

Uncrewed and Undersea:

China's XLUUV Fleet and the Contest for Seabed Surveillance

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01 Executive Summary

China is currently threatening the United States' undersea superiority in the Pacific through its development of Extra Large Unmanned Underwater Vehicles (XLUUV) as part of its broader Transparent Ocean Strategy. The People's Liberation Army Navy (PLAN) has operationalized or is actively developing at least 5 XLUUV models. China intends to use these unmanned platforms to degrade the United States undersea surveillance system and submarine forces in the Pacific through three primary mission sets: Intelligence, Reconnaissance, and Surveillance operations (ISR), Mine countermeasure (MCM)/Mine laying operations, and Anti-submarine warfare (ASW).

Research Questions:

- Why does China need an XLUUV fleet?
- What is the current state of China's UUV and XLUUV fleet?
- How does China plan to use its XLUUV fleet?

02 Problem Statement

Chinese XLUUVs will execute autonomous ISR, MCM/Mine-laying, and ASW missions that will threaten U.S. submarines in the Pacific and deteriorate the U.S. undersea surveillance system. The continued development and deployment of XLUUVs by the PLAN will give them an asymmetric undersea advantage in the Pacific, as the U.S. doesn't currently field them. China's program has overtaken those of Western navies and is unmatched globally. In particular, the PLAN fields the most advanced UUVs in greater quantity than all other competing navies combined.

