Confrontation in the Sargasso Sea: Soviet Submarines During the Cuban Missile Crisis

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Jusqu'à tout récemment, on ne savait que peu de choses au sujet des sous-marins qui faisaient partie des forces soviétiques envoyées à Cuba en 1962. Quatre sous-marins diesels armés de torpilles à ogives nucléaires furent localisés par la U.S. Navy Quarantine Force, des destroyers américains ont dû en remonter trois à la surface afin de les identifier. Deux nouveaux ouvrages, basés sur les souvenirs des sous-mariniers russes et des documents américains récemment déclassifiés, fournissent un aperçu apprécié des activités marines au cours de la crise des missiles cubains.

The perilous superpower confrontation during the Cuban Missile Crisis of 1962 included an underwater dimension which has until now been little known. Three Soviet diesel submarines were brought to the surface by the US Navy north of the Bahamas after being hunted to exhaustion. Such encounters were then unprecedented in international waters and fraught with the risk of misunderstanding by one of the units involved. In the event of a miscalculation the submarines' torpedo loads were an additional hazard. The American on-scene commanders were not aware that as part of its weapon load each submarine carried a single long-range torpedo armed with a 15-kiloton nuclear warhead. Two books published in 2002, one Russian and one American, together with recently-declassified US naval records and other archival material shed welcome light on what happened during the US naval "quarantine".[1] This paper discusses what has now been revealed.

The volatile decision by General Secretary Khrushchev and the Soviet Defence Council in May 1962 to position long-range missiles in Cuba became part of a larger plan called Operation Anadyr. A substantial naval force, including seven ballistic-missile submarines, was to be based forward in Cuba. Its first wave would be four diesel-powered Project 641 attack submarines (designated by N A T O as Foxtrot class).

Both new books - *Kubinskaya Samba Kvarteta "Fokstrotov" (A Cuban Samba by*

[1] Aleksandr Mozgovoi, *Kubinskaya Samba Kvarteta "Fokstrotov"* (Moscow, 2002), available from East View Publications (castviw@eaatvicw.com):,Peter Huchthausen, *October Fury* (Hoboken NJ.2002); William Burr and Thomas Blanton (eds.), "The Submarines Of October" (2002), posted at www, gwu.cdu/~nsarchiv/NSAEBB/NSAEBB75/.

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Four Foxtrots) and *October Fury* - focus on events as seen by participants. *Kubinskaya Samba,* a rather slim volume of 122 pages, is by Aleksandr Mozgovoi, an experienced military journalist. It is based on interviews of seventeen veteran submarine officers.[2] It in fact covers the overall evolution of the Soviet submarine force in the years leading up 1962. What happened when the four Foxtrots encountered an unforeseen massive US naval presence north of Cuba occupies about only forty percent of *Kubinskaya Samba.* The author explains that his book is based on interviews, as official records are not yet available. Because his narrative is focused on what his sources told him, Mozgovoi provides only limited operational context.

October Fury is by Peter Huchthausen, a retired US Navy captain who specialized in intelligence and served as naval attaché in Moscow at the end of the Cold War. Based on recollections of both Russian submariners and USN destroyer sailors, its value is unit-level insights from both sides. Back in the fall of 1962 Peter Huchthausen, fresh out of the US Naval Academy, was a junior officer in USS *Blandy,* one of the destroyers which brought a Foxtrot to the surface. His first-hand impressions add immediacy to his narrative. Since retiring Huchthausen has written or was co-author of several popular histories.[3] *October Fury* draws on interviews with thirteen Russian officers, including five of Mozgovoi's sources.

Huchthausen employs a novelistic style, describing the Cuban crisis in a series of brisk vignettes of high-level deliberations on both sides and what was happening more or less simultaneously in the Soviet submarines and American destroyers. He includes activities by the defence attachés of both sides. There is a lot of imagined dialogue and the emphasis is on action. Huchthausen cites no official American records but consulted several of his former destroyer shipmates and a few officers and men, mostly junior, from two other destroyers. Three footnotes in his first chapter are general references to documents in Russian archives. While the Russian book explicitly quotes participants, Huchthausen narrates their stories in the third person. Mozgovoi's account is remarkably frank and, while reflecting pride in achievements, is forthright about problems and shortcomings. That said, the concept of *vranyo,* a national form of leg-pulling or blarney deeply embedded in the

[2] Several of Mozgovoi's bearded, dignified and bemedalled sources are shown in retirement at the end of the book. Mozgovoi's interviews have been an important source of information about Soviet submarine incidents during the Cold War cited in recent English-language books. An interview in 1995 with one of the Foxtrot commanding officers was cited in the authoritative *One Hell of a Gamble* (1997) by Aleksandr Fursenko and Timothy Naftali; Mozgovoi also interviewed Russian former submariners for the American investigative journalists Sherry Sontag and Christopher Drew who produced *Blind Man's Bluff,* (New York, 1998), a sensational account about US submarine intelligence-gathering in Soviet waters.

[3] *Echoes of the Mekong* (1996) is based on Huchthausen's service in a river patrol boat in Vietnam in 1967. Because they were based on interviews with Russian officers and Russian publications his two previous books about Soviet submarines were groundbreaking English-language accounts. *Hostile Waters* (1997) recounts a crippling missile explosion aboard a submarine off Bermuda; it became the basis for a feature film of the same name. Huchthausen was technical advisor during the making of another film, "K-19: The Widow Maker" (2002) which concerned a reactor failure in the first Soviet nuclear-powered ballistic missile submarine, an incident described in his book of the same title.

Russian psyche.[4] colours the reminiscences of the Russian submariners. Both books contain far-fetched *vranyo* elements, which probably reflects their reliance on received memories of events now forty years ago.

Huchthausen narrates episodes aboard his destroyer from his perspective as an inexperienced and impressionable young officer. The portrayal of how his ship functioned is entertaining but less than positive. Just five years old, the 4,000 ton USS *Blandy* was one of the handsome Forest Sherman class large destroyers. *Blandy* carried new Mark 43 anti-submarine homing torpedoes and had the capable SQS-23 sonar but her antisubmarine depth charges and hedgehog multi-barrel mortars were obsolete. Her antisubmarine organisation and equipment for displaying and evaluating sensor information were rudimentary. *Blandy's* captain conducted his tactics from the bridge with the limited aid of a sonar display unit. Ensign Huchthausen was the bridge "talker" who relayed reports from the sonar compartment deep in the ship, where he explains, the sensor operators shivered in an overcooled compartment. He was awed by his hard-driving commanding officer, a skilled tactician "feared but respected" by his officers; "a kind and understanding father figure" in the wardroom but "savage and unpredictable" on the bridge.

The third major new fund of information, "The Submarines of October," is an extensive US National Security Archive "electronic briefing book" including documents declassified in October 1992. It incorporates USN operational records and Soviet documents in Russian and in translation. Also now available on the web is "The Naval Quarantine of Cuba, 1962," a narrative report prepared in 1963 in the Office of the Chief of Naval Operations (CNO).[5] A further noteworthy analysis is the authoritative "The 1962 Cuban Missile Crisis" by Captain Joseph Bouchard, USN.[6]

At the time of the Cuban crisis the Soviet submarine arm had been struggling for years with the challenges of bringing new technologies into operational service. Successive ambitious programs resulted in constant overstretch. Mozgovoi cites manning problems In the mid fifties resulting from the massive Project 613 (Whiskey) diesel submarine program. In 1955 alone the navy took delivery of sixty-seven of this class. They would be followed by improved conventional submarines of Projects 611 (Zulu), introduced in 1954, and 641 (Foxtrot), which appeared in 1959. Like the Whiskeys the Foxtrots had six torpedo tubes but their diving depth (280 vice 200 metres)[7] and endurance (30,000 vice 8,580 nautical miles) were substantial improvements. Soviet diesel boats undertook their first tentative submerged

[4] Ronald Hingley, *The Russian Mind* (New York, Sons, 1977), 90-98.

