



C H I N A A E R O S P A C E
S T U D I E S I N S T I T U T E

The PLA Navy Coastal Defense Missile Force



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Author's Note

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The PLA Navy Coastal Defense Missile Force

The People's Liberation Army Navy (PLAN) is comprised of five branches (兵种): the surface fleet, the submarine fleet, naval aviation, the marine corps, and coastal defense.¹ As the PLAN modernizes, each of the branches has undergone its own modernization. This includes the PLAN Coastal Defense force (PLANCDF) which is primarily comprised of coastal artillery forces and coastal defense missile forces.^{1,2} Although the PLANCDF coastal artillery has become mostly obsolete, the missile component of this force (海军岸导部队 or PLAN Coastal Defense Missile force (CDMF)) has not only been growing, but may play a critical role in many of the PLA's envisioned operations on China's periphery. The CDMF is comprised of anti-ship cruise missile (ASCM) systems and represents the shore-based medium and long-range fires that the PLAN brings to fights on the periphery of China. In the past decade, the CDMF has consistently undergone upgrades to its organization, the missile systems that it fields, and its barracks (军营).ⁱⁱ This branch has also been highlighted in official media several times recently demonstrating an increased interest in enhancing its capabilities and bringing the CDMF into focus. This paper aims to document the CDMF organization, its role in PLA operations, the different CDMF regiments within the Theater Commands (TC), the missile technology, and the facility modernizations that the CDMF has undergone. To compile this information, the author used open-source publicly available information from a variety of different online tools as well as official PLA media, and publicly available databases to draw conclusions on the capability and potential roles of the CDMF in PLAN operations.

The Coastal Defense Force

Each of the five branches of the PLAN provide unique capabilities PLAN. The PLANCDF, not to be confused with the China Coast Guard, is tasked with providing defense for naval bases, ports, and coastal areas, as well as destroying enemy ships, blocking waterways and strategic lines of communication, supporting ships operating in coastal areas, and supporting the defense of other shore-based facilities. The CDMF is considered part of the PLAN's main battle force and is one part of China's mainland-based layered anti-ship fires for comprehensive defense of the Chinese homeland and its periphery waters.³ The shore-to-ship firepower of the PLANCDF is broken into two different components: coastal artillery and the guided missile forces.⁴ As Chinese missile technology has evolved; coastal artillery has been largely replaced by shore-to-ship missiles. According to the PLAN, in addition to the firepower of the coastal artillery and the missile force, the larger Coastal Defense Force may contain certain other capabilities that do not fall within the other four PLAN branches such as anti-aircraft artillery or radar systems.^{iii, 5} However, this paper primarily covers the CDMF regiments and battalions.

ⁱ For the purpose of this paper, only the Coastal Defense Missile force will be discussed at length

ⁱⁱ The facilities that the CDMF occupy have been referred to as *yíngqū* (营区) or *jūnyíng* (军营) in different sources. The translation for the term *yíngqū* (营区) is barracks, however barracks does not exactly fit into this naval concept, and it most likely means "battalion area" or "regiment area" in this regard. *Jūnyíng* (军营) can be translated as barracks. For the purposes of this report the term *yíngqū* and *jūnqū* will be translated as barracks when referring to the set of buildings and facilities from which the CDMF operates out of. The use of barracks should not be confused with the disambiguated term "barracks" which generally refers to the building in which soldiers live.

ⁱⁱⁱ In PLA terminology, a force can be used to describe a group or units within different levels of the command structure, but for the purposes of this paper regiments (团队) of the CDMF will be identified individually and the overall anti-ship cruise missile component of the PLANCDF will be referred to as either a CDMF regiment or the individual battalions at unique locations.

China's Evolving Coastal Defense Strategy

As China's naval forces have grown, China's maritime strategy has evolved. Beginning with the founding of the People's Republic of China in 1949 until the 1980's, the PLAN was focused on "near-coast defense".⁶ Throughout this period, China witnessed the Great Leap Forward and Great Proletarian Cultural Revolution, periods of time that shook the Chinese economy and political system to its core. A lack of economic might meant that coastal defense, as envisioned, was largely left to land-based systems aimed at repulsing any attempted invasion of the mainland by Chiang Kai-shek and the Kuomintang forces on Taiwan.^{iv} These small-scale attacks occurred from both sides throughout the 1950s with shelling from PLA coastal artillery playing an important role in the Second Taiwan Strait crisis of 1958. Partly due to the lack of an economic engine and partly due to a lack of modern shipyards, at that time the PLAN had not yet built a substantial surface fleet. Instead, the PLAN fielded systems including short-range anti-ship cruise missiles and coastal guns to defend up to 12 nautical miles off the Chinese coast.⁷ The old shore-based coastal defense forces, largely artillery based with some Soviet Type 542 shore-to-ship missile systems, began to field indigenously produced early model cruise missiles including the HY-2 (Silkworm-2), a PRC developed version of the Soviet Type 542.⁸ These missiles were usually used rail mounted in fixed positions or on rudimentary missile trucks and were quite limited in range.

