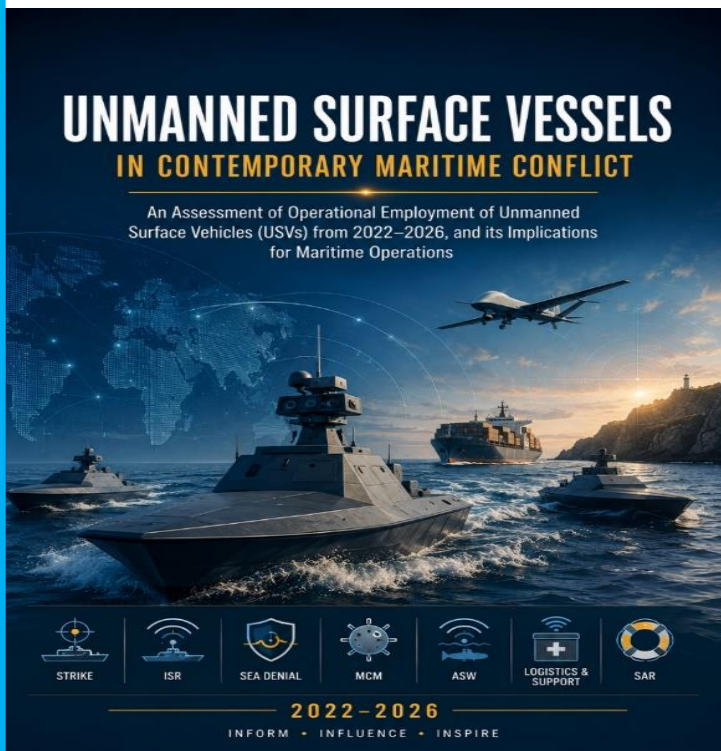




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About the Occasional Paper

Unmanned Surface Vessels (USVs), or drone boats, have rapidly evolved from experimental platforms into operational instruments of maritime power. This Occasional Paper examines their operational employment from 2022 to 2026, drawing lessons from recent conflicts and developments involving Ukraine, Russia, the United States, China, Iran, non-state actors and other maritime powers.

The paper assesses how relatively low-cost autonomous platforms are transforming maritime warfare through surveillance, sea denial, precision attack, mine countermeasures, anti-submarine warfare, logistics and protection of critical infrastructure. It also examines the vulnerability of major maritime chokepoints and the disproportionate strategic and economic effects that USVs can generate.

For India, with its extensive coastline, island territories, Exclusive Economic Zone and pivotal position in the Indian Ocean Region, the paper highlights the need for a sovereign autonomous maritime capability integrating artificial intelligence, resilient communications, navigation, sensors, command-and-control networks, human-machine teaming and an indigenous defence-industrial ecosystem.

UNMANNED SURFACE VESSELS IN CONTEMPORARY MARITIME CONFLICT

**An Assessment of Operational
Employment of Unmanned Surface
Vehicles (USVs) from 2022-2026, and its
Implications for Maritime Operations**

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Introduction

For much of the past decade, Unmanned Surface Vessels (USVs), or drone boats, were viewed as technologies of the future and featured in concept papers, showcased at defence exhibitions, and repeatedly deferred in procurement plans. That era is over.

In just the past four years, drone boats have fundamentally altered maritime warfare. They have sunk warships and merchant vessels, shot down helicopters and a fighter aircraft, damaged a strategically vital bridge, struck a submarine inside a heavily defended naval base, rescued the crew of a downed helicopter, patrolled a contested international strait, protected undersea communication cables for a military alliance, and transported illicit narcotics across oceans.

Their employment spans the full spectrum of actors: a nation with virtually no navy, the world's largest naval power, a non-state armed group, a sanctioned regional power, and transnational criminal networks. These are not projections or theoretical possibilities; they are documented operational realities.

This paper examines that operational record: what happened, who employed these systems, where they were used, and with what effect. It then assesses the strategic implications for the world's maritime chokepoints i.e., the narrow sea passages through which

much of global trade, energy supplies, and naval power must flow.

Scope and Methodology

This paper examines the evolution and operational employment of USVs from Oct 2022 to Jul 2026. Incidents are included only where they involve unmanned or optionally crewed surface vessels and are supported by official government statements, credible defence and maritime security publications, or respected independent analysts. Claims originating from a single party to a conflict without independent verification are explicitly identified as such. National acquisition programmes and capability announcements are included where they provide insight into future force development.

Data on maritime trade and energy flows through key chokepoints are drawn primarily from the United States (US) Energy Information Administration, based on the first half of 2025 unless otherwise stated. Piracy statistics are sourced from the ReCAAP Information Sharing Centre, while global market estimates are presented as ranges to reflect methodological differences among leading industry analysts.

