almost unopposed U-boat passages early in 1943, 143, 143n; March sees the first U-boat kills for five months, 143; the scheme of air patrols and U-boat traffic up to June, 143; the retreat of U-boat packs from the Northern Atlantic allows much increased flying in the transit area, 144; June operations and a notable kill followed by air/sea rescue in a mined area, 144, 145; a new patrol area (Catspaw) to counter U-boat group sailings, 146; flying hours, results from March to June and Doenitz temporarily cancels sailings, 146, 147, 147n; concentration of all transit flying into the new area Moorings, 147; co-operation by surface forces, 148, 148n; U-boat losses cause Doenitz to suspend all sailings again, 148-150; he re-institutes maximum time submerged passages in September, 230; collapse of air offensive against U-boat traffic, 230, 231; the Moorings area cancelled and because of renewal of Atlantic convoy war only sparse transit patrols are flown, 230; flying hours and U-boat traffic from September to December 1943, 231n; between January and mid-May 1944 there was little flying, no sightings but falling U-boat traffic, 482, 483; the air patrols are moved closer to Norway and are immediately successful, 484; re-inforcements to No. 18 Group and a series of U-boat kills, 484-487; a significant fact that only one of the schnorchel fitted U-boats was located, 487.

Gibraltar Strait U-boat transit area, policy and events: of eight U-boats detailed to go through during first half of 1943, five succeeded, 166; flying hours and results in the area, 167n; another batch of U-boats detailed in September, their failure led Doenitz to suspect centimetric radar in our aircraft, 184n, 226; however, of five U-boats fitted with Naxos in the October sailings three were sunk and the German warning equipment became suspect again, 227, 228; successful singleton passages at end of 1943 show that prior intelligence was required before an effective bar could be raised, 228; flying hours and results from September to December, 228n; a determined U-boat survives damage by several air attacks, 487, 488; the arrival of a U.S.N. squadron fitted with M.A.D., 488;

No. 179: 123n, 125, 139, 199, 203, 213, 216, 225, 487.
No. 190: 28n, 143, 143n, 145, 210, 354.
No. 201: 46, 115, 325.
No. 202: 34n, 35, 44, 67, 123n, 487, 490.
No. 206: 57, 113, 143, 145, 191, 453, 454, 464.
No. 210: 44, 96, 100n, 123n, 128, 460, 485.
No. 220: 42, 110, 144, 149, 191, 196, 454, 464.
No. 224: 85n, 90n, 119-122, 125, 132, 188, 201, 305, 323, 461.
No. 228: 99n, 100n, 109, 124, 128, 130-132, 330.
No. 233: 44, 65, 67, 152, 166, 191, 489.
No. 235: 254, 460.
No. 236: 64n, 65, 104, 249-253, 270-274, 500-502, 516-518.
No. 246: 28n.
No. 248: 99n, 101, 101n, 104, 124, 200, 210, 221, 313, 320, 474, 475, 479.
No. 254: 249-253, 270, 272-274, 320, 500-502, 516, 517.
No. 269: 53, 57, 70, 74, 143, 144, 146, 149, 182, 182n, 210, 230, 482, 571.
No. 304 (Pole): 321, 480.
No. 311 (Czech): 66, 222, 313, 323, 326, 474.
No. 320 (Dutch): 28n.
No. 330 (Norge): 145, 484.
No. 333 (Norge): 29, 257, 276, 484, 486, 504-507.
No. 500: 493.
No. 502: 47, 66, 97n, 111, 120, 128, 129, 132, 469.
No. 524: 209n, 297.
No. 547: 127, 131, 258.
No. 612: 97n, 221, 323, 455, 458, 475, 479, 480.
No. 618: 29, 29n, 210.
No. 1477 Flight: 28n, 29.
No. 1693 Flight: 210, 210n.

R.A.A.F. squadrons

No. 10: 97n, 100n, 115, 130, 330, 467.
No. 455: 143, 254-257, 505, 517-519.
No. 461: 97n, 102, 104, 128, 129, 131, 132, 456.

R.C.A.F. squadrons

No. 162: 466n, 482, 487.
No. 404: 255-257, 356-358, 503, 504, 506, 519.
No. 405 (B.C.): 84, 84n, 85n, 90.
No. 407: 131, 213, 323, 455, 457, 459, 479.
No. 415: 109, 210n, 248, 251, 252, 254, 272, 273, 275, 294, 313, 500-502, 509-511, 517, 521, 522, 530-532, 545-547.
No. 422: 111, 187, 200, 325, 463, 485.
No. 423: 63, 72, 149, 183, 325, 485.

R.N.Z.A.F. squadrons

No. 489: 255-257, 503-505, 507, 517-519.

Fleet Air Arm squadrons

No. 819: 519, 522, 550.
No. 833: 258, 540.
No. 834: 258, 540.
No. 836: 248, 409.
No. 848: 518.

U-Boats, German, Damage to:

MAP No. I

LOCATION OF COASTAL COMMAND STATIONS

LEGEND

- GROUP HEADQUARTERS
- AIRFIELDS
- FLYING BOAT BASES

5° 0°

60° 60°

55° 55°

50° 50°

SULLOM VOE
SHETLAND IS.
SUMBURGH
ORKNEY IS.
WICK
STORNOWAY
BENBECULA
TIREE
OBAN
BOWMORE
WOODHAVEN
LEUCHARS
No. 18 GROUP
LIMAVADY
BALLYKELLY
ALDERGROVE
CASTLE ARCHDALE
ST ANGELO
THORNABY
No. 15 GROUP
NORTH COATES
STRUBBY
DOCKING
LANGHAM
BIRCHAM NEWTON
ST DAVIDS
TALBENNY
DALE
ANGLE
PEMBROKE DOCK
BENSON
LONDON
MANSTON
No. 16 GROUP
HAWKINGE
CHIVENOR
WINKLEIGH
DUNKESWELL
HOLMSLEY SOUTH
BEAULIEU
THORNEY IS.
EXETER
DAVIDSTOW MOOR
HAMWORTHY
ST EVAL
No. 19 GROUP
HARROWBEER
PERRANPORTH
PORTREATH
MOUNT BATTEN
PREDANNOCK
SCILLY IS.

A.H.B.I. DIAG. No. 1048

U-BOAT DISPOSITIONS 8 FEBRUARY 1943

LEGEND

- U-BOAT GROUPS
- U-BOAT ON INDIVIDUAL PATROL
- U-BOATS ON PASSAGE
- SUPPLY U-BOATS
- LIMIT OF EFFECTIVE SHORE-BASED AIR COVER

NORDSTURM 5

12 PFEIL SCATTERED

HAUDEGEN 9

DELPHIN 9

ROCHEN 10

460

459

119

107

68

183

124

105

217

304

214

176

118

175

156

510

518

160

506

182

509

516

BERMUDA

AZORES

MADEIRA

CANARIES

CAPE VERDES

ASCENSION IS.

ST HELENA

90° 80° 70° 60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

A.H.B.I DIAG. No. 889

MAP No.3

U-BOAT DISPOSITIONS 17 FEBRUARY 1943

LEGEND

- U-BOAT GROUPS
- U-BOAT ON INDIVIDUAL PATROL
- U-BOATS ON PASSAGE
- SUPPLY U-BOATS
- LIMIT OF EFFECTIVE SHORE-BASED AIR COVER

M/L & SUPPLY 119

NEPTUN 10

RITTER 15

TAIFUN 6

ROBBE 10

ROCHEN 12

460

461

180

523

185

155

183

103

108

107

118

156

510

459

518

160

506

509

516

182

AZORES

MADEIRA

CANARIES

CAPE VERDES

ASCENSION IS.

ST HELENA

BERMUDA

A.H.B.I DIAG. No.890

MAP No.4

NEPTUN
14

BURGGRAF
9

WILDFANG
9

ROBBE
5

4
ROCHEN AND SOME
ROBBE SCATTERED

AZORES

MADEIRA

BERMUDA

CANARIES

CAPE VERDES

ASCENSION IS.

ST HELENA

119
180
460
462
508
172
515
185
106
461
459
515
135
68
183
156
510
518
182
516
306
160
309

U-BOAT DISPOSITIONS
27 FEBRUARY 1943

LEGEND

- U-BOAT GROUPS
- U-BOAT ON INDIVIDUAL PATROL
- U-BOATS ON PASSAGE
- SUPPLY U-BOATS
- LIMIT OF EFFECTIVE SHORE-BASED AIR COVER

A.H.B.I DIAG. No.891

MAP No.5

U-BOAT DISPOSITIONS 6 MARCH 1943

LEGEND

- U-BOAT GROUPS
- U-BOAT ON INDIVIDUAL PATROL
- U-BOATS ON PASSAGE
- SUPPLY U-BOATS
- LIMIT OF EFFECTIVE SHORE-BASED AIR COVER

WILDFANG 21

BURGGRAF 7

NEULAND 17

ROBBE 4

TUMMLER 6

119

462

463

459

172

508

390

180

513

515

AZORES

MADEIRA

BERMUDA

106

461

521

CANARIES

155

185

183

68

136

CAPE VERDES

510

518

ASCENSION IS.

ST HELENA

182

160

316

509

508

90° 80° 70° 60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

A.H.B.I DIAG. No.892

MAP No. 6

U-BOAT DISPOSITIONS 14 MARCH 1943

LEGEND

- U-BOAT GROUPS
- U-BOAT ON INDIVIDUAL PATROL
- U-BOATS ON PASSAGE
- SUPPLY U-BOATS
- LIMIT OF EFFECTIVE SHORE-BASED AIR COVER

STURMER 20

RAUBGRAF 10

DRAENGER 11

UNVERSAGT 6

WOHLGEMUT 4

AZORES

MADEIRA

CANARIES

CAPE VERDES

BERMUDA

ASCENSION IS.

ST HELENA

188 168 198 196 463 119 524 445 410 107 103 461 180 155 185 185 680 510 518 182 160 516 506 509

90° 80° 70° 60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

A.H.B.I DIAG. No.893

MAP No.7

U-BOAT DISPOSITIONS 25 MARCH 1943

LEGEND

- U-BOAT GROUPS
- U-BOAT ON INDIVIDUAL PATROL
- U-BOATS ON PASSAGE
- SUPPLY U-BOATS
- LIMIT OF EFFECTIVE SHORE-BASED AIR COVER

SEETEUFEL 19

SEEWOLF 17

SEERAUBER 5

191 229 195 196 409 119 463 161 174 198 129 106 159 515 105 123 155 183 185 68 510 518 180 509 506 160 182 514

AZORES

MADEIRA

BERMUDA

CANARIES

CAPE VERDES

ASCENSION IS.

ST HELENA

90° 80° 70° 60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

A.H.B.I DIAG. No 694

MAP No.8

U-BOAT DISPOSITIONS 3 APRIL 1943

LEGEND

- U-BOAT GROUPS
- U-BOAT ON INDIVIDUAL PATROL
- U-BOATS ON PASSAGE
- SUPPLY U-BOATS
- LIMIT OF EFFECTIVE SHORE-BASED AIR COVER

LOWENHERZ 15

TO REFUEL AFTER THE OPERATION AGAINST HX230

REMNANTS OF SEEWOLF SOON TO BE REFORMED INTO ADLER

487 332 195 463 177 462 117 M/L 174 178 161 455 196 510 172 167 513 67 126 181 154 198 515 155 68 183 185 159 123 105 518 129

AZORES

MADEIRA

BERMUDA

CANARIES

CAPE VERDES

ASCENSION IS.

ST HELENA 506 160

180 509 516 182 ITALIAN U/B

90° 80° 70° 60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

A.H.B.I DIAG. No.923

U-BOAT DISPOSITIONS 21 APRIL 1943

LEGEND

- U-BOAT GROUPS
- U-BOAT ON INDIVIDUAL PATROL
- U-BOATS ON PASSAGE
- SUPPLY U-BOATS
- LIMIT OF EFFECTIVE SHORE-BASED AIR COVER

MEISE 19

SPECHT 17

AZORES

BERMUDA

MADEIRA

CANARIES

CAPE VERDES

ASCENSION IS.

ST HELENA

A.H.B.I DIAG. No.895

U-BOAT DISPOSITIONS 1 MAY 1943

LEGEND

- U-BOAT GROUPS
- U-BOAT ON INDIVIDUAL PATROL
- U-BOATS ON PASSAGE
- SUPPLY U-BOATS
- LIMIT OF EFFECTIVE SHORE-BASED AIR COVER

STAR 13

SPECHT 17

AMSEL 15

DROSSEL 13

459 461 487 119 M/L 185 516 506 58 410 460 616 160 509 183 117 197 515 123 126 105 182 128 154 195 177 178 196 198 181 180 176 262 161 129

AZORES

MADEIRA

CANARIES

CAPE VERDES

ASCENSION IS.

ST HELENA

BERMUDA

90° 80° 70° 60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

A.H.B.I DIAG. No 896

MAP No.11

U-BOAT DISPOSITIONS 18 MAY 1943

LEGEND

- U-BOAT GROUPS
- U-BOAT ON INDIVIDUAL PATROL
- U-BOATS ON PASSAGE
- SUPPLY U-BOATS
- LIMIT OF EFFECTIVE SHORE-BASED AIR COVER

ILLER 4

DONAU 18

ODER 8

461

459

119 M/L

190

129

521

527

67

66

161

AZORES

BERMUDA

MADEIRA

511

CANARIES

CAPE VERDES

199

193

460

123

126

105

154

515

ASCENSION IS.

ST HELENA

128

197

181

198

195

196

177

178

180

90° 80° 70° 60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

60° 50° 40° 30° 20° 10° 0° 10° 20° 30°

A.H.B.I DIAG. No.897

MAP No. 12

U-BOAT DISPOSITIONS 23 MAY 1943

LEGEND

- U-BOAT GROUPS
- U-BOAT ON INDIVIDUAL PATROL
- U-BOATS ON PASSAGE
- SUPPLY U-BOATS
- LIMIT OF EFFECTIVE SHORE-BASED AIR COVER

DONAU AND NORTHERN MOSEL 27

SOUTHERN MOSEL 5

BERMUDA

AZORES

MADEIRA

CANARIES

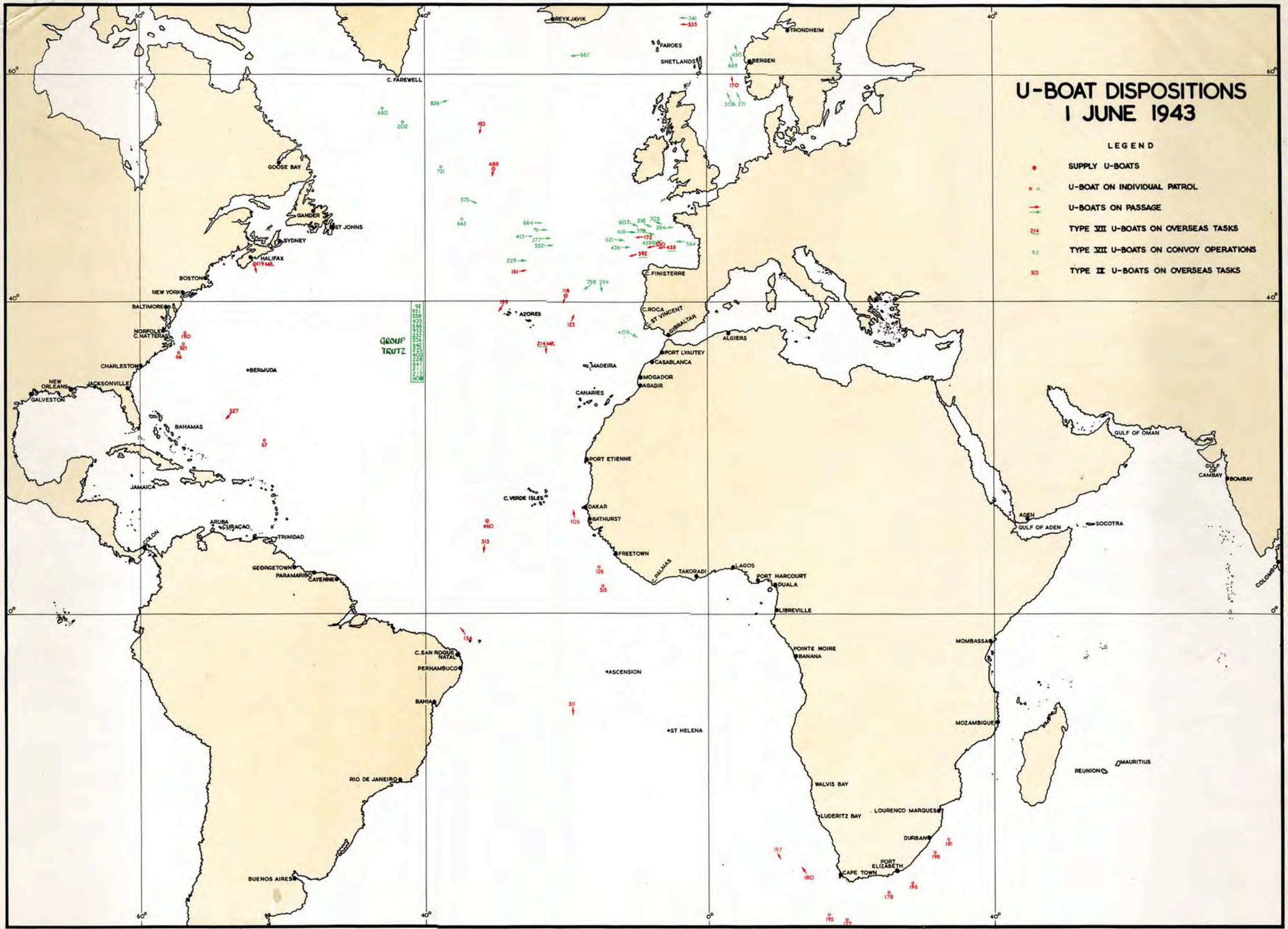
CAPE VERDES

ASCENSION IS.

ST HELENA

193 488 199 221 217 129 459 461 214 M/L 119 M/L 321 190 66 161 67 513 527 123 SM 126 460 134 105 128 515 197 181 177 195 198 178 196 180

A.H.B.I DIAG. No. 898



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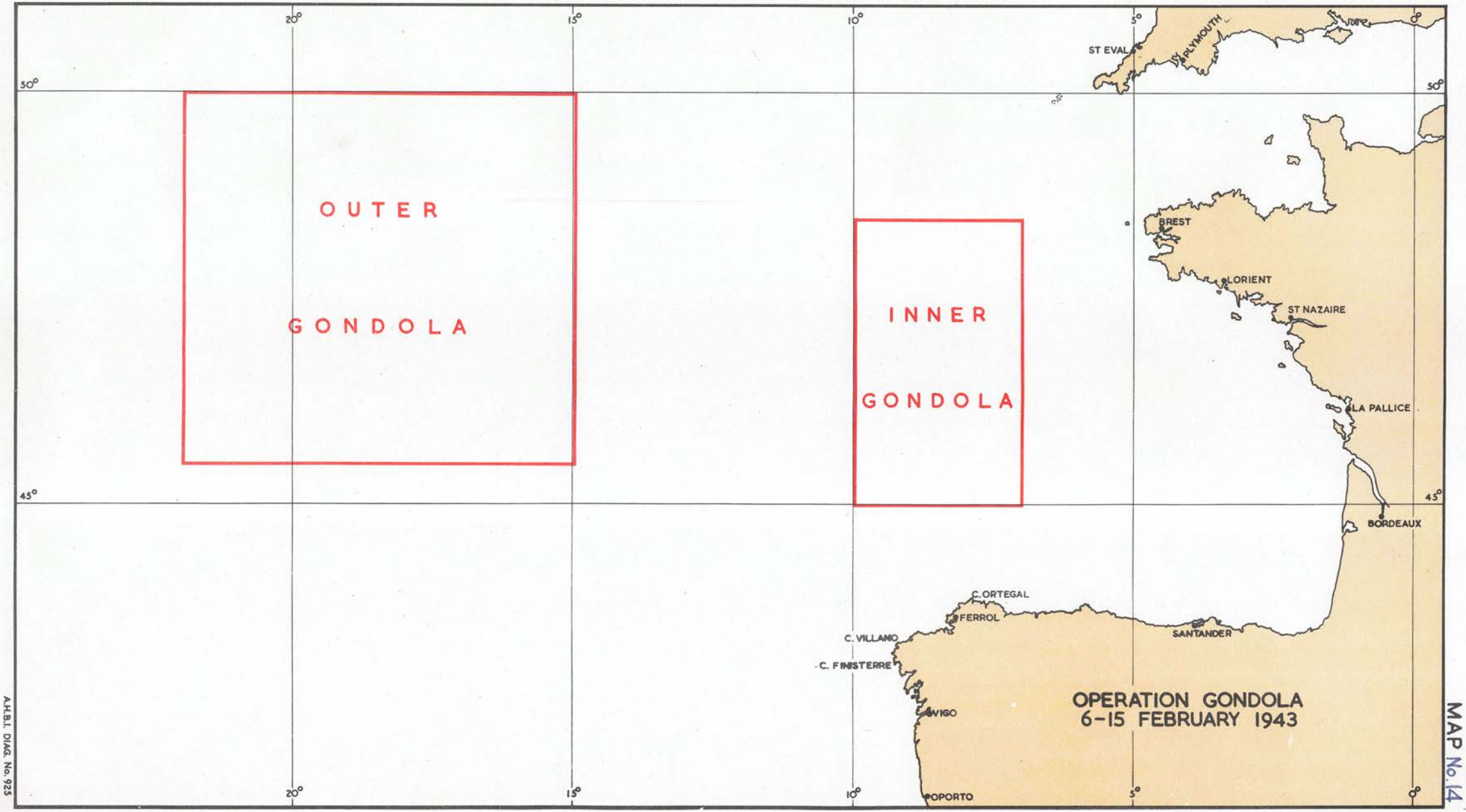
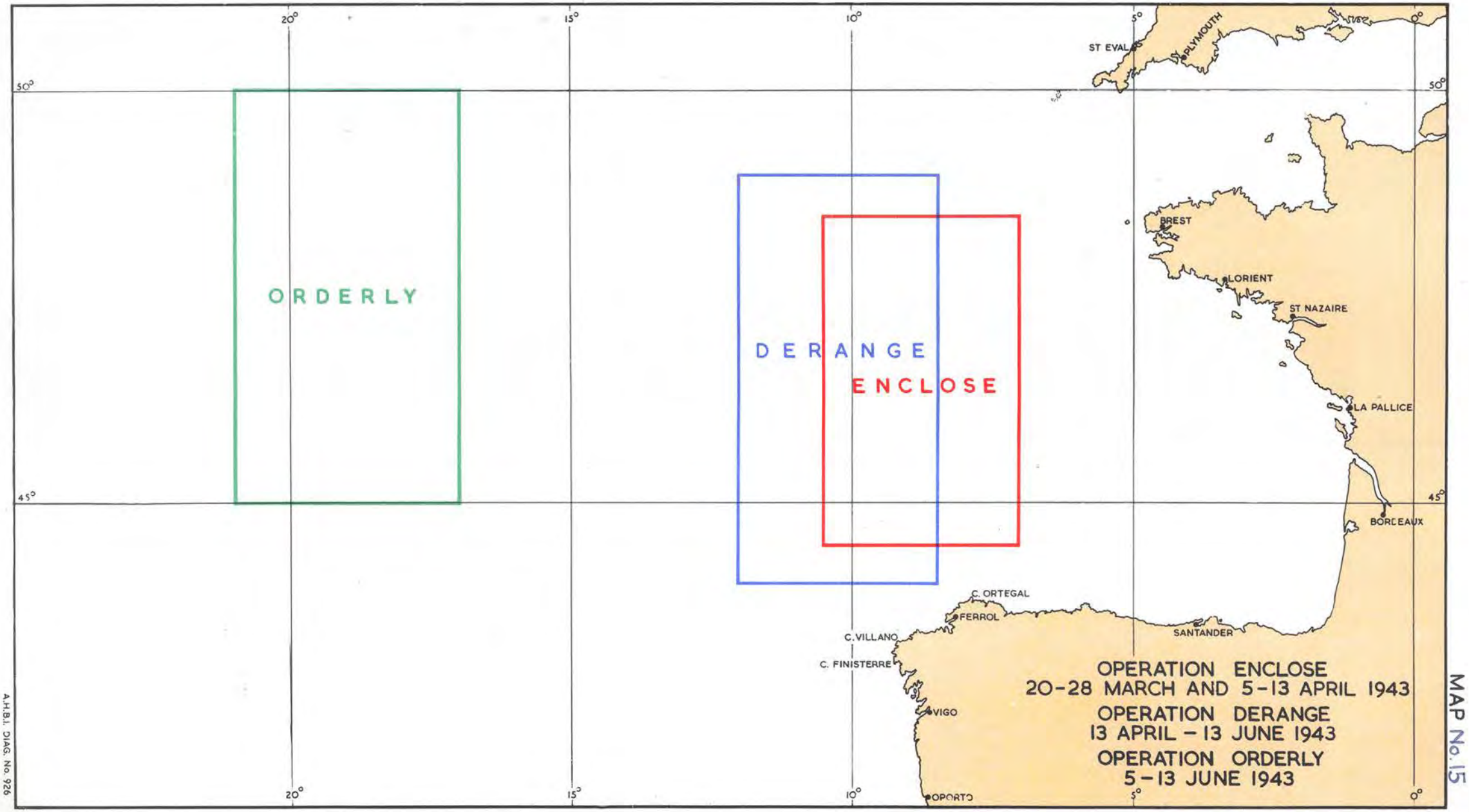
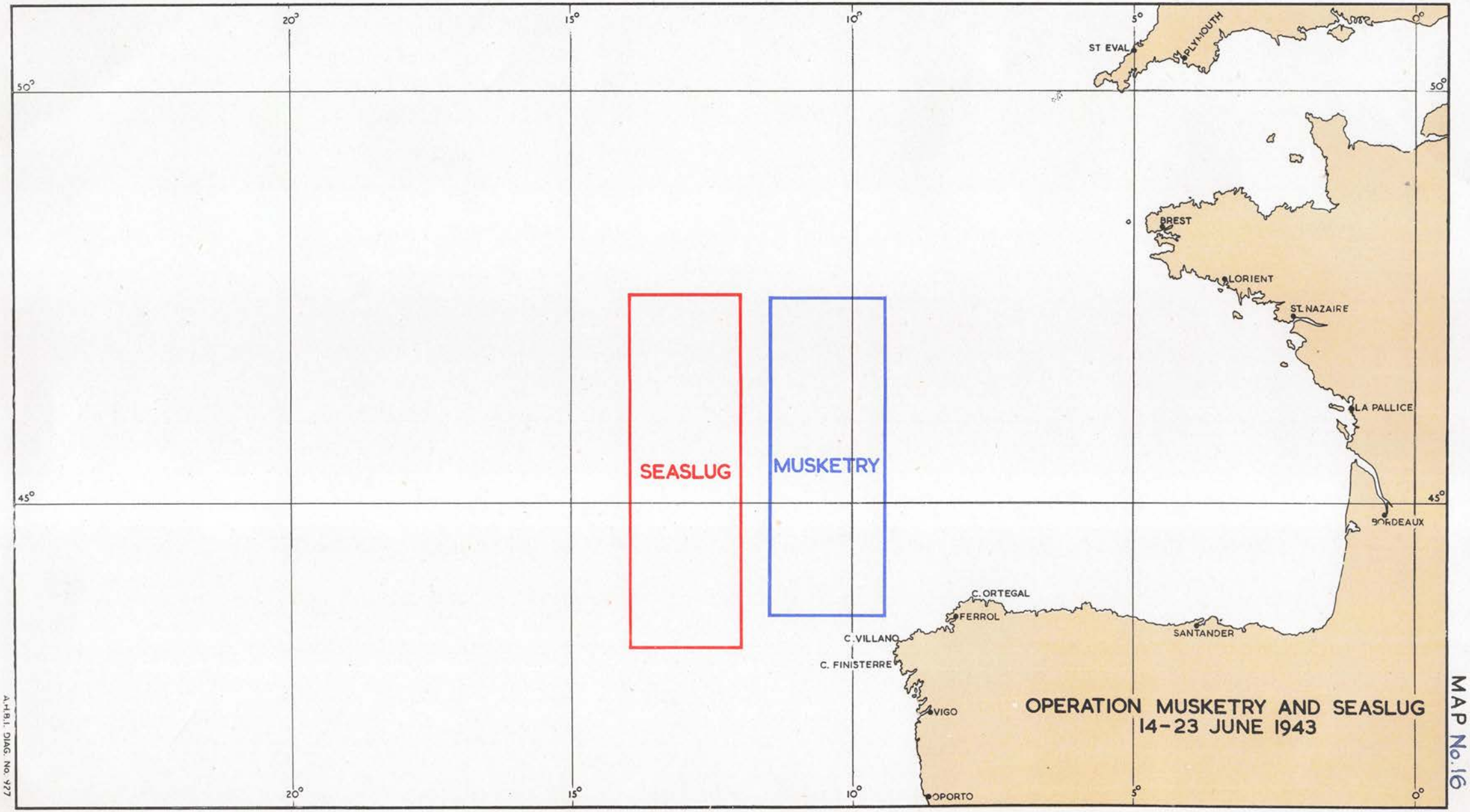
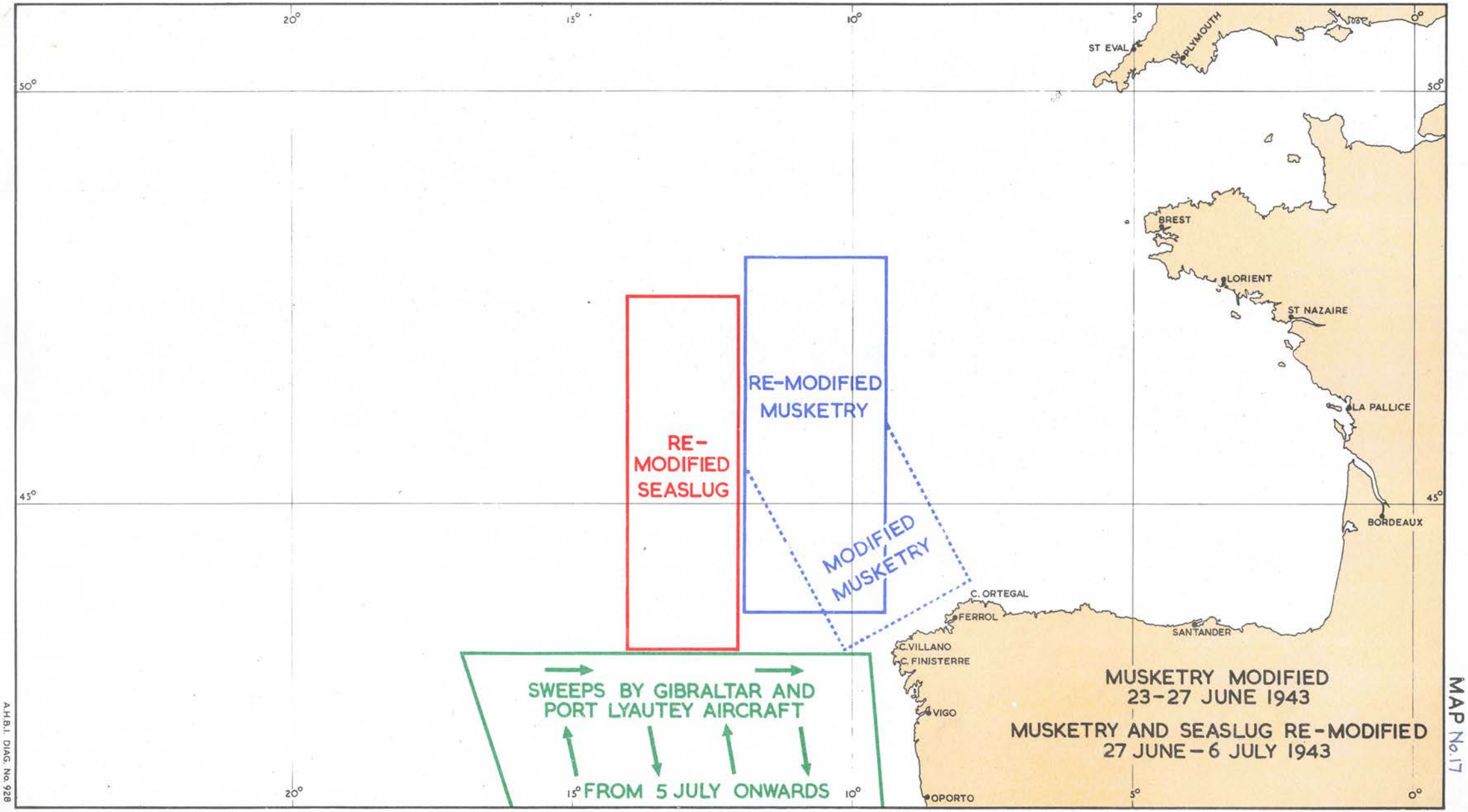

