

Potential Indicators of China's Next Generation Nuclear Submarines

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While China's People's Liberation Army (PLA) has gradually embraced transparency in many spheres of its military endeavors, there are a large number of issues and programs that remain closely guarded and one of these is its future nuclear submarines. However, one popular tool the PLA uses to convey limited information about some military programs is to use models. A large outdoor model of a next generation nuclear attack submarine (SSN) has appeared at the People's Liberation Army Navy (PLAN) Submarine Academy in Qingdao, China. The role of this model may simply be to inspire the Academy's students, but it may signify a larger personnel investment by the PLAN to prepare for its next generation submarines, as it may also offer some indications about a new class of SSN.

A New SSN Model

Images of the ½ to 2/3 scale SSN model emerged as part of Chinese state media coverage of a delegation from the Indonesian Naval Academy visiting the Submarine Academy, a sideline of the April 21-25 Western Pacific Naval Symposium hosted by the PLAN in Qingdao.¹ The model was not the centerpiece of the official Chinese media treatment of the Indonesian Naval Academy visit and the model was not featured in all Chinese web accounts of the Qingdao Submarine Academy.



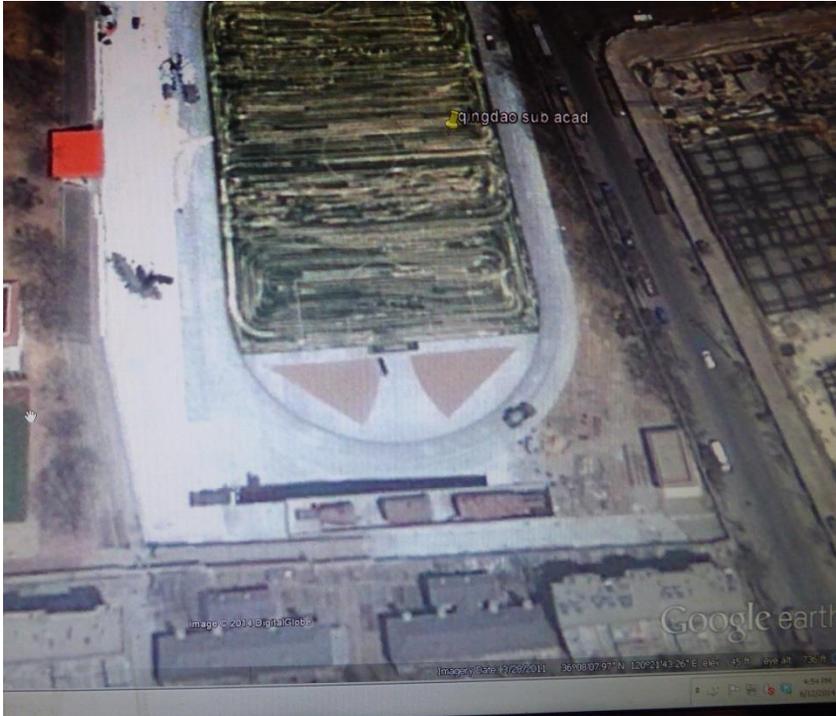
Above and next page: Chinese Submarine Academy and Indonesian Naval Academy students seen walking in front of a model that may represent a next generation PLA Navy nuclear attack submarine. Source: Sina.com



The model is located at the end of a football field. Imagery from Google Earth indicates the Submarine Academy playing field was rebuilt in 2011 to 2012 and that the large model has been in place since at least 2012. According to another expert who wishes to remain anonymous, the Submarine Academy also occupies a second location in Qingdao, which Google Earth historic imagery indicates also underwent a major upgrade starting in 2011. Such construction, to include the new model, may indicate that the PLAN is using the 2011 and 2016 Five Year Planning cycles to prepare larger numbers of personnel for its next generation SSN nuclear ballistic missile submarines (SSBN).



Current Satellite Image view of Qingdao Academy “SSN” model seen at the end of a football field.
Source: Baidu Maps



The same location as seen in 2012, showing new construction, as seen in the historical imagery made available by Google Earth.

The PLA has long used pre-construction models to help convey intent for domestic and foreign audiences.² There are numerous examples, such as the Chengdu J-10 fighter, in which pre-production models were revealed to demonstrate an advancing capability, though the models did not at the time reflect the final configuration of that fighter aircraft.