Two caveats should be noted. First, the details of wartime operations may evolve as additional evidence emerges. Second, developments in active theatres, particularly the Black Sea and the Strait of

Hormuz, were continuing at the time of writing and may alter the operational picture.

Record of Incidents, 2022 to 2026

Ukraine, the Initiator. Ukraine initiated the USV evolution. A country that lost the much of its Navy in the first few weeks of the war has using drone boats alone, countered a much larger fleet from operating freely at sea. The first sign of this came on 29 Oct 2022, when a combined raid on the Russian Black Sea Fleet at Sevastopol used about nine air drones and seven drone boats. It highlighted that cheap boats could reach a well-defended naval harbour.

- **The Magura Series.**
 - Run by Ukraine's military intelligence through a specialist unit called Group 13, the Magura V5 is a 5.5 m boat with a range of about 800 kms, a payload of around 320 kms and a reported cost of USD 250,000 to 300,000.¹ Its confirmed record² is shown in Table 1.

Date	Target	Class/Type	Outcome
24 May 2023	Ivan Khurs	Project 18280 intelligence ship	Damaged; struck at considerable distance from the Ukrainian coast
1 Aug 2023	Sergey Kotov	Project 22160 patrol ship	Struck
31 Jan to 1 Feb 2024	Ivanovets	Tarantul-III missile corvette	Sunk. First warship in history sunk by an unmanned surface vessel
14 Feb 2024	Tsezar Kunikov	Ropucha-class landing ship	Sunk
5 Mar 2024	Sergey Kotov	Project 22160 patrol ship	Sunk
6 May 2024	Mangust-type craft	Project 12150 patrol boat	Destroyed
30 May 2024	KS-701 Tunets boats	Border guard craft (four engaged)	Two destroyed, two damaged

Date	Target	Class/Type	Outcome
31 Dec 2024	Two Mi-8 helicopters	Rotary-wing aircraft	Reported by Ukrainian military intelligence as destroyed by Magura craft; presented as a Ukrainian claim
2 May 2025	Su-30SM	Multirole combat aircraft	Two aircraft downed by Magura V7 craft firing AIM-9 Sidewinder missiles. First combat aircraft destroyed by an unmanned surface vessel

Table 1: Confirmed Magura drone-boat attacks, 2023 to 2025

Sources: Defence Intelligence of Ukraine; United States Naval Institute Proceedings; Naval News; contemporaneous defence reporting. Certain outcomes rest on belligerent claims corroborated by imagery or independent loss-tracking.

- An independent study by a Polish academic found that Ukrainian drone boats had hit twenty-two Russian warships and destroyed eight, with the Magura V5 alone responsible for fourteen hits and eight sinkings.³ Ukrainian sources put the total damage to the Black Sea Fleet at more than USD 500 mn. The bigger effect went beyond the ships actually sunk: Russia pulled its most valuable ships back from Sevastopol to Novorossiysk, and in some cases all the way to the Caspian Sea.

- **The Sea Baby Series**

- Built separately by Ukraine's security service and paid for partly by public donations, the Sea Baby was designed to hit fixed targets like bridges rather than moving warships. It was used against the Kerch Bridge in Jul 2023. In a further operation on 3 Jun 2025, the Security Service of Ukraine detonated explosives equivalent to approximately 1,100 kilograms of TNT against the bridge's underwater supports, in a

mission the service said its agents had prepared over several months.

- In Oct 2025, a new generation of boat was disclosed, with a stated range beyond 1,500 kms and payload capacity to 2,000 kms, presented in two armed configurations: one carrying a gyro-stabilised machine gun mount with automatic target acquisition, the other a ten-round multiple launch rocket system.⁴ This is an important shift: the boat has gone from a single-use weapon to one that can be reused, is armed, and works as part of a network.

- **The Tanker Campaign, 2025-26**

- From late 2025 Ukraine turned its drone boats against the tankers carrying Russian oil, an effort Ukrainian officials called sanctions enforced by force. Sea Baby craft struck the tankers Kairos and Virat off the Turkish Black Sea coast on 28 Nov 2025, both vessels having already transited the Bosphorus while empty and bound for Novorossiysk. On 2 Dec the tanker Midvolga-2 was

attacked off the Turkish coast while carrying sunflower oil to Georgia.⁵ Further strikes on shadow-fleet tankers, including the Louise 1 and the Banda, followed through mid-2026.

■ By mid-2026 this had become an organised campaign. On 6 Jul 2026 Ukraine launched an operation called MoLoChKa, led by the head of its drone forces, against shadow-fleet ships in the Sea of Azov and the Black Sea, using both drone boats and long-range aerial attack drones. In a single night on 15 Jul 2026, a reported twenty ships were hit (seventeen oil tankers, two gas tankers and a tug), according to Ukraine's drone forces. On 7 Jul 2026 another strike hit eight tankers along with a cargo ship and a ferry in the Sea of Azov.⁶ By late Jul, Russian sources reported that traffic through the Kerch Strait had dropped sharply and that the oil port of Sheskharis at Novorossiysk had stopped loading.