[5] Office of the Chief of Naval Operations (1963), "The Naval Quarantine of Cuba, 1962" (1963), posted at www.history.navy.rnil/faqs/faq90-5.htm. Another useful paper -presented at a colloquium on the crisis in Washington in June 1992 - "Some Aspects of the US Navy's Participation in the Cuban Missile Crisis," by Dr. Jeffrey Barlow of the US Naval Historical Center is now at www.members.salts.navy,mil

[6] Included in his *Command in Crisis* (New York, 1991). Bouchard's focus is on how the crisis was managed at the politico-military level in Washington. However, it includes operational aspects of the quarantine. Because of his naval aviation background, exhaustive research, including extensive interviews and correspondence with the entire naval chain of command and balanced approach, Bouchard produced a definitive account.

[7] The commanding officer of Foxtrot *B-36* , A. F. Dubivko, gives his maximum operating depth as 300 metres. "In the Depths of the Sargasso Sea", document 32 in "The Submarines of October."

operations in the mid-fifties, reaching the Equator in the Atlantic and Hawaii in the Pacific. There was much to learn, particularly about operating in tropical waters where propulsion *cooling systems and* ventilation proved only marginally effective. Difficulties were also encountered with faulty schnorkel systems (which supplied air to operate diesel engines while submerged) and electric torpedoes, which gave off toxic gases. Crews experienced health problems during long deployments; Mozgovoi cites issues such as weight loss and heart problems after prolonged submerged patrols. Design shortfalls would hamper Soviet submarines operating southwest of Bermuda in October 1962.

In 1956 two Zulus accomplished the first passage by submarines in a single season across the top of Siberia from European Russia to the Pacific. According to Mozgovoi Whiskies and Zulus were deployed during the Hungarian and Suez crises that fall. By the following year Zulus were measuring gravitational fields in equatorial waters to help calculate the trajectories of ballistic missiles and carrying out long patrols in the Atlantic to listen to western radio traffic (which Mozgovoi confirms was routine during all oceanic deployments). Under Khrushchev the USSR was extending its overseas reach. Whiskeys were based in Albania starting in 1958 and in Indonesia the following year. Mozgovoi reports that apart from a few officers, the Indonesian boats, which eventually numbered twelve, retained their Soviet crews. When Indonesia launched its confrontation with the Netherlands about West Irian (New Guinea) in the summer of 1962 the Russian crews prepared for war patrols. Fortunately the conflict was resolved without hostilities.

Meanwhile, the first nuclear submarines had entered service but were plagued with matériel problems. Twelve of twenty-eight sorties by nuclear boats in 1961 had to be cut short because of breakdowns. Submarine-launched ballistic missiles were also being developed in parallel. The first operational system was the Project 629 (Golf) diesel submarine which had to surface to fire its three ballistic missiles with a range of three hundred and fifty nautical miles. The initial test firings were in February 1962. The first Soviet submerged long-range missile firing would not be until 1964. Thus, when it was decided in 1962 to base submarines and ships forward in Cuba, the only boats available capable of firing missiles were the diesel-powered Golfs.

Along with nuclear-armed missiles the Soviets were developing nuclear-tipped torpedoes. Mozgovoi covers test firings which began in Novaya Zemlya in 1955. A test torpedo with a 20-kiloton warhead fired from a submarine into an anchorage in 1957 destroyed two target destroyers, minesweepers and other warships. The early torpedoes had depth-keeping problems. Both they and the nuclear warheads were subsequently improved. In October 1961 one of the Foxtrots sent to Cuba successfully launched a live 20-kiloton torpedo during a series of nuclear detonations of various sizes on Novaya Zemlya.

The year 1962 had started badly for the Soviet Navy. One hundred and thirty one men were killed when a torpedo exploded in a submarine in its northern base, sinking the boat and seriously damaging a second. Mozgovoi's sources said that the actual cause of the calamitous explosion was never determined. Shortly afterwards another boat had a fire in the bow compartment while alongside, and in a separate incident a sailor was killed when a missile cruiser collided in fog with a destroyer.

When it was decided to sail four Northern Fleet Foxtrots of the 69th Submarine Brigade to Mariel west of Havana, only one hundred miles from Key West, the Soviet submarine service already had experience with forward basing in Albania and Indonesia. Corporate experience had also been accumulated through the first tentative deployments of diesel submarines in distant waters. But the era in which the Soviet Navy regularly appeared on the high seas was still around the corner. The four commanding officers were tenacious and seasoned submariners. One for example had nine years of command behind him.[8] Their crews were stoic and prepared to accept hardships. But the coming operation and opposition from the US Navy would severely tax the submariners and their boats. Preparations were progressed in official secrecy although Mozgovoi says that the planned destination was widely known in the various supporting bases. The submarines departing for Cuba were crowded with extra personnel and equipment for the new base. The brigade (squadron) commander rode and his staff officers were distributed among the quartet of boats. In addition, a contingent of radio intercept operators who were to function from ashore in Cuba was embarked. *B-59* alone carried a group of nine operators and extra equipment in addition to a brigade officer and a normal complement of seventy. The original ambitious plan to follow the Foxtrot attack boats with diesel missile-firing Golfs plus cruisers and destroyers was delayed to make the naval element of the Soviet forward deployment less confrontational.[9]