The possibility that the submarine model may represent some kind of training facility is ruled out by the apparent lack of air conditioning or other electronic support. It is likely that the main purpose of this large model may be to inspire Academy students to aspire to the elite rank of submariners that will operate China’s future nuclear-powered submarines.

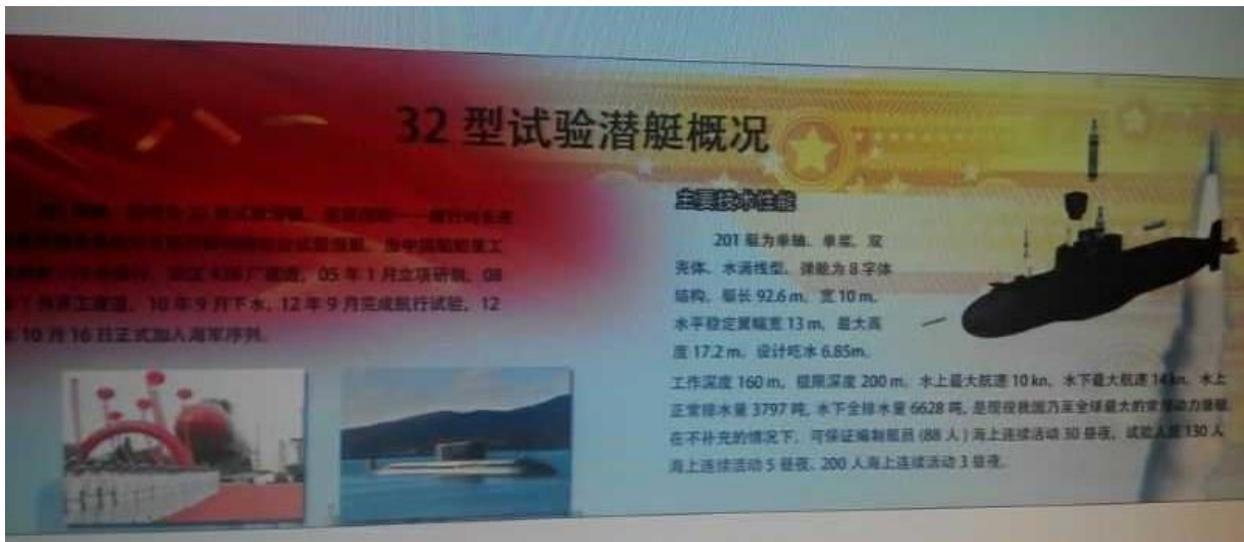


The opposite side of the “SSN” model at the Qingdao Submarine Academy shows doors that face away from the football field and toward a wall, indicating that the appearance of the model may be more important than any other function.

Whether the submarine model represents a possible shape for a future SSN, identified as the Type 095, cannot be determined. But as the PLA has yet to provide advanced information about the Type 095 or other future nuclear submarines, the Submarine Academy model should be considered a possible indicator. It shows significant differences from the first generation Type 091 *Han* and the current production Type 093 *Shang*.

When considered in scale, the hull of the model appears to be wider than the current Type 093 *Shang* class SSN with a more pronounced “teardrop” form. The model’s sail shows new concepts including greater length, more hydrodynamic shaping versus the sharp square form on the 093. It also uses a sloping “fillet” at the base of the sail to reduce drag and conceal additional sonar.

This feature plus added length of the sail are also used by the new Type 032 conventionally-powered ballistic missile submarine. It is at least worth considering that the long sail on the new SSN model could also accommodate new smaller fiber-optic data-link guided missiles that apparently are to be tested on the Type 032. Such missiles could give future PLAN submarines a tactical anti-aircraft, anti-ship and ground-attack capability. After a long development, in the last year the PLA Ground Forces have obtained their first fiber-optic cable guided tactical ground attack missile. In addition, the PLA is likely well aware of Germany’s effort to develop the Diehl Interactive Defense and Attack System for Submarines (IDAS), also a fiber-optic guided submarine-launched multirole tactical missile.³



This now-familiar wall poster first seen in July 2013 provided the first mention that the PLA Navy may be testing a submarine-launched fiber-optic guided missile for anti-aircraft missions.