- **Doing More Than Just Attacking.**

Ukrainian drone boats are no longer only used to attack. They have also carried small attack drones and launched them at air defences on shore. In Apr 2026 a drone boat launched an interceptor that shot down a Shahed attack drone over the Black Sea. Ukrainian sources say this was the first time one drone was launched from a boat to shoot down another, an early example of air defence run from an unmanned boat. And in Dec 2025 an underwater version was used against a Russian submarine at Novorossiysk.⁷

Russia: Reactive Response.

- It took Russia nearly three years to fully appreciate the effectiveness of USVs. After enduring sustained drone-boat attacks, it eventually adopted the same capability and began responding in kind. It developed several types of drone boat, including the Katran, Murena-300S, Vizier, Orkan and BEK-1000, along with a mother ship, and the Navy set up dedicated drone units. Russia's first confirmed success came on 28 Aug 2025, when an explosive drone boat struck the Ukrainian Navy reconnaissance ship Simferopol in the Danube delta, killing two

sailors.⁸ It was the first confirmed Russian drone-boat attack on a Ukrainian vessel.

- Russia's drone boats as per initial reports are largely controlled by radio rather than satellite, which limits their range to roughly 150 to 200 kms and is prone to jamming.⁹ Both have its pros and cons. The lesson is clear: the control architecture, resilient communications, and command-and-control systems that make USVs effective cannot be built—or bought—overnight.

Yemen: Cheap Weapons, Real Damage.

- Houthi forces showed that you do not need a big industry to do this. The first one-way attack drone boat on the international shipping lanes took place in Jan 2024 however, it blew up without damaging anything.¹⁰ Table 2 lists the main attacks involving drone boats by Houthis.

Date	Vessel	Means employed	Outcome
12 Jun 2024	M/V Tutor	USV strike on the stern, approx. 66 nm SW of Hodeidah, followed by a missile.	One crew member killed; abandoned; sank six days later.
21 Jun 2024	Transworld Navigation	USV attack, Gulf of Aden.	Damaged; proceeded to next port of call.
20 Jul 2024	M/V Pumba	USV approach, Red Sea.	Attack defeated by embarked armed security team using rifle fire.
6 Jul 2025	Magic Seas	Two unmanned explosive boats, five cruise missiles, three drones.	Sunk; crew rescued.

Date	Vessel	Means employed	Outcome
7-9 Jul 2025	Eternity C	Sea drones, skiffs and rocket-propelled grenades.	Sunk; four seafarers killed; surviving crew removed from the area.

Table 2: Merchant ships attacked with drone-boat involvement, Red Sea and Gulf of Aden

Sources: United Kingdom Maritime Trade Operations; Operation Aspides; Ambrey; contemporaneous agency reporting.¹¹

- In Jul 2025, a non-state armed group sank two merchant vessels using improvised drone boats in coordinated attacks with missiles, underscoring that USV capabilities have proliferated far beyond state navies. Equally significant was the Pumba incident, which demonstrated the other side of the equation: a well-trained and properly equipped embarked security team can successfully detect, engage, and defeat such attacks. Together, these incidents highlight both the growing accessibility of drone-boat

technology and the critical importance of effective defensive measures.

Iran: Using Drone Boats at a Vital Chokepoint.

- Iran has been developing drone boats for many years, the best known being the Ya Mahdi, a boat under twelve metres long with a low profile, reported to be able to carry rocket launchers or act as a floating bomb, controlled from the shore or from another vessel.
- Iran first used one of these against shipping during the conflict that began on 28 Feb 2026.¹² On 1 Mar 2026 the Marshall Islands-flagged tanker MKD VYOM was hit about forty-four nautical miles off the coast of Oman. The United Kingdom Maritime Trade Operations organisation confirmed the attacker was a drone boat. One crew member, who was in the engine room, was killed.¹³
- The strategic impact far outweighed the scale of the weapon used. Iran's declaration closing the Strait of Hormuz triggered an immediate collapse in maritime traffic, which fell by nearly 85 per cent as ships sought to avoid detection. Oil flows through the strait declined by almost six million barrels per day from normal volumes

of over twenty million barrels per day¹⁴, demonstrating how even limited maritime threats can disrupt global energy security.¹⁵

The United States: From Testing to Combat.

- The US approach decisively dispels the notion that USVs are simply the weapon of weaker navies. Instead, they have become a core capability even for the world's most powerful navy. Table 3 illustrates this progression.