In the 1980's, under the guidance of Admiral Liu Huaqing, the PLAN Commander from August 1982 to January 1988 prior to becoming a Vice Chairman of the Central Military Commission, the PLAN started to implement the systemic improvement of its surface fleet. From a "near-coast defense" posture, China began operating under the concept of "near-seas active defense," aiming to restrict adversary's access between the Chinese coast and first island chain.⁹ To meet this mission set, in the late 1980s, the CDMF began to field the YJ-8 ASCM, with an extended range YJ-8A missile being developed in 1990's. After the 1995-96 Taiwan Strait Crisis, China's attention once again focused on the vulnerabilities of the PRC's mainland defense against U.S. operations around Taiwan. During the 1995-96 Taiwan Strait Crisis, the lack of capability in both the PLAN and PLA Air Force (PLAAF) became apparent. At this time, the navy was considered a "green water" force, only effectively operating in coastal areas, and the air force lacked any real ability to operate over-water and at range for extended periods of time. One outgrowth of this strategic lack of capabilities was an investment in ballistic missile systems to extend the protection rings around mainland China and provide the PLA with a credible strike force at range. Under the Second Artillery Corps, which was not a full service at that time, the PLA began acquiring a wide variety of ballistic and cruise missiles to create a buffer zone around mainland China's periphery. Despite the elevation of the Second Artillery Corps to a full service (the PLA Rocket Force "PLARF") in 2016, and the PLARF's fielding of cruise missiles, the CDMF still maintained the primary role of fielding cruise missiles for anti-ship coastal defense. During the 1980s-2010s period of growth within the Second Artillery Corps, the PLAN began to field the HOUXIN and HOUJIAN-class missile patrol combatants, likely equipped with the early C-801/YJ-1 ASCM systems in support of the "near-coast defense" and to augment coastal defense.¹⁰

As the navy emphasized "near-seas active defense" and shifted further towards "far seas operations," the role of the PLANCDF branch became overshadowed by a growing

^{iv} Chiang Kai-shek's Chinese name is 蒋介石 (Jiang Jieshi) and the Kuomintang is the 国民党 (Guomin Dang).

surface fleet and the PLAN's ability to project power outward. However, the CDMF continued to upgrade its systems to meet modern demands. In 1998, the YJ-8s were then replaced by the YJ-83, providing the PLA with coastal defense missile systems that could range over 100 nautical miles. The YJ-83, unaccounted for in some orders of battle, may still be in service today, possibly at fixed position CDMF locations. From the YJ-83, in 2005, the YJ-62 came into service.

The CDMF underwent further organizational and technological changes in 2008. Prior to the 60th anniversary of the founding of the PRC, a revamped version of mobile CDMF regiment was established, nicknamed the "1st Coastal Thunderbolt Regiment."¹¹ Envisioned as a new take on mobile coastal defense to meet the needs of creating an "informationized" military, this new type of regiment was tasked with developing operational concepts to field a mobile, rapidly deployable ASCM capability that would be able to operate under a complex electromagnetic environment.¹² The first regiment was purportedly stood up with 75 soldiers from across the PLA's services as well as 26 military and civilian academics and researchers.¹³ The 1st regiment was tasked with developing the requirements for equipment, force structure, and concepts of operations for deployment of their capabilities. Maneuverability was their hallmark, travelling across regions and up to 3,000 kilometers to train. Zhong Xiaojun, one regiment leader of the CDMF, also stressed that as a land-based force, maneuverability and concealment meant survivability for the troops.¹⁴ Since the founding of the 1st regiment, at least four similar regiments have been formed across the theater commands, and multiple barracks have been added or upgraded for these units. As part of standing up the newer style CDMF regiments, the practice of repurposing and refitting older PLA barracks and facilities as new accommodations and storage facilities became a trend that continues today.¹⁵ Accordingly, the timeline of construction at CDMF barracks roughly corresponds to the timeline for the stand up of new regiments.^v