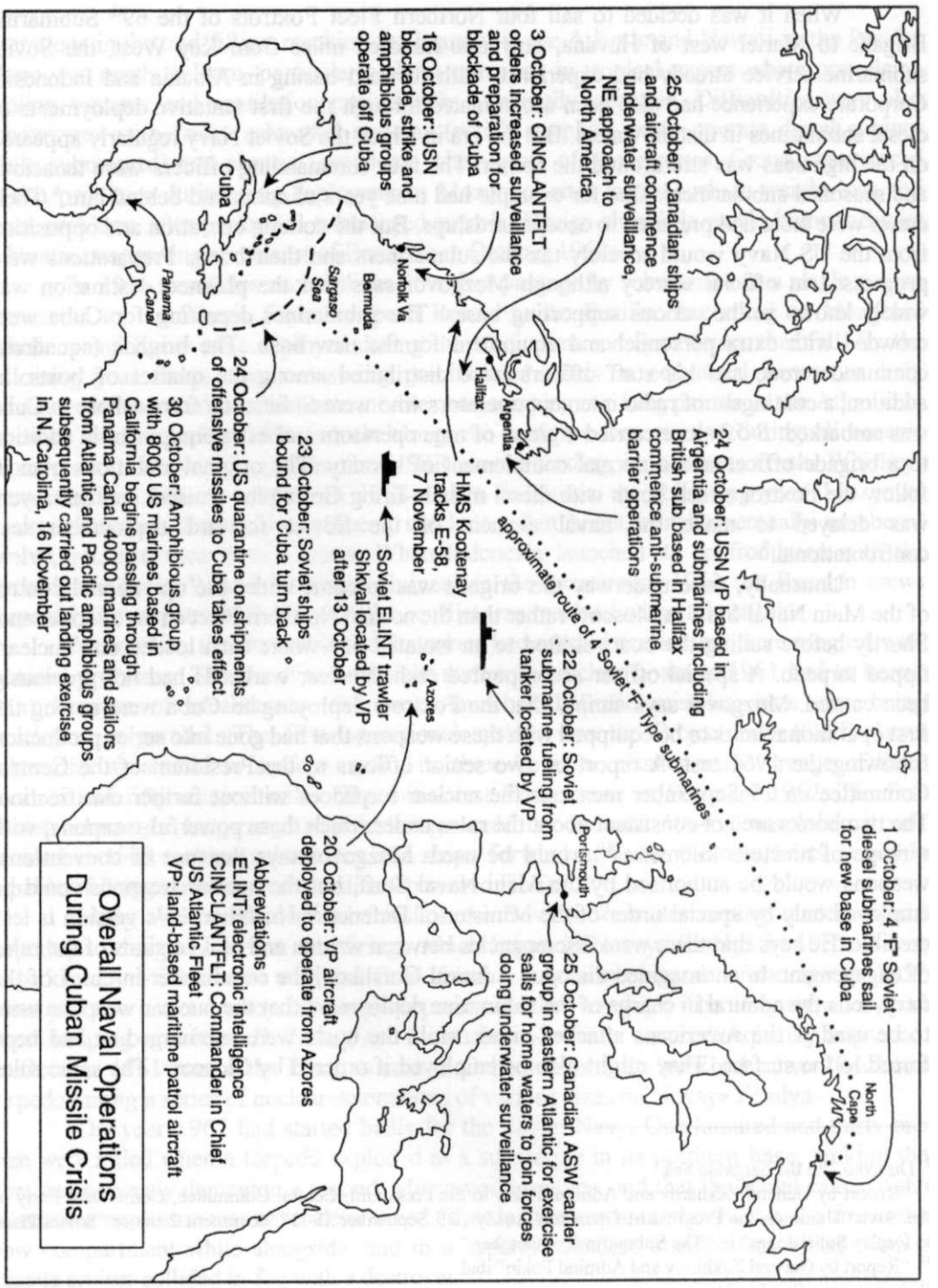
Unusually, once underway the brigade was to come under the operational control of the Main Naval Staff in Moscow rather than the normal Northern Fleet chain of command. Shortly before sailing the boats shifted to an isolated bay where each loaded one nuclear-tipped torpedo. A special officer accompanied each. Nuclear warheads had not previously been carried. Mozgovoi says simply that the Foxtrots deploying to Cuba were among the first operational units to be equipped with these weapons that had gone into series production following the 1961 test. A report by two senior officers to the Presidium of the Central Committee on 25 September mentions the nuclear torpedoes without further clarification. The two books are not consistent about the rules under which these powerful weapons, with a range of nineteen kilometres[10] would be used. Mozgovoi says that use of conventional weapons would be authorised by the Main Naval Staff, but the nuclear weapons could be employed only by special order of the Minister of Defence.[11] Huchthausen's version is less credible. He says that there were discrepancies between written and oral versions of the rules of engagement. In an imagined dialogue Admiral Gorshkov, the commander-in-chief of the navy, tells the admiral in charge of the submarine deployment that the nuclear weapons were to be used if the Americans attacked either while the boats were submerged or had been forced to the surface. They might also be employed if ordered by Moscow. The same rules

[8] Dubivko, "In the Sargasso Sea".

[9] "Report by General Zakharov and Admiral Fokin to the Presidium, Central Committee, Communist Party of the Soviet Union on the Progress of Operation Anadyr, 25 September 1962", document 2 under "Soviet Plans to Deploy Submarines" in "The Submarines of October."

[10] "Report by General Zakharov and Admiral Fokin" ibid.

[11] *Kubinskaya Samba,!* \.


1 October: 4 "F" Soviet diesel submarines sail for new base in Cuba
North Cape
24 October: USN VP based in Argentia and submarines including British sub based in Halifax commence anti-submarine barrier operations
25 October: Canadian ships and aircraft commence underwater surveillance, NE approach to North America
3 October: CINCLANTFLT orders increased surveillance and preparation for blockade of Cuba
16 October: USN blockade, strike and amphibious groups operate off Cuba
approximate route of 4 Soviet "F" Type submarines
22 October: Soviet submarine fueling from tanker located by VP
25 October: Canadian ASW carrier group in eastern Atlantic for exercise sails for home waters to join forces doing underwater surveillance
Portsmouth
Halifax
Argentia
Norfolk Va
Bermuda
Sargasso Sea
Cuba
Panama Canal
Azores
HMS Kootenay tracks E-58, 7 November
Soviet ELINT trawler Shkval located by VP after 13 October
23 October: Soviet ships bound for Cuba turn back
20 October: VP aircraft deployed to operate from Azores
24 October: US quarantine on shipments of offensive missiles to Cuba takes effect
30 October: Amphibious group with 8000 US marines based in California begins passing through Panama Canal. 40000 marines and sailors from Atlantic and Pacific amphibious groups subsequently carried out landing exercise in N. Carolina, 16 November
Abbreviations
ELINT: electronic intelligence
CINCLANTFLT: Commander in Chief US Atlantic Fleet
VP: land-based maritime patrol aircraft
Overall Naval Operations
During Cuban Missile Crisis

are subsequently briefed directly to the commanding officers shortly before sailing by the Northern Fleet Chief of Staff in another imagined dialogue. Later, however, one of the submarine commanding officers opens his package of secret instructions and reads rules about the use of the nuclear weapons which agree with the version given by Mozgovoi.[12] Both Huchthausen and Mozgovoi used interviews with this particular officer.

The Foxtrots sailed in secrecy in the early hours of 1 October. Their detailed orders were opened when at sea. Once clear of home waters they were to make covert passages at a mean speed of ten knots to Mariel, arriving as soon as possible after 20 October. The boats were to report as they reached specified way points. These instructions reflected conflicting aims because the mean speed for a covert passage was five knots. Both books record the submariners' dismay at the incompatibility between the required speed of advance and the need to remain undetected. Mozgovoi says that one boat calculated that twelve knots would be required to arrive as ordered. They counted on the stormy weather expected in October to hamper surveillance by NATO aircraft and figured that if detected the opposition would be plotting them at four to five knots rather than at their actual higher speed of advance.

On the opposite side of the Atlantic the United States administration had been monitoring the Soviet build-up in Cuba with mounting concern. On 3 October preparations began for massive military action including a possible naval blockade. One of the immediate measures was increased surveillance of the approaches to Cuba.[13] The four Foxtrots would thus encounter increased American vigilance.

Since both Mozgovoi and Huchthausen focus on events as experienced by individuals their coverage about the actual passages and surveillance by NATO forces, if any, is sketchy. Huchthausen provides better, albeit incomplete context. He points out that the SOSUS (sound surveillance system) chain of fixed passive listening stations was then comparatively new and noise data on Soviet submarines was sparse.[14] Neither book speculates on Allied eavesdropping on Soviet naval communications. By listening to radio traffic the Russian submariners were aware of Norwegian, British and American maritime patrol aircraft but believed that they remained undetected in the North Atlantic. The boats were buffeted by heavy weather and at least two suffered damage. Once the Foxtrots reached the Sargasso Sea southwest of Bermuda the weather was benign but omnipresent air cover

[12] Huchthausen, 19, 53 and 65.

[13] Forces were readied under existing contingency plans for a blockade. In the event the United States declared a "quarantine" because "blockade" was considered a wartime action. While the actual quarantine implemented on 24 October was a limited form of the contingency plan the advance preparations started twenty days earlier "greatly expedited" its execution since the forces called up under the contingency plan were used. "The Naval Quarantine of Cuba 1962," Part I, entries for 2 and 3 October; Bouchard, 90.