Date	Development
Sep 2021	US 5 th Fleet establishes Task Force 59 to integrate unmanned and AI-enabled systems in the Middle East.
Dec 2022	Exercise Digital Horizon fields fifteen system types from seventeen industry partners in the Gulf.
Oct 2023	Exercise Digital Talon. A T-38 Devil Ray launched a lethal miniature aerial missile system under human supervision, reported as the first lethal munition employed from a USV in the region.
Jan 2024	Task Group 59.1 formed to transition from experimentation to routine operational deployment.

Date	Development
Jun 2026	A US Navy Corsair operated by Task Force 59 assisted in the recovery of an AH-64 Apache crew off the coast of Oman, in what US Central Command described as the first personnel rescue by an unmanned surface vessel. ¹⁶
2026 (ongoing)	GARC uncrewed surface vessels conduct combat patrols in the Strait of Hormuz, logging over 450 underway hours and more than 2,200 nautical miles.
12 Jul 2026	Three Corsair one-way attack vessels struck a submarine and ship-maintenance facility at Bandar Abbas Naval Base. US Central Command described this as the first employment of sea drones in combat by American forces. ¹⁷ A defence official stated the operation was conducted by Central Command rather than by Task Force 59. ¹⁸

Table 3: How the United States moved from testing to combat

Sources: United States Central Command; United States Naval Institute News; Naval News; Navy Times; DefenseScoop.

- Two platforms feature in these operations. The Corsair, built by Saronic Technologies, is a craft of roughly 7.3 metres, or 24 feet, with a payload of about 450 kgs, a top speed near 35 knots and a range in excess of 1,000 nautical miles. It was the craft used both in the Apache-crew recovery and in the Bandar Abbas strike.
- American buying has moved unusually fast. The Modular Attack Surface Craft programme was announced in Jul 2025 and cancelled in Mar 2026, replaced by a broader effort called the Medium Unmanned Surface Vessel Family of Systems, part of the Navy's Golden Fleet plan.^{19,20} The change was deliberate: instead of a boat built for one job, the Navy wanted boats that could do many. Close to USD 5 billion was set aside for the Navy's unmanned programmes, including USD 2.1 billion for medium drone boats, and the 2027 Navy budget calls for buying sixty-three unmanned vessels. In Apr 2026 the drone boat Seahawk took on fuel from a supply ship while under way, a necessary step before drone boats can sail alongside an aircraft carrier group. The Navy has said it plans to deploy thousands of drone boats to the Indo-Pacific by 2030.²¹

- **China: Numbers, Swarms and a Drone Carrier.** On 25 Mar 2026 China released footage of an operational exercise off Zhuhai in which a swarm of L30 USVs conducted autonomous patrol, surveillance and interception of a simulated intruder under centralised command with decentralised execution.²² Chinese reporting describes the L30 as a 7.5-metre craft with a top speed of about 35 knots and a range exceeding 300 nautical miles. In parallel, the Type 076 amphibious assault ship Sichuan, fitted with an electromagnetic launch system and designed around drone operations, completed initial sea trials in late 2025 before entering service. China's approach relies on many boats sharing information and working together, rather than on a single dramatic strike.

Taiwan: Defending a Strait on the Cheap. Taiwan is copying Ukraine's approach directly. Its Endeavor Manta is an 8.6-metre boat that can carry more than a tonne, reach 35 knots, work in a coordinated group, and either return to port or self-destruct if captured. One control station can run up to fifty of them, and a single landing ship can carry twenty. Local firms have also built the Sea Shark series, the larger versions of which carry up to 1,000 kms. In Dec 2025 the Navy asked industry for a one-way attack boat

capable of 35 knots and a 250-nautical-mile range.²³ In late 2025 the government proposed a special defence budget of about NT USD 1.25 tn, roughly USD 40 bn, whose unmanned-systems part sought more than 2,00,000 drones and about 1,320 drone boats. In May 2026, the legislature reportedly reduced this allocation.

NATO and Northern Europe: Guarding Undersea Infrastructure

- Following repeated damage to cables and pipelines in the Baltic, NATO launched Baltic Sentry on 14 Jan 2025 and Task Force X in the same period. NATO described the effort as combining frigates, maritime patrol aircraft and a small fleet of naval drones.²⁴ Over three weeks in Jun 2025, Task Force X-Baltic fielded more than seventy air, surface and undersea systems conducting persistent intelligence, surveillance and reconnaissance, chokepoint monitoring and critical infrastructure patrol, and tracked hundreds of vessels daily across varied sea states.²⁵
- This is the second big use for drone boats, and it does not involve attacking anything. More than ninety-five per cent of the world's internet traffic runs through undersea cables. Keeping constant,

affordable watch over them is only practical with unmanned boats.