Over time, the CDMF has consistently improved the missile systems it fields and conducted more realistic training under contested conditions. Since 2019, the CDMF has been adding the YJ-12B ASCM to its inventory. In 2021, the CDMF was highlighted by official media as an example of studying history and party history to modernize and improve modern capabilities.¹⁶ These forces have also been rated as an "Advanced Regiment for Naval Grassroots Construction."¹⁷ Across the CDMF, regiments have been training and exercising under varying conditions. Exercises have included introducing unfavorable or adverse elements such as weather, terrain, distance, simulated casualties, contested electromagnetic environments, low-light conditions, and chemical attacks.¹⁸ These exercises have also included short- and long-term deployments, rearming for volley and continuous fire, and forced diversion from originally planned strike points.¹⁹ The CDMF has been a 'first-level' military training unit for 13 consecutive years indicating an official recognition of the enhanced rigor of the force's training and exercises.^{vi} Furthermore, these units have received second-level and third-level merits and were commended by the Central Military Commission in 2018 as advanced military training units of the PLA.²⁰ Official PLA media has indicated that the CDMF has won the political favor of the Chinese Communist Party (CCP) as it is often highlighted as one of the leading efforts in developing "informationized" warfighting capabilities for the modern era.²¹ Moving forward, it is likely that the CDMF's capabilities and force structure will

^v For detailed analysis of individual CDMF barracks and their construction, see Appendix 1

^{vi} First-level regiments are those that test at the highest level of readiness and skill in military exercises according to the "Outline for Military Training." Roughly 16 out of 1000 regiments are commended at this level each year.

expand to fill the PLAN's need for a multi-domain integrated medium and long-range defense network to defend its ships operating in this zone.²² For a smaller branch that plays a specific role, gaining media attention and the commendation by the CCP is not a small feat and does indicate that this service may benefit from the political tailwinds accompanying the attention.

CDMF Integration in Modern PLA Strategy and Operations

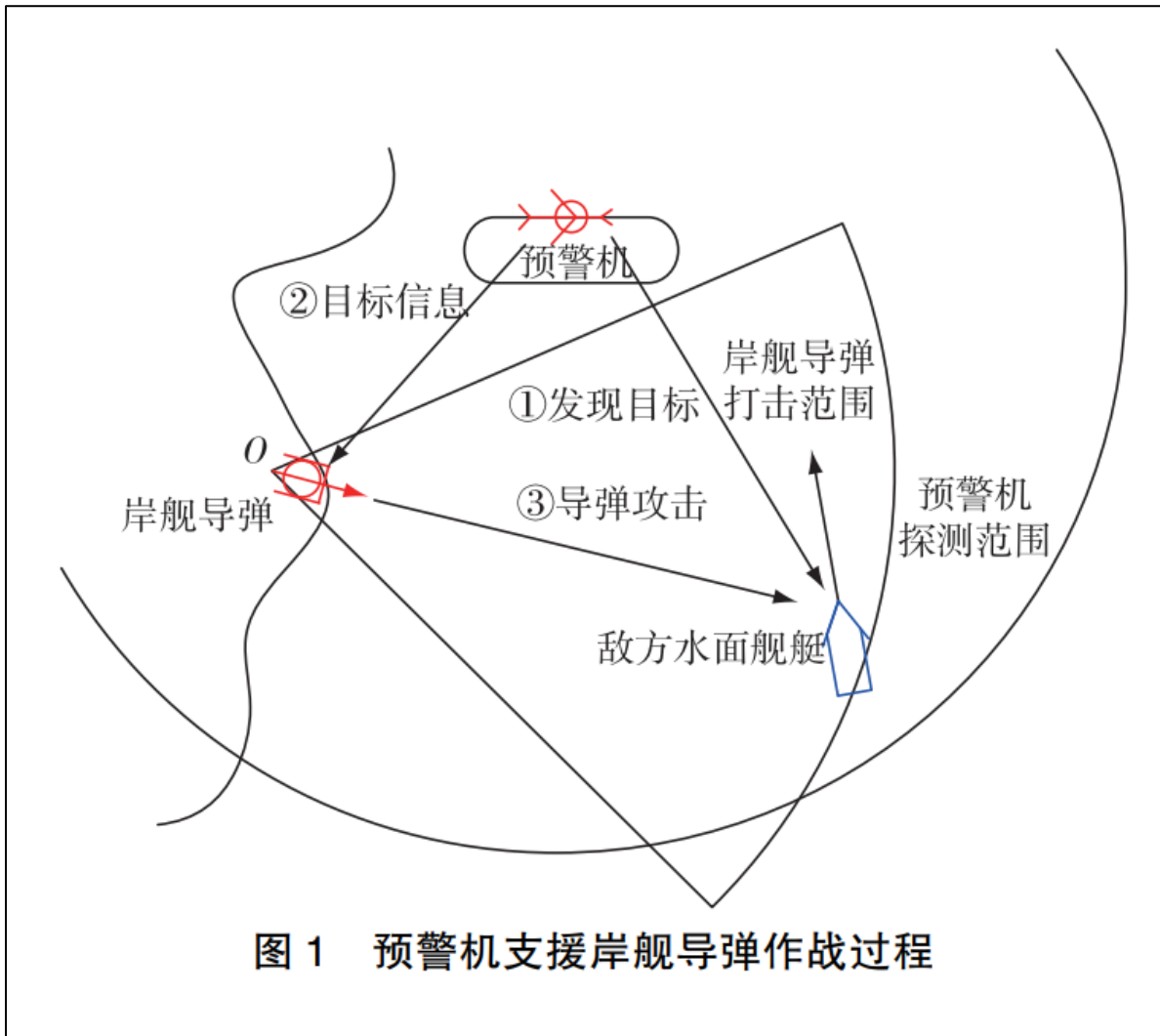
In the past several decades, the PLA has been undertaking significant modernization programs. Part of these efforts has been a push towards developing PLA joint warfighting capabilities across the PLA. Structural changes in the organization of the PLA to Theater Commands further pushed for joint military capabilities in China's "Strategic Directions."