[14] The system was established under Project Caesar and started operating in 1956: Gary Weir, *An Ocean in Common: American Naval Officers, Scientists, and the Ocean Environment* (College Station, 2002), 308; the declassified messages report propagation conditions favourable for SOSUS. They also report that the signals obtained did not match the reference data tapes held, which suggests that in October 1962 the stations had limited experience of identifying actual acoustic signatures of Foxtrots: CTG 81.1 message 2716445Z October 62; CTG 81.1 message 311621Z October 62 and CINCLANT message 011332Z November 62, documents 11,33 and 34, "The Submarines of October."

was oppressive. The commanding officers endeavoured to operate below the thermocline (area where water temperature and sound velocity decrease markedly) to hide from aircraft-dropped sonobuoys, but this level was often below their maximum operating depth. Conditions for the submariners were harsh - Mozgovoi calls them hellish. Humidity and temperatures in the boats rose during prolonged periods submerged due to the rudimentary ventilation systems. Temperatures in the engine and motor rooms reached 60-65°C, while in the spaces furthest from the machinery they were "only" 40-45°. Fresh water was limited to two hundred and fifty grams, (one cup), per crew member per day. Infected skin rashes were general due to increased sweating and dehydration. Crew members lost one third of their body weight due to decreased appetites and took on emaciated appearances.[15]

On 22 October President Kennedy announced a naval quarantine starting on the 24th on all offensive military equipment under shipment to Cuba. It would affect all ships and craft from whatever ports and nations. Two hunter-killer groups built around ASW carriers deployed west of Bermuda and ships were positioned to enforce the quarantine line five hundred miles north of Cuba (based on the radius of the Soviet 11-28 "Beagle" bombers on the island). Two attack carriers were operating south of Cuba in readiness to strike targets in Cuba and provide air defence for the US base at Guantanamo.[16] Huchthausen's destroyer was sailed hurriedly from Newport on 22 October; just hours after returning to harbour and granting leave. Other ships had left Norfolk earlier, including the destroyer *Charles P. Cecil.* Huchthausen's account includes organisational details which suggest that some US destroyers were poorly prepared for unexpected departures. *Cecil* got underway in mid-afternoon on Sunday, 21 October, twenty-four hours later than originally intended. Recalling the crew was apparently a major problem because it had been decided not to make announcements on the radio so as to avoid alarming the public. The shore patrol was used to track down libertymen. *Cecil* eventually sailed with only two hundred of her 350-man crew but with one hundred men borrowed from other destroyers aboard.[17]

The Russian Foxtrots were eventually ordered to turn back and allocated to 25-mile radius patrol areas northeast of Cuba. The various sources do not clarify this decision. There are two unanswered questions. The first is whether all boats were ordered simultaneously to break off their passages and proceed to patrol areas. The second is whether the change was intended to position the Foxtrots to defend the Soviet sealift ships if necessary in reaction to increasing US activity, or whether it was prompted by the quarantine to come into effect on 24 October.[18] Huchthausen does not clarify this issue and Mozgovoi records only vaguely that particular submarines were ordered to new patrols. According to Huchtausen, *B-130*

[15] Dubivko, 9; Mozgovoi 79,92. Fortunately, this boat had extra rations of stewed fruit that also provided liquids.

[16] Barlow, 12; Bouchard 91.

[17] The President decided on a limited blockade on Saturday afternoon 20 October. Why ships earmarked for the blockade but alongside that weekend were not at a higher state of readiness is obscure. Bouchard, (90), discusses how preparations ordered 3 October for military action against Cuba were to have been complete by the 20th.

[18] When on 22 October the Soviet Presidium first discussed the draft of President Kennedy's quarantine speech it was decided that the "four submarines must continue their cruise...". In other words they would not be recalled.

received a message as early as 15 October ordering the four boats to form a barrier due north of the Turks Island Passage, i.e. to the northeast of the Bahamas on the Atlantic side of Cuba. Moscow had been providing no news or intelligence. The commanding officer instructed his communications officer to start tuning to American commercial broadcasts. Shortly afterwards, another boat, *B-36,* was ordered through the Caicos Passage in the eastern Bahamas on 20 October. Because of the transparent water in this choke point the commanding officer decided to find a merchant ship making the transit and to hide underneath. After this was successfully accomplished *B-36* was assigned a patrol area back out in the Sargasso Sea and instructed to return through the Caicos Passage. The Foxtrot once again used a passing merchant ship to avoid detection. A third boat, *B-4,* having passed through the Windward Passage east of Cuba on 20 October, was only a day short of Mariel when ordered to a patrol area.

Declassified information concerning early American intelligence about Soviet submarines is incomplete. By mid-October the electronics intelligence (ELINT) trawler *Shkval* had been located by patrol aircraft in the western Atlantic and was being kept under surveillance.[19] Similarly, a Russian naval auxiliary tanker had been under constant surveillance while making for the mid-Atlantic. On 22 October a USN patrol aircraft photographed her fuelling *B-75,* a Zulu type diesel boat, northwest of the Azores. Triggered by the sighting, American anti-submarine air patrols were increased.[20] That same day the CIA reported that four Soviet boats could reach Cuba within a week and the CNO issued a warning about possible underwater attacks on carriers and other high-value targets.[21] The submarine spotted while fuelling in mid-Atlantic had been sailed from the Kola Peninsula in the second half of September to carry out reconnaissance and report on warship movements along the American Eastern Seaboard. Mozgovoi says that for the first time she had loaded two nuclear-tipped torpedoes. The Zulu worked her way south, hugging the three-mile limit of the US territorial sea, eventually reaching the Windward Passage. *B-75* was then ordered to a new patrol area to parry potential attacks on a Soviet vessel carrying nuclear warheads to Cuba.[22] Mozgovoi explains this boat was later instructed to remain in the Sargasso Sea southwest of Bermuda to give the four Foxtrots warning of American movements. Before reUirning home *B-75* needed fuel.

In addition to the spectre of Soviet submarine operations from Cuba the US administration was particularly concerned that they could be transporting nuclear missile warheads to the island. The quarantine was worded to cover "any ship or craft." At the time there were no internationally understood procedures for contacting unidentified submarines.

[19] Barlow, 12.

[20] "The Submarines of October," document 12, CINCLANT message report to JCS "Summary of Soviet Submarine Activities in Western Atlantic to 271700Z."

[21] "Chronology of Submarine Contact During the Cuban Missile Crisis", Part TV of "The Submarines of October," entries for 22 October 1962. The same document shows that a Soviet tanker "likely to play a role in replenishing Soviet submarines" had been sighted in mid-Atlantic on 18 October.

[22] Report by General Zakharov and Admiral Fokin, *ibid.* This document says that *B-75* had twenty-two torpedoes but does not specify whether nuclear-tipped weapons were included but this could be an oversight. Mozgovoi's source was the commanding officer.

The US Navy devised a unique set of signals which were promulgated by a notice to mariners.[23] Unidentified submarines detected in the quarantine area would be contacted on underwater telephone or signaled by explosive charges to surface steering a safety course of East. President Kennedy was deeply concerned about the use of explosives by the blockading forces and the dangers of misunderstandings. "Those few moments were the time of greatest worry to the President" Attorney General Robert Kennedy noted when explosive charges were discussed during a review of countering the submarine threat.[24] The Soviet government was notified on 23 October about the surfacing procedures.[25] Huchthausen reports that they were indeed relayed on Moscow's submarine broadcast on 25 October.