3.9 Israel and Türkiye: Established Builders

Israel has been using drone boats longer than most countries. Its Seagull is a twelve-metre boat that can do several jobs, including hunting submarines, clearing mines, electronic warfare and maritime security. It can stay out for more than four days and has been controlled by satellite from a station about 3,500 kms away. Its Silver Marlin and Protector boats have been used for patrol and protection duties for years. Türkiye has moved from prototypes to real service: the MARLIN drone boat entered service with the Turkish Navy in 2024, the armed ULAQ family is now in production with Turkish-made missiles fitted, and another armed boat was unveiled in 2026.

Use by Criminal Groups.

- The implications extend far beyond state navies. In Jul 2025, the Colombian Navy seized the first uncrewed drug-smuggling semi-submersible in South American waters. Equipped with satellite communications and cameras, it was assessed to carry up to 1.5 tonnes of cocaine over nearly 800 miles.²⁶ Removing the crew eliminates both the risk of human capture and the challenge of

recruiting operators for inherently dangerous missions.

- The threat has already reached India's maritime neighbourhood. In Nov 2024, Indian authorities intercepted a remotely satellite-controlled vessel carrying a large consignment of methamphetamine near the Andaman and Nicobar Islands reported as the first known seizure of its kind. The message is unmistakable: commercially available satellite communications, autopilots, and small boats have dramatically lowered the barrier to entry. Building an effective unmanned maritime platform no longer requires a sophisticated defence-industrial base.

India: Moving from Trials to Service

- India has moved from testing these boats to putting them into service. The Matangi, a thirteen-metre self-navigating boat built under the Innovations for Defence Excellence (iDEX) programme, sailed 850 nautical miles from Mumbai to Tuticorin on its own, using Indian-made navigation and collision-avoidance systems. It was formally launched on 29 Oct 2024 by the Defence Minister at the Swavlamban event, backed by the Navy's innovation organisation and the

iDEX initiative. Indian reports call it the country's first such self-navigating voyage.

- Indian reports say the Navy is now bringing in armed drone boats, some able to work in coordinated groups, and that Indian work is under way on having crewed ships and drone boats operate together to hunt submarines and clear mines.²⁷ Both government defence bodies and private companies are involved, which evidences a growing industry rather than a single project.
- The reason is simple arithmetic. A coastline of 11,098.91 kms and a sea area of nearly 2.3 mn square kms are far too large to watch around the clock with crewed ships, at any affordable number of crews.

■ Programme Under Development: Parshu Sentinel.

○ As part of India's indigenous maritime autonomy initiative, Parshu Tactical Defence Pvt Ltd, incubated at the Indian Institute of Technology Madras Pravartak Technologies Foundation, is developing a fully autonomous, Indian-

designed drone boat optimised for Indian waters and the wider Indian Ocean Region. Built around indigenous navigation, control, and autonomy systems, the platform adopts a modular architecture that enables rapid reconfiguration for Intelligence, Surveillance and Reconnaissance (ISR), maritime security and interception, force protection, and one-way attack missions. The programme is aligned with India's *Aatmanirbhar Bharat* (self-reliant India) vision, with a high indigenous content and export potential for countries facing similar maritime security challenges.

○ The design reflects the principal lesson of recent conflicts: the future belongs to multi-role, not single-purpose, USVs. Operational experience from US programme evolution to

Baltic infrastructure protection has demonstrated that mission flexibility is a decisive force multiplier. Accordingly, the programme is progressing toward prototype development and sea trials, after which performance will be validated through operational testing rather than projected specifications.

What the Record Shows

Seven strategic conclusions emerge from the operational record.

- **The cost-exchange ratio overwhelmingly favours the attacker.** USVs costing as little as USD 2,50,000–3,00,000 have sunk warships worth hundreds of millions of dollars and inflicted fleet losses exceeding USD 500 mn. Such economics fundamentally favour the offensive and are unsustainable for conventional defence.
- **Sea denial no longer requires a conventional navy.** Ukraine, despite having virtually no surface fleet, compelled Russia's Black Sea Fleet to withdraw from its principal naval base. This is arguably the most

significant shift in maritime warfare of the past decade.

- **Every navy eventually seeks the capability.** Nations that have faced USV attacks have moved to develop their own; Russia after Ukraine, the US after Houthi and Iranian attacks, and Taiwan in response to China's maritime challenge. For any coastal nation, USVs are no longer an option but an operational necessity.
- **USVs are multi-role platforms, not single-purpose weapons.** Within four years they have evolved from one-way attack craft into versatile systems for ISR, armed patrols, mine countermeasures, anti-submarine warfare, launching smaller drones, air defence, logistics, search and rescue, critical infrastructure protection, and seabed mapping. Investing in a USV means acquiring a modular maritime capability rather than a single weapon.
- **Geography no longer guarantees security.** Modern USVs can operate beyond 1,500 km, carry payloads approaching 2,000 kg, and strike targets more than 2,000 km from their launch point. Distance from an adversary's coastline is no longer a reliable defence.