OUTER
GONDOLA
INNER
GONDOLA
ST EVAL
PLYMOUTH
BREST
LORIENT
ST NAZAIRE
LA PALLICE
BORDEAUX
C. ORTEGAL
FERROL
SANTANDER
C. VILLANO
C. FINISTERRE
VIGO
OPORTO
OPERATION GONDOLA
6-15 FEBRUARY 1943
MAP No. 14
A.H.B.I. DIAG. No. 925



MAP No. 15

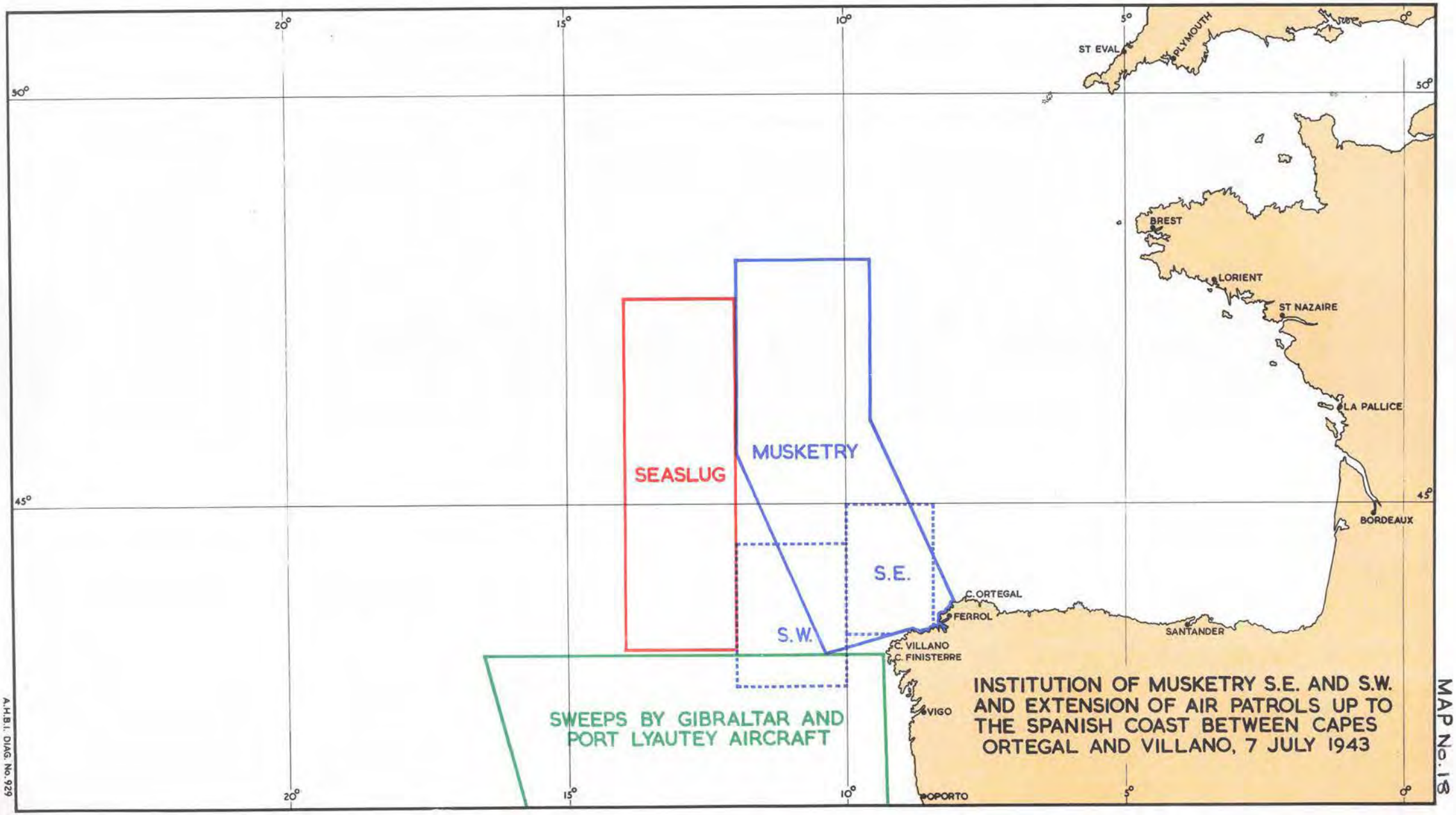
A.H.B.I. DIAG. No. 926

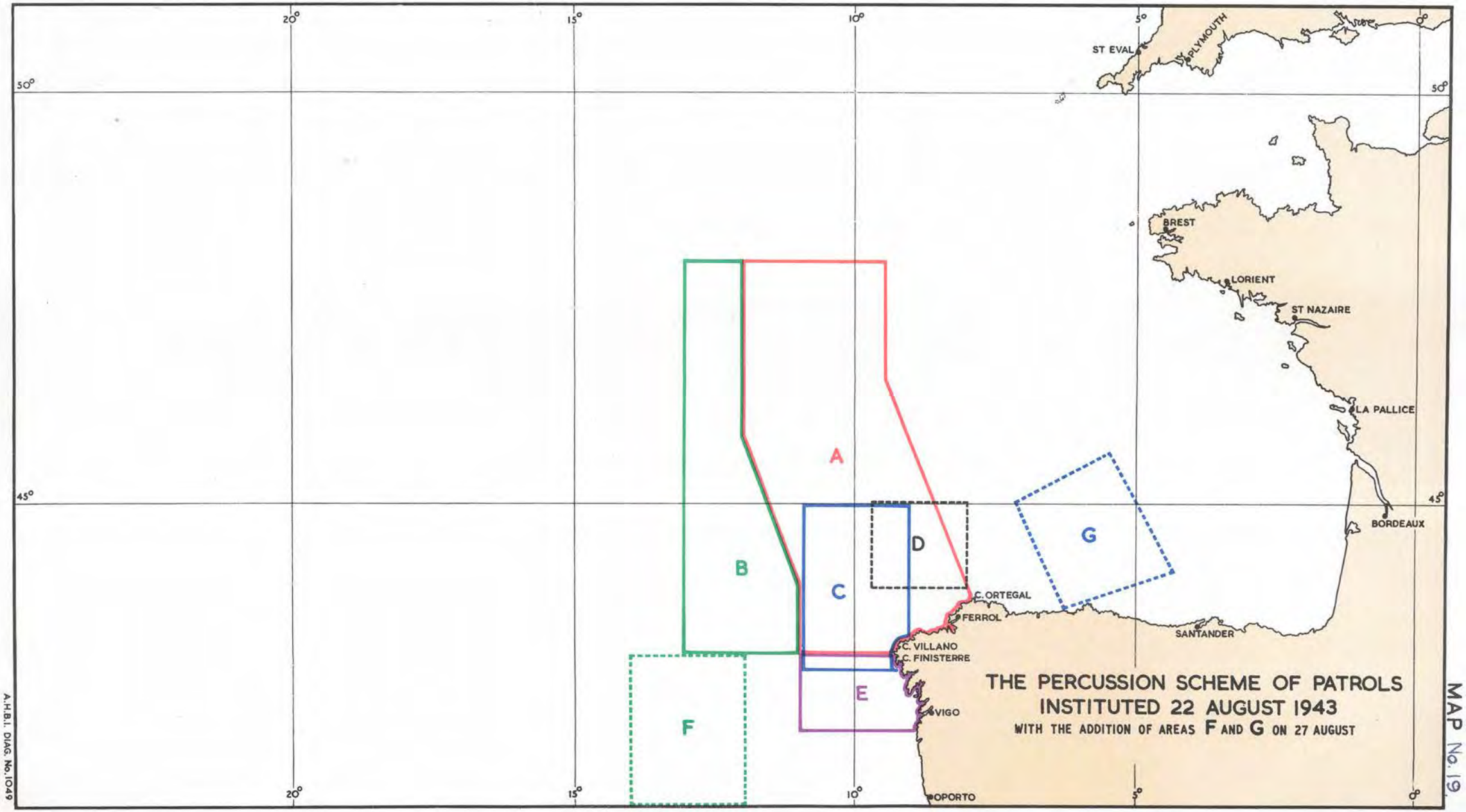

20°
15°
10°
5°
0°
50°
45°
ST EVAL
PLYMOUTH
BREST
LORIENT
ST NAZAIRE
LA PALLICE
BORDEAUX
SEASLUG
MUSKETRY
C. ORTEGAL
FERROL
SANTANDER
C. VILLANO
C. FINISTERRE
VIGO
OPORTO
OPERATION MUSKETRY AND SEASLUG
14-23 JUNE 1943
MAP No. 16
A.H.B.I. DIAG. No. 927

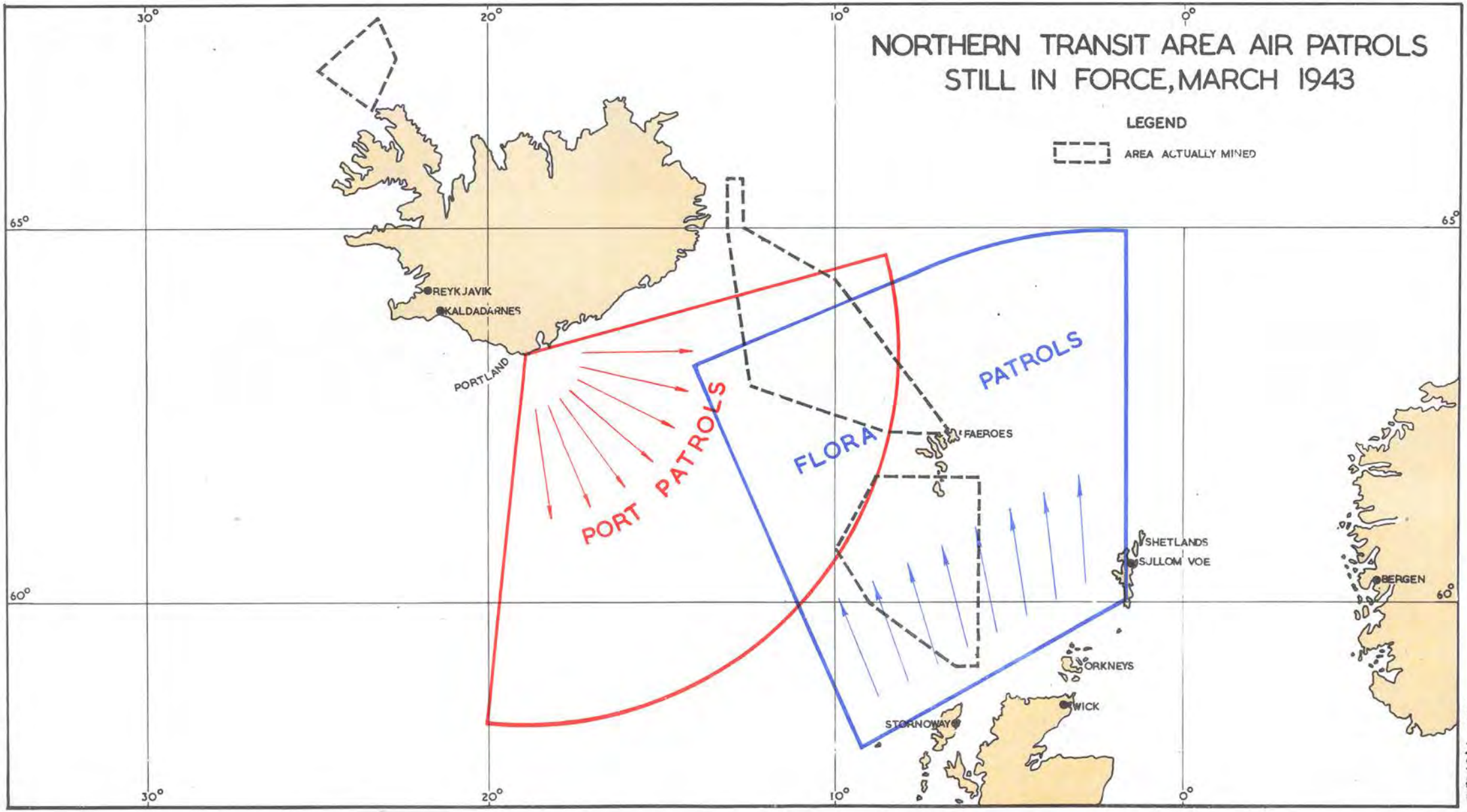


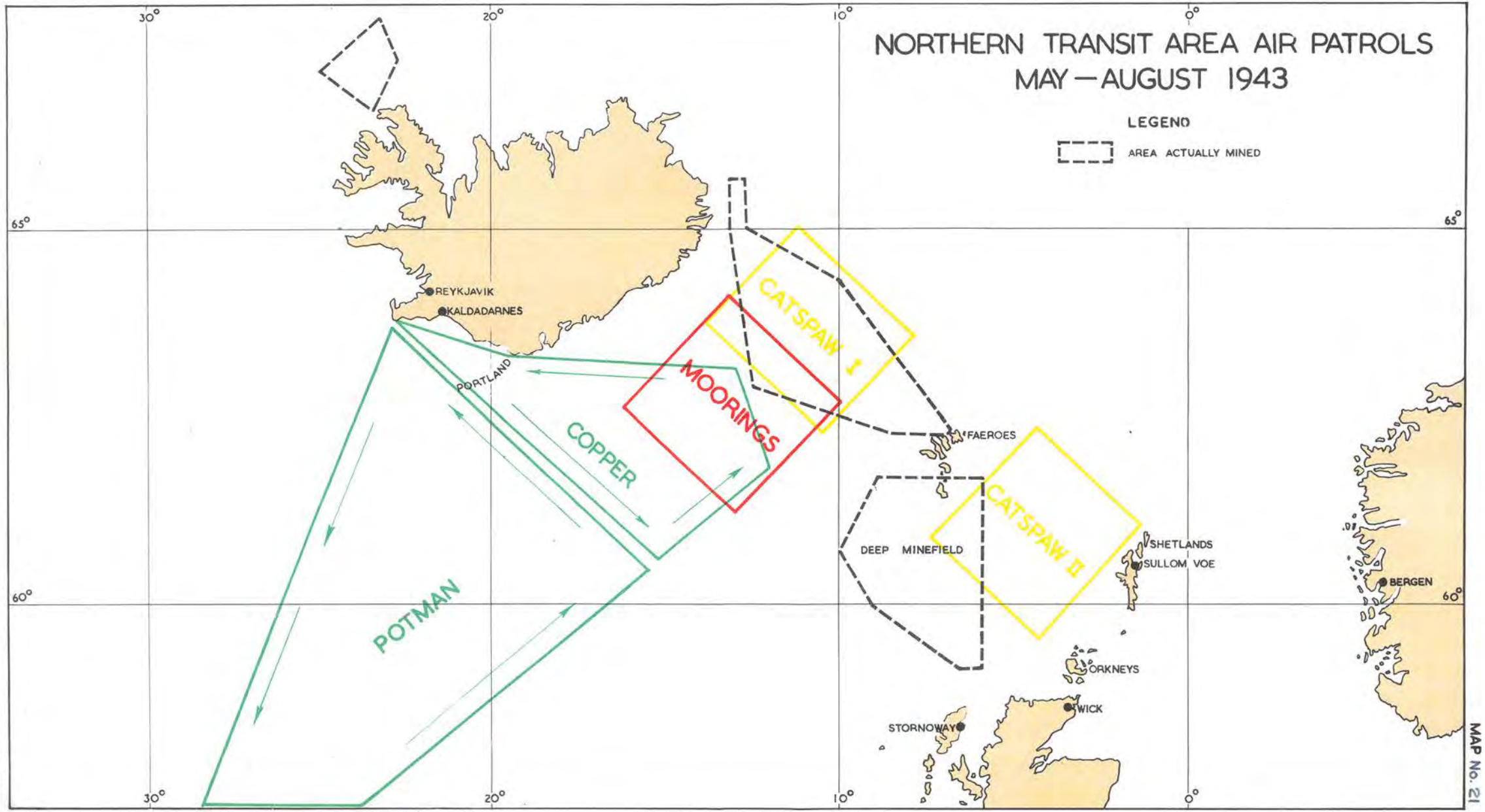
A.H.B.I. DIAG. No. 928

MAP No. 17


20°
15°
10°
5°
0°
50°
45°
ST EVAL
PLYMOUTH
BREST
LORIENT
ST NAZAIRE
LA PALLICE
BORDEAUX
SEASLUG
MUSKETRY
S.E.
S.W.
C. ORTEGAL
FERROL
SANTANDER
C. VILLANO
C. FINISTERRE
VIGO
OPORTO
SWEEPS BY GIBRALTAR AND PORT LYAUTEY AIRCRAFT
INSTITUTION OF MUSKETRY S.E. AND S.W. AND EXTENSION OF AIR PATROLS UP TO THE SPANISH COAST BETWEEN CAPES ORTEGAL AND VILLANO, 7 JULY 1943
A.H.B.I. DIAG. No. 929
MAP No. 18

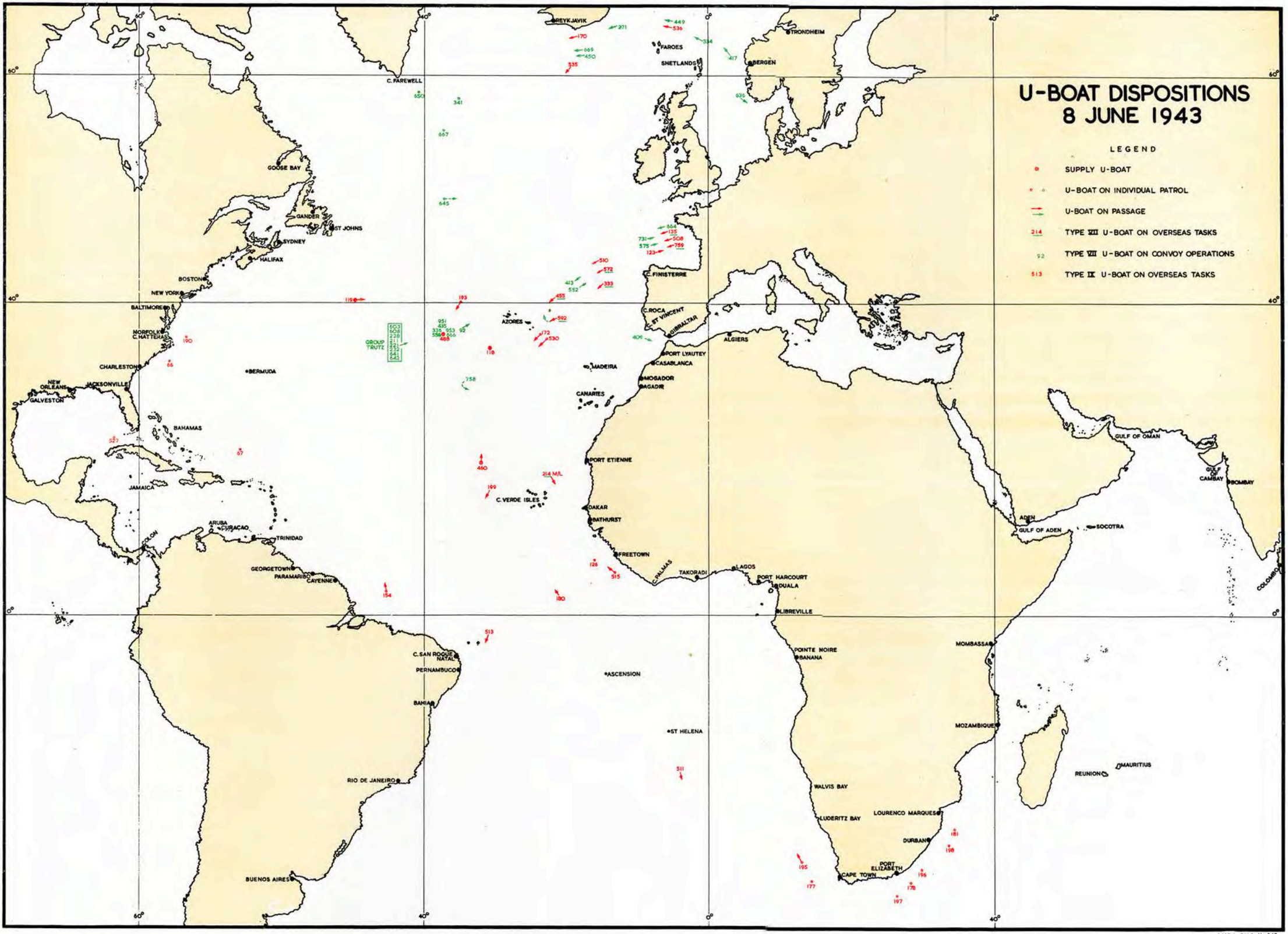

20°
15°
10°
5°
0°
50°
45°
ST EVAL
PLYMOUTH
BREST
LORIENT
ST NAZAIRE
LA PALLICE
BORDEAUX
A
B
C
D
E
F
G
C. ORTEGAL
FERROL
SANTANDER
C. VILLANO
C. FINISTERRE
VIGO
OPORTO
THE PERCUSSION SCHEME OF PATROLS
INSTITUTED 22 AUGUST 1943
WITH THE ADDITION OF AREAS F AND G ON 27 AUGUST
A.H.B.I. DIAG. No. 1049
MAP No. 19


NORTHERN TRANSIT AREA AIR PATROLS
STILL IN FORCE, MARCH 1943
LEGEND
AREA ACTUALLY MINED
30°
20°
10°
0°
65°
60°
REYKJAVIK
KALDADARNES
PORTLAND
PORT PATROLS
FLORA PATROLS
FAEROES
SHETLANDS
SJLLOM VOE
BERGEN
ORKNEYS
WICK
STORNOWAY
A.H.B. I DIAG. No. 936
MAP No. 20

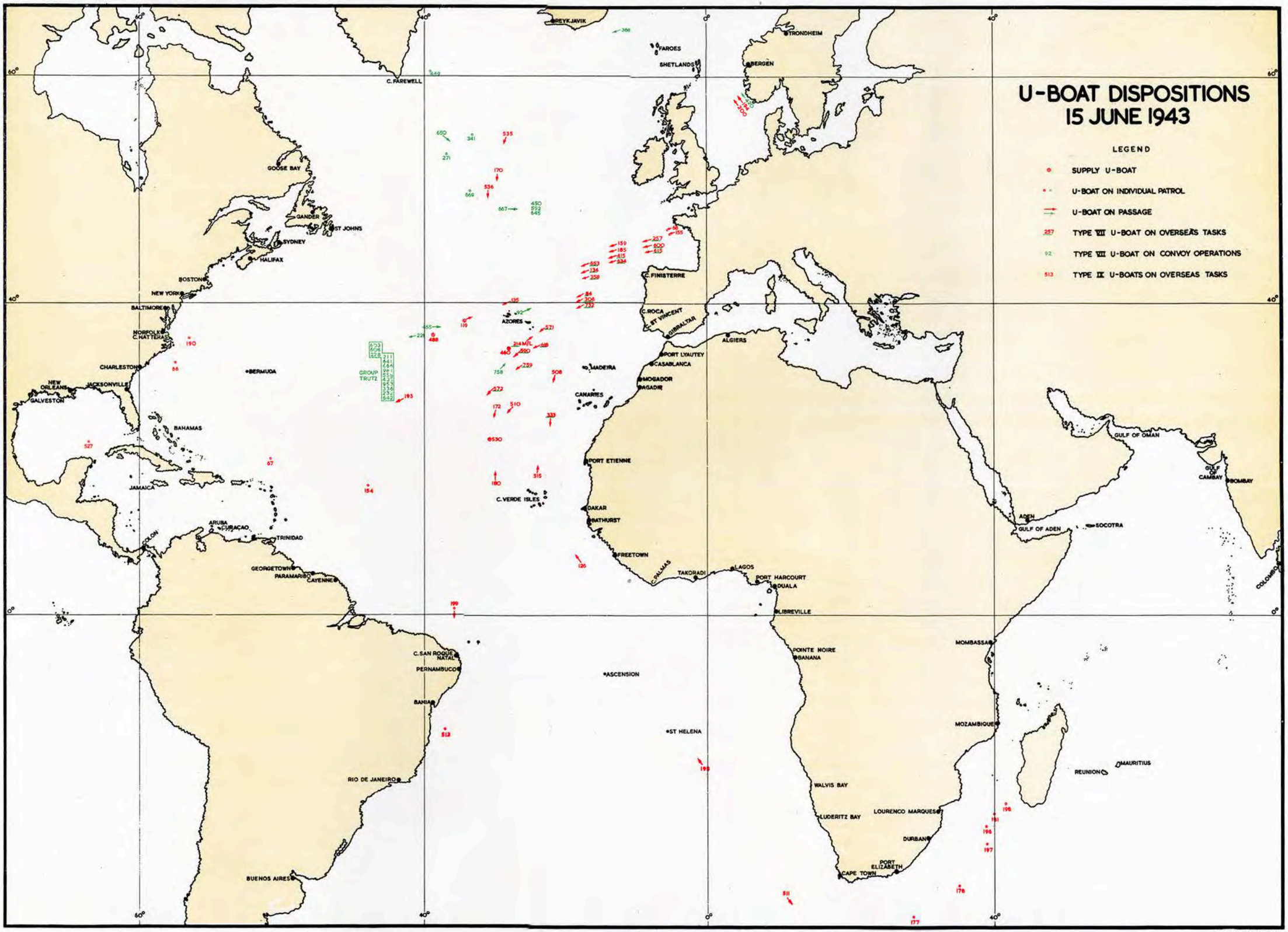


A.H.B.1 DIAG. No.930

MAP No. 21



A.H.B.I. DIAG. No. 943



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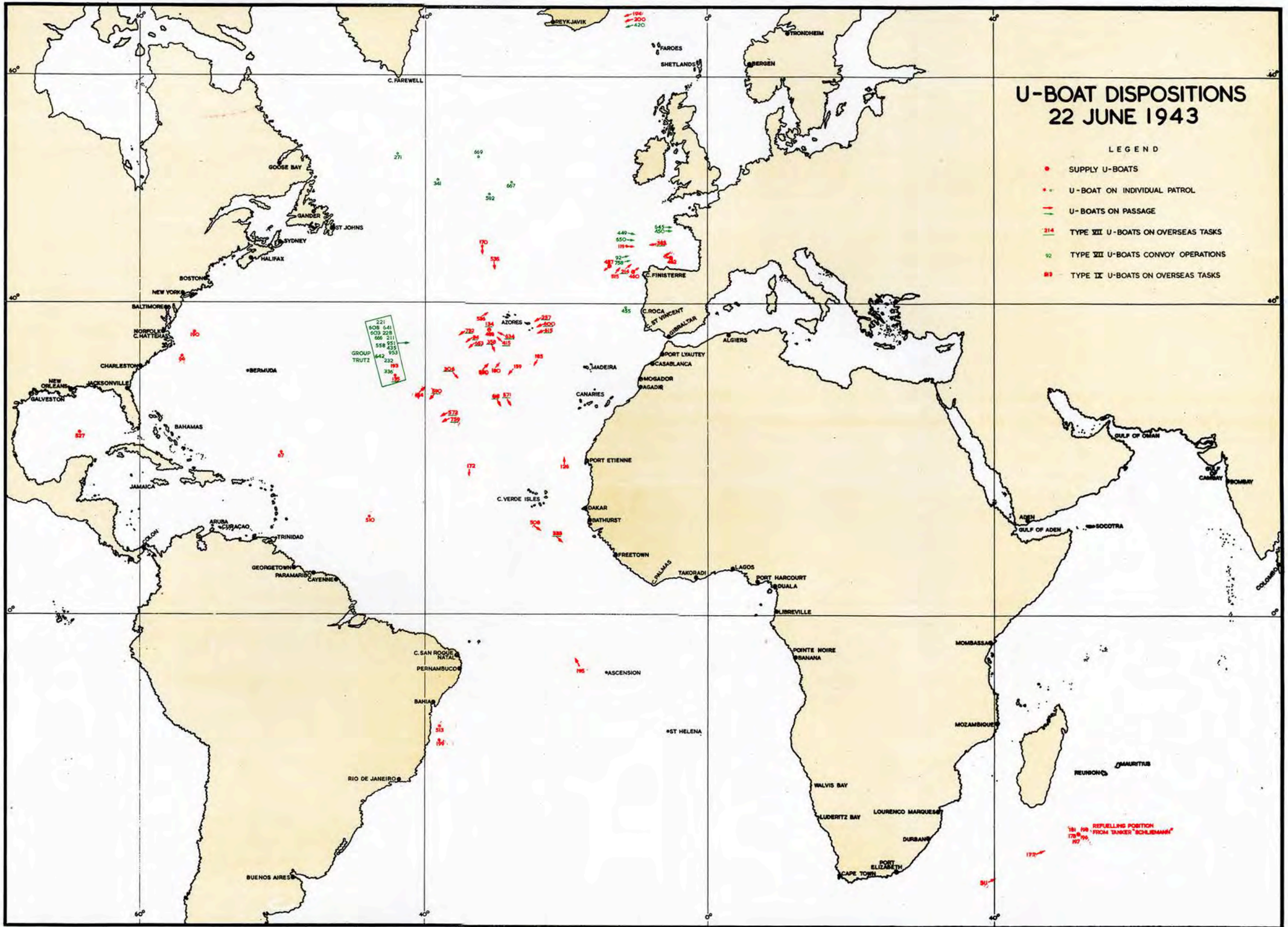