When below schnorkel depth the Foxtrots used batteries to supply power to electric propulsion motors. Accumulations of mildly toxic battery gases spread into all compartments during prolonged periods submerged. These batteries had to be charged using the diesel engines, which required drawing air through a schnorkel while dived, or ingesting directly on the surface. Adequate ventilation was critical because charging the batteries produced hydrogen fumes. The battery ventilation systems in Soviet boats were crude compared with those in western submarines. Although charging while schnorkelling meant exposing a far smaller target for radar or visual detection, fumes could be evacuated far more effectively on the surface where additional air could be drawn in to supplement the limited ventilation system. The amount of air being ingested while schnorkelling was another limitation. The schnorkel could draw in only sufficient air to run two of the three diesels. One would drive the boat while the other charged. By contrast, charging on the surface could be at a higher rate because two or even all three of a Foxtrot's diesels could be used so that far less time was needed to bring the batteries up to capacity. For both of these reasons - improved ventilation and faster charging - commanding officers were tempted to charge their batteries on the surface at night, which made them vulnerable to detection, particularly by patrolling aircraft.[26] Water temperatures in the tropics were another factor which prolonged charging. The Foxtrot battery cooling systems were satisfactory in their normal operating areas where the sea water temperature was 6-7°C. Now with water temperatures at 26-27°, cooling was far less effective so that the charging rate had to be reduced.[27]

Communication between the western Atlantic and Moscow proved tenuous. Mozgovoi explains that Moscow stuck to an inflexible submarine broadcast schedule. Receiving messages involved coming to periscope depth and putting an antenna above the

[23] Bouchard, 119-121. The new procedures were transmitted to the US fleet five hours before the quarantine went into effect.

[24] "Excerpt from meeting of the Executive Committee (Excom) of the National Security Council, 10:00 A.M. - 11.15 A.M., 24 October 1962, "The Submarines of October," document 1 under "Cables, reports, deck logs and after-action reports on US ASW operations."

[25] "Chronology of Submarine Contact During the Cuban Missile Crisis," entry for 23 October.

[26] The commanding officer of *B-36* recorded that his preferred method of charging was to remain stationary on the surface. Relying on his radar emission detector to give warning of patrol aircraft, he would be forced to submerge up to six times a night. Dubivko, 13.

[27] Mozgovoi, 81.

surface daily at 1600 (midnight Moscow time) for the broadcast. At least one of the Foxtrots requested without success that the broadcast time be changed to match darkness in the western Atlantic. When they started encountering unexpected levels of surveillance the commanding officers became particularly anxious about not missing the broadcast times. The submarines also had problems in reporting by radio to Russia, presumably because of the frequencies available and equipment limitations. The commanding officer of Foxtrot *B-36* recalls that after being surfaced it took forty-eight attempts to clear a radio report successfully.[28]

Three of the four Foxtrots were eventually brought to the surface northeast of the quarantine line. They essentially ignored surfacing signals but were held tenaciously by US destroyers. Ultimately they had to come up to replenish air, charge their batteries or because of mechanical problems. *B-59,* the first, was sighted by a land-based patrol aircraft on the surface at dusk three hundred and fifty miles southwest of Bermuda on 25 October. Relays of patrol aircraft commenced searching the area for what was designated as contact C-19. Hunter-killer group Alfa, a crack anti-submarine unit built around the ASW carrier *Randolph,* started to close.[29] One of *Randolph's* Tracker ASW aircraft laid sonobuoys in squally weather in darkness early on 27 October and detected *B-59.*[30] Successive groups of Trackers intermittently held the submarine on sonobuoys and confirmed the contact using their magnetic anomaly detectors (MAD) which registered fluctuations in the earth's magnetic field. They started dropping explosive charges to signal the submarine to surface to identify herself. In mid-afternoon a Tracker sighted a schnorkel which promptly disappeared but the aircraft regained contact on sonobuoys. Three Sea King ASW helicopters joined and promptly gained contact using their dipping sonars. Next to arrive were three destroyers which in turn also gained sonar contact. All three destroyers dropped the prescribed charges.[31] Mozgovoi was told that *B-59* had experienced various defects. The diesel cooling system was contaminated by salt water; packing glands leaked and the electric air compressors broke down. The submarine was charging on the surface when an aircraft was sighted and dived with, Mozgovoi says, only a low charge. The Russians eventually

[28] Dubivko, 12. This event is also related by Mozgovoi.

[29] Task Group Alfa was a permanent organisation charged with developing new ASW tactics and procedures. In its development work it normally had generous dedicated resources including an ASW carrier group, a squadron of shore-based patrol aircraft and two submarines.

[30] "Narrative by CDR. D. Millsaps, USN, VP-36, Plane Commander of S2F-3 side number JT 43 concerning participation in prosecution of contact C-19." The aircraft commander's report shows that his launch was initially delayed for two hours because of low visibility; he and his crew were finally catapulted from the carrier "into an extremely black, rainy night" and flew one hundred and fifty miles to join the patrol aircraft. Interestingly, he sighted the Soviet electronic intelligence (ELINT) trawler *Shkval* near the estimated position of the submarine. *B-59* apparently was unaware of having being detected and remained on the surface in heavy rain squalls until sighted around 0900 by one of the next relay of Trackers from *Randolph;* she then dived. "Narrative by LTJG William Moroney, Plane Commander of S2F-3 side number JT26, concerning participation in prosecution of contact C-19", both in "Carrier Division Sixteen, Report of ASW Barrier Operations During Cuban Missile Crisis by Group Built Around Randolph," document 47, "The Submarines of October."

[31] Deck Log Books of USS *Beak, Cony* and *Bache,* 27 October 1962, documents 13,14 and 15, "The Submarines of October."

heard surface ships corning to hunt for them and counted fourteen.[32] Because of the low battery charge only emergency ventilation was functioning. Conditions became extremely taxing with very high humidity. Crew members started fainting as carbon dioxide concentrations in the boat approached the danger level. After being held submerged in what felt like a "steel box" for eighteen hours by Trackers, helicopters and now destroyers, the submarine commanding officer reacted to the ominous hail of grenades by concluding that hostilities may have started. Even though he had received the US surfacing procedures via Moscow's submarine broadcast the captain ordered the nuclear-tipped torpedo to be prepared for use. After discussion with the brigade chief of staff who was sharing command, the commanding officer then changed his mind and surfaced in darkness on the evening of 27 October.[33] *B-59* replied enigmatically "Korabl (ship) X" when asked "what ship?" by flashing light.[34] Five destroyers soon ringed *B-59* as aircraft and helicopters conducted numerous photo runs and illuminated using bright lights, which must have felt like harassment.[35] The Russians heard *Randolph* report that she was departing for Norfolk because of a boiler problem. *B-59* was accompanied for forty-eight hours; eventually only a single destroyer remained. The Russian commanding officer flooded down so that he was ready to submerge. His crew had fashioned a dummy radar target with numerous angles to provide echoes out of packing cases. *B-59* was taken down vertically while it was still daylight on 29 October and eluded the destroyer.[36] The log of the destroyer *Barry* records cryptically "1814 Submarine... submerged without warning." The US records show that *B-59* was tracked intermittently moving eastwards by patrol aircraft using radar and sonobuoys

[32] As *Randolph* was only thirteen miles distant they may in fact have heard the entire group which numbered the carrier and eight destroyers.

[33] *B-59's* captain is no longer alive and the brigade chief of staff was not among the sources used by Mozgovoi and Huchthausen. The Russian version of events is based on reminiscences by V.P. Orlov, then a young communications intelligence officer in charge of a group of radio intelligence operators being sent out to Cuba. Orlov's account says that the explosions which triggered his captain's loss of temper sounded more powerful than earlier ones. Possibly they exploded closer because they were dropped by destroyers in direct contact overhead, in contrast to the earlier charges from helicopters and aircraft. Aircraft used practice depth charges (PDCs) with roughly the same explosive charge as the grenades dropped by ships. Both were routinely used in exercises with US submarines.

[34] Deck log, USS *Cony,* entry 2120 27 Oct 62. After all three surfacings the Foxtrots replied when asked by the US destroyers that no assistance was required. Mozgovoi's account has all three submarines telling the American ships to desist from provocative actions; both books recount how one of the destroyers entertained *B-59's* bridge watch with a jazz group. While *Cony's* log does not include this event, Huchthausen (170) recounts that *B-59's* captain asked the destroyer for bread and cigarettes, which were then passed by light-line. Mozgovoi does not include such a transfer, which is almost certainly apocryphal.