- **The decisive capability lies in the ecosystem, not the platform.** Success depends on resilient communications, secure satellite links, autonomous navigation, electronic warfare resilience, and robust command and control networks. These capabilities cannot be improvised during a crisis; they require sustained investment and development.
- **The technologies of attack are also the technologies of defence.** The most effective counter to hostile USVs is a layered network of indigenous unmanned surveillance and interceptor systems operating under human supervision. A navy without such capabilities is disadvantaged not only offensively but, more critically, in defending its own ports, fleets, and maritime infrastructure.

The Eight Straits That Matter Most

Global maritime trade is concentrated through a handful of critical chokepoints rather than dispersed across the oceans. Nearly 70 per cent of global oil demand and over 90 per cent of seaborne oil trade transit just a few narrow straits; each now vulnerable to disruption by drone boats costing less than a single anti-ship missile. This stark asymmetry has

transformed these maritime chokepoints into strategic pressure points with global economic consequences. Table 4 identifies the world's eight most critical straits, the littoral states that control them, the volume of oil they carry, and the extent to which drone boats have already featured in their security environment.

Strait	Bordering states	Transit (mb/d, 1H2025) ²⁸	Demonstrated USV record
Hormuz	Iran; Oman; United Arab Emirates.	20.9. About one quarter of seaborne oil and one fifth of global LNG.	Iranian USV strike on MKD VYOM (Mar 2026); US GARC combat patrols; first US combat USV strike, Bandar Abbas (Jul 2026).
Bab el-Mandeb	Yemen; Djibouti; Eritrea.	4.2. Gateway for an estimated 12 to 15 per cent of global trade	The most sustained anti-shipping USV campaign on record: Tutor, Magic Seas and Eternity C all sunk in engagements involving surface drones. ²⁹

Strait	Bordering states	Transit (mb/d, 1H2025) ²⁸	Demonstrated USV record
Suez Canal and Gulf of Suez	Egypt	4.9 via canal and SUMED pipeline.	No strike on the canal itself; the threat approximately 200 nm to the south proved sufficient to halve transits. ³⁰
Turkish Straits (Bosphorus and Dardanelles)	Türkiye	3.7. The sole maritime access to the Black Sea.	Ukrainian USV strikes on Kairos and Virat off the Turkish coast (28 Nov 2025) and Midvolga-2 (2 Dec 2025); drifting craft recovered on Turkish shores.
Kerch Strait	Russian Federation; Ukraine (contested).	Black Sea to Sea of Azov link; Crimean Bridge.	Underwater-explosive strikes Jul 2023 and Jun 2025 against bridge supports; Kerch traffic sharply reduced Jul 2026.

Strait	Bordering states	Transit (mb/d, 1H2025) ²⁸	Demonstrated USV record
Malacca and Singapore Straits	Indonesia; Malaysia; Singapore; Thailand.	23.2. The world's largest oil chokepoint, about 29 per cent of seaborne oil flows.	No USV attack to date. Demonstrated small-craft vulnerability: 108 boarding incidents in the Malacca and Singapore Straits in 2025, the highest since 2007, concentrated in the Singapore Strait; ReCAAP rates them opportunistic theft.
Taiwan Strait	People's Republic of China; Taiwan.	Very large share of global container and semiconductor movement.	No conflict, but the most concentrated USV build-up in the world on both sides.

Strait	Bordering states	Transit (mb/d, 1H2025) ²⁸	Demonstrated USV record
Danish Straits and Baltic approaches	Denmark; Sweden; Germany; Finland; Estonia; Poland.	4.9. The densest concentration of critical undersea infrastructure in the world.	Defensive employment: a small fleet of naval drones under Baltic Sentry; seventy-plus unmanned systems under Task Force X-Baltic (Jun 2025).

Table 4: The eight key straits: bordering countries, oil traffic and drone-boat record

Source: Created by author

Transit volumes: United States Energy Information Administration, first half of 2025, crude oil and petroleum liquids. Piracy figures: ReCAAP Information Sharing Centre.³¹

What These Straits Tell Us. Three strategic lessons emerge.

- **First, maritime chokepoints need not be physically attacked to be strategically disrupted.** The Suez experience demonstrates that the mere threat of drone-boat attacks can reroute global

shipping. Canal traffic fell by roughly half from pre-2023 levels, while Egypt's revenue declined from USD 9.4 bn in 2022–23 to USD 4.67 bn in 2025–26. Although traffic has begun to recover, both vessel movements and revenues remain below pre-crisis levels. Ships diverting via the Cape of Good Hope incur an additional 6,000–11,000 nautical miles and 10–14 days per voyage, imposing substantial costs on global trade.