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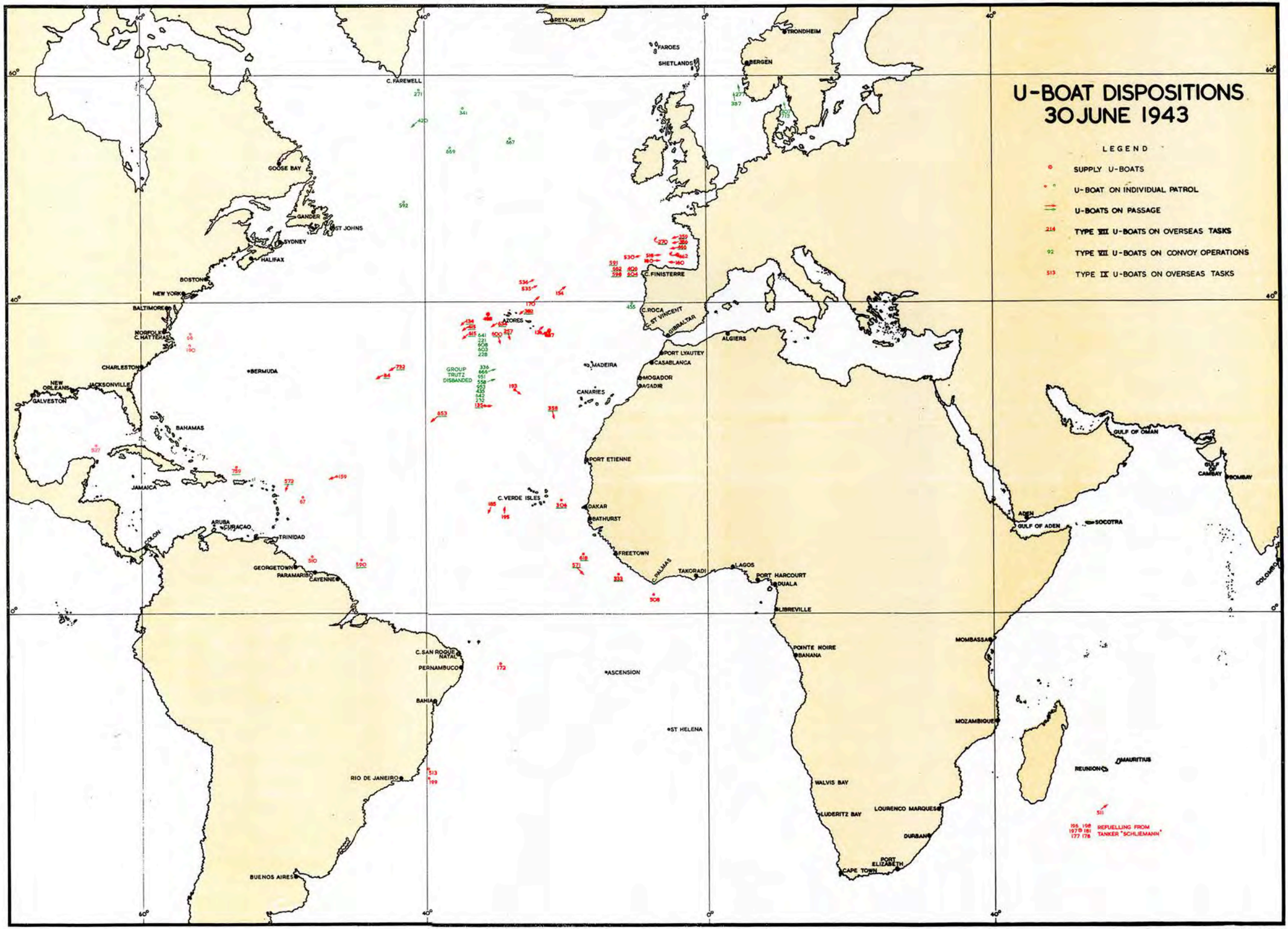
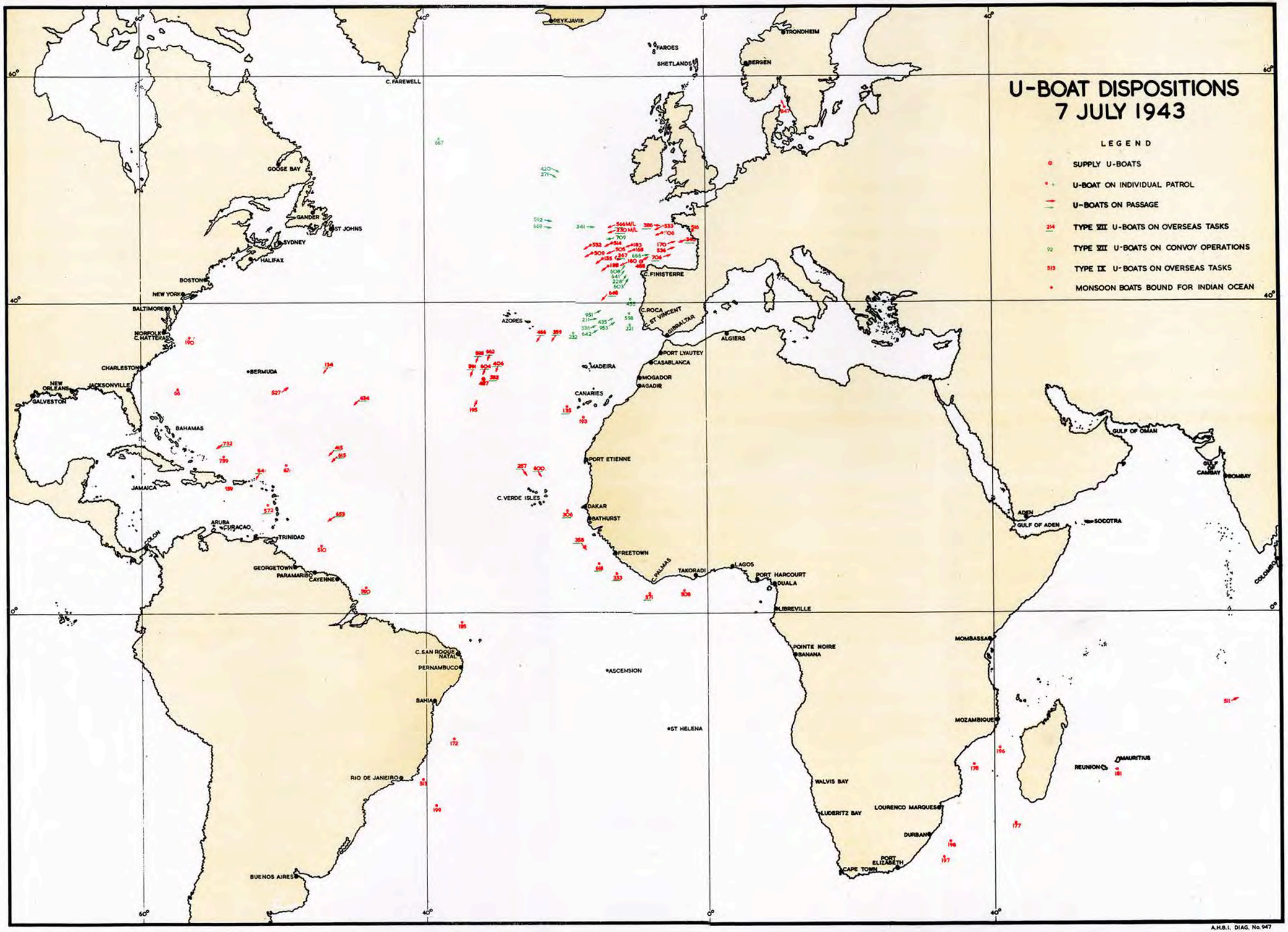
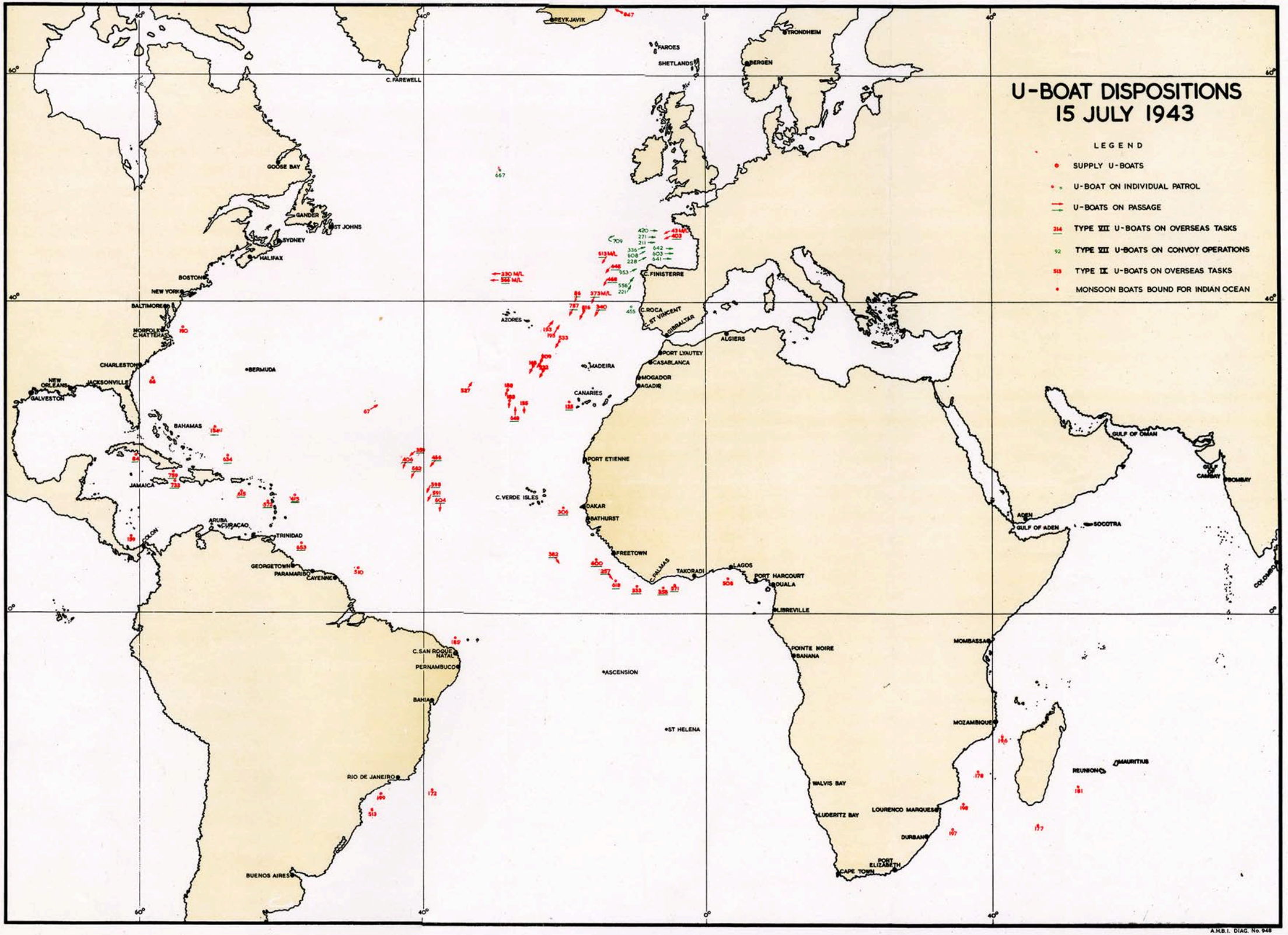
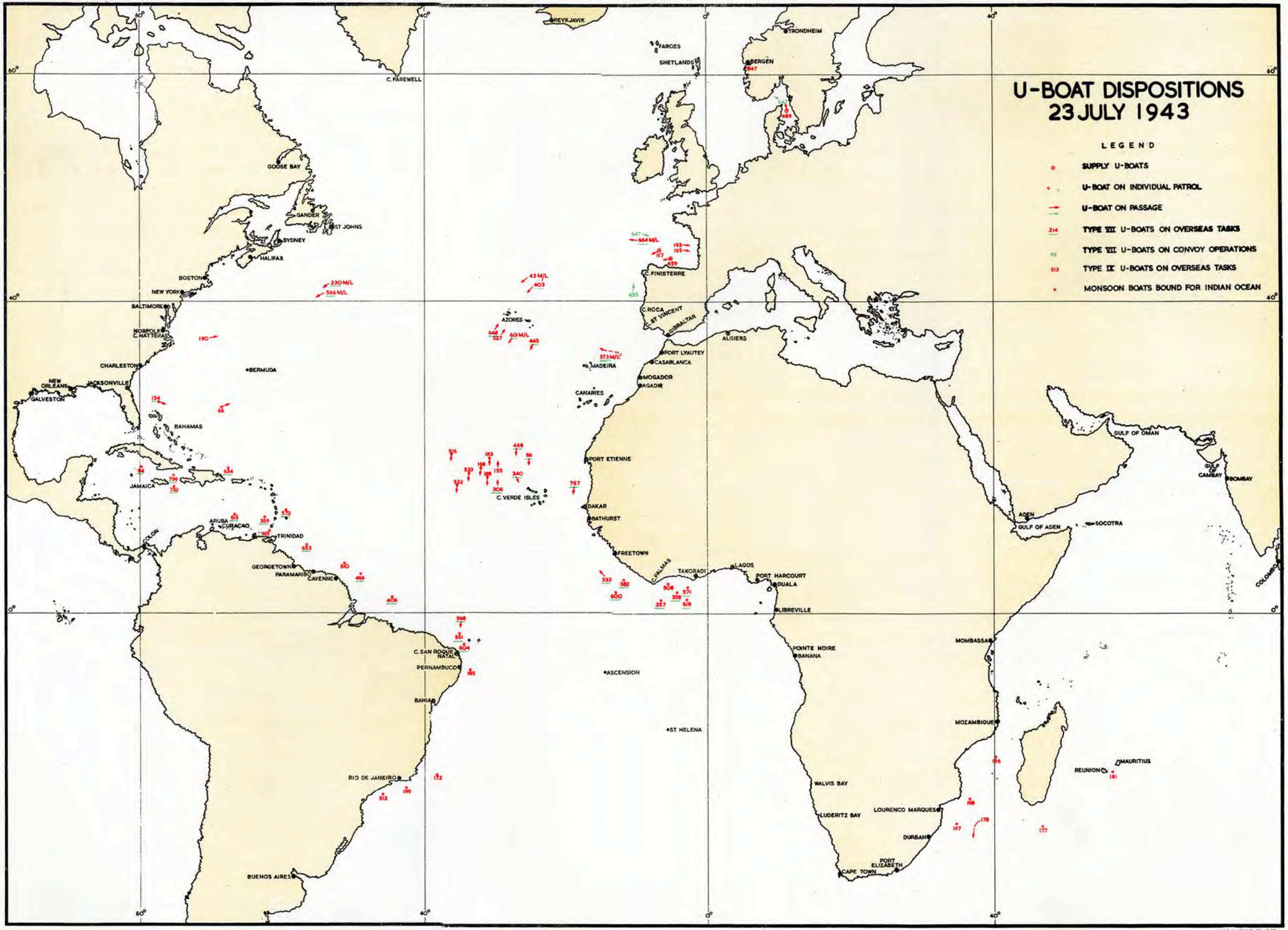
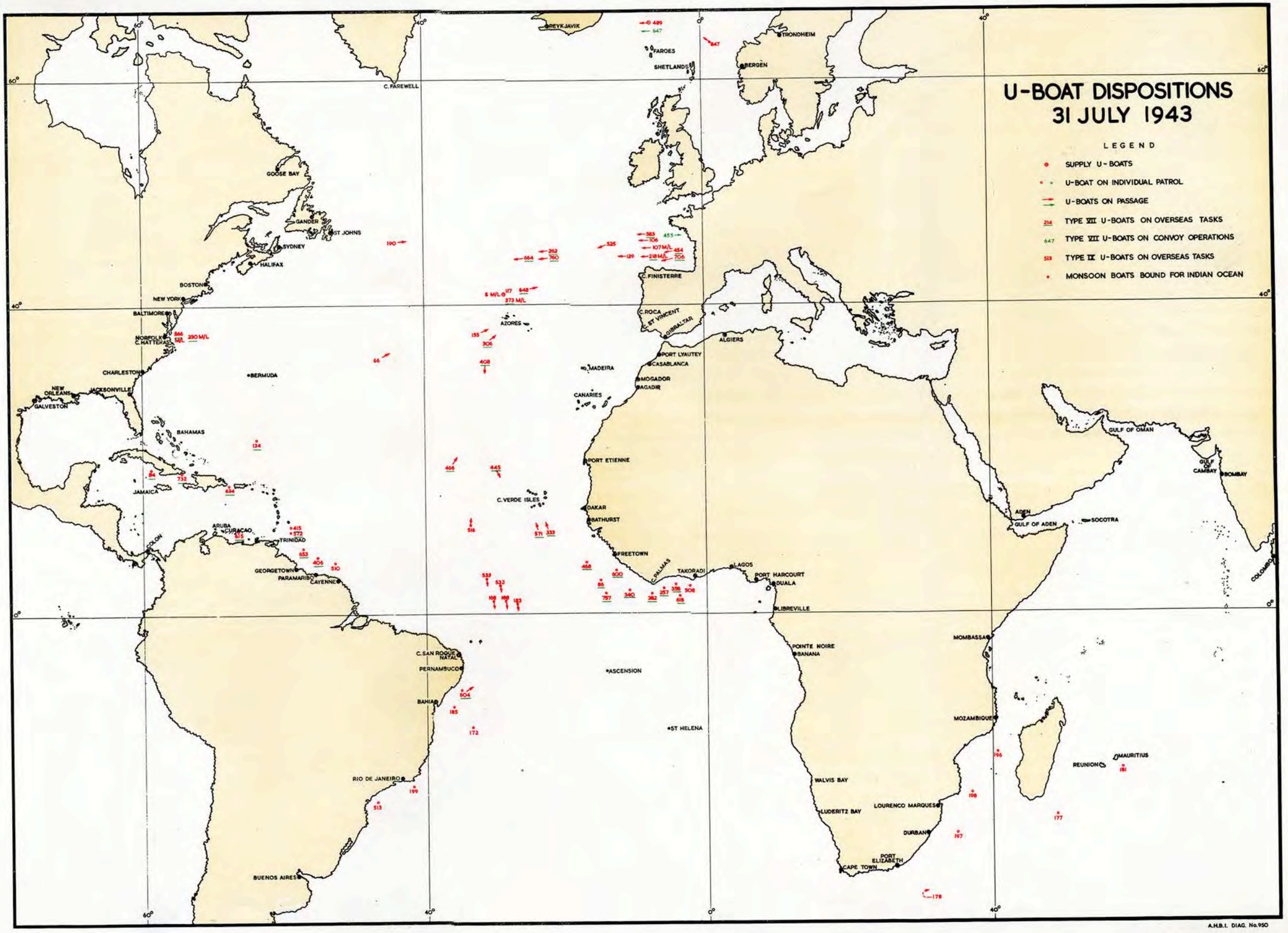

U-BOAT DISPOSITIONS
30 JUNE 1943
LEGEND
SUPPLY U-BOATS
U-BOAT ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
214 TYPE VIII U-BOATS ON OVERSEAS TASKS
92 TYPE VII U-BOATS ON CONVOY OPERATIONS
513 TYPE IX U-BOATS ON OVERSEAS TASKS
REFUELLING FROM TANKER "SCHLIEMANN"
GROUP TRUTZ DISBANDED
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
COLON
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
ASCENSION
ST HELENA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
ADEN
GULF OF ADEN
SOCOTRA
MOMBASSA
MOZAMBIQUE
REUNION
MAURITIUS
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN

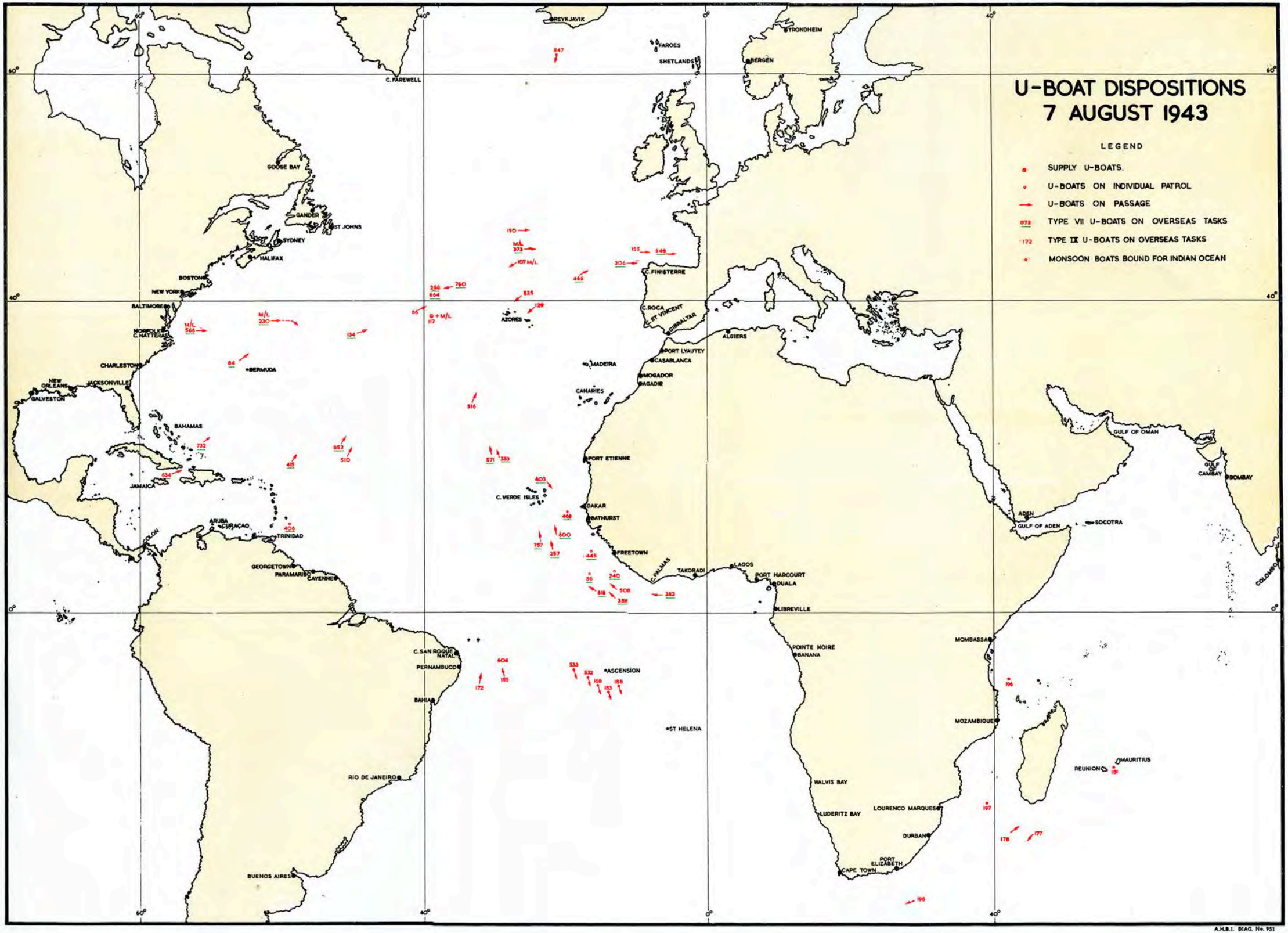

U-BOAT DISPOSITIONS
7 JULY 1943
LEGEND
SUPPLY U-BOATS
U-BOAT ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
214 TYPE VII U-BOATS ON OVERSEAS TASKS
92 TYPE VII U-BOATS ON CONVOY OPERATIONS
513 TYPE IX U-BOATS ON OVERSEAS TASKS
MONSOON BOATS BOUND FOR INDIAN OCEAN
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURACAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
CAPE TOWN
PORT ELIZABETH
DURBAN
LOURENCO MARQUES
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS
A.H.B.I. DIAG. No. 947

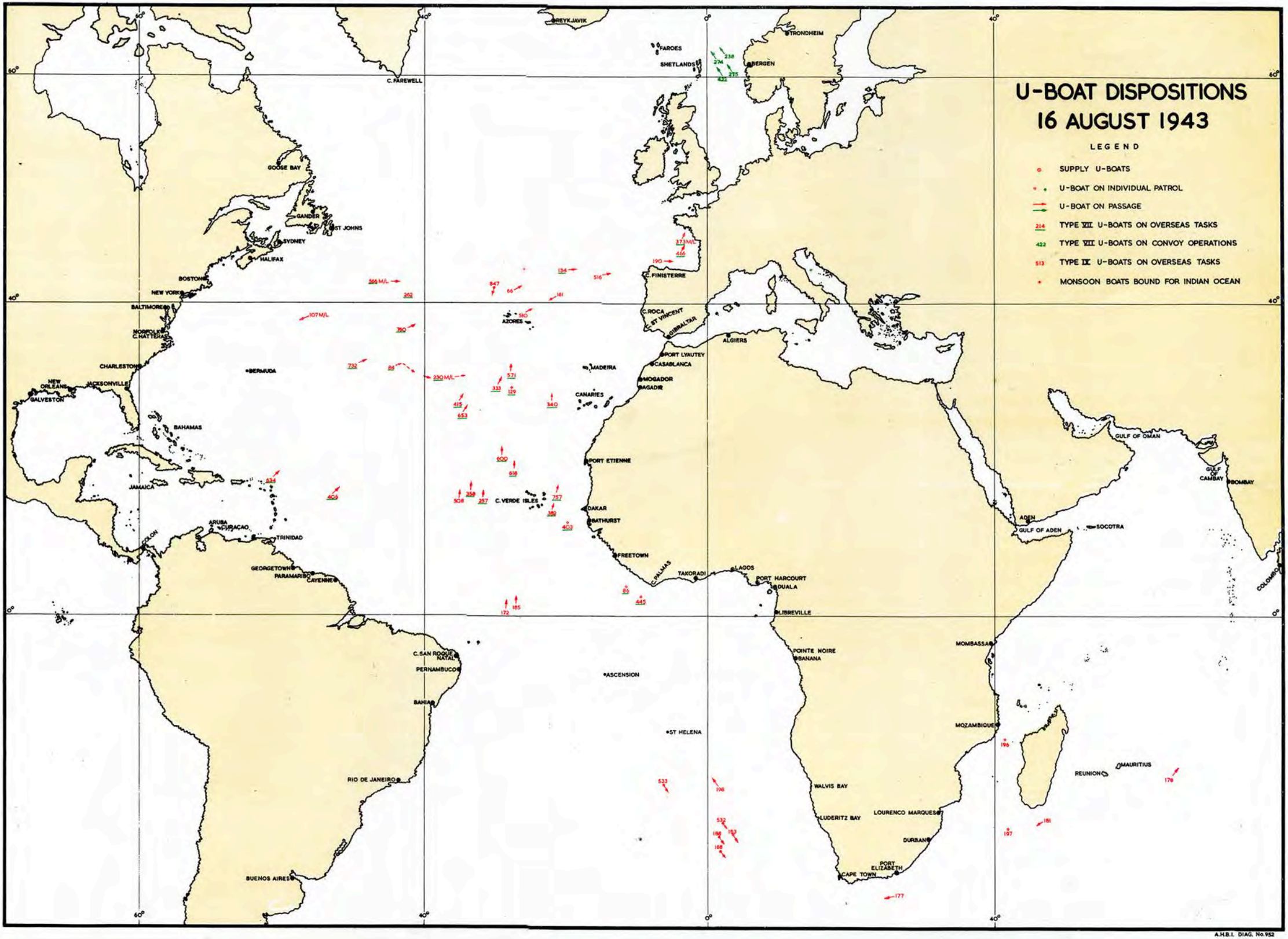

U-BOAT DISPOSITIONS
15 JULY 1943
LEGEND
SUPPLY U-BOATS
U-BOAT ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
TYPE VIII U-BOATS ON OVERSEAS TASKS
TYPE VII U-BOATS ON CONVOY OPERATIONS
TYPE IX U-BOATS ON OVERSEAS TASKS
MONSOON BOATS BOUND FOR INDIAN OCEAN
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
JACKSONVILLE
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
COLON
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
C. VERDE ISLES
PORT ETIENNE
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOMBASSA
MOZAMBIQUE
REUNION
MAURITIUS
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
BOMBAY
COLOMBO
A.H.B.I. DIAG. No. 948



A.H.B.I. DIAG. No. 949


U-BOAT DISPOSITIONS
31 JULY 1943
LEGEND
SUPPLY U-BOATS
U-BOAT ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
TYPE VII U-BOATS ON OVERSEAS TASKS
TYPE VII U-BOATS ON CONVOY OPERATIONS
TYPE IX U-BOATS ON OVERSEAS TASKS
MONSOON BOATS BOUND FOR INDIAN OCEAN
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
JACKSONVILLE
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURACAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOMBASSA
MOZAMBIQUE
REUNION
MAURITIUS
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
ADEN
GULF OF ADEN
SOCOTRA
COLOMBO
A.H.B.I. DIAG. No. 950


U-BOAT DISPOSITIONS
7 AUGUST 1943
LEGEND
SUPPLY U-BOATS.
U-BOATS ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
873 TYPE VII U-BOATS ON OVERSEAS TASKS
172 TYPE IX U-BOATS ON OVERSEAS TASKS
MONSOON BOATS BOUND FOR INDIAN OCEAN
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
AZORES
C. FINISTERRE
C. ROCA
ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
ASCENSION
ST HELENA
RIO DE JANEIRO
BUENOS AIRES
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS
A.H.B.I. DIAG. No. 951



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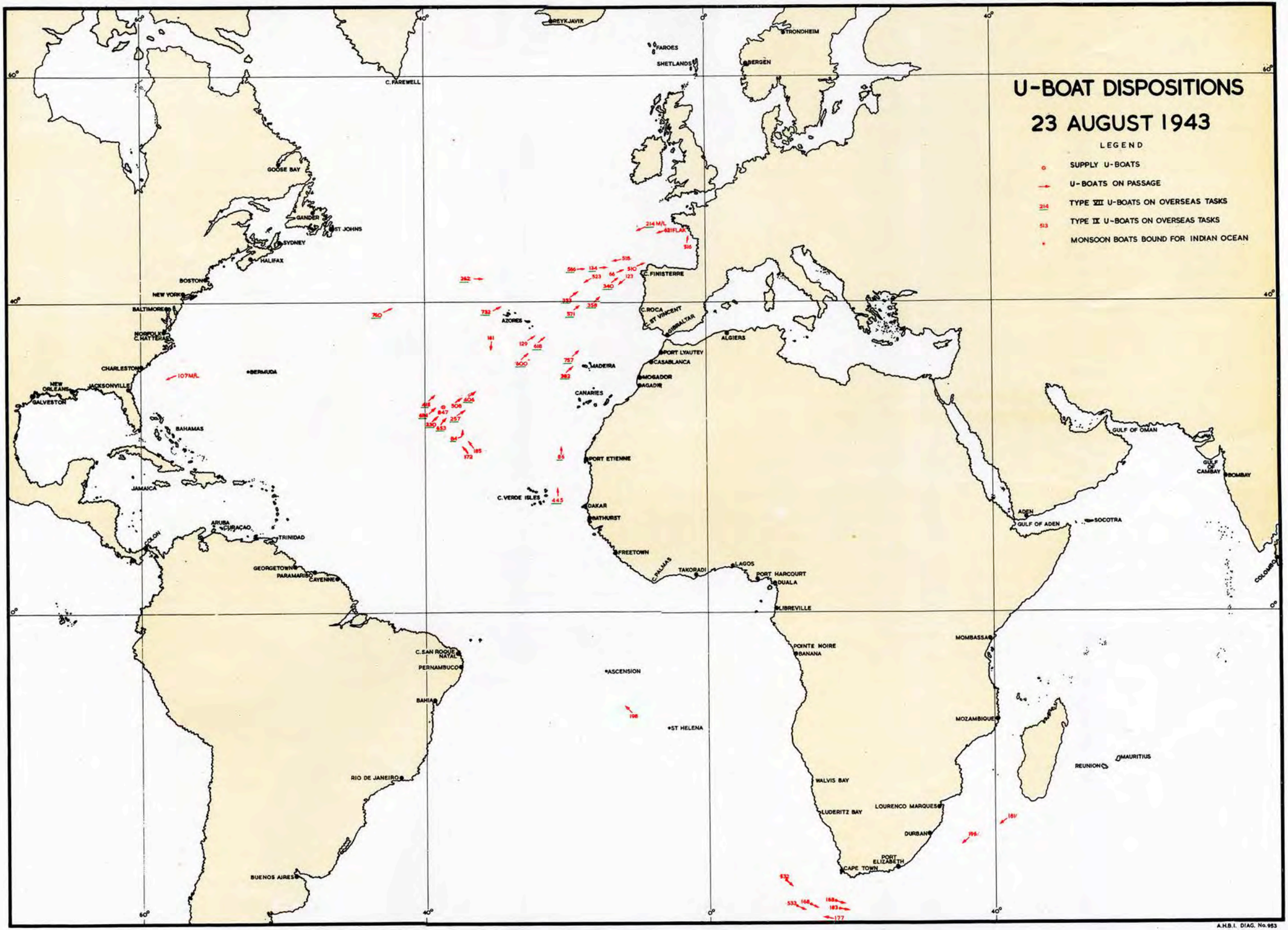
MAP No. U.23