[35] Illumination runs are recorded in ships' logs and the CARDIV 16 post-flight reports. Mozgovoi was told that Trackers strafed the submarine's wake using machine guns. This is not credible, as Trackers did not carry these weapons. They had wing-mounted rockets but the post-flight reports do not mention such firings. "Carrier Division Sixteen, Report of ASW Barrier Operations".

[36] Mozgovoi, 91.

until 6 November.[37]

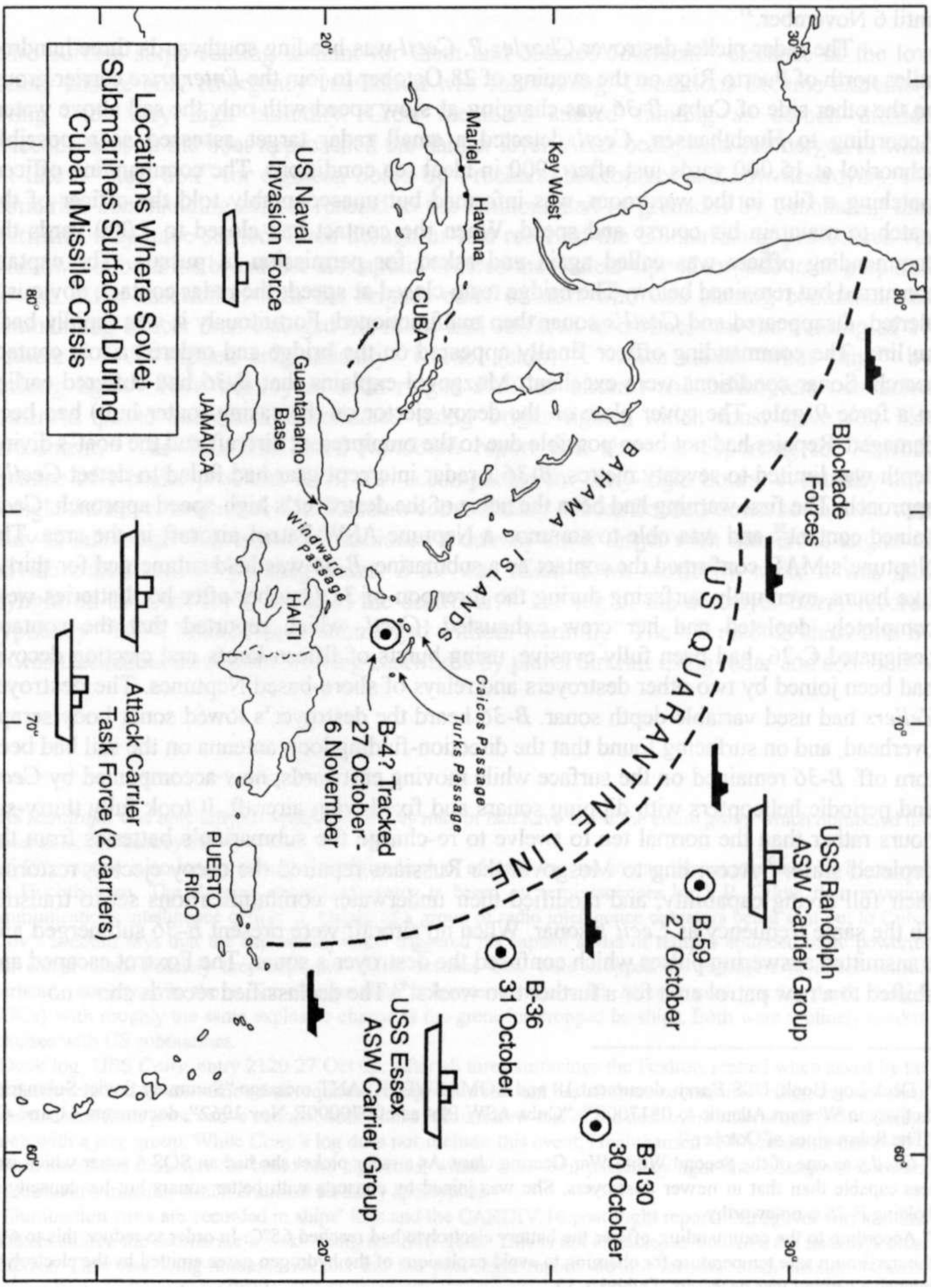
The radar picket destroyer *Charles P. Cecil* was heading southwards three hundred miles north of Puerto Rico on the evening of 28 October to join the *Enterprise* carrier group on the other side of Cuba. *B-36* was charging at slow speed with only the sail above water. According to Huchthausen, *Cecil* detected a small radar target assessed as a possible schnorkel at 15,000 yards just after 1900 in ideal sea conditions. The commanding officer, watching a film in the wardroom, was informed but unaccountably told the officer of the watch to maintain his course and speed. When the contact had closed to 7,000 yards the commanding officer was called again and asked for permission to pursue. The captain concurred but remained below. The bridge team closed at speed; the radar contact, obviously alerted, disappeared and *Cecil's* sonar then malfunctioned. Fortuitously it was rapidly back on line. The commanding officer finally appeared on the bridge and ordered a lost contact search. Sonar conditions were excellent. Mozgovoi explains that *B-36* had suffered earlier in a force 9 gale. The cover plate on the decoy ejector on the casing (outer hull) had been damaged. Repairs had not been possible due to the omnipresent aircraft and the boat's diving depth was limited to seventy metres. *B-36's* radar intercept gear had failed to detect *Cecil's* approach. The first warning had been the noise of the destroyer's high-speed approach. *Cecil* gained contact[38] and was able to summon a Neptune A S W Patrol aircraft in the area. The Neptune's M A D confirmed the contact as a submarine. *B-36* was held submerged for thirty-five hours, eventually surfacing during the forenoon of 31 October after her batteries were completely depleted and her crew exhausted. *Cecil,* which reported that the contact, designated C-26, had been fully evasive, using bursts of fifteen knots and ejecting decoys, had been joined by two other destroyers and relays of shore-based Neptunes. The destroyer *Zellers* had used variable-depth sonar. *B-36* heard the destroyer's towed sonar body scrape overhead, and on surfacing found that the direction-finding loop antenna on the sail had been torn off. *B-36* remained on the surface while moving eastwards, now accompanied by *Cecil* and periodic helicopters with dipping sonars and fixed-wing aircraft. It took fully thirty-six hours rather than the normal ten to twelve to re-charge the submarine's batteries from the depleted state.[39] According to Mosgovoi the Russians repaired the decoy ejector, restoring their full diving capability, and modified their underwater communications set to transmit on the same frequency as *Cecil's* sonar. When no aircraft were present *B-36* submerged and transmitted answering pulses which confused the destroyer's sonar. The Foxtrot escaped and shifted to a new patrol area for a further two weeks.[40] The declassified records show no

[37] Deck Log Book, USS *Barry,* document 18 and C O M A S W F O R L A N T message "Summary Soviet Submarine Activity in Western Atlantic to 051700Z"; "Cuba A S W Plot as of 070000R Nov 1962", documents 41 and 47, "The Submarines of October."

[38] *Cecil* was one of the Second World War Gearing class. As a radar picket she had an SQS 4 sonar which was less capable than that in newer destroyers. She was joined by consorts with better sonars but her tenacity in holding *B-36* is noteworthy.

[39] According to the commanding officer the battery electrolyte had reached 65°C. In order to reduce this to 60°, the maximum safe temperature for charging to avoid explosions of the hydrogen gases emitted by the electrolyte, intensive venting was necessary. Dubivko, 12.

[40] Mozgovoi, 889.