- **Second, the Malacca and Singapore Straits represent the world's most vulnerable maritime chokepoint.** They carry nearly 29 per cent of global seaborne oil, yet have not experienced a drone-boat attack. However, 108 small-boat boarding incidents were reported in 2025, the highest in 19 years. While most were opportunistic thefts and subsequent enforcement reduced incidents, the operational lesson is unmistakable: if small boats can routinely approach and board large vessels undetected, an explosive-laden drone boat could do the same.

- **Third, neutrality does not confer immunity.** Türkiye, despite not being a belligerent in the Black Sea conflict, has repeatedly dealt with its spillover effects,

including drifting drone boats, maritime hazards, and burning tankers within its area of responsibility. Modern maritime conflicts increasingly impose risks well beyond the combatants themselves.

India's Own Waters. India occupies a pivotal position in the Indian Ocean, controlling the Nine Degree and Ten Degree Channels and, through the Andaman and Nicobar Islands, overseeing the western gateway to the Strait of Malacca, one of the world's most critical maritime chokepoints. Two incidents underscore the significance of this geography. The 2008 Mumbai terrorist attacks demonstrated how a handful of terrorists using a small boat could exploit India's maritime approaches. Sixteen years later, the interception of a remotely satellite controlled drug vessel near the Andaman and Nicobar Islands revealed the emergence of a new generation of autonomous maritime threats. The challenge has evolved from crewed infiltration to unmanned, self-navigating, satellite linked vessels. India's response must evolve accordingly: an indigenous, scalable fleet of autonomous drone boats for persistent surveillance, rapid interception, and maritime deterrence.

Why This Is a Strategic Necessity, Not a Choice

The case for a national USV capability is no longer driven by technological ambition, it is dictated by

operational necessity, strategic economics, and the pace of modern warfare. Five realities make the case.

A Conventional Fleet Cannot Provide Persistent Maritime Presence. No warship can be everywhere at once. In contrast, a network of low-cost autonomous USVs can provide continuous surveillance of maritime chokepoints, ports, offshore assets, and critical undersea infrastructure at a fraction of the cost. For nations with long coastlines and vast Exclusive Economic Zones, persistent maritime awareness is unattainable without unmanned systems.

The Threat Already Exists and the Cost of Entry Is Falling. This is no longer a future threat. Non-state actors have sunk merchant ships using improvised drone boats, while criminal networks have deployed satellite-controlled unmanned vessels for transnational narcotics trafficking. With commercially available satellite communications, autopilots, and navigation software, the barriers to entry have collapsed. The technology will become more accessible, more capable, and less expensive.

The Cost of Disruption Far Exceeds the Cost of Deterrence. A single maritime chokepoint disruption can impose global economic costs running into billions of dollars. Attacks in the Red Sea halved Suez Canal traffic and slashed Egypt's annual canal revenues by nearly USD 5 bn, while the threat in the

Strait of Hormuz caused vessel traffic to fall by almost 85 per cent. Against losses of this magnitude, investing in a national USV capability is not a cost, it is strategic insurance.

Capability Cannot Be Built in a Crisis. An operational USV capability cannot be purchased off the shelf when conflict begins. Russia required nearly three years to field an effective response after facing sustained Ukrainian USV attacks. Even the US took five years from establishing Task Force 59 in 2021 to conducting its first combat USV strike in 2026. The challenge is not building the platform but integrating the ecosystem: autonomy, sensors, resilient communications, satellite links, electronic warfare resilience, command-and-control networks, shore infrastructure, doctrine, and trained operators. These capabilities require years of sustained development.

A Strategic Industry with Global Growth Potential. The opportunity extends beyond defence. Unmanned surface and underwater vehicles share the same technology base i.e., autonomy, navigation, communications, propulsion, manufacturing, and skilled personnel. Investment in one strengthens the other, creating a national autonomous maritime ecosystem. As global demand for these systems accelerates, countries that establish indigenous capabilities early will gain not only military advantages but also a significant position in a rapidly

expanding international market. Table 5 presents the principal market forecasts.³²

Segment	2025 value (USD)	Forecast by 2035 (USD)	Annual growth	Source
Underwater vehicles	5.9 bn	22.7 bn	approx 14.5 per cent	Expert Market Research (a separate, broader estimate reaches 46.6 bn).
Surface vessels	1.3 to 2.0 bn	4.6 to 7.2 bn	13.7 to 15.2 per cent	Emergen Research; Global Growth Insights; The Business Research Company.

Segment	2025 value (USD)	Forecast by 2035 (USD)	Annual growth	Source
Both combined (whole-domain estimates)	2.9 to 5.3 bn	9.0 to 20.6 bn	8.5 to 12 per cent	market.us; Global Market Insights; Market Research Future.
Underwater plus surface, added together	approx. 7 to 8 bn	approx. 30 bn	n/a	Our own total of the two segment forecasts above, not a single published figure.