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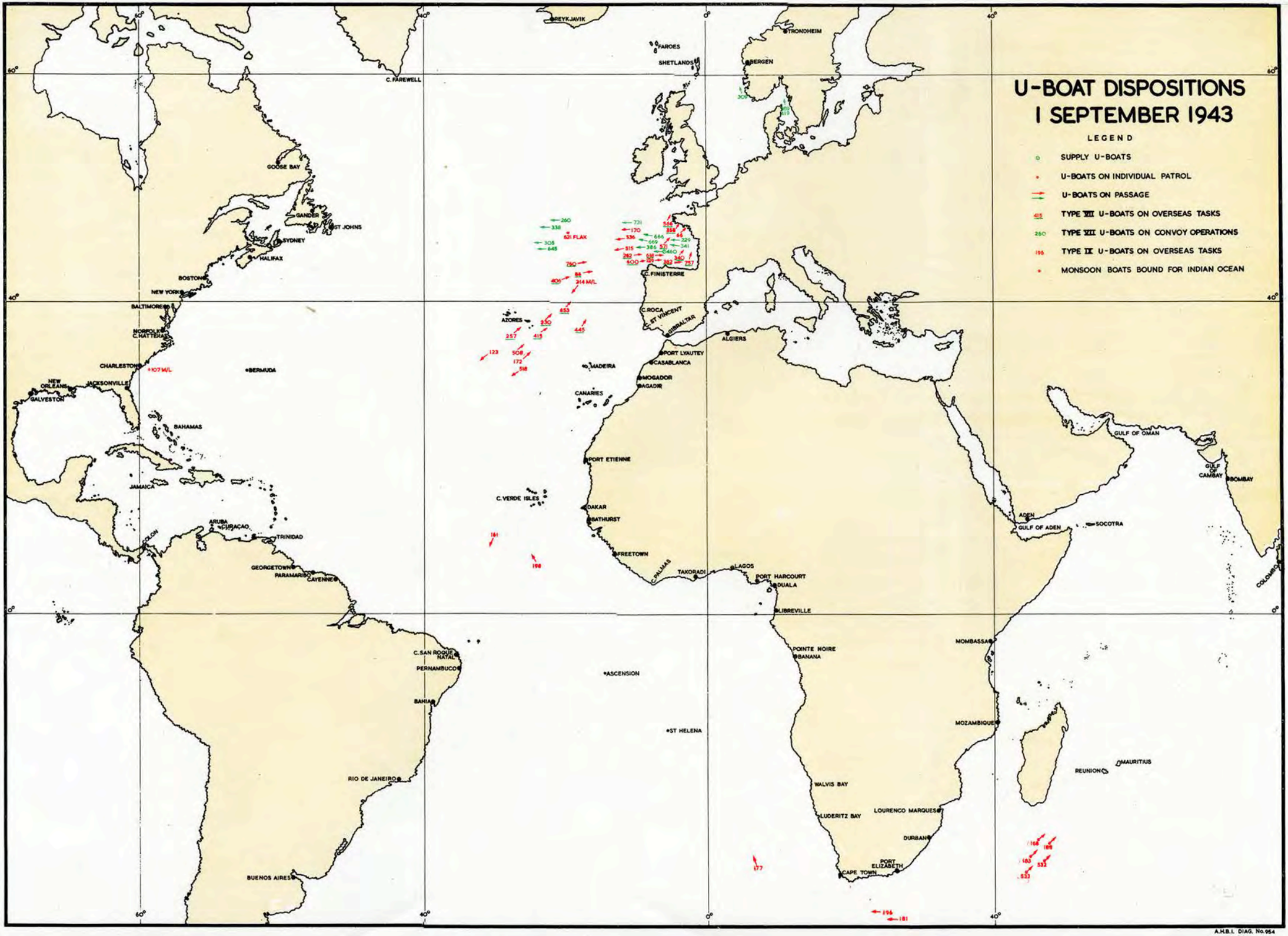

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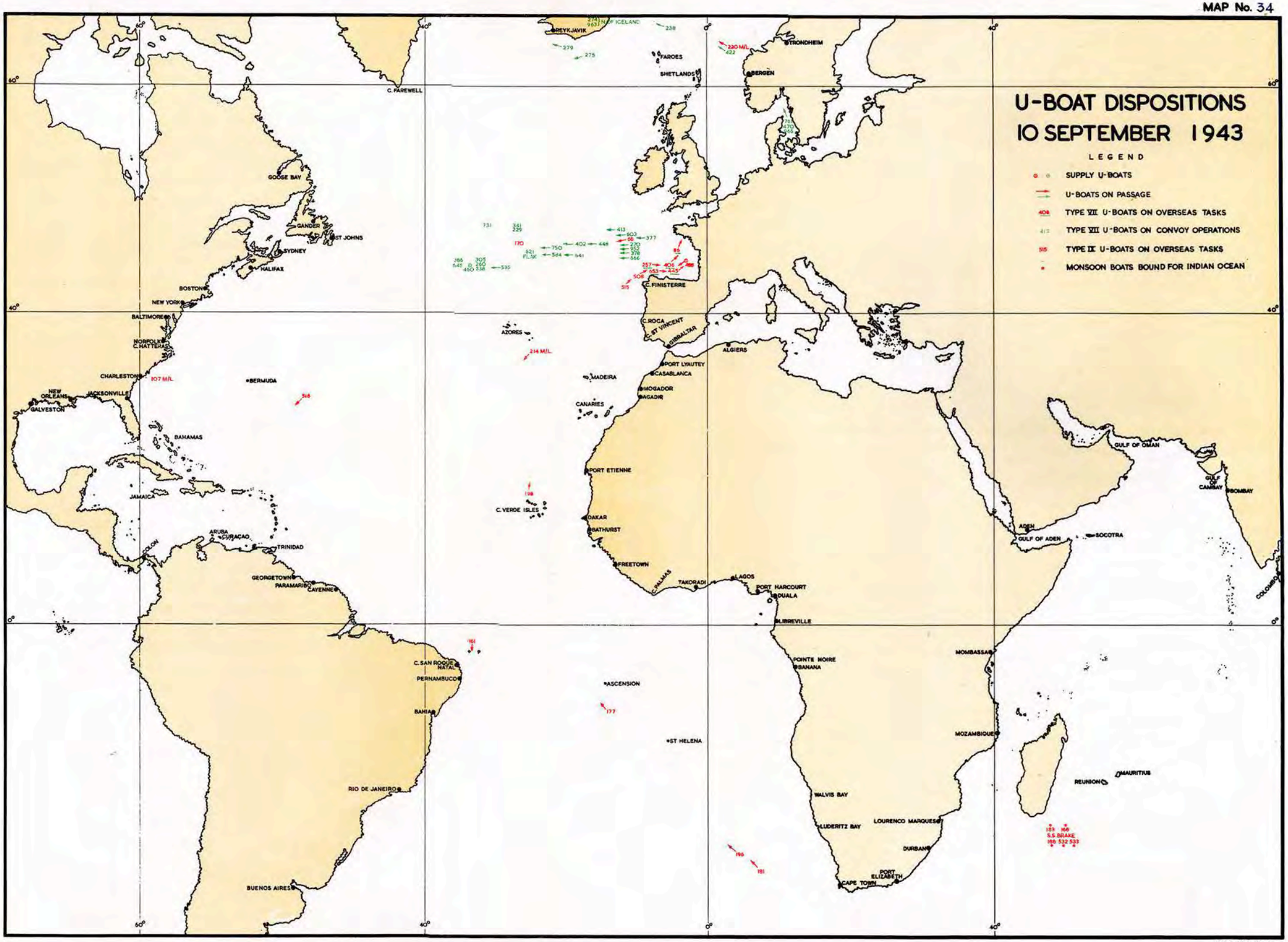
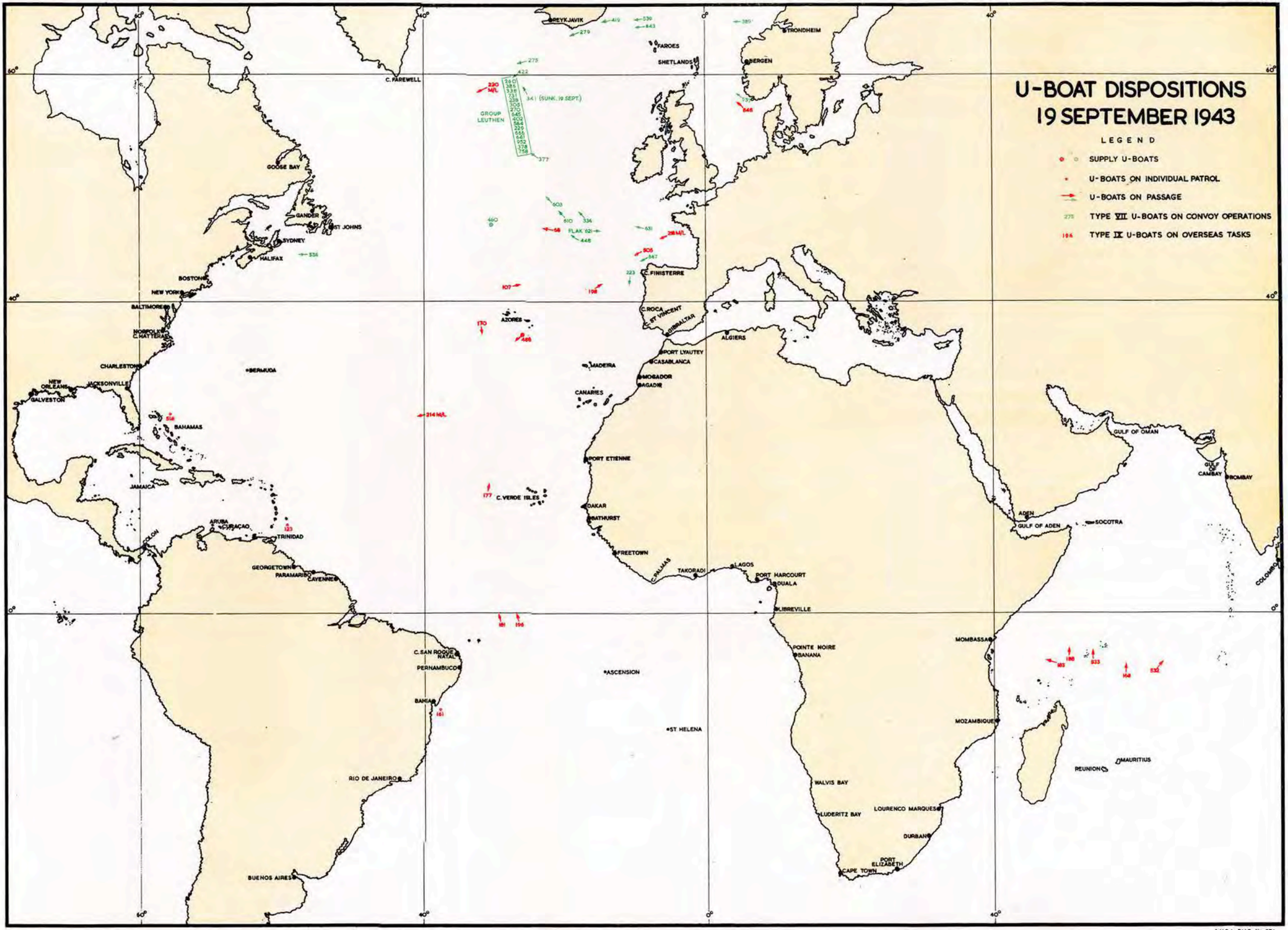
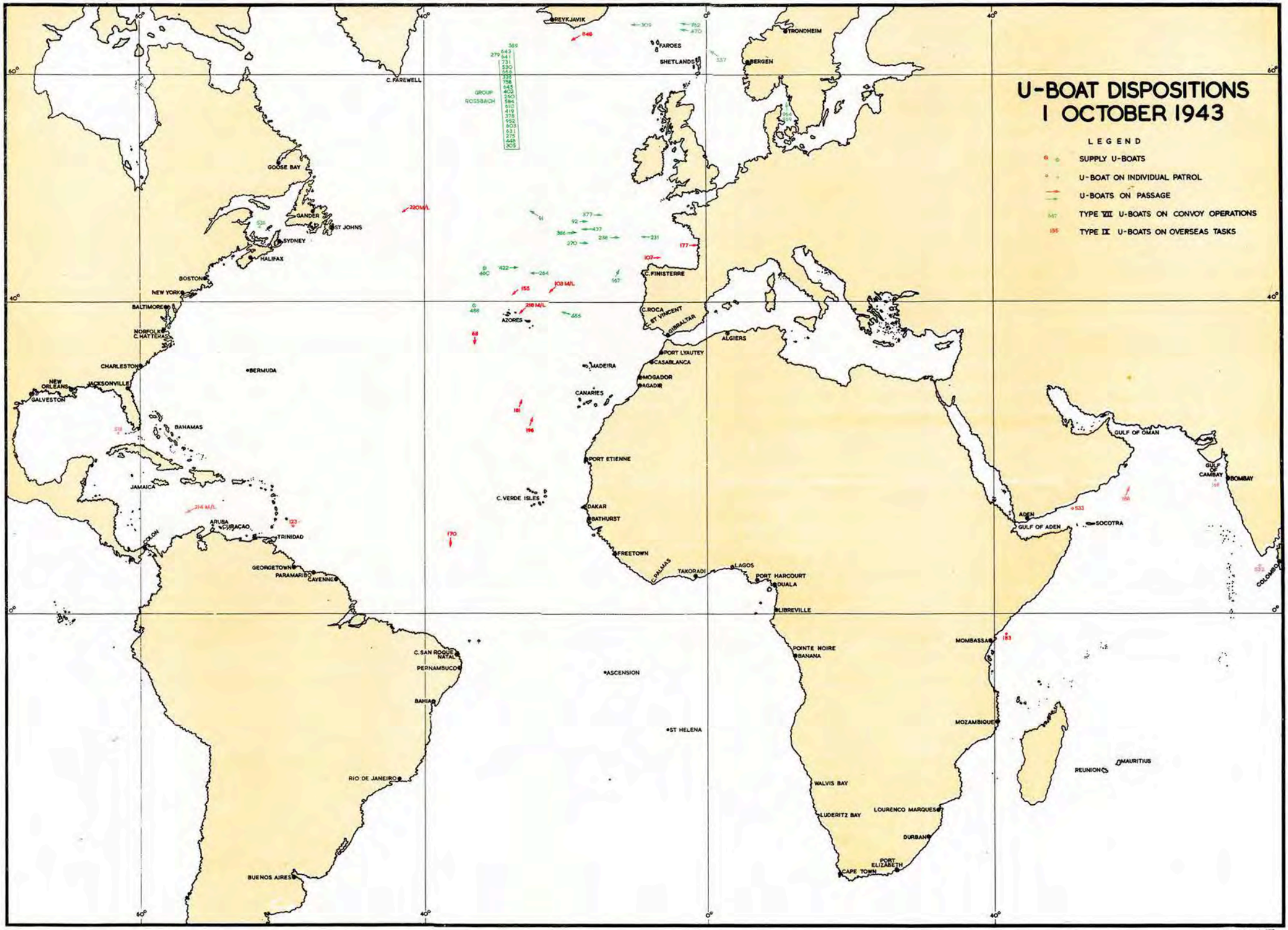
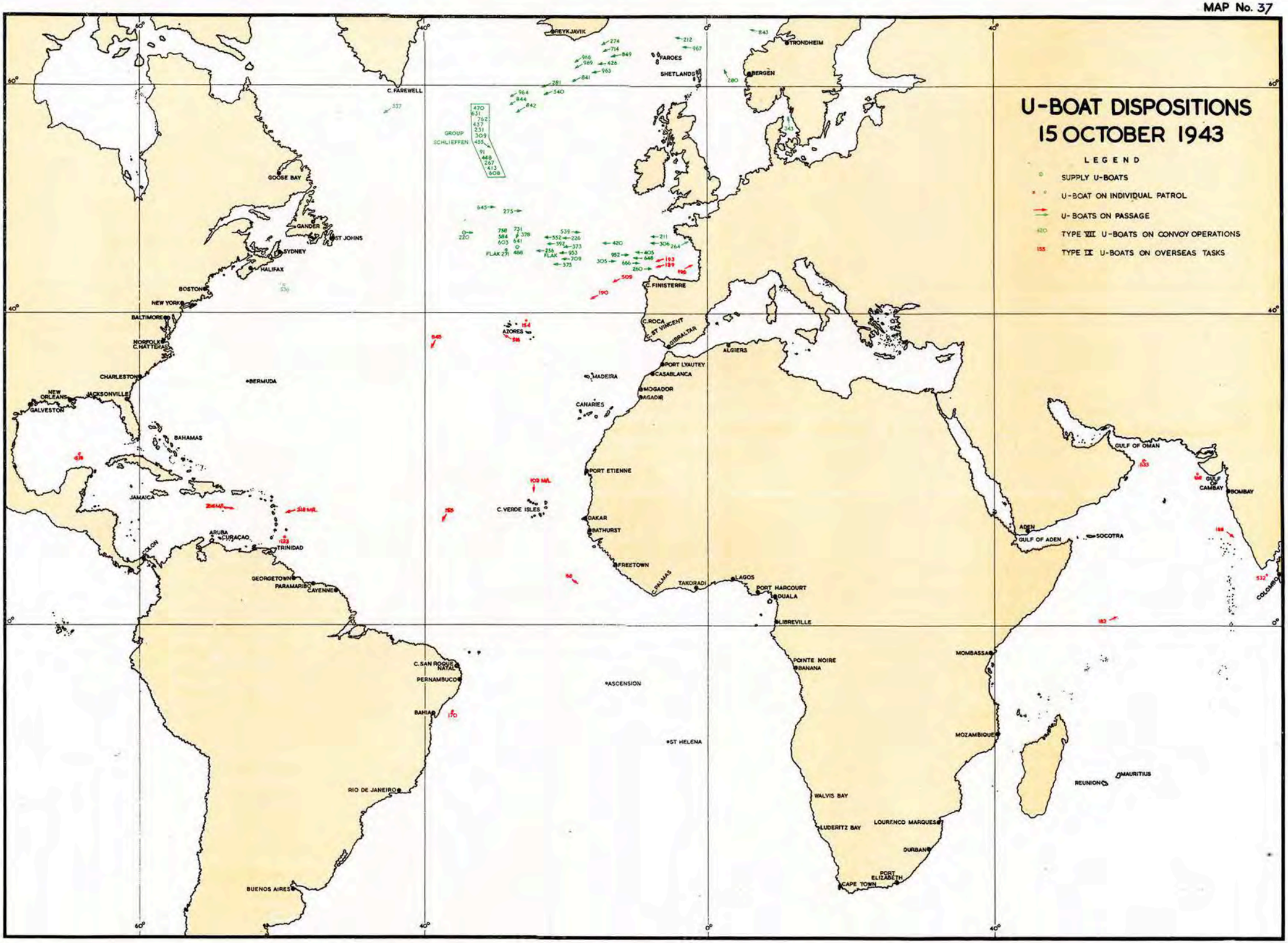
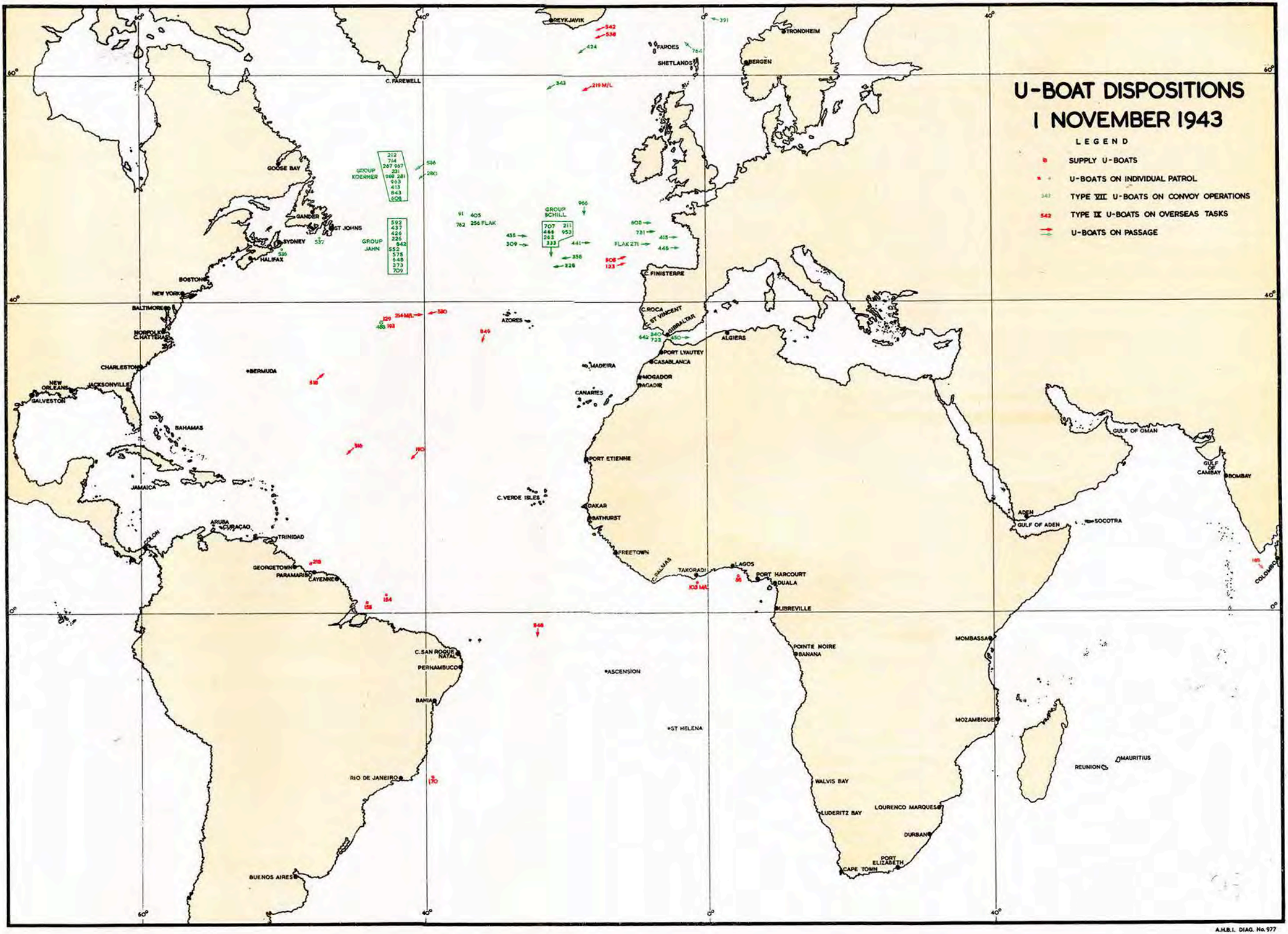

U-BOAT DISPOSITIONS
10 SEPTEMBER 1943
LEGEND
SUPPLY U-BOATS
U-BOATS ON PASSAGE
TYPE VII U-BOATS ON OVERSEAS TASKS
TYPE VII U-BOATS ON CONVOY OPERATIONS
TYPE IX U-BOATS ON OVERSEAS TASKS
MONSOON BOATS BOUND FOR INDIAN OCEAN
REYKJAVIK
N.W. OF ICELAND
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURACAO
COLON
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
C. VERDE ISLES
PORT ETIENNE
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
CAPE TOWN
PORT ELIZABETH
DURBAN
LOURENCO MARQUES
MOZAMBIQUE
MOMBASSA
REUNION
MAURITIUS
S.S. BRAKE
GULF OF ADEN
ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO

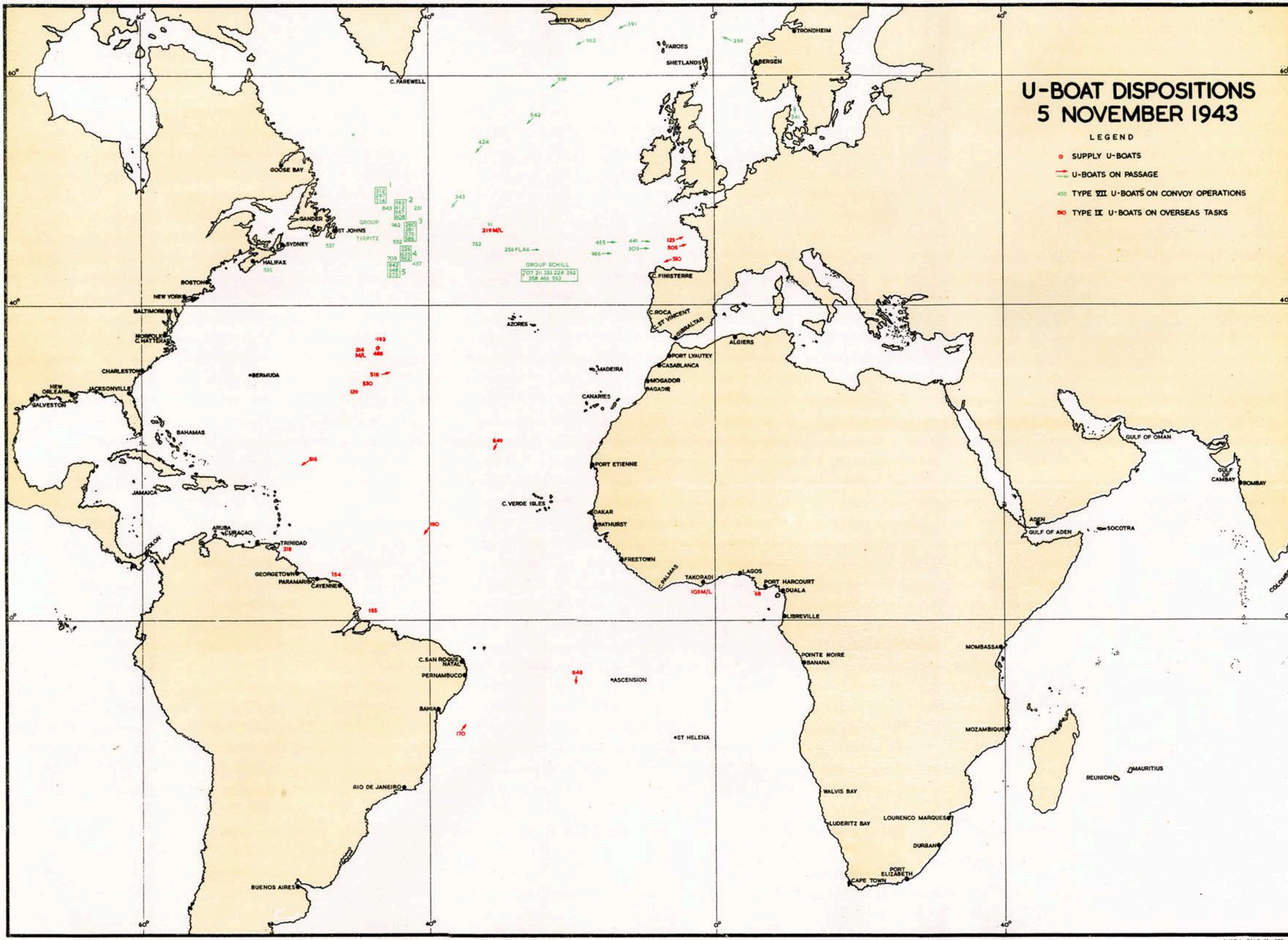

U-BOAT DISPOSITIONS
19 SEPTEMBER 1943
LEGEND
SUPPLY U-BOATS
U-BOATS ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
TYPE VII U-BOATS ON CONVOY OPERATIONS
TYPE IX U-BOATS ON OVERSEAS TASKS
GROUP LEUTHEN
341 (SUNK, 19 SEPT.)
FLAK 621
214 M/L
220 M/L
298 M/L
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
JACKSONVILLE
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
ASCENSION
ST HELENA
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
AZORES
C. FINISTERRE
C. ROCA
ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
C. VERDE ISLES
PORT ETIENNE
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
WALVIS BAY
LUDERITZ BAY
CAPE TOWN
PORT ELIZABETH
DURBAN
LOURENCO MARQUES
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS

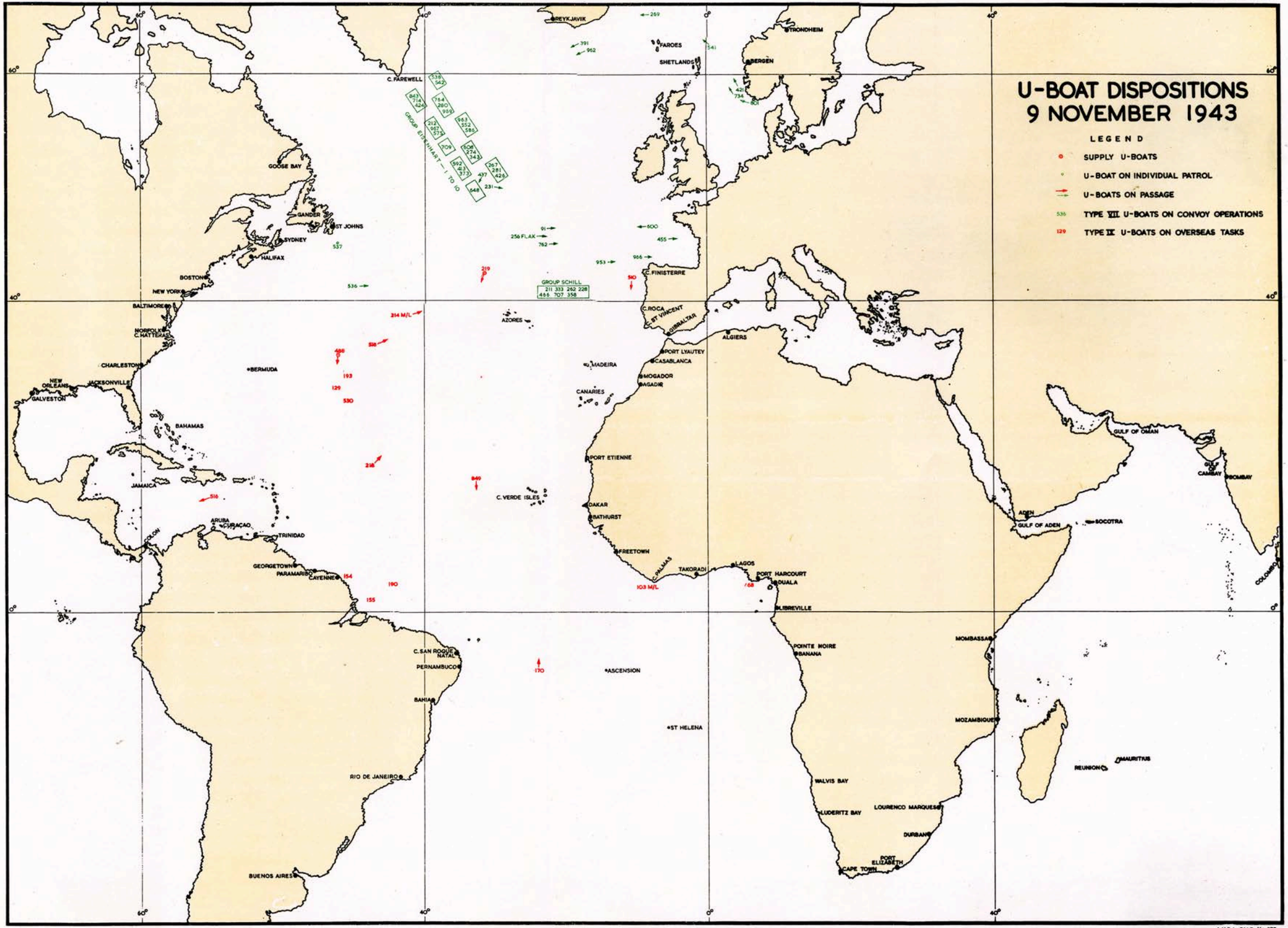

U-BOAT DISPOSITIONS
1 OCTOBER 1943
LEGEND
SUPPLY U-BOATS
U-BOAT ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
TYPE VII U-BOATS ON CONVOY OPERATIONS
TYPE IX U-BOATS ON OVERSEAS TASKS
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GROUP ROSSBACH
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
AZORES
C. FINISTERRE
C. ROCA
ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
WALVIS BAY
LUDERITZ BAY
CAPE TOWN
PORT ELIZABETH
DURBAN
LOURENCO MARQUES
MOZAMBIQUE
MOMBASSA
REUNION
MAURITIUS
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO

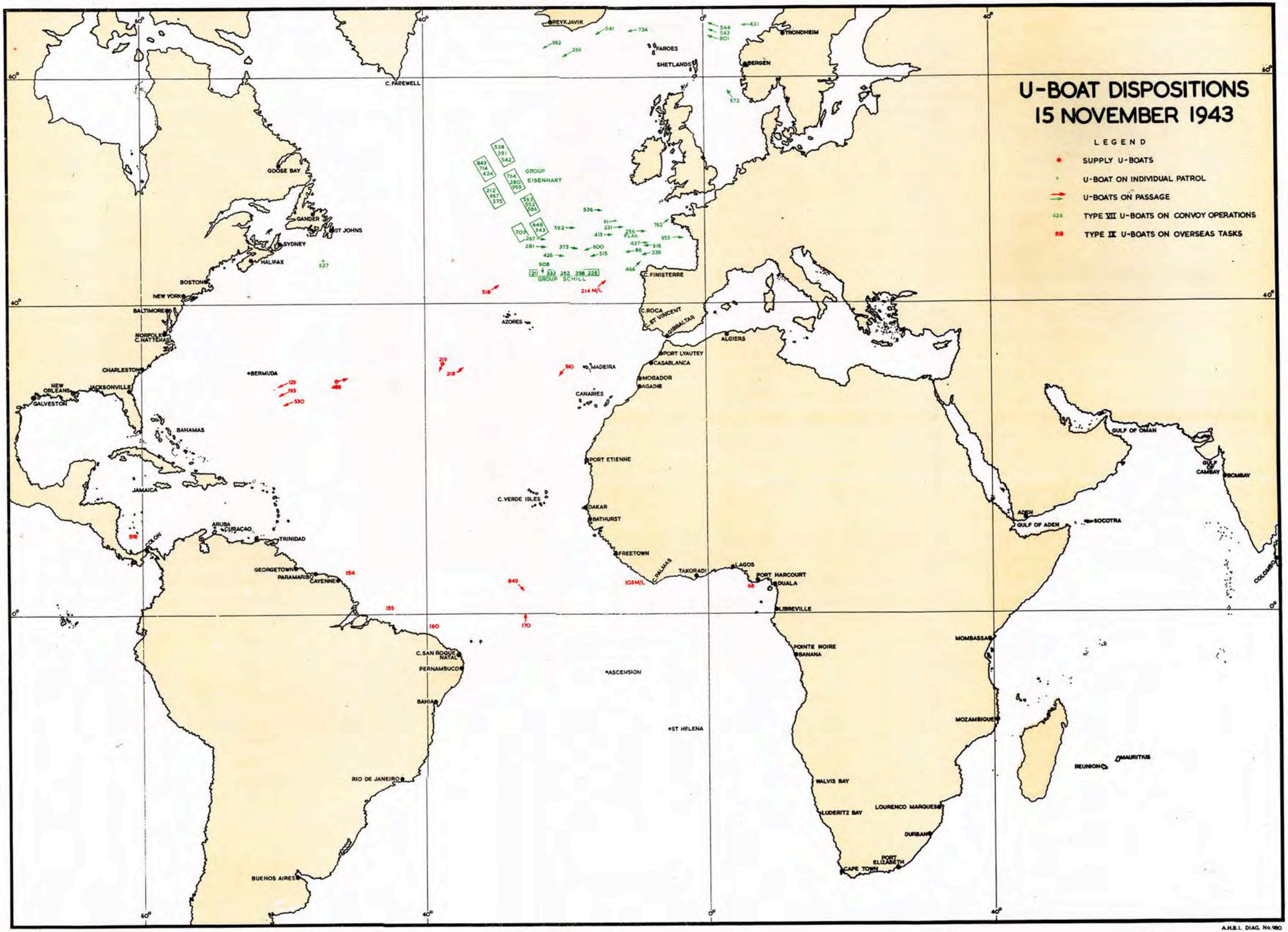

U-BOAT DISPOSITIONS
15 OCTOBER 1943
LEGEND
SUPPLY U-BOATS
U-BOAT ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
420 TYPE VII U-BOATS ON CONVOY OPERATIONS
155 TYPE IX U-BOATS ON OVERSEAS TASKS
GROUP SCHLIEFFEN
420 631 752 437 231 309 455 91 448 267 413 608
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
JACKSONVILLE
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
ASCENSION
ST HELENA
RIO DE JANEIRO
BUENOS AIRES
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS

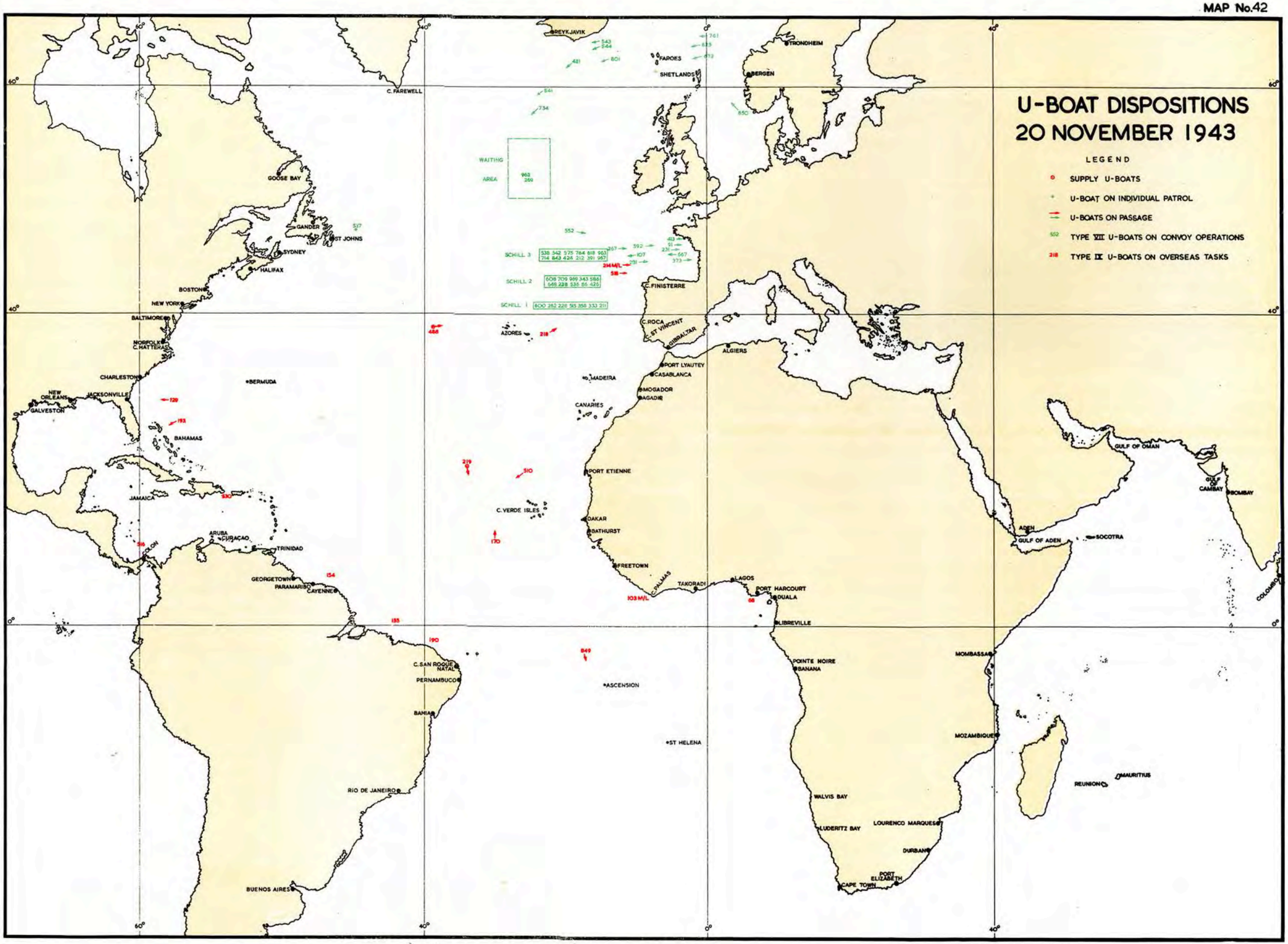

U-BOAT DISPOSITIONS
1 NOVEMBER 1943
LEGEND
SUPPLY U-BOATS
U-BOATS ON INDIVIDUAL PATROL
TYPE VII U-BOATS ON CONVOY OPERATIONS
TYPE IX U-BOATS ON OVERSEAS TASKS
U-BOATS ON PASSAGE
GROUP KOERNER
212 714 267 967 231 969 281 903 413 843 608
GROUP JAHN
592 437 426 226 842 552 575 648 373 709
GROUP SCHILL
707 211 466 953 262 333
FLAK 271
256 FLAK
GREYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
JACKSONVILLE
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURACAO
COLON
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
C. VERDE ISLES
PORT ETIENNE
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
GULF OF OMAN
ADEN
GULF OF ADEN
SOCOTRA
BOMBAY
COLOMBO
MOMBASSA
MOZAMBIQUE
MAURITIUS
REUNION
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN

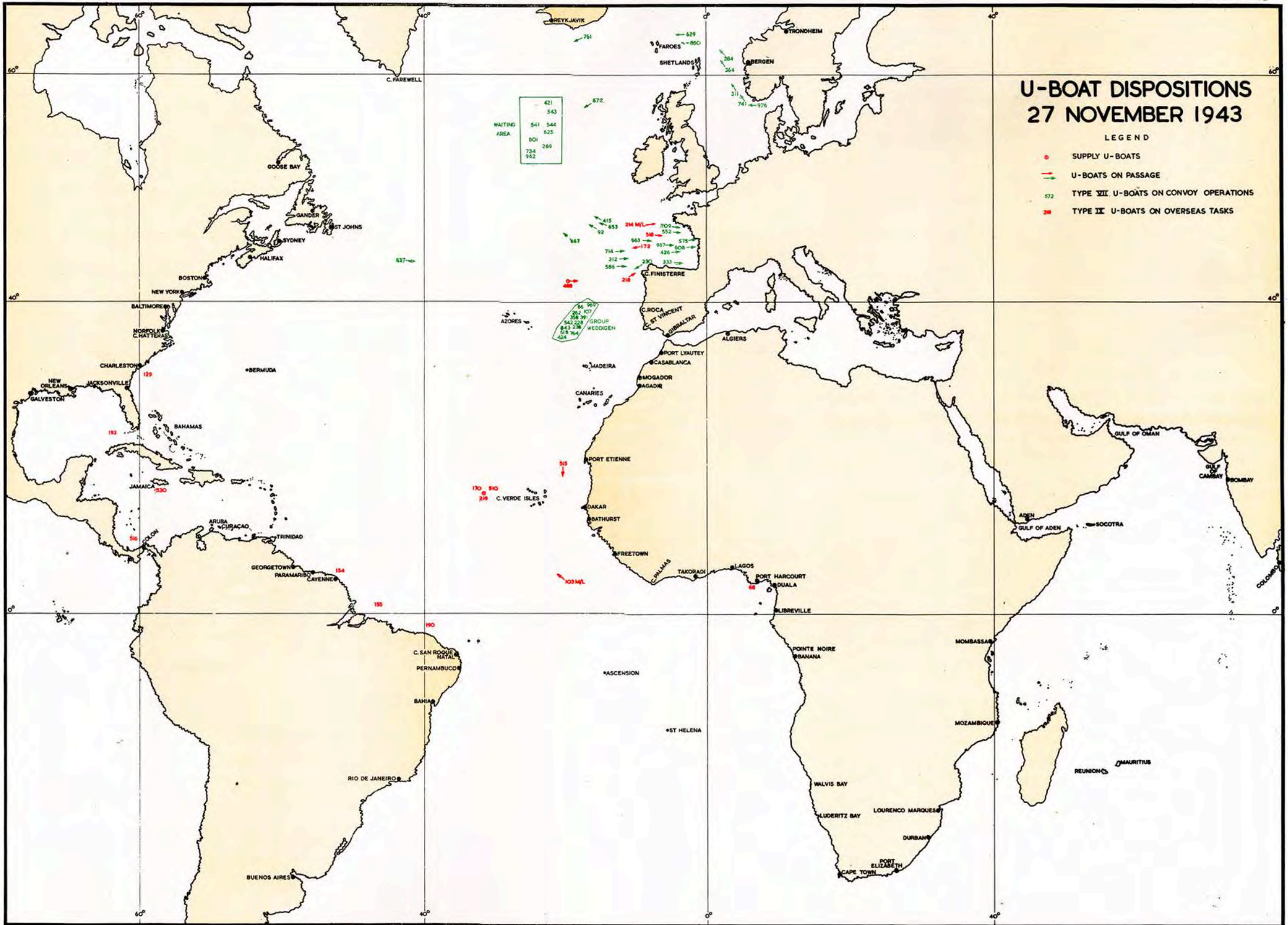
U-BOAT DISPOSITIONS 5 NOVEMBER 1943

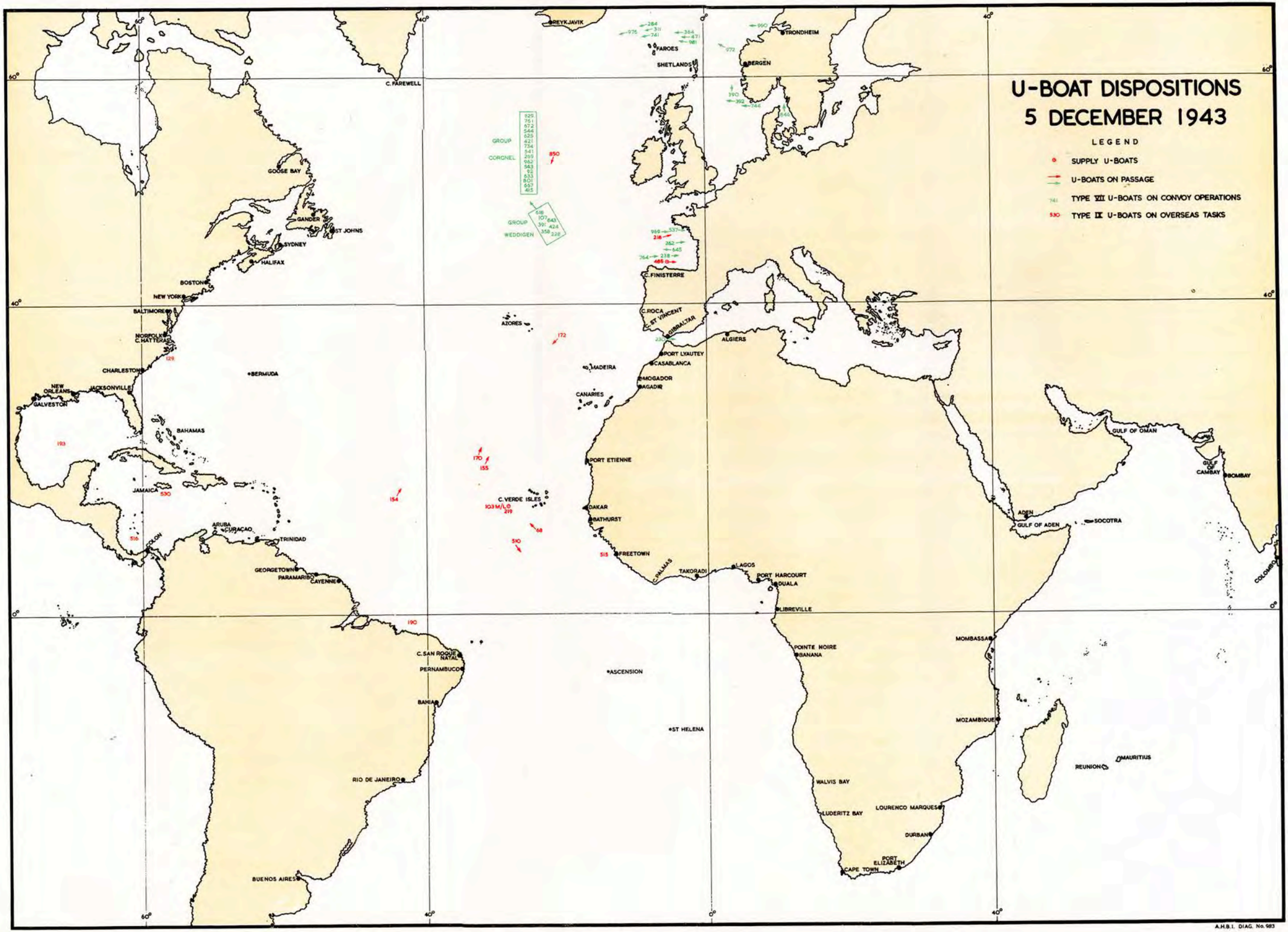


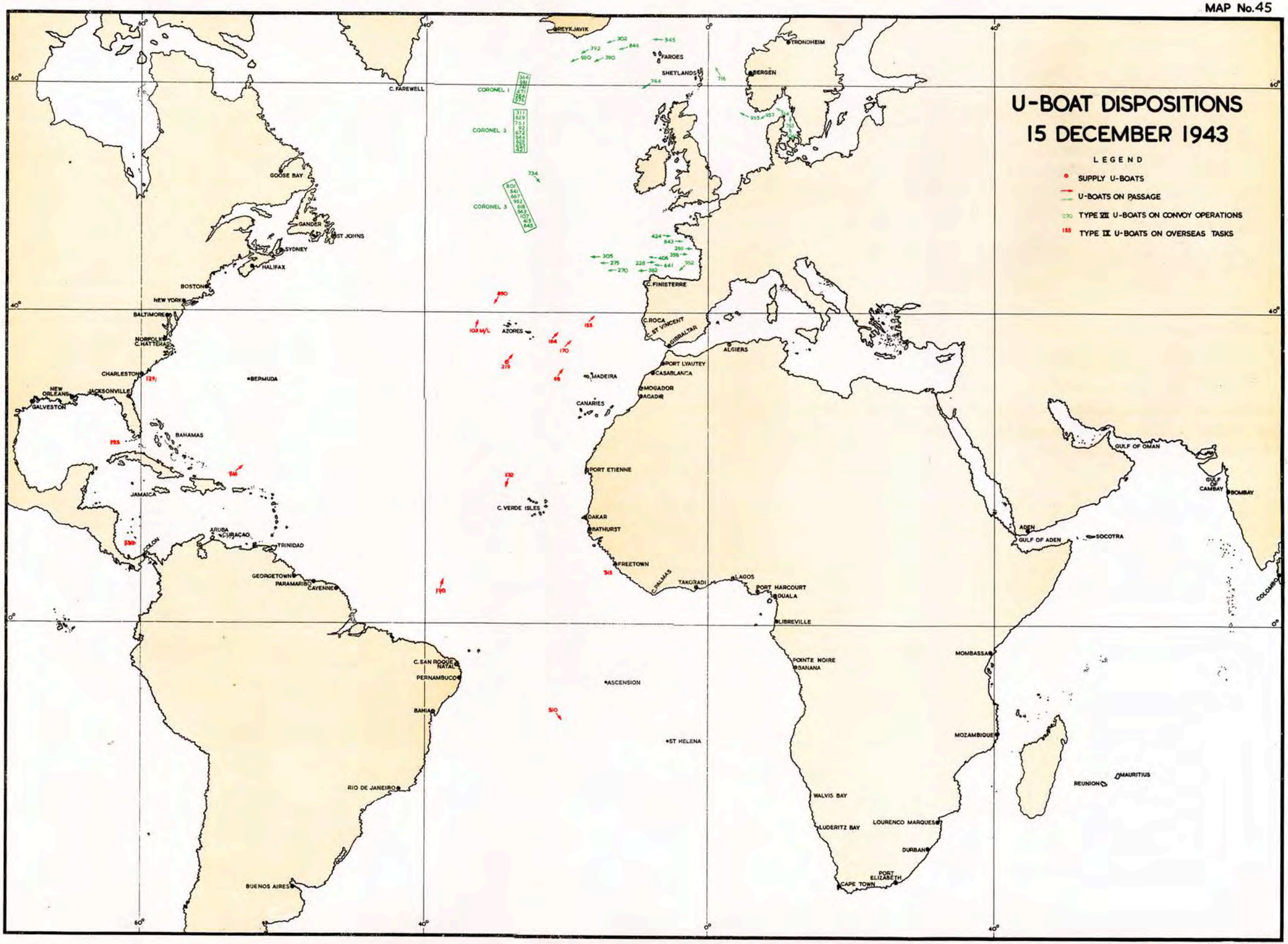

U-BOAT DISPOSITIONS
9 NOVEMBER 1943
LEGEND
SUPPLY U-BOATS
U-BOAT ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
TYPE VII U-BOATS ON CONVOY OPERATIONS
TYPE IX U-BOATS ON OVERSEAS TASKS
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GROUP EISENHART – 1 TO 10
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURACAO
COLON
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
ASCENSION
ST HELENA
GROUP SCHILL
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF CAMBAY
BOMBAY
COLOMBO
MAURITIUS
REUNION

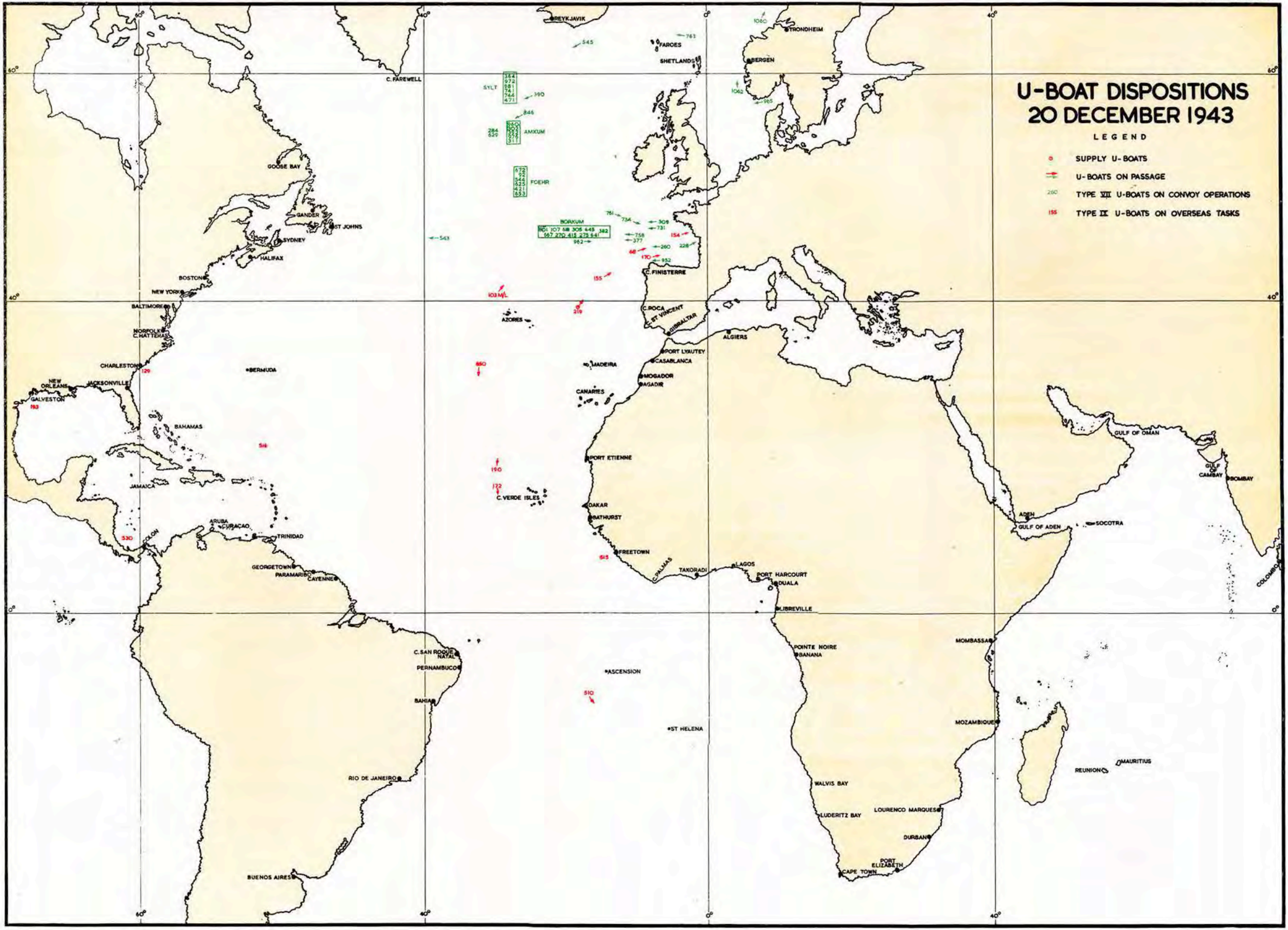

U-BOAT DISPOSITIONS
15 NOVEMBER 1943
LEGEND
SUPPLY U-BOATS
U-BOAT ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
426 TYPE VII U-BOATS ON CONVOY OPERATIONS
518 TYPE IX U-BOATS ON OVERSEAS TASKS
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
GROUP EISENHART
GROUP SCHILL
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
MAURITIUS
REUNION

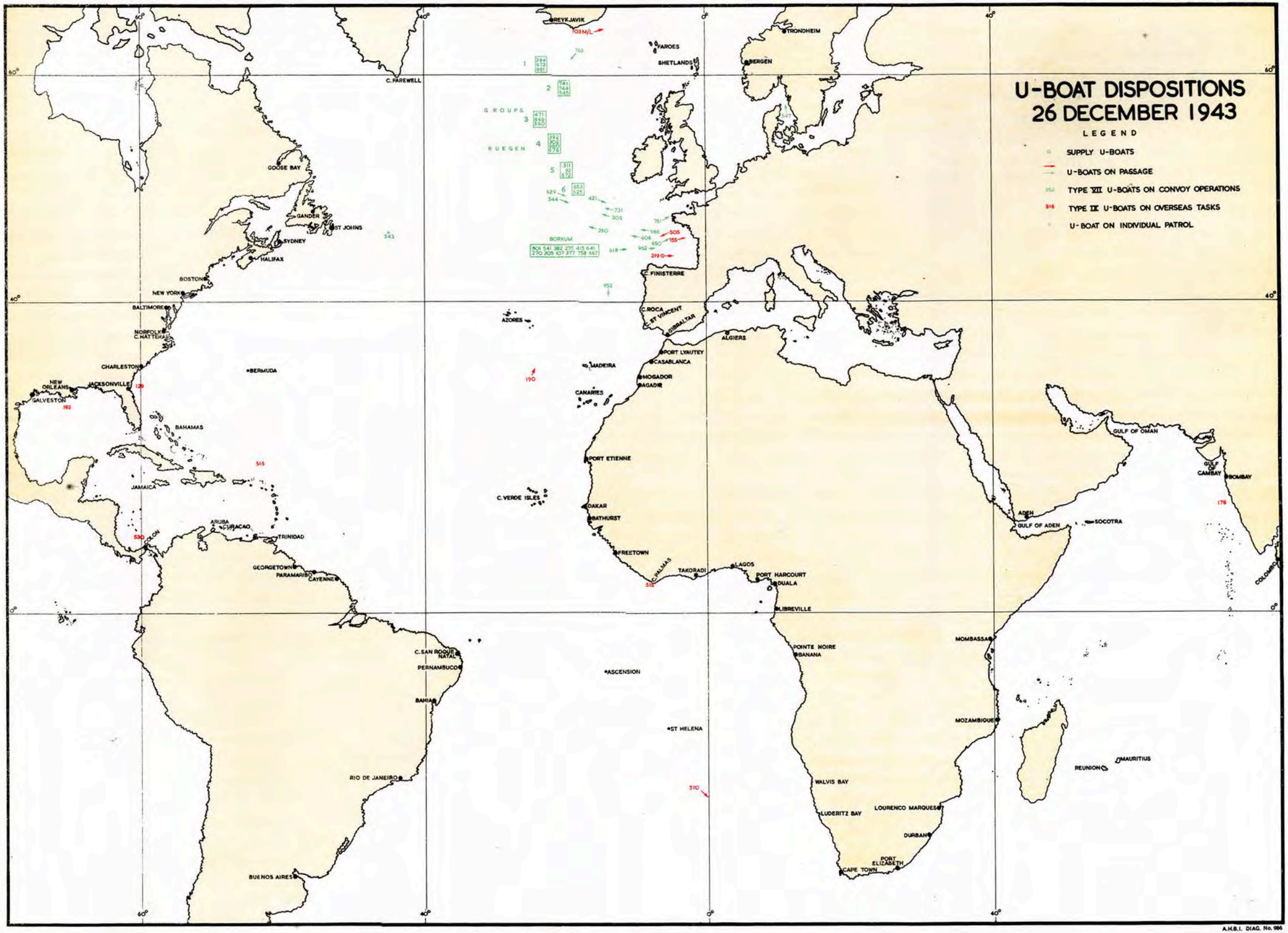

U-BOAT DISPOSITIONS
20 NOVEMBER 1943
LEGEND
SUPPLY U-BOATS
U-BOAT ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
552 TYPE VII U-BOATS ON CONVOY OPERATIONS
218 TYPE IX U-BOATS ON OVERSEAS TASKS
WAITING AREA
963 269
SCHILL 3
538 542 575 764 618 963 714 843 424 212 391 967
SCHILL 2
608 709 969 343 586 I 549 228 535 86 420
SCHILL 1
600 262 228 565 358 333 211
REYKJAVIK
TRONDHEIM
FAROES
SHETLANDS
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS

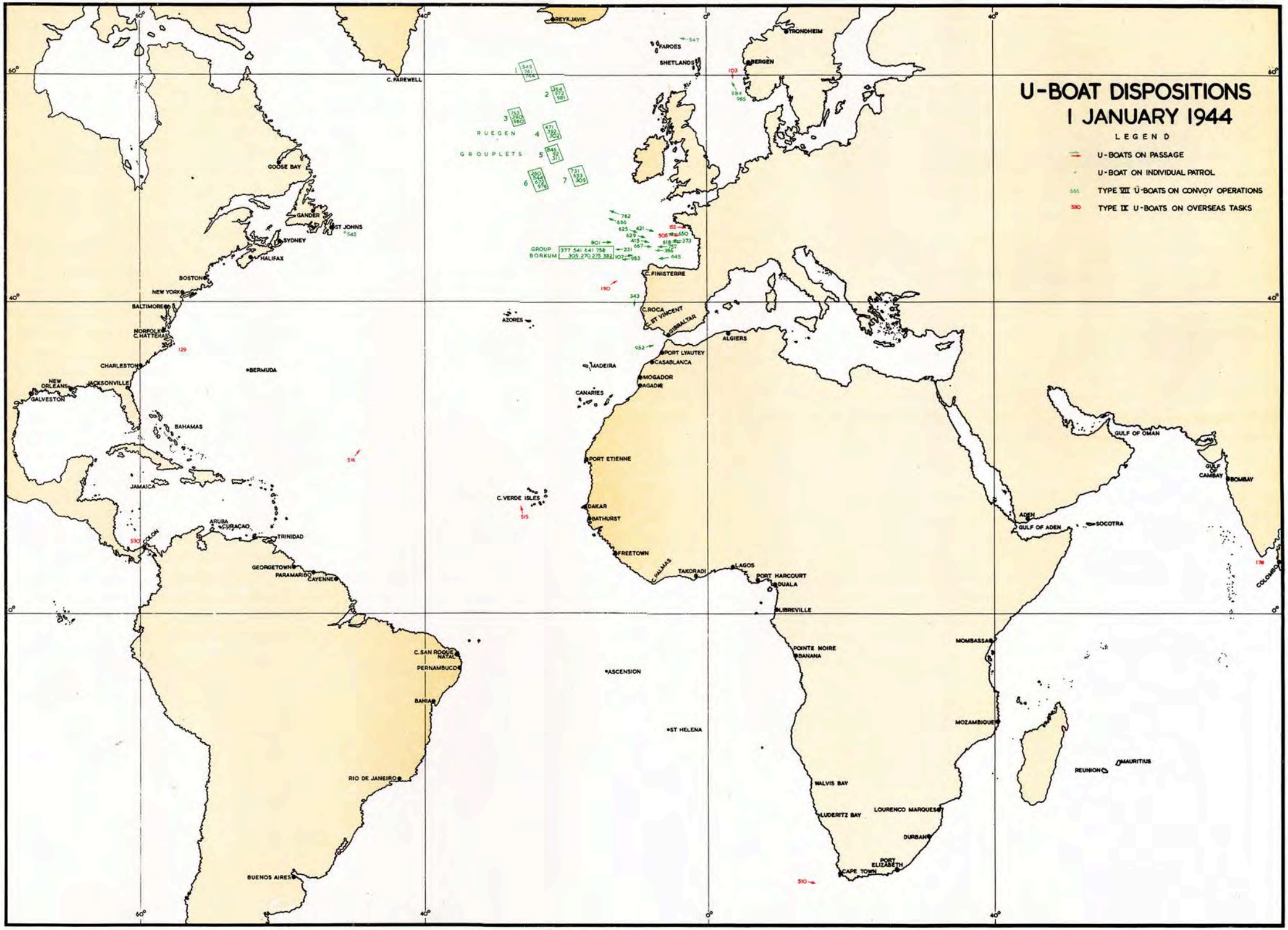

U-BOAT DISPOSITIONS
27 NOVEMBER 1943
LEGEND
SUPPLY U-BOATS
U-BOATS ON PASSAGE
572 TYPE VII U-BOATS ON CONVOY OPERATIONS
239 TYPE IX U-BOATS ON OVERSEAS TASKS
WAITING AREA
GROUP WEDDIGEN
214 M/L
103 M/L
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
JACKSONVILLE
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURACAO
COLON
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS

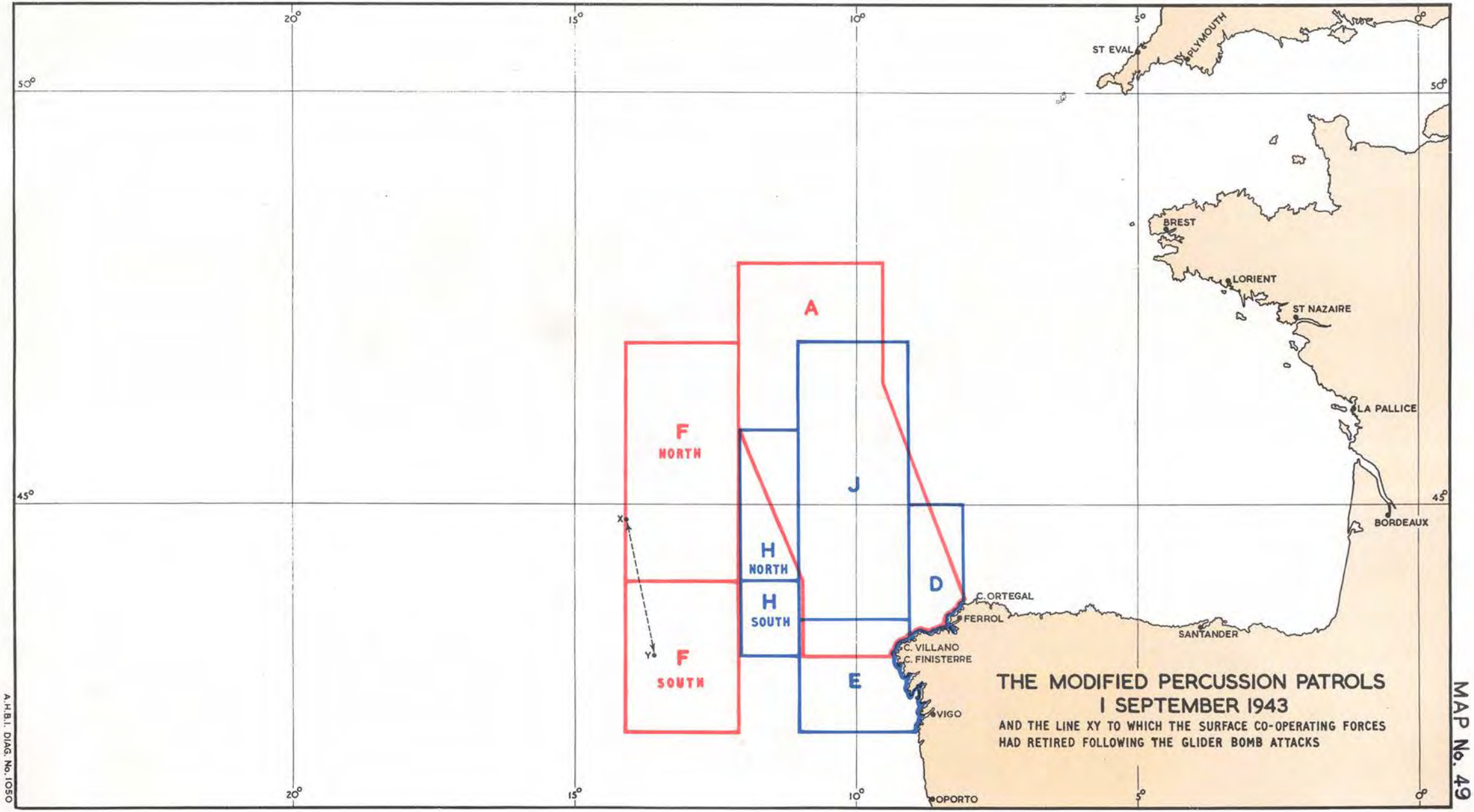

U-BOAT DISPOSITIONS
5 DECEMBER 1943
LEGEND
SUPPLY U-BOATS
U-BOATS ON PASSAGE
TYPE VII U-BOATS ON CONVOY OPERATIONS
TYPE IX U-BOATS ON OVERSEAS TASKS
GROUP CORONEL
GROUP WEDDIGEN
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
JACKSONVILLE
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURACAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
AZORES
MADEIRA
CANARIES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
ASCENSION
ST HELENA
RIO DE JANEIRO
BUENOS AIRES
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
ADEN
GULF OF ADEN
SOCOTRA
COLOMBO
MOMBASSA
MOZAMBIQUE
MAURITIUS
REUNION
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN


U-BOAT DISPOSITIONS
15 DECEMBER 1943
LEGEND
SUPPLY U-BOATS
U-BOATS ON PASSAGE
270 TYPE VII U-BOATS ON CONVOY OPERATIONS
155 TYPE IX U-BOATS ON OVERSEAS TASKS
CORONEL 1
CORONEL 2
CORONEL 3
REYK-JAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURACAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
AZORES
C. FINISTERRE
C. ROCA
ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDE ISLES
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
ASCENSION
ST HELENA
RIO DE JANEIRO
BUENOS AIRES
WALVIS BAY
LUDERITZ BAY
CAPE TOWN
PORT ELIZABETH
DURBAN
LOURENCO MARQUES
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS


U-BOAT DISPOSITIONS
20 DECEMBER 1943
LEGEND
SUPPLY U-BOATS
U-BOATS ON PASSAGE
260 TYPE VII U-BOATS ON CONVOY OPERATIONS
155 TYPE IX U-BOATS ON OVERSEAS TASKS
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
SYLT
AMKUM
FOEHR
BORKUM
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
JACKSONVILLE
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURACAO
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
AZORES
C. FINISTERRE
C. ROCA
ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
DAKAR
BATHURST
FREETOWN
C. VERDE ISLES
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
ASCENSION
ST HELENA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
ADEN
GULF OF ADEN
SOCOTRA
COLOMBO
MOMBASSA
MOZAMBIQUE
MAURITIUS
REUNION
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN


U-BOAT DISPOSITIONS
26 DECEMBER 1943
LEGEND
SUPPLY U-BOATS
U-BOATS ON PASSAGE
TYPE VII U-BOATS ON CONVOY OPERATIONS
TYPE IX U-BOATS ON OVERSEAS TASKS
U-BOAT ON INDIVIDUAL PATROL
GROUPS
RUEGEN
BORKUM
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURACAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
MADEIRA
CANARIES
C. VERDE ISLES
C. ROCA
ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
PORT ETIENNE
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOMBASSA
MOZAMBIQUE
REUNION
MAURITIUS
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
ADEN
GULF OF ADEN
SOCOTRA
COLOMBO


U-BOAT DISPOSITIONS
1 JANUARY 1944
LEGEND
U-BOATS ON PASSAGE
U-BOAT ON INDIVIDUAL PATROL
666 TYPE VII U-BOATS ON CONVOY OPERATIONS
530 TYPE IX U-BOATS ON OVERSEAS TASKS
RUEGEN GROUPLETS
GROUP BORKUM
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
JACKSONVILLE
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
C. VERDE ISLES
PORT ETIENNE
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
CAPE TOWN
PORT ELIZABETH
DURBAN
LOURENCO MARQUES
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS

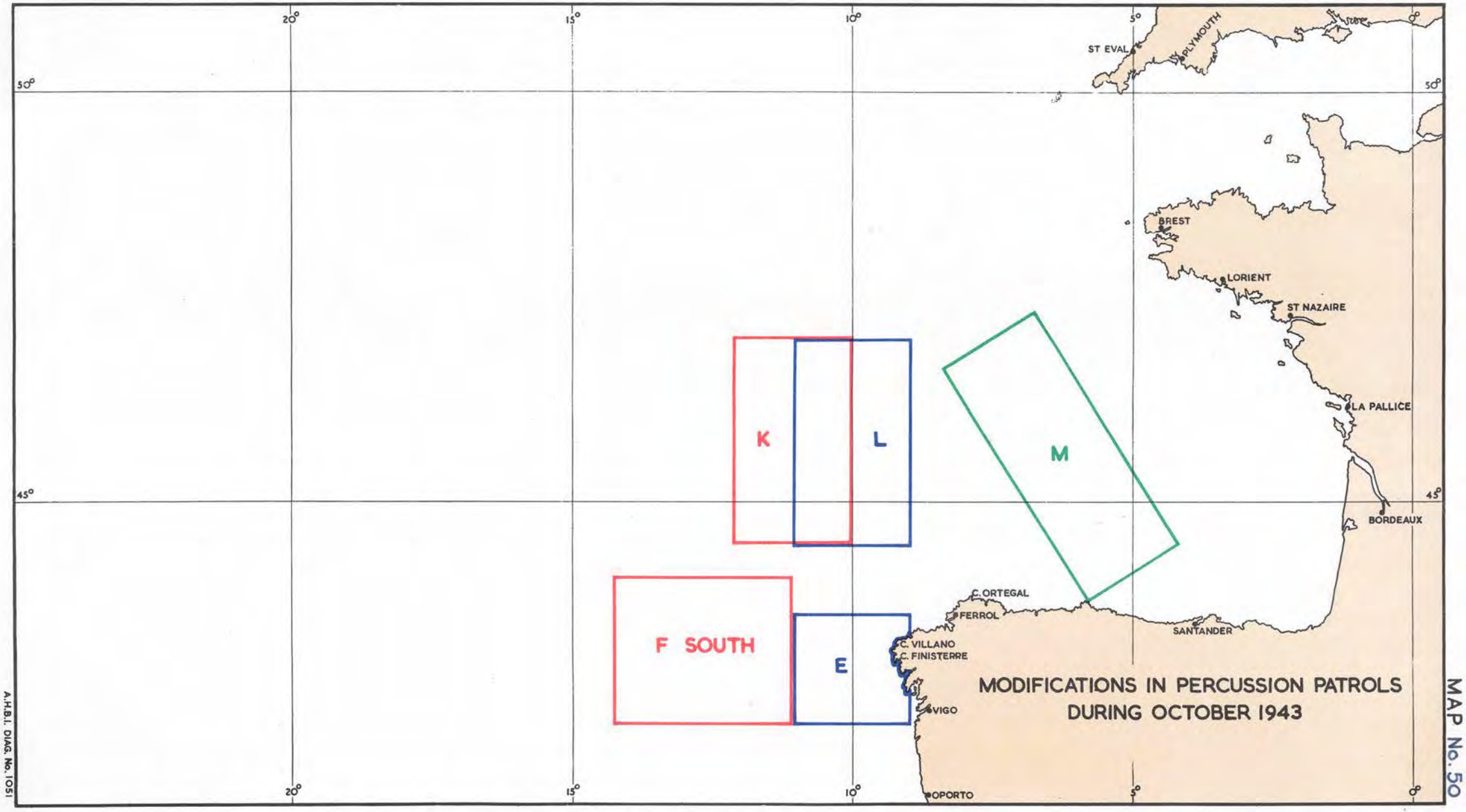


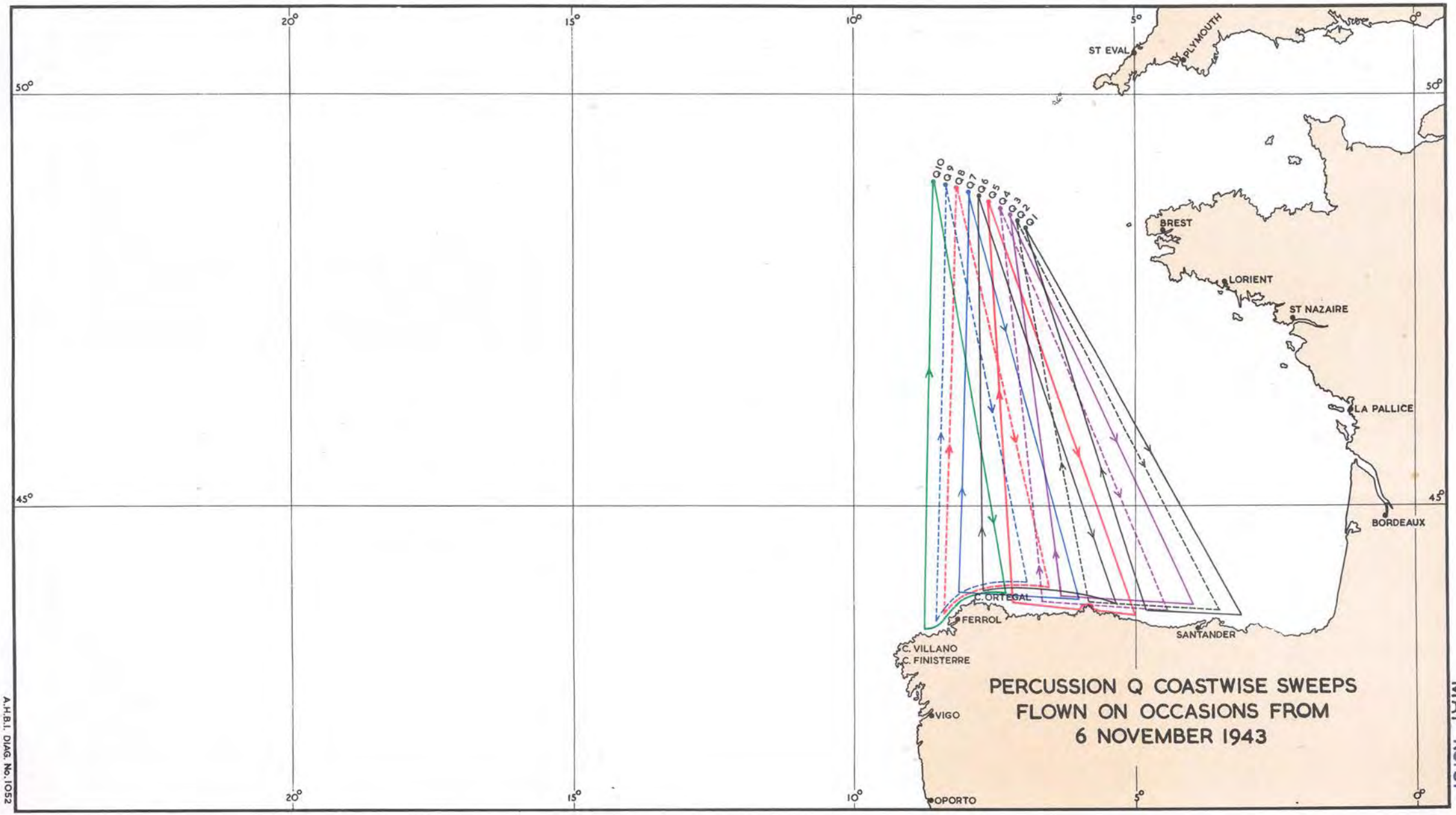
THE MODIFIED PERCUSSION PATROLS
1 SEPTEMBER 1943

AND THE LINE XY TO WHICH THE SURFACE CO-OPERATING FORCES HAD RETIRED FOLLOWING THE GLIDER BOMB ATTACKS

MAP No. 49

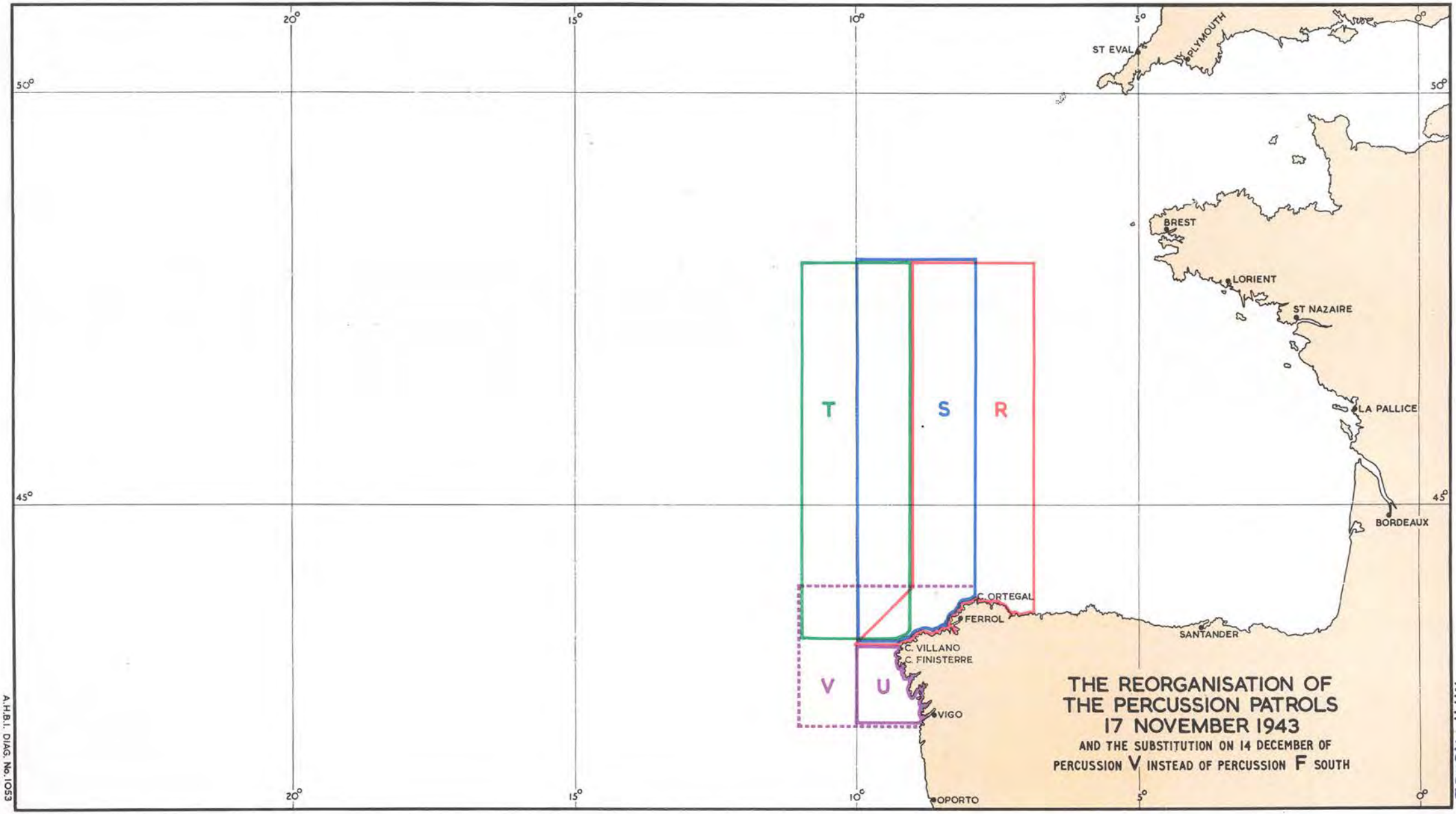
A.H.B.I. DIAG. No. 1050


20°
15°
10°
5°
0°
50°
45°
ST EVAL
PLYMOUTH
BREST
LORIENT
ST NAZAIRE
LA PALLICE
BORDEAUX
K
L
M
F SOUTH
E
C. ORTEGAL
FERROL
SANTANDER
C. VILLANO
C. FINISTERRE
VIGO
OPORTO
MODIFICATIONS IN PERCUSSION PATROLS
DURING OCTOBER 1943
A.H.B.I. DIAG. No. 1051
MAP No. 50