Locations Where Soviet Submarines Surfaced During Cuban Missile Crisis
US Naval Invasion Force
Key West
Mariel
Havana
CUBA
Guantanamo Base
JAMAICA
BAHAMA ISLANDS
Windward Passage
HAITI
Caicos Passage
Turks Passage
B-4? Tracked 27 October - 6 November
PUERTO RICO
Attack Carrier Task Force (2 carriers)
US QUARANTINE LINE
Blockade Forces
USS Randolph ASW Carrier Group
B-59 27 October
B-36 31 October
USS Essex ASW Carrier Group
B130 30 October
20°
30°
80°
70°
60°

further contact with C-26.

B-130 was the third Foxtrot brought to the surface. An amphibious Marlin patrol aircraft flying out of Bermuda sighted a schnorkel four hundred and twenty miles north of Puerto Rico on 24 October. This was designated as C-18 and relays of aircraft searched the area. A Tracker from the ASW carrier USS *Essex* spotted *B-36* mid-day on 26 October, took photographs, and then observed her dive.[41] Ongoing searches by ships and aircraft of Task Group Bravo, the *Essex* hunter-killer group, plus land-based patrol aircraft were rewarded late on 29 October when, Huchthausen recounts, an Orion patrol aircraft gained fleeting visual and radar contact. Ensign Huchthausen's destroyer *Blandy,* only fifteen miles distant, closed and commenced searching with the aircraft. Early on 30 October *Blandy* detected *B-130* on the surface by radar in squally conditions. On hearing *Blandy* closing the submarine dived, narrowly missing being struck as she descended. Huchthausen explains how *B-130* operated at one hundred and fifty metres below the thermocline to try to evade detection. *Blandy* was joined by two other destroyers and Trackers and Sea Kings from *Essex.* The Foxtrot used decoy targets and according to Huchtausen went to two hundred and fifty metres, finally surfacing after more than fourteen hours. Huchthausen emphasizes the risks of misunderstandings by explaining that *Blandy's* sonar operators initially classified the decoys as torpedoes, causing the commanding officer to prepare firing anti-submarine homing torpedoes and hedgehog. As the submarine came to the surface an over-eager sailor trained one of *Blandy's* gun mountings on *B-130;* the submarine captain in turn prepared to fire torpedoes. *B-130* had serious engineering problems as all three diesels were unserviceable on surfacing and her batteries, at the end of their service life, were painfully slow to charge. She requested a tug and crept away on the surface towards a rendezvous off the Azores. *B-130* was eventually towed home.

The fourth Foxtrot, *B-4,* had made the quickest passage, going through the Windward Passage east of Cuba on 20 October, and was less than twenty-four hours from Mariel when ordered to take up a patrol position. Huchthausen says that *B-4* retraced her passage back along the southern coast of Cuba and then used the Turks Passage through the eastern end of the Bahamas to return to the Sargasso Sea. Both Huchthausen and Mozgovoi were told that *B-4* was subjected to a prolonged search by aircraft employing Jezebel and Julie (listening passively on sonobuoys and listening after dropping explosive charges to bounce noise off submerged objects respectively). In Mozgovoi's narrative *B-4* had been charging on the surface at night. Towards morning an aircraft radar was detected and the commanding officer promptly dived. Huchthausen explains how *B-4,* the only Foxtrot not eventually brought to the surface, remained below the thermocline.[42] For this reason, and because Mozgoivoi gives no dates it is difficult to correlate *B-4* with the various contacts tracked by US aircraft and ships and SOSUS. Examination of the contemporary contact reports included in "The Submarines of October" suggest that *B-4* best equates to C-23, a

[41] COMASWFORLANT 241610Z message to TG 81.5, 24 October 1962; CTG 136.5 *{Essex* ASW Group) 261412Z message to COMASWFORLANT 26 October, "The Submarines of October" documents 2, and 7 respectively.

[42] *B-4* was the only boat with a new RG-10 passive sonar which had superior range. Huchthausen, 239.

Foxtrot photographed by an aircraft on the surface east of Turks Island on 27 October. C-23 was tracked intermittently between 27 October and 6 November by SOSUS and aircraft using Jezebel and Julie.[43]

The Cuban crisis apparently triggered a Soviet submarine response in the Pacific. Mozgovoi cites a patrol by a Pacific Fleet Zulu, *B-88,* which was sailed from Kamchatka on 28 October to operate off Pearl Harbor. *B-88* was also equipped with one nuclear-armed torpedo. Arriving off the American base on 10 November, *B-88* then had her patrol extended to record noises emitted by the new nuclear-powered carrier USS *Constitution,* remaining off the Hawaiian Islands for twenty-five days.

By mid-November the Soviet missiles destined for Cuba were being returned to Russia and the three Foxtrots still on patrol were ordered home. The deployments to Cuban waters had been arduous but persistence and ingenuity had overcome various equipment problems. Mozgovoi relates how two of *B-36's* diesels broke down towards the end of her time on patrol. The submarine's engineers rebuilt one, and later when fuel ran out close to home substituted lubricating oil mixed with water.[44] According to both Mozgovoi and Huchthausen the commanding officers recounted that their post-patrol recommendations were not welcome. While certain mechanical defects were subsequently corrected in other Foxtrots, the commanding officers told Mozgovoi that there was no systematic effort to study the lessons learned and to apply them to future operations.[45]

Many tantalising questions remain despite the recently declassified documents and the books by Mozgovoi and Huchthausen. Was *B-75* the only Soviet submarine carrying out reconnaissance in the Western Atlantic? Were any Golf diesel-powered ballistic missile boats positioned off the US East Coast? A report by the CNO compiled after the crisis notes "An unprecedented number of eleven submarines had been identified outside of Soviet home

[43] COMASWFORLANT 051920Z message to CTG 81.0, "Special Report of the CNO Submarine Contact Evaluation Board as of 8 November 1962"; "Cuba ASW Plot as of 070000R Nov 1962: documents 41,40 and chart 47 in "The Submarines of October;" Huchthausen (map, 132) equates *B-4* with C-21, a contact south of Jamaica on 2 November. This location does not square with *B-4's* reported use of the Windward and Turks Passages east and northeast of Cuba and probable patrol assignment north of Cuba. According to the declassified documents C-21 was held intermittently by various units and there was low frequency noise and visual evidence that it may have been a nuclear boat.

[44] Dubivko also relates these incidents, 14-15. According to him mixing lubricating oil and water was an old trick passed on from by wartime Russian submariners.

[45] Mozgovoi, 107. Of the commanding and brigade officers involved only the chief of staff eventually became an admiral. Vadim Orlov, a young intelligence specialist taking passage in *B-59* also retired as a Vice-Admiral. While Mozgovoi's sources were disappointed by the lack of official recognition given to their accomplishments and apparent unwillingness to extract lessons learned they did in fact brief the First Deputy Minister of Defence, Marshal Grechko and senior officers of the Armed Forces General Staff in Moscow in January 1963. Mozgovoi (109-110) account shows that Grechko, although poorly informed about submarines, asked probing questions. The briefing may have had a long-term impact as in a recent paper Professor Evan Mawdsley, "The Russian Navy in the Gorshkov Era" in Phillips O'Brien (ed.), *Technology And Naval Combat* (London, 2001), 181, cites evidence that when Grechko became Minister of Defence in 1967 he paid more attention to the problems of the navy based on the problems which had become apparent off Cuba in 1962.

waters."[46] This is almost certainly more than the actual number, but whether it was based in part on sensitive sources such as intercepts of radio traffic has not been disclosed. During the crisis Canadian maritime forces actively carried out surveillance in the area of national responsibility under bilateral defence plans. Peter Haydon's 1993 study of the missile crisis drew on contemporary Canadian naval records and cites contact E-58 that was tracked by aircraft slowly closing the US Eastern Seaboard three hundred miles southeast of Nova Scotia 23-28 October.[47] The recently declassified US documents include the Canadian reports on E-58.[48] This contact was subsequently reported by a Canadian Tracker on 2 November. The destroyer HMCS *Kootenay* held firm sonar contact on E-58 for four and a half hours forty miles east of Cape Cod on 7 November. Two separate US aircraft confirmed the contact using MAD.[49] However, the identity of E-58 remains an unanswered question.