Table 5: Market forecasts for unmanned maritime systems, to the mid-2030s

Source: created by author

The last row is our own total of the two segments above, not a number published by any single research firm. The whole-domain estimates are listed separately because some of them leave out payloads, software and support, so they are not directly comparable.

Taken together, the leading market forecasts indicate an autonomous maritime systems market of around USD 30 bn by 2035. While published estimates range from USD 9 bn to over USD 20 billion for the combined market and as high as USD 46.6 bn for underwater systems alone, the divergence reflects differences in market definitions rather than outlook. Every major forecast points to sustained, high-growth demand.

Two strategic conclusions follow. First, the market is large enough to sustain a national industrial ecosystem, not merely individual procurement programmes. Nations that view unmanned maritime systems as products to import will forfeit the opportunity to become exporters in one of the fastest-growing defence sectors. Second, surface and underwater autonomous systems share a common technology base; autonomy, navigation, communications, propulsion, sensors, and control architectures. Investment in one directly strengthens the other. For India, therefore, the industrial, economic, and strategic sovereignty imperatives

converge into a single compelling case for building an indigenous autonomous maritime ecosystem.

Summary and Recommendations

The operational evidence presented in this paper demonstrates that USVs have crossed the threshold from an emerging technology to an indispensable element of maritime power. Much like the transformation brought about by drones on land, USVs are fundamentally altering the economics of naval warfare by providing persistent surveillance, distributed lethality, sea denial, logistics support and infrastructure protection at a fraction of the cost of conventional platforms. The pace of adoption by major powers, regional actors and even non-state organisations confirms that autonomous maritime systems will increasingly define the character of future naval operations. The question before nations is therefore no longer whether to adopt these capabilities, but how rapidly they can build sovereign capacity before strategic dependence emerges.

For India, the implications are particularly significant. With a coastline of 11,098.91 kms, island territories straddling vital sea lanes, a vast Exclusive Economic Zone and growing responsibilities across the Indian Ocean Region, traditional fleet expansion alone cannot provide the persistent maritime presence that future security demands. India must therefore pursue a comprehensive unmanned

maritime strategy encompassing USVs, Unmanned Underwater Vehicles and autonomous command-and-control networks as an integral component of its maritime doctrine. Indigenous Artificial Intelligence, secure communications, resilient navigation, autonomous decision-support, human-machine teaming and modular payload architectures must become national priorities rather than isolated technology projects. The convergence of these technologies will determine not only naval effectiveness but also India's ability to safeguard critical maritime infrastructure, sea lines of communication and underwater assets.

Equally important is the creation of a vibrant indigenous industrial ecosystem. Success will require sustained collaboration among the Armed Forces, Defence Research and Development Organisation, academia, start-ups and private industry through long-term procurement visibility, accelerated testing frameworks, innovation funding and export-oriented policies. The objective should extend beyond replacing imported platforms; India must aspire to become a global developer and exporter of trusted autonomous maritime systems tailored for the operational requirements of friendly nations across the Indo-Pacific, Gulf, Africa and South East Asia. Sovereign capability in autonomy, software and mission systems will be as strategically important as

indigenous shipbuilding has been over previous decades.

Ultimately, history shows that military revolutions favour nations that recognise technological shifts early and institutionalise them before conflict compels adaptation. The evolution of USVs is one such inflection point. Just as aircraft carriers transformed twentieth-century naval power and drones reshaped twenty first-century land warfare, autonomous maritime systems are poised to redefine control of the seas. India has the scientific talent, industrial capability and strategic necessity to emerge as a leading maritime autonomy power. Achieving this will demand vision, sustained investment and whole-of-nation commitment. Nations that build sovereign autonomous maritime capabilities today will shape the maritime balance of power tomorrow; those that delay will find themselves responding to, rather than determining, the future security environment.

Conclusion

In Oct 2022, drone boats were viewed as improvised weapons of necessity. By Jul 2026, they had fundamentally reshaped maritime warfare—sinking warships, disrupting global shipping, striking high-value naval targets, protecting critical undersea infrastructure, and conducting missions ranging from surveillance to search and rescue. Today, every major

naval power and an increasing number of non-state actors are developing or deploying this capability.

The world's critical maritime chokepoints, through which much of global trade and energy flows, are now vulnerable to low-cost autonomous systems capable of producing disproportionate strategic and economic effects. The last four years have demonstrated that unmanned maritime systems are no longer an emerging technology; they are an operational reality.

For any maritime nation, the choice is no longer whether drone boats will shape its security environment, but whether it will possess this capability or confront it in the hands of others. For India, with its peninsular geography, extensive coastline, island territories, and pivotal position in the Indian Ocean, a sovereign autonomous maritime capability is not a luxury; it is a strategic imperative.

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