

# CENTRE FOR JOINT WARFARE STUDIES



## CENJOWS

### MANNED SUBMERSIBLES – CHINESE ‘FENDOUZHE’

1. **China’s Latest Manned Submersible ‘Fendouzhe’ Dives to Record Depth.** China's new deep-sea manned submersible *Fendouzhe*, or Striver, set a national diving record of 10,909 meters on 10 Nov 2020, in the Challenger Deep located at the bottom of the Mariana Trench in the Pacific Ocean. The submersible first broke the 10,000-meter milestone by descending to 10,058 meters on 27 Oct 2020. *Fendouzhe*, one of the world's deepest-diving manned submersibles, is capable of carrying a crew of three. It is electrically powered and can operate underwater for 10 hours. *Fendouzhe* manned submersible, successfully completed all sea trials in Mariana Trench; and its mother ship, Explorer-1 (Tansuo-1) brought it back to Sanya Port on Hainan Island on 28 Nov 2020.



China's new deep-sea manned submersible Fendouzhe being lowered into water

2. The Institute of Acoustics, of Chinese Academy of Sciences (IACAS) has developed *Fendouzhe*'s acoustic system, including deep-water acoustic communication modem, topography detection sonar, multi-beam forward looking sonar, doppler velocity

log and obstacle avoidance sonar; as also carried out system integration of the positioning sonar and inertial navigation equipment. Underwater acoustic communication between *Fendouzhe* and its mother ship Explorer-I, was accomplished in real-time, by transmission of text, voice, and images from 10,000-meter deep seabed. During the dive on 16 Nov 2020, crew of *Fendouzhe* retrieved three underwater objects – placed earlier on the seabed – with the help of integrated navigation system and sonar equipment.



Fendouzhe submersible with its crew. (Image by IACAS)

3. **Comments.** In 2016, Chinese scientists and engineers from the teams which developed *Jiaolong* and *Shenhai Yongshi* (Deep-Sea Warrior) submersibles launched a project to build a manned underwater vehicle capable of surveying the entire ocean. The vehicle was later named *Fendouzhe*. In June 2012, *Jiaolong* – China's first – deep-sea manned submersible had set national record by diving till 7,062 meters in Mariana Trench. *Shenhai Yongshi*, China's second deep-sea manned submersible, has an operational depth of 4,500 meters. Such deep-sea vehicles can collect samples and data from the deepest part of ocean for hydrothermal, geological and marine biological research.

**Source:** [https://english.cas.cn/newsroom/cas\\_media/202011/t20201111\\_249059.shtml](https://english.cas.cn/newsroom/cas_media/202011/t20201111_249059.shtml)

4. **China's 'Explorer 2' Research Vessel also Collaborates with 'Fendouzhe' Manned Submersible Trials.** During joint mission with *Fendouzhe* manned submersible, the *Explorer-2* scientific research ship lowered a deep sea Lander called *Canghai* (vast sea), equipped with high definition cameras. This Lander module was lowered at the same speed as *Fendouzhe* submersible; and successfully docked with it on the ocean floor, at a depth of more than 10,000 meters. Headquarters of China Media Group – parent company of the Lander – successfully used indigenous Ultra-high Definition 4K technology to carry out real-time video broadcast from the seabed at a depth of 10,000 meters. The Lander can not only send back real-time images from the bottom of the ocean, but it can keep a record of every move by *Fendouzhe*. To better accomplish the job, *Canghai* Lander also had a small assistant – *Lingyun* – which could move around freely in the deep sea and provide lighting at different angles for the cameras.



China's 'Explorer-2' (Tansuo er hao) research vessel in Port

5. In addition to carrying the Canghai lander, the *Explorer-2* also carried another manned submersible developed by China, the *Shenhai Yongshi*. This manned submersible also dived in the Mariana Trench and acquired large amount of scientific data and samples, for further study about geological structure of the area. The *Explorer-2* completed its research missions in Mariana Trench and returned to Sanya Port on 17 Dec 2020.

6. **Comments.** The *Explorer-2* research vessel continued its mission in Mariana Trench after completing joint operations with the *Explorer-1* mother ship and *Fendouzhe* manned submersible. The *Shenhai Yongshi* manned submersible carried by it completed its 100th dive of 2020 – and 325 overall. It set a new record of 12 dives in eight days, with an average underwater time of eight hours and 27 minutes. It is also the first time in the world that a diving operation of such high frequency was conducted.

**Source:** [https://english.cas.cn/newsroom/cas\\_media/202012/t20201217\\_256794.shtml](https://english.cas.cn/newsroom/cas_media/202012/t20201217_256794.shtml)  
<https://news.cgtn.com/news/2020-11-13/What-s-new-with-China-s-manned-submersible-s-second-10-000-meter-dive--VnKGLb2M9i/index.html>

7. **China's Second Type 075 Amphibious Assault Ship (LHD) Starts Sea Trials.** China's second Type 075 amphibious assault ship embarked on its first sea trial on 22 Dec 2020, just eight months after its launch in Apr 2020. The second Type 075 left Hudong Zhonghua Shipyard in Shanghai, and sailed toward the East China Sea for a test voyage. This indicates that outfitting of the second Type 075 Landing Helicopter Dock (LHD) ship must have progressed very fast, since the ship was launched on 22 Apr 2020. By comparison, the first Type 075 sailed for its maiden voyage on 05 Aug 2020, more than 10 months after its launch on 25 Sep 2019. Maiden sea trial of the first ship had lasted 19 days. The second ship's maiden voyage could follow a similar pattern.

8. **Comments.** China's fast development of the amphibious assault ships is a world record. Type 075 LHD, is comparable to the US' Wasp-class amphibious assault ship. Amphibious assault ships mainly conduct vertical deployment and landing missions on islands and reefs. These ships with large flat flight decks can transport troops using helicopters, much faster than landing craft. They can also operate with aircraft carriers,

letting the carriers seize air superiority as they transport troops, tanks, and armour vehicles to the shore.

9. With two Type 075s undergoing sea trials and one more under construction, China will soon gain significant amphibious landing capabilities, which are vital for dominating areas like the Taiwan Straits and the South China Sea. In military operations other than war, amphibious assault ships can also be deployed in anti-terrorism, anti-piracy, sea lanes protection, disaster relief, and humanitarian aid missions.

**Source:** <https://www.globaltimes.cn/page/202012/1210707.shtml>