Accompanying the larger organizational changes, the PLA has pushed for a three-phased military modernization program of the three "izations." These are mechanization, informationization, and intelligentization.²³ The backbone of informationization and intelligentization can be considered the PLA's joint command, control, communications, computing, intelligence, surveillance, and reconnaissance (C4ISR) networks enabling modern platforms to conduct joint operations with timely decision cycles. As this networked architecture has expanded, so too have the ranges of the different weapons systems that the PLA fields. This includes the shore-to-ship missiles of the CDMF. As alluded to by the stand up of the "1st Coastal Thunderbolt Regiment", these shore-to-ship missile units and especially the newer mobile regiments, are figuring out ways to leverage the informationized nature of PLA combat operations and to provide their capability to PLA multi-domain and joint operations on China's periphery. The CDMF has been training in this multi-domain way with the PLAN's surface fleet, naval aviation, and other brother services, as well as consistently being part of larger multi-service joint exercises.²⁴ These units were included in the August 2022 and Joint Sword exercise in April of 2023, indicating a role for this force in applying pressure to Taiwan.²⁵

According to several authoritative texts on the PLA's concept of joint operations, the CDMF plays a supporting or primary role in several operations. The *Science of Military Strategy (2020)* describes coastal defense forces as "strategic cover forces" in charge of providing supporting fires and attached to the main battle force.²⁶ In the *Science of Campaigns (2006)*, the Coastal Defense forces are envisioned as playing a role in littoral campaigns, naval base defense, and countering an enemy's naval blockade.²⁷ In *Services and Arms Applications in Joint Operations*, these forces play a critical role in "coastal land battlefields" and are included in the basic task organization of fleets during wartime.²⁸ According to the text, "Coastal defense troops consist of coastal missile units and coastal artillery units. They have fairly great assault power and a fairly strong ability to keep on fighting. Their defensive fortifications are solid but their locations are relatively fixed, so it is easy for the enemy to attack their positions. Their principal missions are to protect naval bases and important coastal targets, to shield coastal traffic lanes at sea, to assist ships [engaged] in coastal activities, to teal off off-shore channels, and to support the operations of units defending islands and coasts."²⁹ Their vulnerability to counterattack is one reason that modern CDMF barracks have a considerable number of underground facilities (UGF) both to shield from preemptive strike and to retreat to after expending munitions.

