

Thank you for your invitation to speak at this important meeting. Taiwan's democracy is one of the U.S.'s largest trading partners and is located at the center of the first island chain that brackets the Asian mainland. It is of great importance to the U.S. both economically and strategically. As you well know the Taiwan Relations Act of 1979 provides that "the U.S. will make available to Taiwan such defense articles and defense services in such quantity as may be necessary to enable Taiwan to maintain sufficient self-defense capabilities." The U.S.-Taiwan Business Council's defense & security element plays a vital role in supporting this key provision of the Taiwan Relations Act.

This brings me to what I'd like to discuss this morning. Taiwan's population is almost entirely dependent on imported food and energy. A recent Ministry of National Defense Report states the PRC's People's Liberation Army will exploit this vulnerability in a conflict, likely using a combination of blockades and threats against supporting nations to choke Taiwan's economy before launching an attack against military and political centers. According to the Pentagon's 2014 report on China, in the event of a war Taiwan would face upwards of 34 PLAN submarines.

A dozen subs connected with advanced sensors and weapons could contest the PLAN's control of the waters surrounding Taiwan. No other Taiwanese naval platform could oppose a maritime blockade as effectively. The ability of submarines to act autonomously and stealthily would give Taiwan an effective defense against a foreseeable threat. The inability of hostile forces to detect submarines helps assure the uninterrupted flow of sea-borne commerce. A modern, deployable fleet of submarines is critical to the sustained defensive strategy of Taiwan.

Forty-six years ago the Chiang Ching-kuo administration and the Ministry of Defense presented plans for a dozen submarines. That request reflected the desire for an improved defensive capability as the U.S. was withdrawing forces from the region. Taiwan saw the sea control ability of submarines as a necessity. For 40 years, Taiwan has faced constant obstacles and interference in acquiring this capability. Last year Taiwan stood at a crossroads. One path was to continue the pursuit of foreign-constructed submarines. This had so far yielded nothing. The

other was indigenous development. The Ministry of Defense announced that Taiwan would build its own submarines.

A developed submarine capability would greatly enhance Taiwan's existing maritime abilities. Taiwan's navy has an extensive network of land, air, and sea-based radars, sonar arrays, imagery intelligence assets, and signal intelligence platforms that can track PRC maritime movement. A Project 2049 report shows that Taiwanese signals intelligence capabilities allow an unrivaled collection of information on PRC maritime activity by collecting an immense amount of information emitted by PRC satellites, military radios, air defense radars, and electric systems aboard aircraft, ships, and submarines. Taiwan's anti-submarine aircraft fleets provide the ROCN with an extensive maritime awareness. The large amount of collected data allows Taiwan to produce a detailed picture of the seas around Taiwan and provide the air force, army, and coast guard with useful tactical intelligence. A fleet of submarines would multiply this intelligence capability and help deter a potential enemy.

Taiwan's attempt to purchase submarines has become a lengthy saga. After receiving four decommissioned submarines from the United States and Holland, Taiwan's vision of a 12 boat fleet has remained largely unrealized. Despite PRC protests, Taiwan searched the world to accomplish the mission. Most submarine-producing countries have continued to operate within the constraints of the Shanghai Communique of 1972 in which the U.S. acknowledged the "One-China" policy. Talks between Holland and Taiwan date back to 1981 when the Dutch company Rotterdamsche Droogdok Maatschappij B.V. Submarines (RDM) signed a contract that delivered Taiwan its two Hai Lung-class vessels.

The PRC feared submarines more than any other defensive ability of the RoCN and sought to prevent possible deals. When Holland agreed to sell the submarines in the early 80's it faced immediate pressure from China, which threatened Holland with economic and diplomatic sanctions. The pressure concluded with the so-called "Gentleman's Agreement" of 1994 in which the Dutch promised not to sell any "strategic" items to Taiwan. The remaining submarine-producing nations have largely continued to operate within the constraints of the "One China" policy.

Notwithstanding the officially supported one-China policy, the U.S. has practiced its own version. The Taiwan Relations Act of 1979 considered any non-peaceful means to influence Taiwan a threat to the security of the Western Pacific and a U.S. concern. Section 3(a) of the Act states that the U.S. will make available to Taiwan such defense articles and services necessary to enable Taiwan to maintain a sufficient self-defense capability. Accordingly, the protection of Taiwan would remain at the discretion of the president and Congress. This de facto policy has remained in practice with significant U.S. arms deals to Taiwan despite a lack of official diplomatic relations.

The sale of U.S. defense equipment to Taiwan totaled \$4.3 billion from 2004-2007 and \$2.9 billion from 2008-2011. However the U.S. has hedged on the sale of submarines as an arguably offensive weapon, barred within the restrictions of the Taiwan Relations Act. The U.S. Navy has also remained largely opposed to the trade of diesel submarines for reasons, both bureaucratic and operational.

In 2001 during the presidency of George W. Bush provided a moment of hope for a change in policy. The Bush administration initially agreed to a major arms sale to Taiwan, approving the sale of eight diesel submarines in a deal that included a variety of anti-submarine and anti-ship defense articles. The Pentagon called the deal a robust package, warning of China's superiority in submarines and the difficulty Taiwan would face in opposing a naval blockade with existing resources. Obstacles materialized at once. Bush never resolved them. Caught between the U.S. nuclear submarine industry's staunch opposition and the PRC's bullying of prospective trading nations, Taiwan's defense needs went unmet.