Several conclusions can be drawn about the effectiveness of both the Soviet diesel submarines and American anti-submarine concepts of the time. The Foxtrots were ill-suited for operations in tropical waters. Because of inadequate battery cooling their commanding officers charged on the surface where they were far more vulnerable to radar detection rather than while schnorkelling. Poor ventilation coupled with very limited fresh water caused hardship and debilitating health difficulties. The Russian submariners coped resourcefully with dreadful conditions and equipment breakdowns. The Foxtrots were poorly served by information from Moscow but exploited American naval communications and commercial broadcasts fully. Once held by US destroyers their commanding officers doggedly remained submerged until crews and batteries were exhausted. The destroyers reported that the submarines had sporadically tried evasive tactics.[50] The three Foxtrots brought to the surface were hampered by their technological limitations but once their batteries had been re-charged and their crews refreshed two submerged and evaded destroyers that had been in close proximity.

On 30 October the CNO noted that the "Soviets are providing excellent submarine services" for American ASW forces.[51] At the time Soviet missile-armed submarines, which had to surface to fire their weapons from within a few hundred miles offshore, were a strategic threat to North America. They were countered by a "barrier" anti-submarine

[46] "The Naval Quarantine of Cuba," Part TV: "Abeyance and Négociation (sic) 31 October-13 November." Entry for 31 October. The entry continues: "At least four Russian 'F' class submarines were operating in the area east of the Bahamas. All of these had been sighted on the surface at least once." Bouchard (124) was told that there were normally two or three Soviet submarines in the Caribbean but the basis for this number is not given.

[47] Peter Haydon, *The Cuban Missile Crisis: Canadian Involvement Reconsidered* (Toronto, 1993), 144, 147. Interestingly, the ubiquitous electronic intelligence trawler *Shkval* appeared southeast of Cape Cod on 1 November and tracked northeast through the area under ASW surveillance, eventually passing through the US/Canadian SUBAIR barrier being maintained by patrol aircraft south of Newfoundland on 6 November. Haydon, situation chartlets between pages 154 and 155.

[48] "Cuba ASW Plot as of030000R Nov 1962": chart 42, "The Submarines of October."

[49] "The Canadian Navy and the Cuban Missile Crisis" (2002), video available from Policy Publishers, PO Box 74001, Ottawa, On, K I M 2H9. This video is narrated by three officers involved, including *Kootenay's* captain and the weapons officer.

[50] Bouchard, 123.

[51] "The Naval Quarantine of Cuba, "Quarantine 27-30 October," entry for 30 October.

concept, an integrated and layered defence in the main ocean approaches, involving surveillance and response by SOSUS, patrol aircraft, anti-submarine carriers, ships and submarines all operating together under a shore headquarters. This barrier concept was essentially applied against the four Foxtrots. From the perspective of the hunters the successful operation in October underlined that massive resources were required for barrier ASW. One hundred and eighty-three ships had been involved in the quarantine[52] plus patrol aircraft flying from Guantanamo Bay Cuba, Puerto Rico, Bermuda and Florida. Apart from periodic squally weather which on occasion restricted night launches, environmental factors were close to ideal for surveillance and tracking. Sonar and SOSUS conditions were excellent sonar and the low sea states meant that radar targets were not obscured by sea clutter. Aircraft located three of the Foxtrots, thus demonstrating again their advantages in searching large areas during operations against au-breathing submarines. Aircraft also inhibited the submarines from coming to the surface. But it was more than generous resources and benign conditions which enabled success. The operational records show that the forces involved were well-trained in ASW. Techniques for destroyer/aircraft co-operation, including timely passing of search and contact information, appear to have functioned well. There were successful uses of active and passive location using aircraft-dropped sonobuoys as well as by MAD, all of which required a high degree of operator proficiency. The declassified records show the role of SOSUS information in surveillance. Once US activity intensified southwest of Bermuda the Foxtrots apparently did not schnorkel much as they were either charging on the surface or operating deep. Because they were not schnorkeling they were producing fewer distinctive noise signatures which could be detected by SOSUS.[53] While the anti-submarine barrier forces located all four Foxtrots, this was achieved against submarines which were operating on the surface relatively extensively. The quarantine proved a severe test for USN communications as radio broadcasts were swamped by an unprecedented volume of traffic. Crucial messages did not reach ships at sea. Single sideband (SSB) high frequency voice transmissions (both clear and encrypted) were then relatively new. Single sideband offered the great advantage of passing secure information instantaneously by voice, thus avoiding the delays inherent in preparing radioteletype or radio telegraph messages. However, during the crisis HF/SSB was degraded by radio propagation problems.[54]

The events of October 1962 happened when air-breatriing submarines were no longer the most serious underwater threat. The diesel submarines sent to Cuba were

[52] "The Naval Quarantine of Cuba." "Stand Down and Conclusion," 4. The nuclear carriers *Independence* and *Enterprise* had remained underway for thirty-six and thirty-two consecutive days. An average of 46 ships, 240 aircraft and some 30,000 personnel were involved directly in locating ships in- and outbound from Cuba. Barlow, 4.

[53] CTG 81.1 Message 271645Z of 27 October CTG 81.1 Message 311621Z to CTF 81, 31 October, "The Submarines of October," documents 11 and 33.

[54] The Crisis marked a watershed because modern communications now made centralised command and control from Washington possible. Top-level civilian authorities paid close attention to naval operations in support of the President's political objectives. Bouchard, 97-99.

obsolescent. The Soviet Union was already building a large fleet of nuclear-powered boats which could remain submerged. Moreover, the Soviets soon introduced submerged-launch missile systems with greatly improved ranges. The barrier concept of attempting to pounce on surfaced missile submarines then lost its validity. Area anti-submarine warfare techniques would be transformed within a few years as passive systems to detect noises emitted by submarines became preeminent. Although still capable of deploying sonobuoys or locating periscopes, aircraft would lose much of their clout in area surveillance. They would be most effective when "cued" to search a relatively small area.

During the Cuban crisis of 1962 naval units of both sides came into close confrontation on an unprecedented scale. Potentially catastrophic misunderstandings were avoided through prudent actions by Russian and American commanding officers. The operation proved arduous for the Project 641 Foxtrots because they were poorly suited for submerged operations in tropical waters. The US was already carrying out increased surveillance when the Soviet submarines arrived northeast of the Bahamas. Since the information they were receiving from Moscow on the unexpected heavy surveillance and underlying political developments was sparse the submariners relied on intercepted American naval communications and commercial broadcasts. Rather than schnorkelling the Foxtrots frequently came to the surface at night to charge their batteries, making them more vulnerable to detection. The massive force deployed to impose the quarantine around Cuba succeeded in locating all four Foxtrots -three were spotted from the air - and in bringing three of them to the surface with destroyers. All levels of the American anti-submarine forces designed to deal with incursions of submarines into the western Atlantic gained valuable experience. They were able to evaluate the performance of sensors, tactics and communications procedures for exchanging information rapidly. In addition, they could assess how coherently and quickly an overall picture of the developing situation had been compiled. The recently declassified records in "The Submarines of October," together with the participants' reminiscences in *Kubinskaya Samba Kvarteta "Foxtrotov"* and *October Fury* provide a rare look at events at the unit level and as assessed by the USN chain of command. It is hoped that the veil of secrecy, which still shrouds encounters with Soviet submarines during the Cold War, will be further lifted.