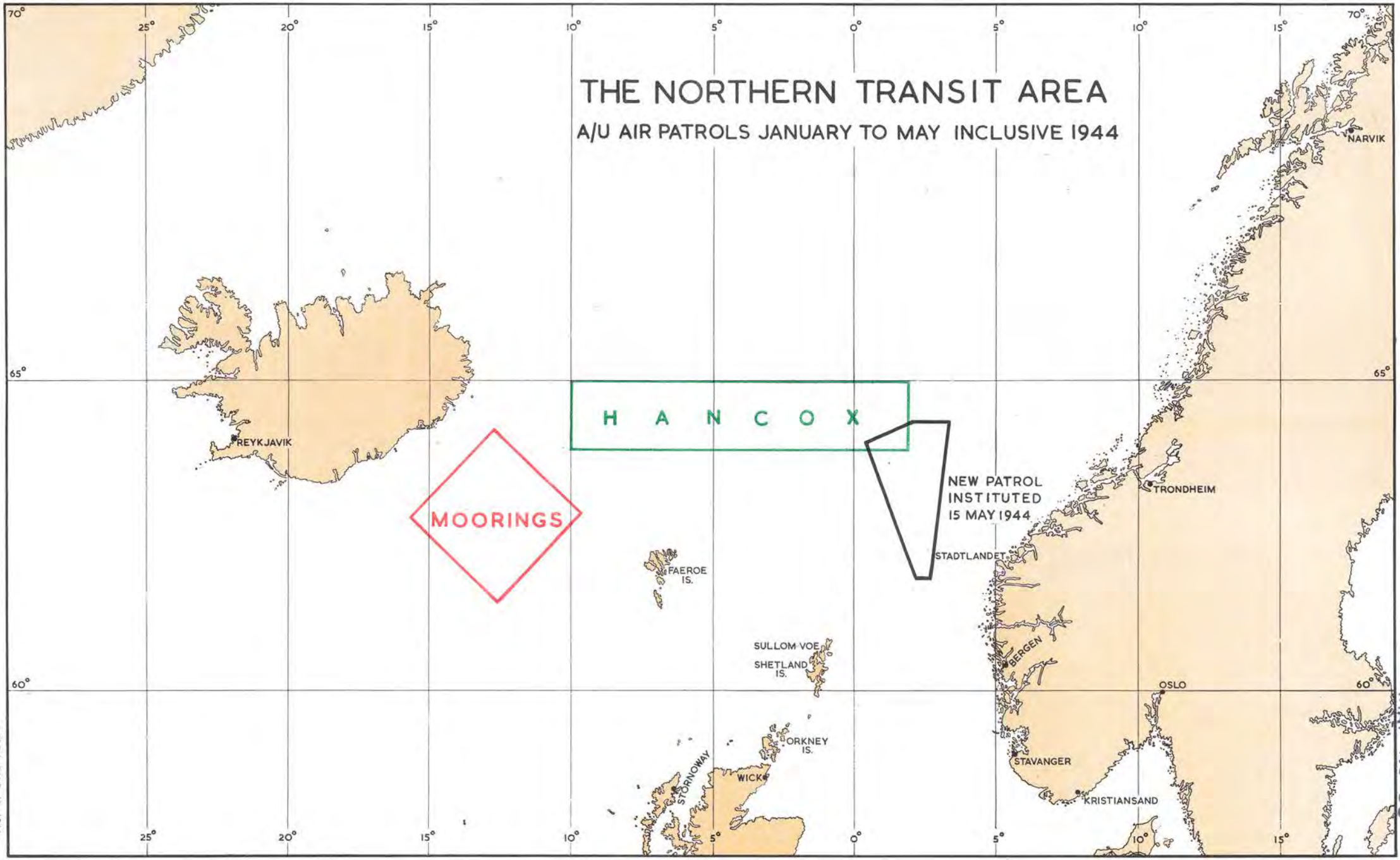
A.H.B.I. DIAG. No. 1052

MAP No. 51



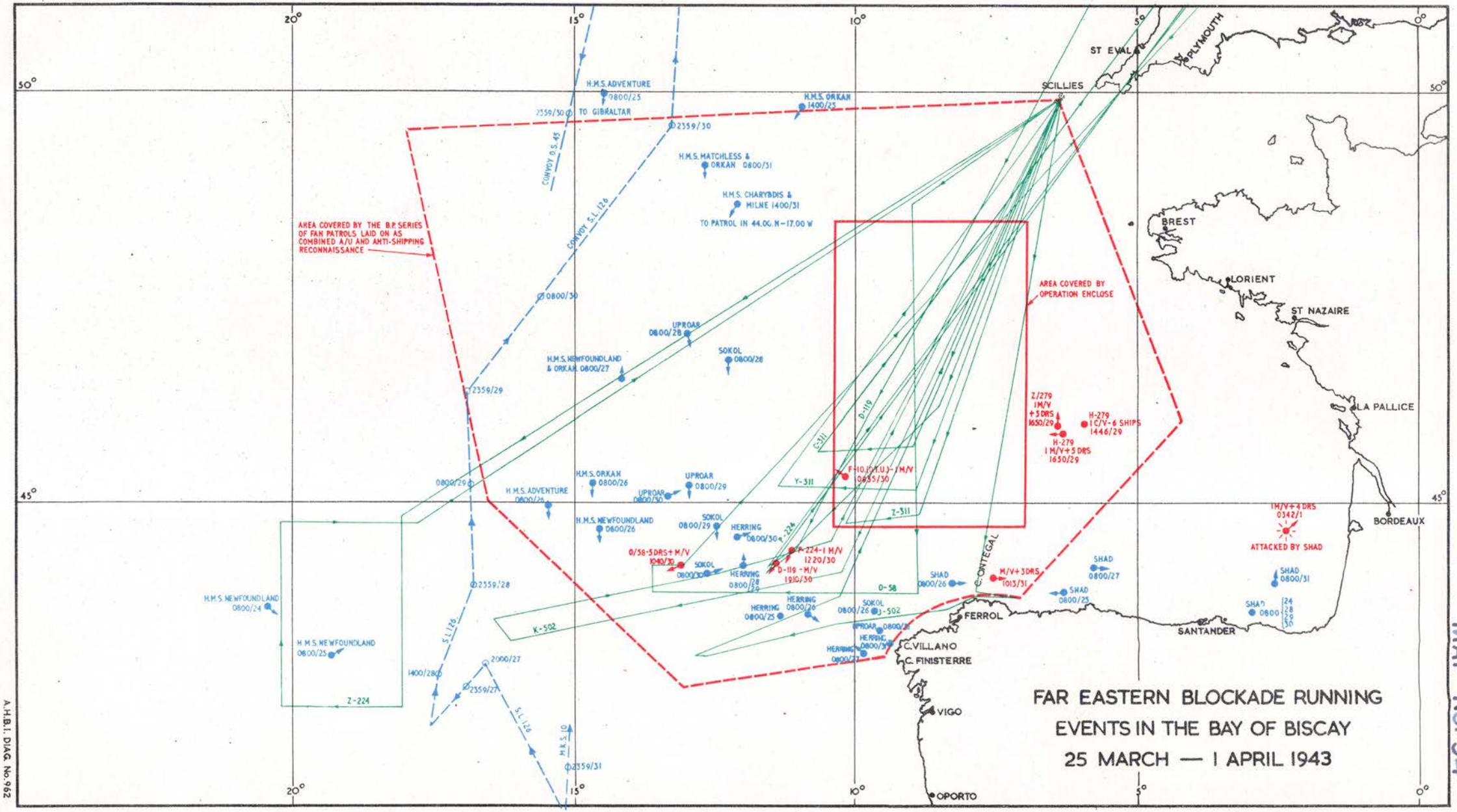
A.H.B.I. DIAG. No. 1053

MAP No. 52



MAP No. 53

A.H.B.I. DIAG. No. 1066



A.H.B.I. DIAG. No. 982

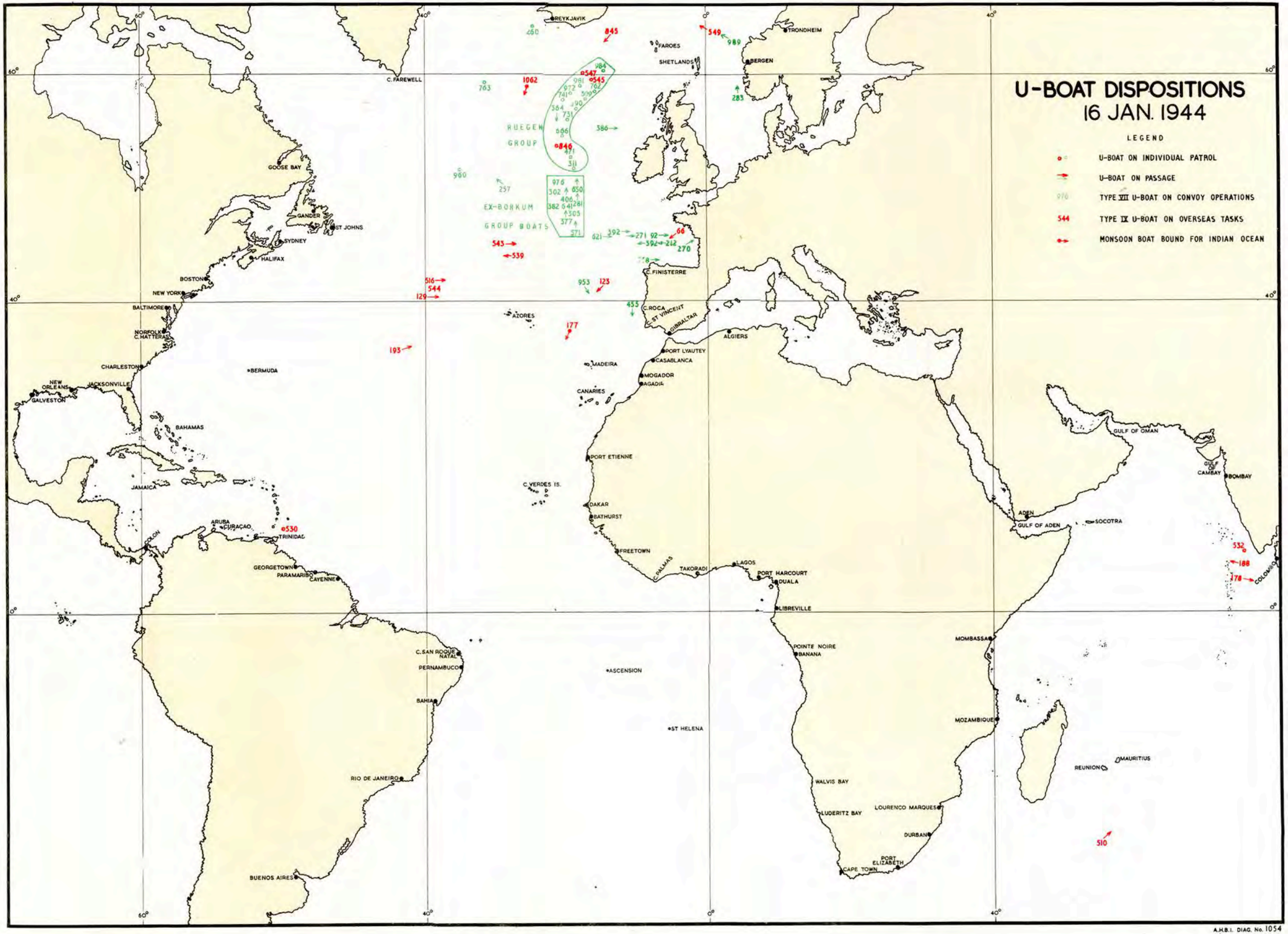
MAP No. 54

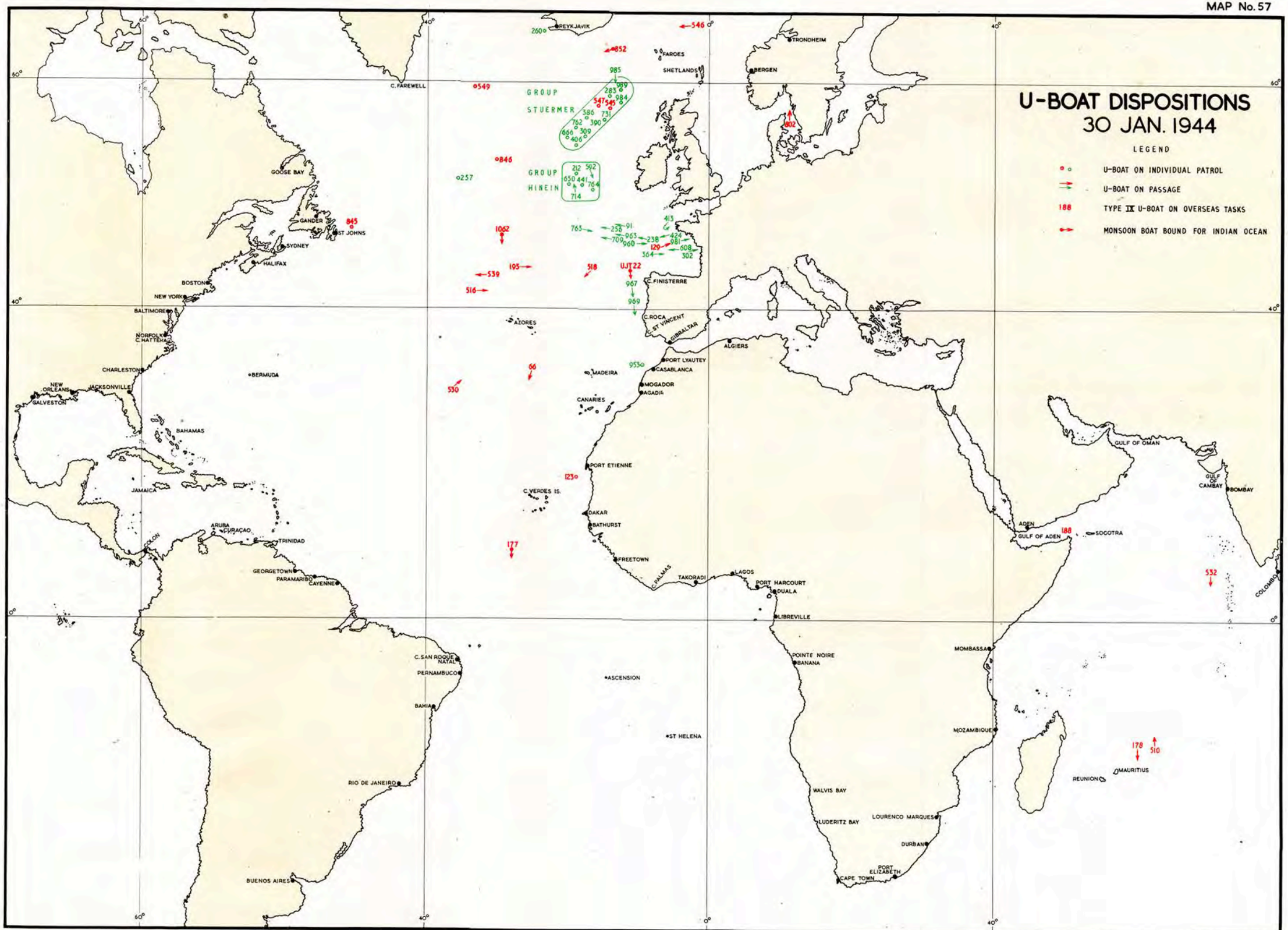
MAP XXIV

POSITIONS OF AIRLAID MINEFIELDS JULY 1941 TO FEBRUARY 1943

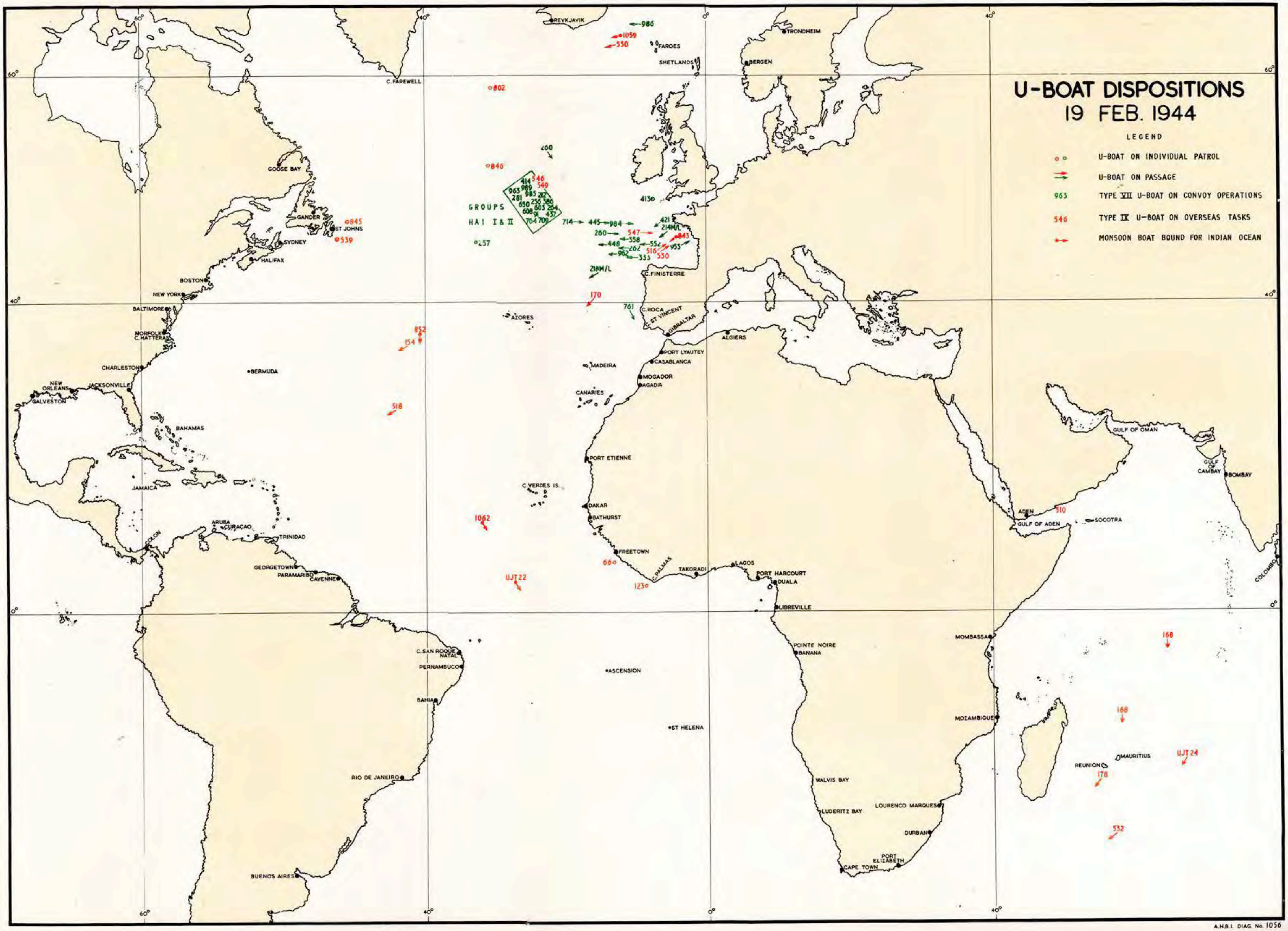
OSLO
ONIONS
BOTTLE
HAUGESUND
STAVANGER
FREDERIKSTAD
TOMATOES
STOCKHOLM
KRISTIANSAND (S)
SILVERTHORN I
SILVERTHORN VII
FREDERIKSHAVN
UNDERGROWTH
LAESO IS.
YEWTREE
HAWTHORN 3
KRAUTS
HALS
AALBORG
SILVERTHORN VI
HAWTHORN 2
ANHOLT
SILVERTHORN IV
SILVERTHORN II
SILVERTHORN V
NASTURTIUM
SILVERTHORN III
PUMPKIN
VERBENA
COPENHAGEN
CARROTS
DAFFODIL
ESBJERG
HAWTHORN 1
ASPARAGUS
BROCCOLI
ENDIVE
POLLOCK
BORNHOLM IS.
RÖNNE
WINDAU
LIBAU
MEMEL
ROSEMARY 3
WALLFLOWERS
QUINCE
SWEETPEA
ROSEMARY 2
MELON
RADISHES
SASSNITZ
WILLOW
ROSEMARY 1
ROSEMARY 4
NECTARINES 3
KIEL
ECKERNFORDE
LETTUCE
FORGET-ME-NOT
DAFFODIL
JASMINE
WARNEMUNDE
ROSTOCK
GERANIUM
TRAVEMUNDE
LUBECK
NECTARINES 2
NECTARINES 1
YAMS
EGLANTINES
HAMBURG
SWINEMUNDE
TANGERINE
PILLAU
KONIGSBERG
GDYNIA
SPINACH
PRIVET
DANZIG
MUSSELS
EMDEN
BREMERHAVEN
WILHELMSHAVEN
ZINNIAS
BREMEN
XERANTHEMUM
LIMPETS
TREFOIL
WHELKS
IJMUIDEN
AMSTERDAM
OYSTERS
ROTTERDAM
FLUSHING
NEWTS
FLOUNDERS
BARNACLES
JUNIPER
TURBOT
ZEEBRUGGE
OSTEND
ANTWERP
CYPRESS
DUNKIRK
PRAWNS
CALAIS
DEWBERRY
BOULOGNE
VINELEAF
DIEPPE
GREENGAGES
ANEMONES
LE HAVRE
SCALLOPS
CHERBOURG
UPSATREE
HYACINTH
MORLAIX
ST MALO
SULTANA
BREST
JELLYFISH
LORIENT
ARTICHOKES
QUIBERON BAY
GORSE
ST NAZAIRE
BEECH
CINNAMON 2
LA PALLICE
CINNAMON 1
DEODAR
R. GIRONDE
BORDEAUX
ARCACHON PT
ELDERBERRY
FURZE
BAYONNE
ST JEAN DE LUZ

A.H.B.I. DIAG. No. 622
1075

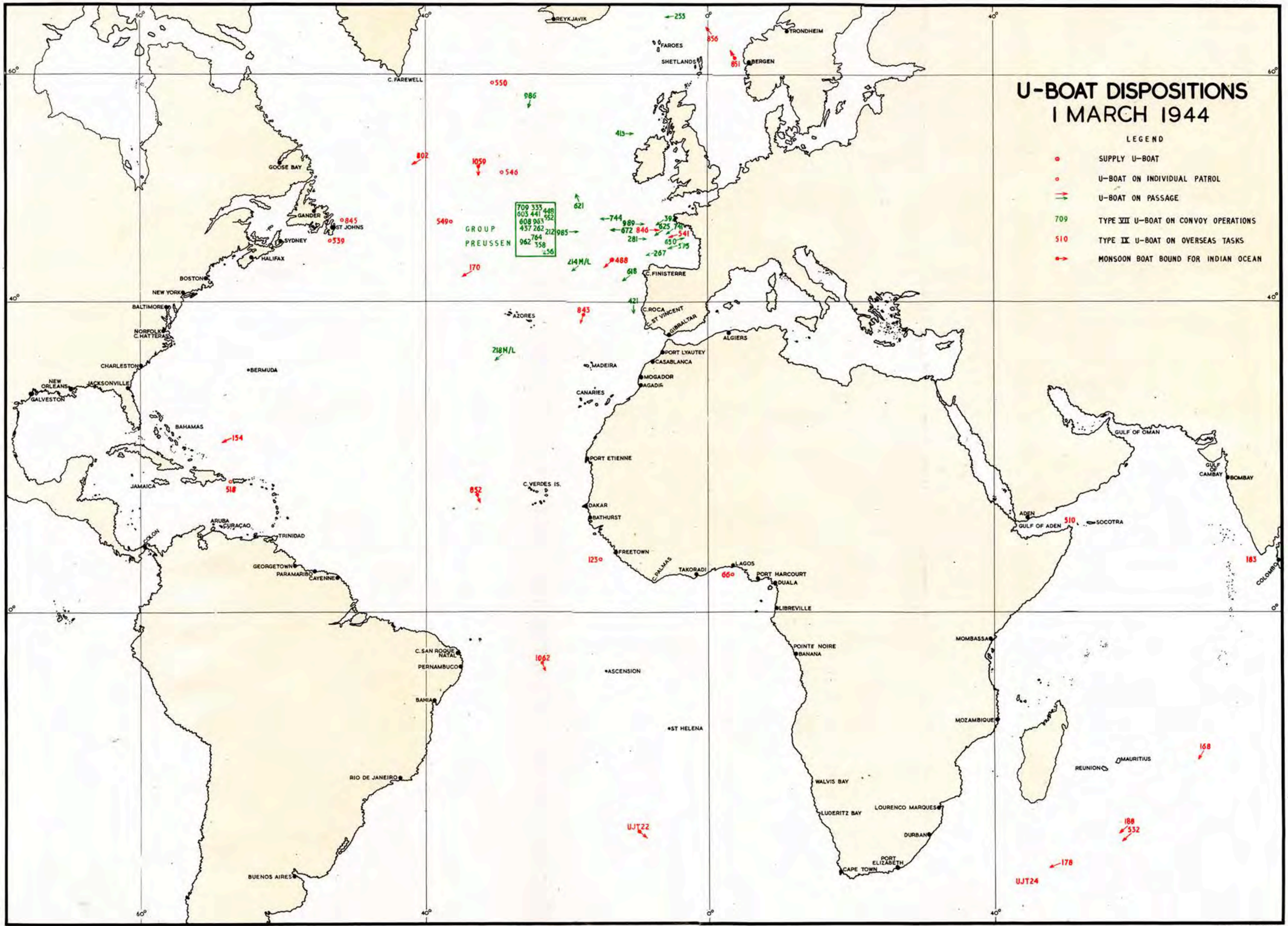

U-BOAT DISPOSITIONS
16 JAN. 1944
LEGEND
U-BOAT ON INDIVIDUAL PATROL
U-BOAT ON PASSAGE
TYPE XVII U-BOAT ON CONVOY OPERATIONS
TYPE IX U-BOAT ON OVERSEAS TASKS
MONSOON BOAT BOUND FOR INDIAN OCEAN
RUEGEN GROUP
EX-BORKUM GROUP BOATS
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
COLON
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
C. VERDES IS.
PORT ETIENNE
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
ADEN
GULF OF ADEN
SOCOTRA
COLOMBO
MOMBASSA
MOZAMBIQUE
MAURITIUS
REUNION
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN

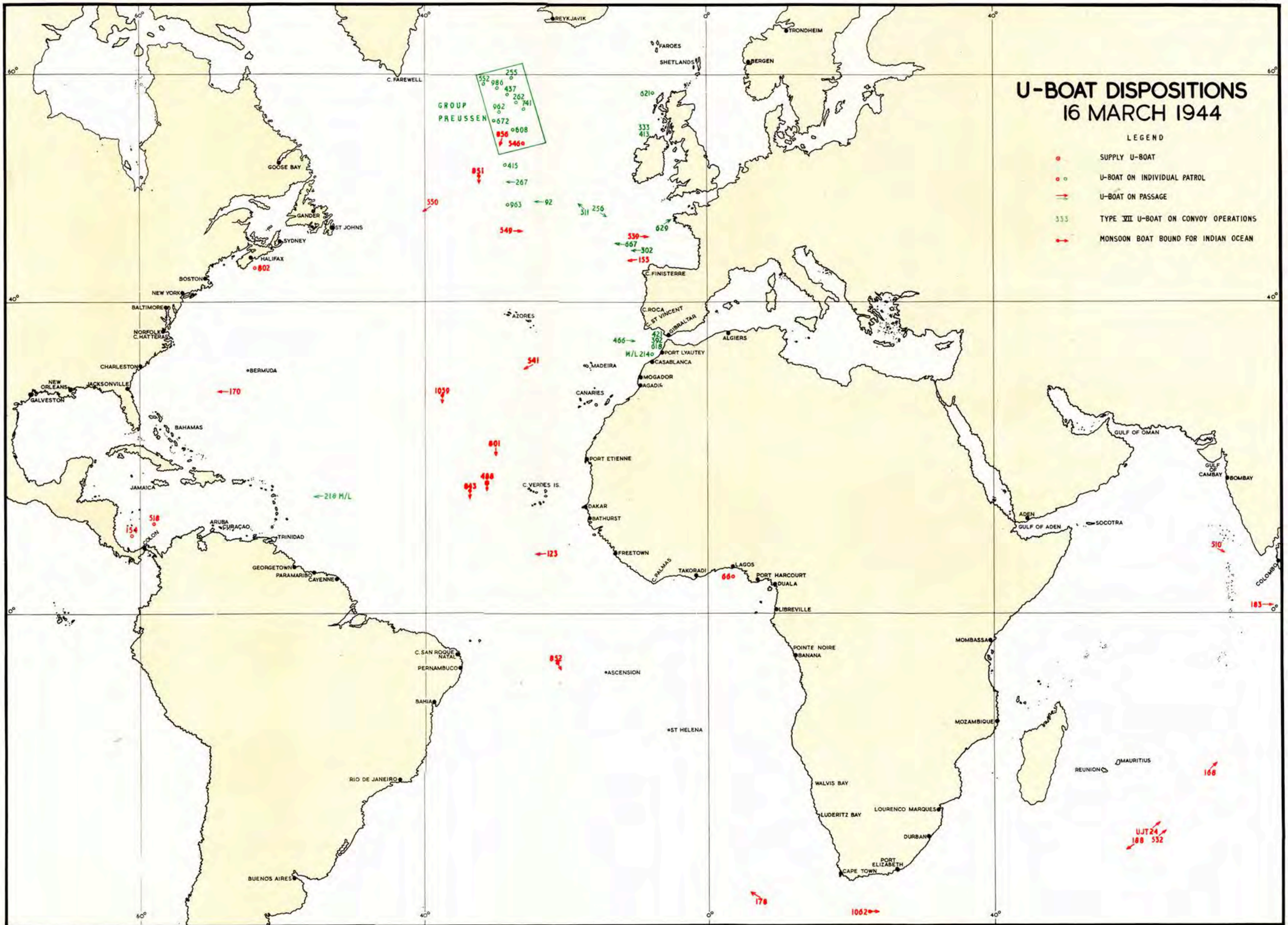

U-BOAT DISPOSITIONS
30 JAN. 1944
LEGEND
U-BOAT ON INDIVIDUAL PATROL
U-BOAT ON PASSAGE
188 TYPE IX U-BOAT ON OVERSEAS TASKS
MONSOON BOAT BOUND FOR INDIAN OCEAN
GROUP STUERMER
GROUP HINEIN
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
JACKSONVILLE
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
COLON
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDES IS.
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
ASCENSION
ST HELENA
RIO DE JANEIRO
BUENOS AIRES
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS

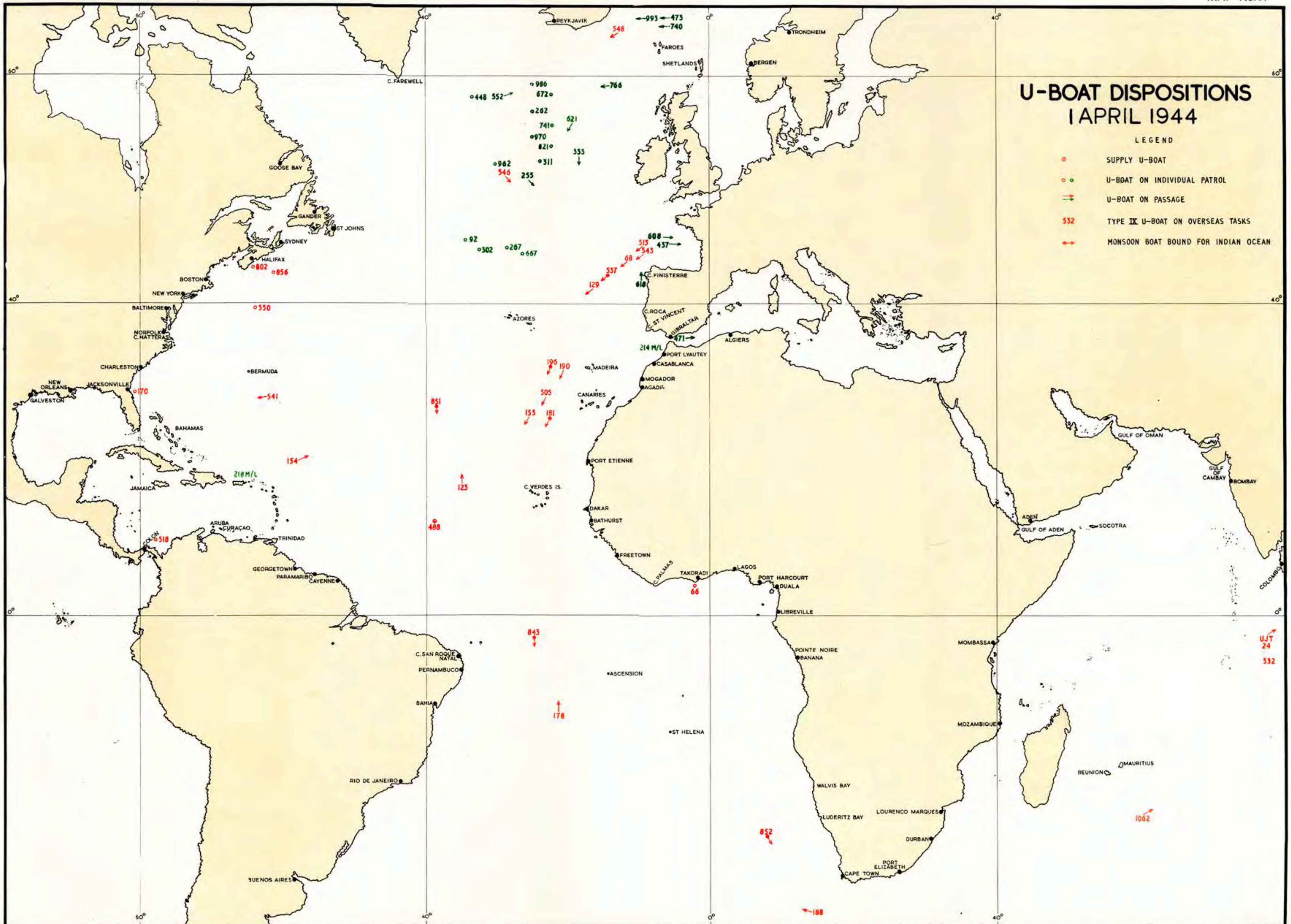
MAP No. 58

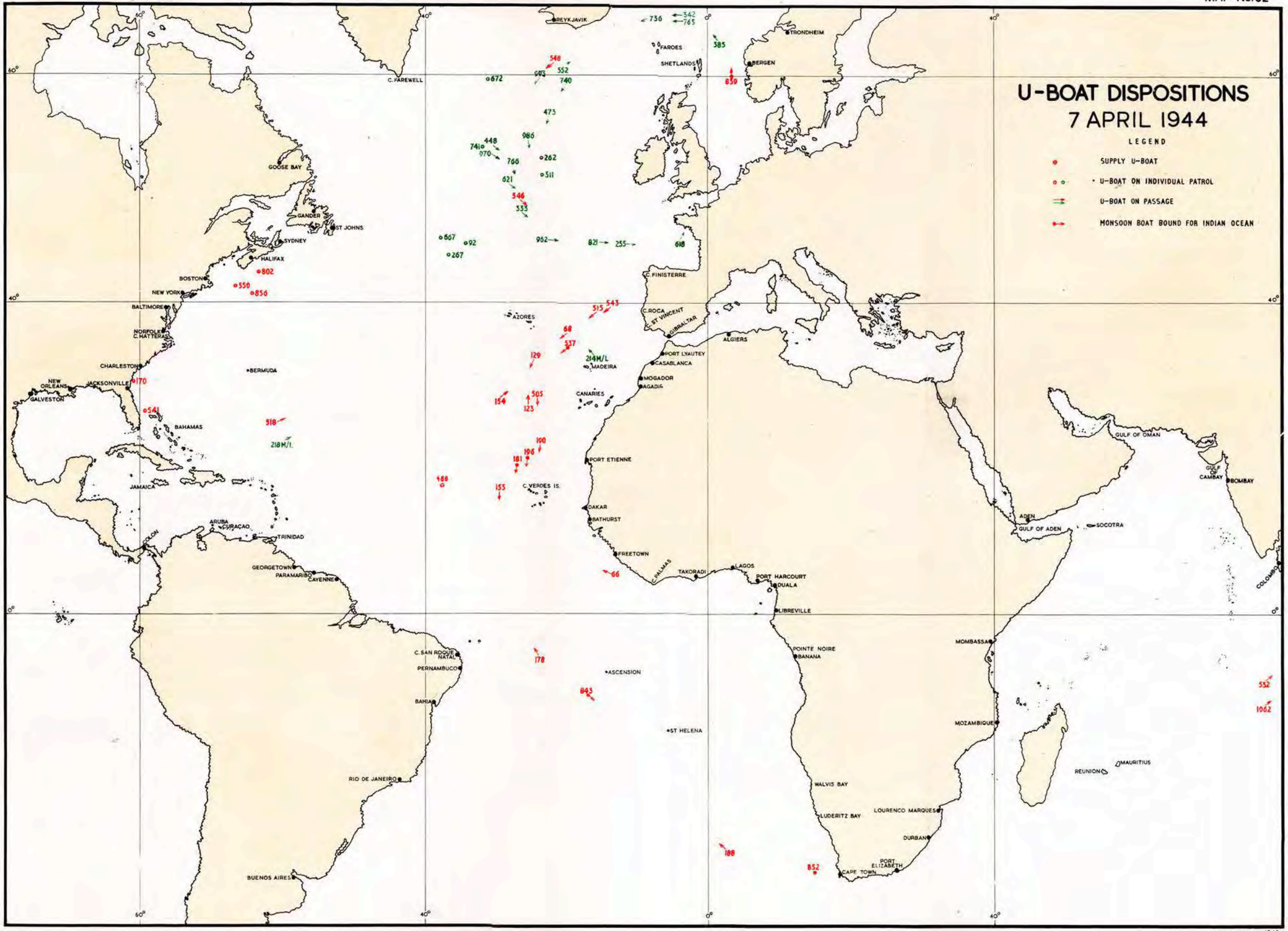


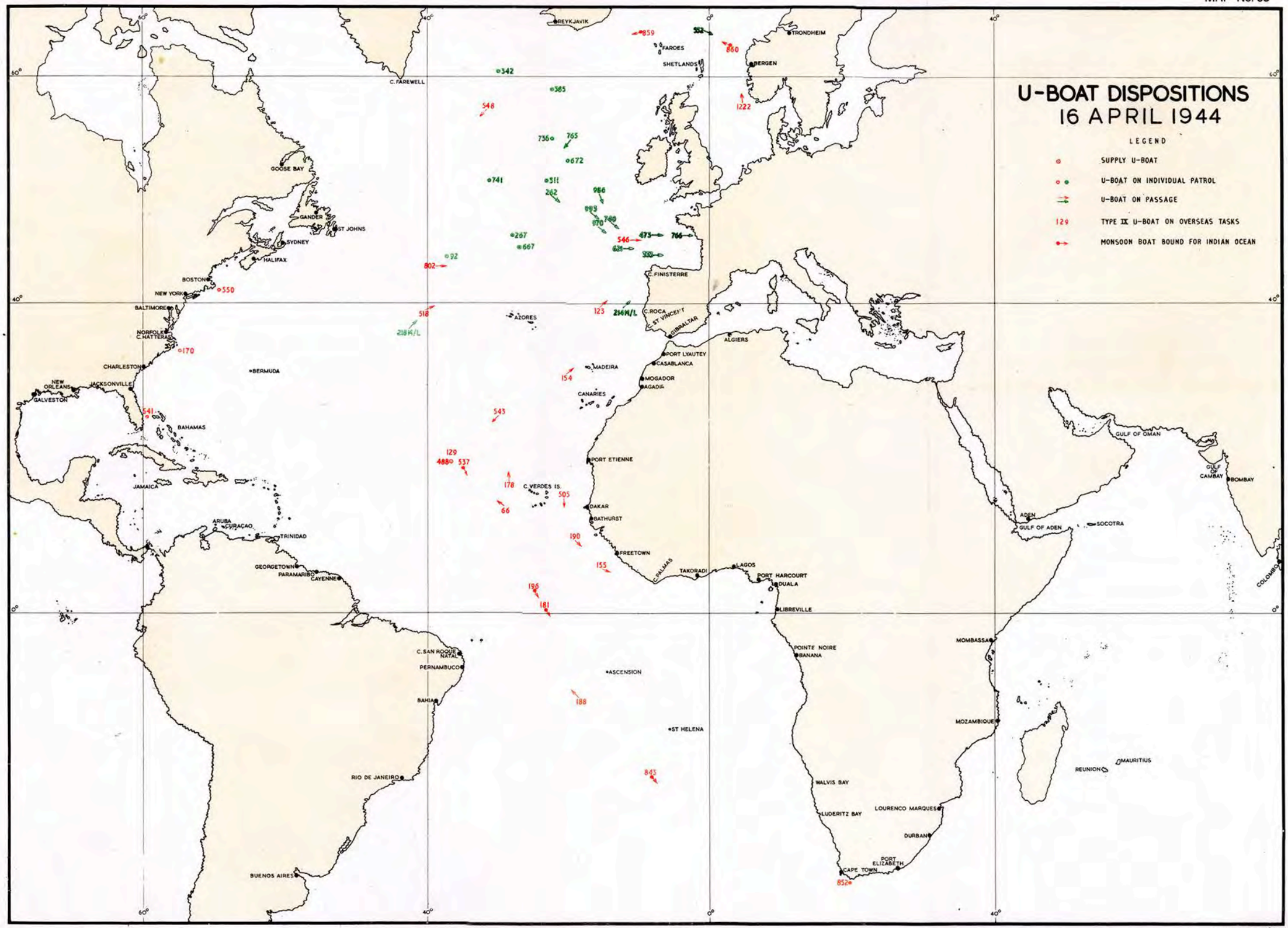
A.H.B.I. DIAG. No. 1056

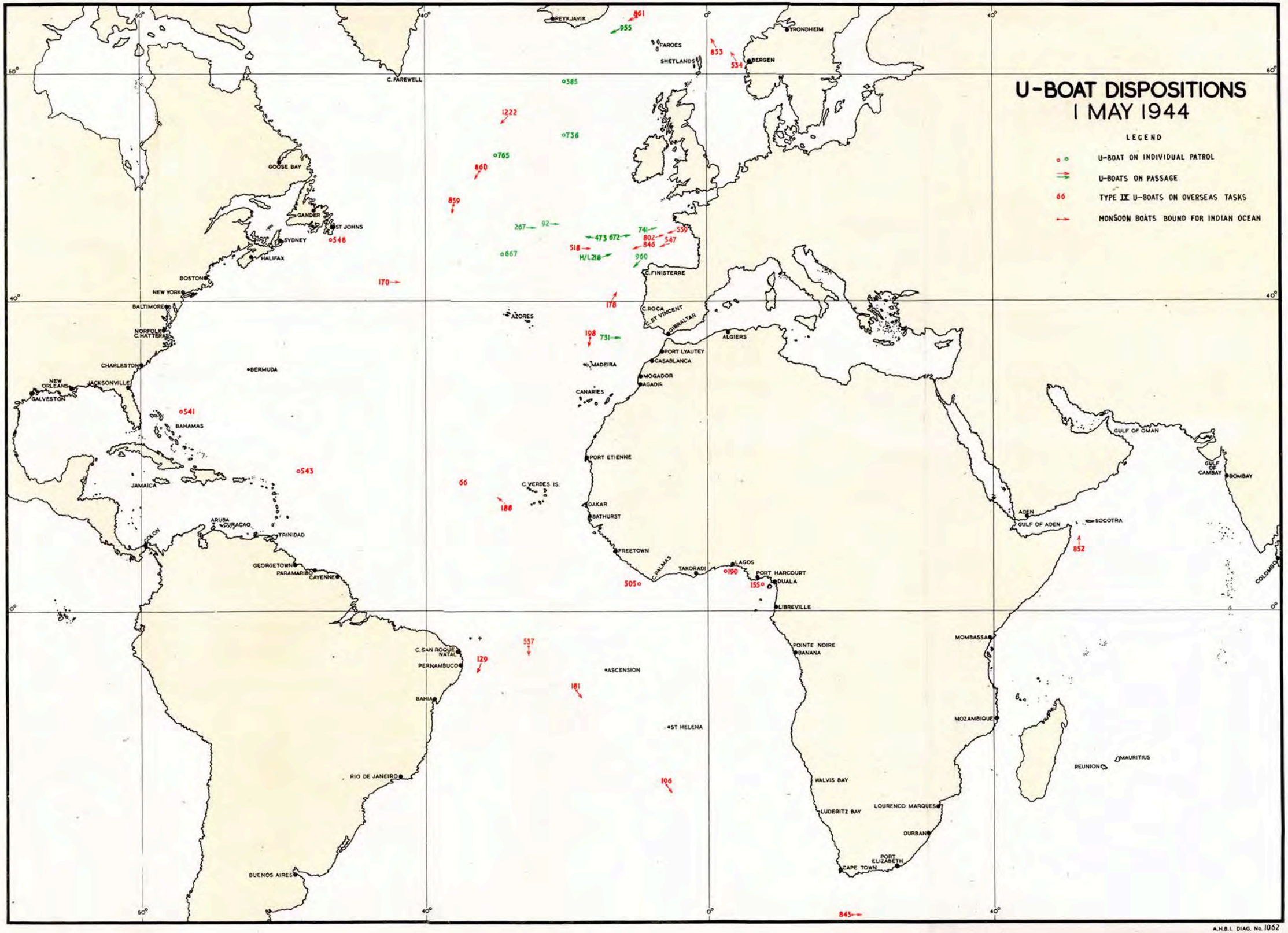

U-BOAT DISPOSITIONS
1 MARCH 1944
LEGEND
SUPPLY U-BOAT
U-BOAT ON INDIVIDUAL PATROL
U-BOAT ON PASSAGE
709 TYPE VII U-BOAT ON CONVOY OPERATIONS
510 TYPE IX U-BOAT ON OVERSEAS TASKS
MONSOON BOAT BOUND FOR INDIAN OCEAN
GROUP
PREUSSEN
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
JACKSONVILLE
NEW ORLEANS
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
COLON
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
MADEIRA
CANARIES
C. VERDES IS.
ASCENSION
ST HELENA
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
PORT ETIENNE
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
WALVIS BAY
LUDERITZ BAY
CAPE TOWN
PORT ELIZABETH
DURBAN
LOURENCO MARQUES
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS
UJT22
UJT24

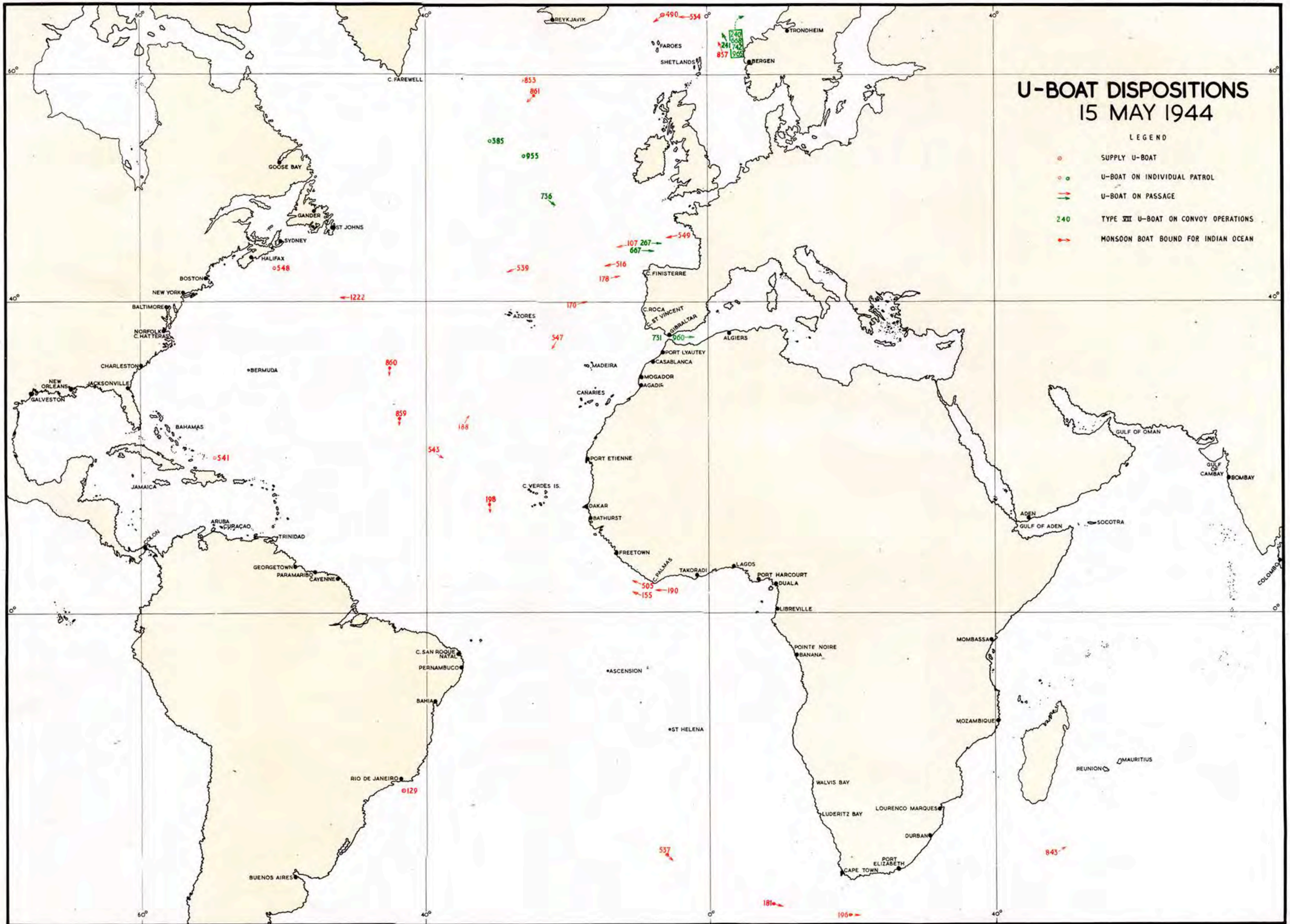

U-BOAT DISPOSITIONS
16 MARCH 1944
LEGEND
SUPPLY U-BOAT
U-BOAT ON INDIVIDUAL PATROL
U-BOAT ON PASSAGE
TYPE VII U-BOAT ON CONVOY OPERATIONS
MONSOON BOAT BOUND FOR INDIAN OCEAN
GROUP PREUSSEN
552
986
255
437
262
741
962
672
608
856
546
415
267
851
550
963
92
311
256
549
539
629
667
302
155
621
333
413
466
421
392
618
M/L 214
541
170
1059
801
488
843
218 M/L
518
154
123
660
852
510
183
168
UIT 24
532
188
178
1062
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
JACKSONVILLE
NEW ORLEANS
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
COLON
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MADEIRA
MOGADOR
AGADIR
CANARIES
PORT ETIENNE
C. VERDES IS.
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
CAPE TOWN
PORT ELIZABETH
DURBAN
LOURENCO MARQUES
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS
60°
40°
0°
40°
60°


U-BOAT DISPOSITIONS
1 APRIL 1944
LEGEND
SUPPLY U-BOAT
U-BOAT ON INDIVIDUAL PATROL
U-BOAT ON PASSAGE
532 TYPE IX U-BOAT ON OVERSEAS TASKS
MONSOON BOAT BOUND FOR INDIAN OCEAN
REYKJAVIK
C. FAREWELL
FAROES
SHETLANDS
TRONDHEIM
BERGEN
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
JACKSONVILLE
NEW ORLEANS
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MADEIRA
MOGADOR
AGADIR
CANARIES
PORT ETIENNE
C. VERDES IS.
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
CAPE TOWN
PORT ELIZABETH
DURBAN
LOURENCO MARQUES
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS
993 473 740 548 986 448 552 672 766 262 621 741 970 821 333 962 311 546 255
92 302 267 667 608 437 515 543 68 537 129 618 802 856 550 471
214 M/L 196 190 170 541 851 505 155 181 154 218 M/L 123 488 518 66 843 178
852 188 1062 UJT 24 532

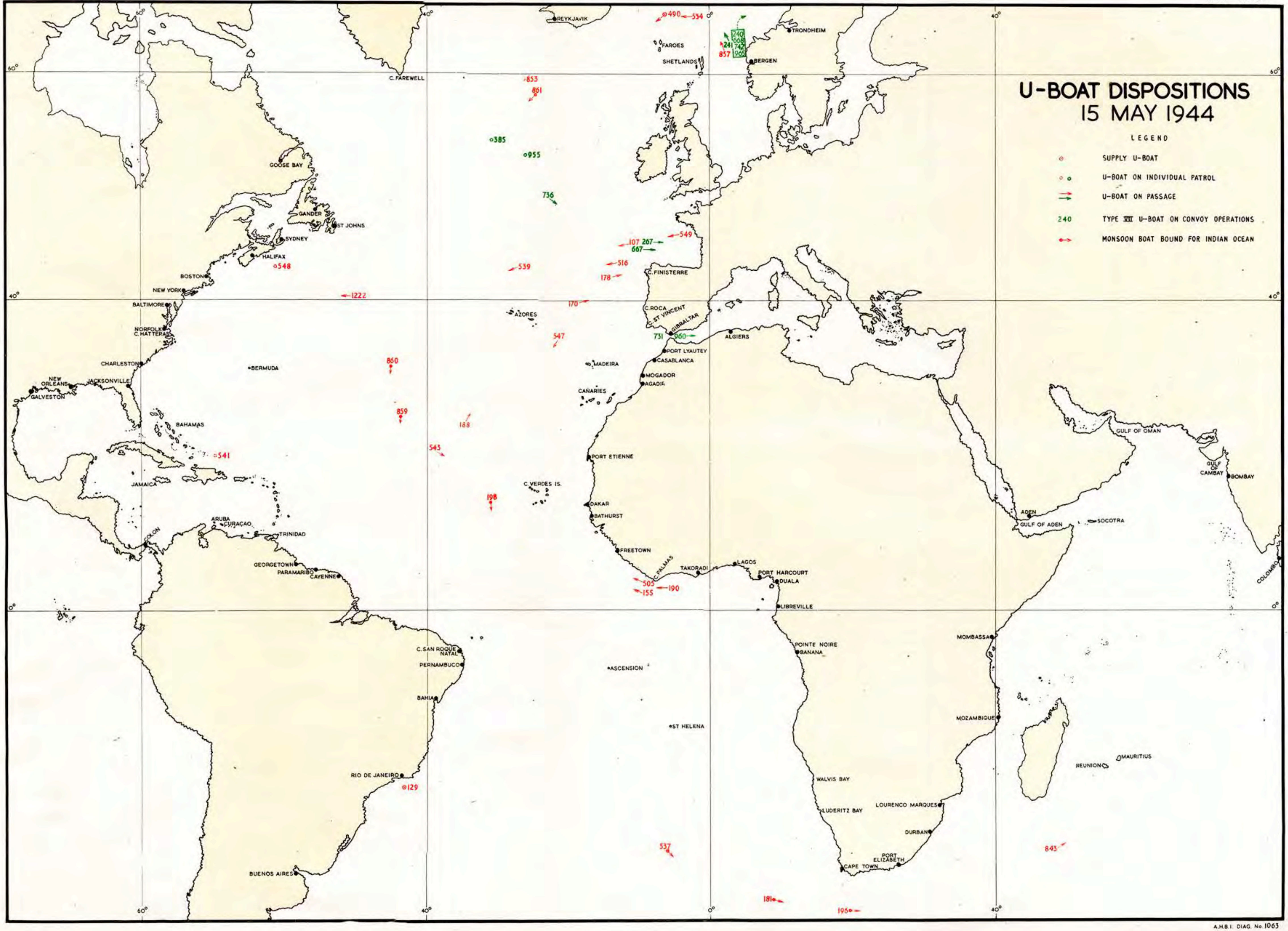

U-BOAT DISPOSITIONS
7 APRIL 1944
LEGEND
SUPPLY U-BOAT
U-BOAT ON INDIVIDUAL PATROL
U-BOAT ON PASSAGE
MONSOON BOAT BOUND FOR INDIAN OCEAN
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MADEIRA
MOGADOR
AGADIR
CANARIES
PORT ETIENNE
C. VERDES IS.
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOZAMBIQUE
MOMBASSA
REUNION
MAURITIUS
GULF OF OMAN
GULF OF ADEN
ADEN
SOCOTRA
GULF OF CAMBAY
BOMBAY
COLOMBO


U-BOAT DISPOSITIONS
16 APRIL 1944
LEGEND
SUPPLY U-BOAT
U-BOAT ON INDIVIDUAL PATROL
U-BOAT ON PASSAGE
129 TYPE IX U-BOAT ON OVERSEAS TASKS
MONSOON BOAT BOUND FOR INDIAN OCEAN
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
TRINIDAD
GEORGETOWN
PARAMARIBO
CAYENNE
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
RIO DE JANEIRO
BUENOS AIRES
AZORES
C. FINISTERRE
C. ROCA
C. ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDES IS.
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
ASCENSION
ST HELENA
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS


U-BOAT DISPOSITIONS
1 MAY 1944
LEGEND
U-BOAT ON INDIVIDUAL PATROL
U-BOATS ON PASSAGE
66 TYPE IX U-BOATS ON OVERSEAS TASKS
MONSOON BOATS BOUND FOR INDIAN OCEAN
REYKJAVIK
FAROES
SHETLANDS
TRONDHEIM
BERGEN
C. FAREWELL
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
NEW ORLEANS
GALVESTON
JACKSONVILLE
BERMUDA
BAHAMAS
JAMAICA
ARUBA
CURAÇAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
AZORES
C. FINISTERRE
C. ROCA
ST VINCENT
GIBRALTAR
ALGIERS
PORT LYAUTEY
CASABLANCA
MOGADOR
AGADIR
MADEIRA
CANARIES
PORT ETIENNE
C. VERDES IS.
DAKAR
BATHURST
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
LIBREVILLE
POINTE NOIRE
BANANA
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
ASCENSION
ST HELENA
RIO DE JANEIRO
BUENOS AIRES
WALVIS BAY
LUDERITZ BAY
LOURENCO MARQUES
DURBAN
PORT ELIZABETH
CAPE TOWN
MOZAMBIQUE
MOMBASSA
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS
861
955
853
534
385
1222
736
765
860
859
267
92
473
672
741
530
802
547
846
518
M/L 218
960
667
170
178
108
731
541
543
66
188
505
190
155
852
537
129
181
106
843


U-BOAT DISPOSITIONS
15 MAY 1944
LEGEND
SUPPLY U-BOAT
U-BOAT ON INDIVIDUAL PATROL
U-BOAT ON PASSAGE
240 TYPE VII U-BOAT ON CONVOY OPERATIONS
MONSOON BOAT BOUND FOR INDIAN OCEAN
REYKJAVIK
490
534
FAROES
SHETLANDS
TRONDHEIM
BERGEN
240
668
742
965
241
857
C. FAREWELL
853
861
385
955
736
GOOSE BAY
GANDER
ST JOHNS
SYDNEY
HALIFAX
548
BOSTON
NEW YORK
BALTIMORE
NORFOLK
C. HATTERAS
CHARLESTON
JACKSONVILLE
NEW ORLEANS
GALVESTON
BERMUDA
BAHAMAS
JAMAICA
541
1222
539
107
267
667
549
516
178
C. FINISTERRE
170
AZORES
C. ROCA
C. ST VINCENT
GIBRALTAR
731
960
ALGIERS
547
PORT LYAUTEY
CASABLANCA
MADEIRA
MOGADOR
AGADIR
CANARIES
860
859
188
543
PORT ETIENNE
C. VERDES IS.
198
DAKAR
BATHURST
ARUBA
CURAÇAO
TRINIDAD
COLON
GEORGETOWN
PARAMARIBO
CAYENNE
FREETOWN
C. PALMAS
TAKORADI
LAGOS
PORT HARCOURT
DUALA
505
155
190
LIBREVILLE
POINTE NOIRE
BANANA
C. SAN ROQUE
NATAL
PERNAMBUCO
BAHIA
ASCENSION
ST HELENA
RIO DE JANEIRO
129
WALVIS BAY
LUDERITZ BAY
CAPE TOWN
PORT ELIZABETH
DURBAN
LOURENCO MARQUES
MOZAMBIQUE
MOMBASSA
BUENOS AIRES
537
181
196
843
ADEN
GULF OF ADEN
SOCOTRA
GULF OF OMAN
GULF OF CAMBAY
BOMBAY
COLOMBO
REUNION
MAURITIUS
60°
40°
0°

MAP No. 65



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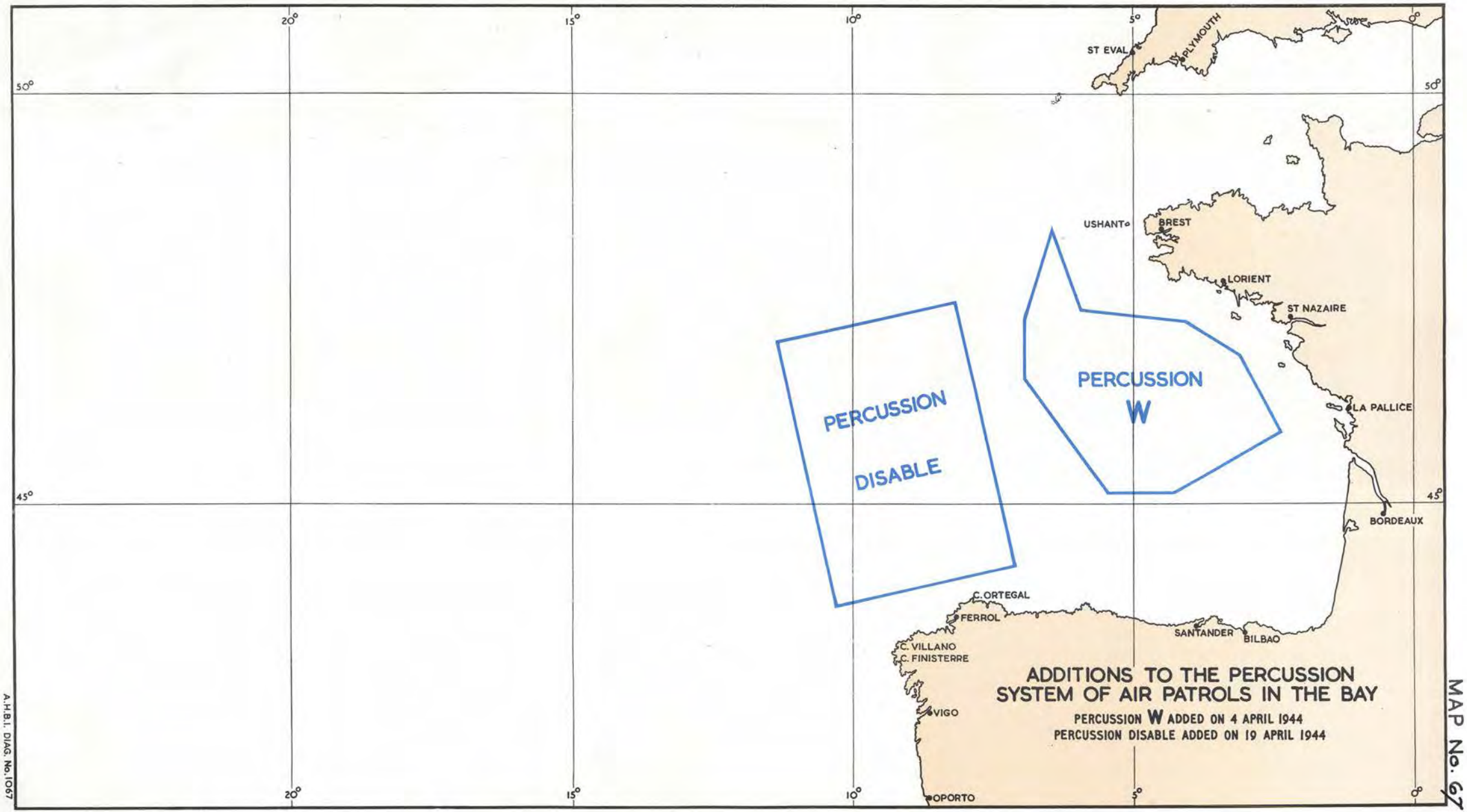
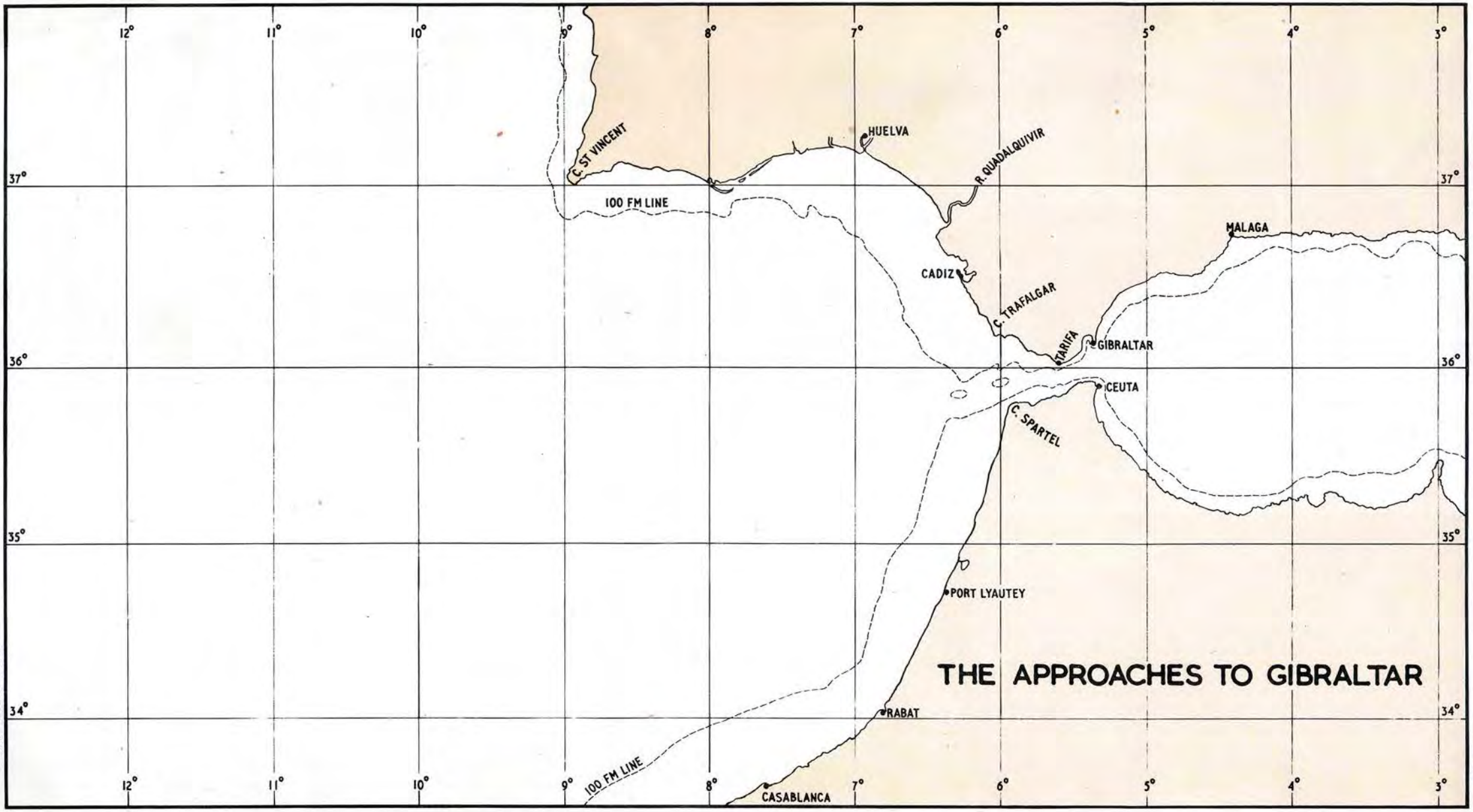


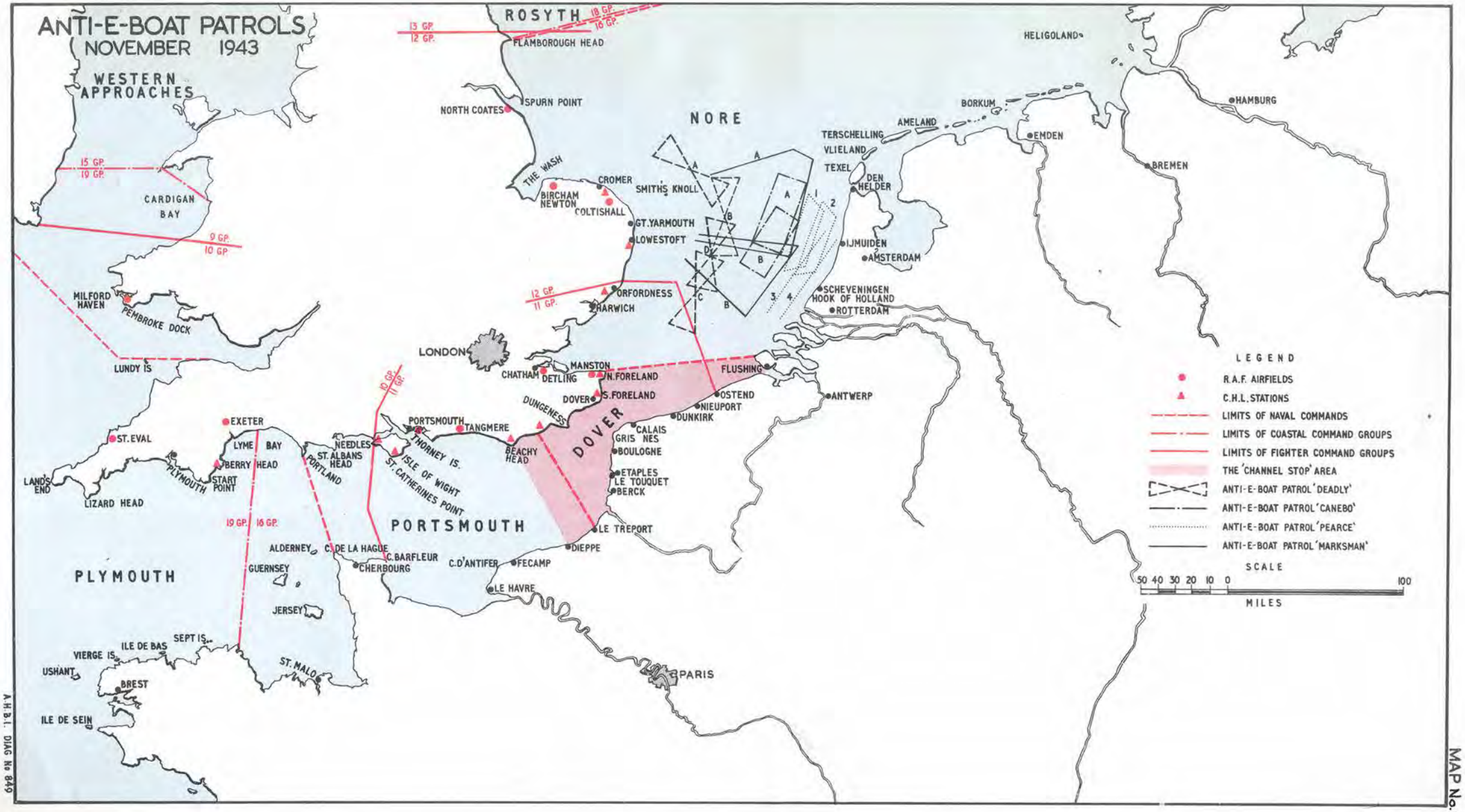
A.H.B.I. DIAG. No. 1057

MAP No. 67



A.H.B.I. DIAG. No. 1065

MAP No. 68



A.H.B.I. DIAG. No. 849

MAP No. 69