Regarding the Type 095 SSN the latest Pentagon report on PLA modernization, issued on 5 June 2014 states:

“In the next decade, China likely will construct the Type 095 guided-missile attack submarine (SSGN), which may enable a submarine-based land-attack capability. In addition to likely incorporating better quieting technologies, the Type 095 will fulfill traditional anti-ship roles with the incorporation of torpedoes and anti-ship cruise missiles (ASCMs).”⁴

In April 2014 an Asian government source disclosed to this analyst that by 2020 the PLAN could have “6-8” SSNs. The Pentagon report states, “Two SHANG-class SSNs (Type 093) are already in service, and China is building four improved variants of the SHANG-class SSN, which will replace the aging HAN-class SSNs (Type 091).”⁵ The variance of two SSNs could mean that two older first generation Type 091 SSNs may be retained, or, two Type 095 SSNs could be built by 2020.

Next Generation SSBN

Following on the Chinese practice of deriving new nuclear powered ballistic missile submarines (SSBNs) from its SSN designs, progress with the Type 095 indicates the PLAN is also advancing its anticipated next generation SSBN, called the Type 096. The latest Pentagon report states:

“Three JIN-class SSBNs (Type 094) are currently operational, and up to five may enter service before China proceeds to its next generation SSBN (Type 096) over the next decade.”⁶



An image that appeared on Chinese web pages in November 2013 appears to come from a professional academic engineering journal and could indicate design concepts being considered for the Type 096 SSBN. Source: Shanghai Hobby Web Site

Images posted in early November 2013 on the popular *Shanghai Hobby* web page have offered the first suggestions of what may be a new Chinese nuclear ballistic missile submarine (SSBN) design. These images are also consistent with vaguely-labeled drawings used in Chinese academic engineering articles, which are known to occasionally provide such hints about sensitive future weapons programs.

The images provide no indication they are related to a next generation PLAN SSBN and may simply be meant to illustrate SLBM coaming alternatives. However, if it possible they may be indicative of a next generation SSBN, they appear show a deeper hull than the Type 094 SSBN, with a pronounced teardrop form, a possible similarity with the SSN mockup seen at the Qingdao Submarine Academy.

The new images differ significantly from the current production Type 094 SSBN primarily in the coaming to cover the submarine launched ballistic missiles (SLBMs). Two versions are shown, with one design showing a shorter coaming than that seen on the Type 094, clearly separate from the sail.

A second design shows a much longer and deeper coaming encompassing most the sail. This larger SLBM coaming could potentially offer hydrodynamic and acoustic advantages. For China, this may allow such a SSBN to more rapidly transit to preferred deep water patrol areas. A much larger coaming would also allow the inclusion of other weapons systems, like smaller anti-torpedo torpedoes. Though these images do not indicate consideration of a propulsor they do suggest consideration of a Russian-style elongated propeller shaft to reduce noise.

A new class of SSBN has also been cause for China to develop a new SLBM. Unconfirmed Chinese sources sometimes mention the development of a “JL-3” to succeed the 8,000 to 8,300km range JL-2. Other Chinese sources suggest that a longer-range “JL-2A” may be under development.⁷

¹ A series of images of the submarine model in question can be found at, “Chinese military unveils a model of an advanced submarine during a visit by the Indonesian Navy,” *Sina.com Web Page*, April 21, 2014, http://slide.mil.news.sina.com.cn/h/slide_8_16116_29095.html#p=1

² Richard D. Fisher, Jr, “Chinese aircraft: The art of ‘modelology’ to predict trends,” *Jane’s Defence Weekly*, July 18, 2012.

³ “Guided Missiles IDAS,” *Diehl Defense Website*, Accessed on June 25, 2014, <http://www.diehl.com/en/diehl-defence/products/guided-missiles/idas.html>

⁴ Office of the Secretary of Defense, Annual Report to the Congress, Military and Security Developments Involving the People’s Republic of China, 2014, p. 8.

⁵ *Ibid.*

⁶ *Ibid.*, p. 7.

⁷ “In Depth: Uncovering the mystery of the 094 nuclear strategic submarine as it begins its cruise,” *Sina.com Web Page*, February 10, 2014, <http://mil.news.sina.com.cn/2014-02-10/1234763497.html>