Over a decade has passed and the Taiwanese navy's submersible capabilities remain severely limited. Still in commission are the two decommissioned Zwaardvis-class vessels built by the Dutch Navy in the 1980's. Taiwan's navy practices in two ex-U.S Guppy-class boats built at the end of World War II. I've seen and been in these boats. They are relics that need to be replaced. Submarines have become the weak spot of the robust and very capable Taiwan navy. The Asia-

Pacific theatre necessitates maritime strength. More to the point, Taiwan is an island. Without modern vessels, Taiwan is short of the means to defend itself.

Taiwan has accordingly increased its efforts to use its own resources to build submarines. ROCN chief Admiral Chen Yeong-kang released the indigenous plan *Forces Structure and Planning Concepts for the Future ROCN* in January of 2014. This plan called for refurbishing the obsolete Guppy-class submarine with new steel plates and pressure hulls and extending their life as training vessels. This would help develop domestic experience in submarine construction. It's a good idea. The ROCN would invest 450 million dollars in China Shipbuilding Corp (CSBC) and the Ship and Ocean Industry R&D Center (SOIC) in the next two years to help accomplish this plan. On August 31, the Ministry submitted an \$89 million budgetary proposal for an indigenous submarine design. The indigenous program includes a separate plan to extend the life of the two Zwaardvis-class submarines with estimated budget of \$90 million. Again, this adds skill and experience to the industrial base needed to build submarines from the keel up.

In November 2014, a seminar on the indigenous defense submarines (IDS) program brought experts and officials from the U.S., Germany, France, Sweden, Netherlands, Italy, and Australia to Taiwan. Following the seminar, the IDS program sought to develop submarines between 1,500 to 2,000 tons with the first boat to be completed in 2024. In December, the Ministry of National Defense, (MND), the Ministry of Economic Affairs, Ministry of Science and Technology, the China Shipbuilding Corporation (CSBC), and Ship and Ocean Industry R & D Center (SOIC) met with the Legislative Yuan's Foreign and Defense Affair Committee. In the hearing, Vice Admiral Kao Tein-Chung revealed that the after a comprehensive evaluation the best approach for the IDS program is to build the submarines in Taiwan with the technical support of the U.S.

Submarine design and production are formidable challenges. For example compare an Australian-produced 3,600-ton frigate to the Australian indigenously designed Collins-class submarine. The submarine required almost triple the number of suppliers, called for almost triple the time of construction, and needed more than double the hours of assembly. Over 33,000 drawings and 5,000 work orders were produced before the Collins-class submarine build process

could even began. During construction the Collins-class submarines faced a multitude of problems, from welding of the hull, to excessive engine noise, to a faulty combat system, and a propulsion system that was prone to failure. Even after completion, the Australian Collins-class faced serious operational issues. In 2009, only one submarine (out of six), HMAS *Farncomb*, was capable of sea duty.

Ten to fifteen years is a reasonable length of time to develop a new type of submarine, with two thirds of that time spent on design. Without many experienced professionals, the design stage will be prolonged. In a RAND analysis, with sufficient software and facilities, an estimated 600 to 900 professional designers are required to complete the design stage. While Taiwan's shipbuilding industry has successively produced exceptional frigates and tankers, its submarine program starts from the ground up. Success depends on Taiwan's ability to train or recruit designers.

Many Taiwanese officials have spoken of securing international assistance for developing an IDS submarine. The United States has not constructed a diesel submarine since the Barbel-class diesel-electric boat of the late 1950s. But the U.S. could assist by providing design engineers; by supplying the plans for the Barbel-class boat; by working together with Japanese shipbuilders who make excellent submarines; and by relaxing export controls on items needed to build subs, and integrating combat systems.

There are multiple U.S. defense contractors that have good working relations with Taiwan. In 2002, when the U.S. Navy discussed options with Taiwan's navy, General Dynamics, Northrop Grumman, Lockheed Martin, and Raytheon all expressed interest in becoming the prime contractor. These companies have long experience in Taiwanese defensive abilities. Taiwan held an Aerospace & Defense Technology Exhibition in August. In attendance were Lockheed Martin, Northrop Grumman, General Dynamics, and Rockwell Collins. Working with U.S. companies to design a Taiwanese submarine could materially assist the program while giving Taiwan control over production and manufacturing.

A remaining option is using the blueprints of an existing model and customizing them to meet Taiwan's needs. Substantially increased cooperation with Japan could help strengthen security partnership between friendly nations. Japan retires one sub each time they add a new one. They are very good boats. Japan is both capable and possibly willing—with the right encouragement—to assist Taiwan in constructing diesel-electric submarines.

The timing is propitious. Tokyo is increasingly concerned about the PRC's aggressive naval activity that frequently encroaches on Japanese territory. A strong and friendly naval presence in the South China Sea advances Japan's strategic interest in the region. By providing the framework for increased Taiwanese naval capability Japan would be supporting its own interests without having to spend large sums. As Taiwan remains a vital component of U.S. naval strategy, Japan's genuine interest in bolstering Taiwan's defensive ability complements the U.S. interest of protecting Japan. A redoubled Taiwanese effort to engage Japan's assistance in building the indigenous submarine is worth the effort. If U.S. policymakers can be persuaded that the benefits of supporting a faithful democratic Asian friend outweigh the cost of incurring the momentary displeasure of an authoritarian potential adversary, then Taiwan's redoubled efforts aimed at enlisting America's promised support for its defensive submarine program would also be worth the effort.

I applaud the valuable work that the U.S.-Taiwan Business Council is doing, especially in this area which is of extraordinary importance to both Taiwan's and the U.S.'s strategic future. I am grateful for this opportunity to speak to you on these matters and honored by your invitation. Thank you.