03 Background

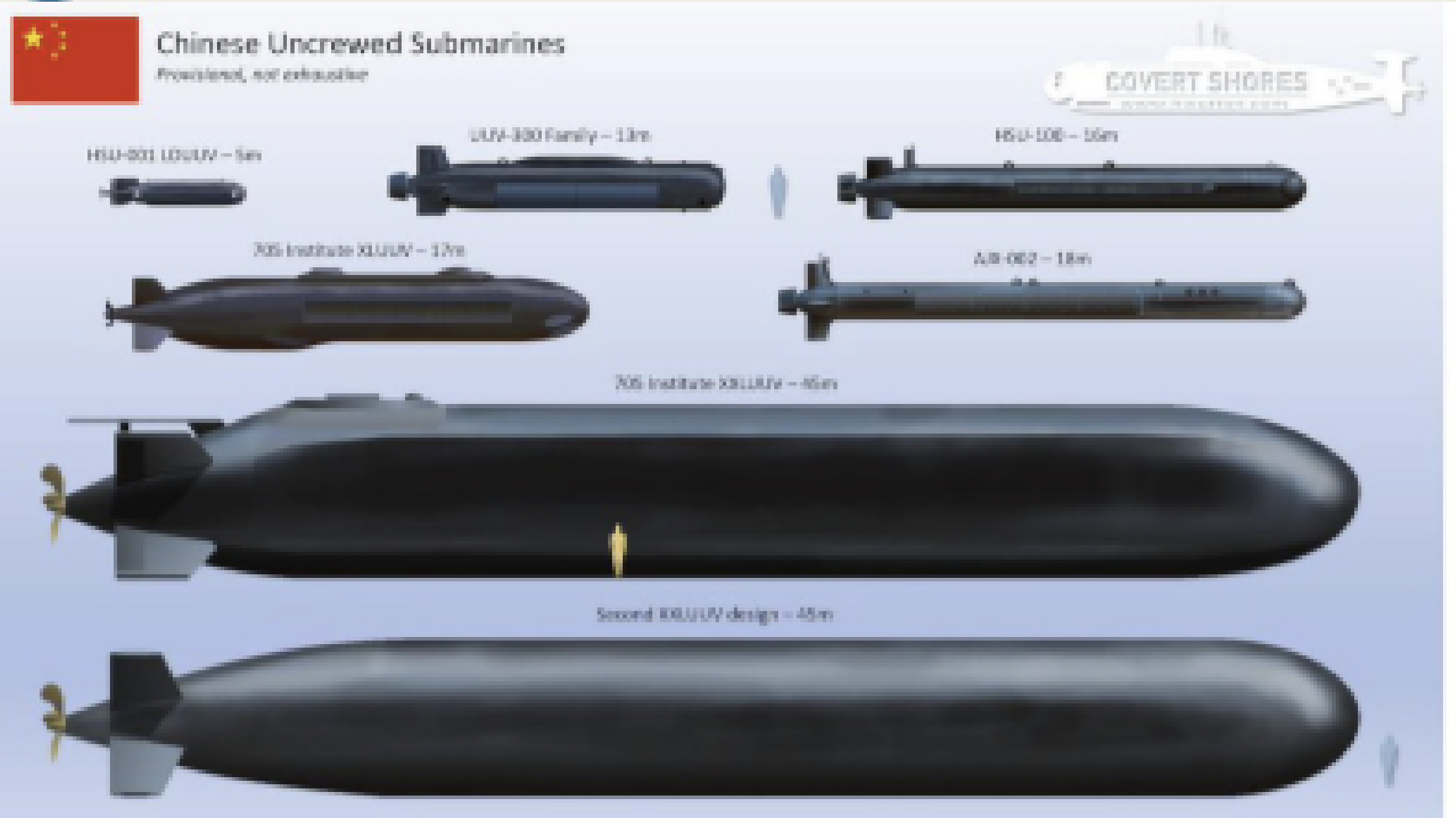
China's UUV Program

China's state-sponsored UUV development has expanded exponentially since it began in 1996. In 2015, at least 15 major universities and institutes were conducting research on UUVs. By 2019, that number had grown to over 40 universities and institutes with a combined 159 undersea vehicle research projects under development. As of 2021, at least 48 Chinese universities and 45 enterprises are conducting major UUV and AUV projects. Increases in the Chinese government's investment in UUV and AUV research have directly translated to advancements in military technology. In September 2025, the PLAN showcased eight Extra Large Unmanned Underwater Vehicles (XLUUV).

China's Transparent Ocean

Unmanned Underwater Vehicles are a crucial part of an emerging technologies package that enables and complements China's strategy to erode the United States' undersea superiority and help ensure its own maritime dominance in the Pacific. The Transparent Ocean Strategy specifically targets the ability of U.S. and allied submarines to maneuver and go silent in the Pacific. This strategy includes a five-layered sensor architecture from the seabed to space. The strategy is still far from maturity but provides much of the impetus for China's drive to develop and procure UUVs.

04 China's Current Capabilities



China's uncrewed submarine fleet, to scale. Source: H. I. Sutton / Covert Shores.

Model	Class	Length	Propulsion	Range	Mission
HSU-001	LDUUV	5 m	Diesel-electric	—	ISR
UUV-300CB	XLUUV	11.5 m	Electric	450 nm	Multi-role, armed
HSU-100	XLUUV	15 m	Ducted propeller	—	ISR / ASW
AJX002	XLUUV	18–20 m	Pump-jet, electric	1,000 nm	Mine-laying
XXLUUV	XXLUUV	40–42 m	Diesel-electric	10,000 nm	ASW (testing)
Sea Wing	Glider	—	Buoyancy	—	ISR

Index of PLAN UUV capabilities (White Paper, Appendix A). Fielded or in testing; research/commercial gliders shown for context.

05 Concepts of Operations

Intel, Surveillance, Reconnaissance (ISR)

China's intent to employ XLUUVs for ISR underscores the importance of all its UUV programs. China has procured UUVs for this purpose from the very beginning, and Chinese defense literature indicates that ISR CONOPS are currently the PLAN's most mature application of UUVs. According to research from the PLAN Command College, specific application scenarios that China may implement include autonomous observation and measurement of complex sea environments or key waterways, screening of key enemy ports or coasts, and comprehensive reconnaissance of specific targets.

MINE WARFARE (MCM + MINE-LAYING)

China intends to use XLUUVs for both mine countermeasures (MCM) and covert mine-laying operations. Today, China has at least five XLUUVs dedicated to these missions. During MCM operations, XLUUVs will serve as extensions of manned platforms and as parent ships for smaller mine countermeasures. Covert mine-laying operations are also a likely application. According to CCP media, the AJX002 will target enemy ships and coastal facilities through autonomous, rapid, covert mine-laying missions.

ANTI-SUBMARINE WARFARE

China intends to use XLUUVs for Anti-Submarine Warfare, particularly to disrupt U.S. undersea dominance in the Pacific. There are three main scenarios in which the PLAN views XLUUVs as advantageous to ASW:

- Area Search: Parent platforms will deploy XLUUVs in designated areas to autonomously navigate, search for, and locate enemy submarines.
- Pre-positioned ASW: XLUUVs will be placed at key waterways and port areas to ambush enemy submarines as they pass through.
- Coordinated ASW: XLUUVs will conduct ASW in cooperation with main anti-submarine forces.

Chinese XLUUVs will be used to disrupt and destroy U.S. underwater sensors and nodes directly through soft kill and hard destruction measures.

06 U.S. Defense Implications

- 1 **China's Asymmetric Advantage:** China leads the United States in developing XLUUV weapon systems, and the gap is widening. In September 2025, China unveiled 8 operational XLUUVs, more than all other nations combined. In the same amount of time China took to field these vessels, the United States has struggled to field even one.
- 2 **China leads the globe in weaponizing UUVs at scale:** China has demonstrated a willingness to weaponize UUVs at levels not observed in competing Western countries, as no other navy has publicly confirmed a fielded XLUUV with weapons capabilities. As mentioned previously, at least three PLAN UUV models are, or can be, weaponized. Willingness to weaponize may lead to the proliferation of weaponized UUVs among other countries as well.
- 3 **U.S. Undersea survival space within the First Island Chain is shrinking:** Emerging Chinese XLUUV capabilities will directly erode the United States' undersea surveillance system in the Pacific. U.S. submarines in the Pacific will also face novel threats. Because of their low cost and covert capabilities, China's XLUUVs can be used for ASW more aggressively than traditional submarines.



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