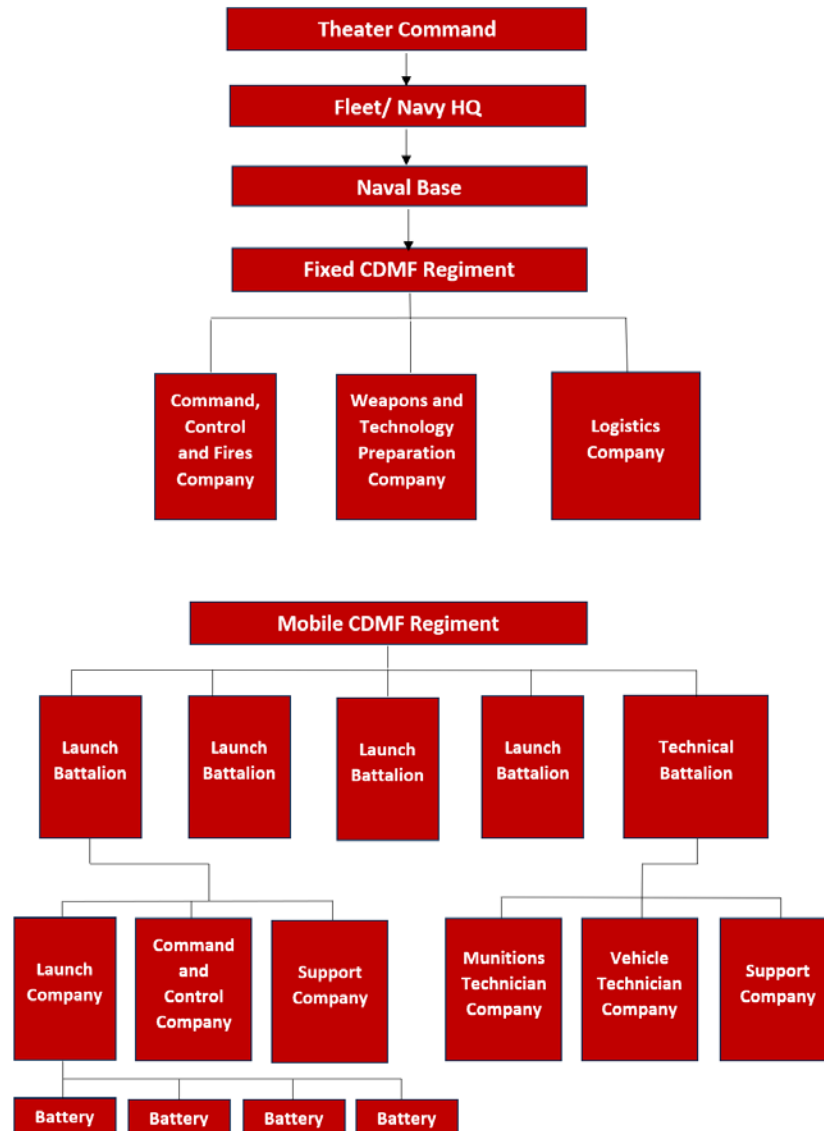
The CDMF was integrated early into PLAN multi domain operations. In the mid 1980's, these regiments began conducting what is known as "Two exceeds, one strike" (双超一打). Using this methodology, the shore-to-ship missile units can receive targeting data from radar ground stations, airborne radar systems and ship-based radar systems and complete their

kill chains.³⁰ This allows shore-to-ship missileers to not need to rely upon force-indigenous radar systems that would be more limited in their range. It also has allowed for firing their cruise missiles at maximum range, engaging targets farther out on the water. In modern operations, a similar methodology is likely used, but it may be more expanded to include newer systems like the KJ-X00 series of airborne early warning and control aircraft.³¹



A diagram depicting the theoretical use of airborne early warning and control aircraft used in conjunction with shore-to-ship missile systems.³²

CDMF Organizational Structure



CDMF regiments are Division Deputy Leader grade organizations or Regiment Leader grade organizations with the forces being described as organized into regiments (团) and the facilities out of which the regiments operate as being described as a barracks (营区, yíngqū or 军营 jūnyíng). Regiments are described as being comprised of battalions (营 yíng) and subordinate companies (连, lián).^{vii33} Additionally, there may be individual CDMF battalions that operate individually and outside of a regiment structure.³⁴ Within a battalion, each companies' soldiers are divided into teams (分队 fēnduì) to man the individual vehicles under

^{vii} The “fixed CDMF Regiment” organizational structure is based off the 1998 PLAN Encyclopedia and may have changed, although this style of regiment is being phased out in favor of mobile regiments. The “Mobile CDMF Regiment” organizational structure has been constructed through cross referencing the titles of various regiment, battalion and company leaders and aligning it to the definitions of a guided missile regiments and battalions.

their responsibility.^{viii, 35} Launch battalions represent the combat capability of the regiment with each regiment having between three and four launch battalions. One launch battalion is normally comprised of four transporter erector launchers (TELs) and one command and control vehicle. An individual TEL and the soldiers manning that TEL likely comprise one battery. The basic five vehicle arrangement of a battalion may be augmented with support vehicles depending on the needs of an individual launch battalion. Support vehicles may include reloading equipment such as munitions transport vehicles and loading cranes, or other utility vehicles and are supplied and manned by the support company.

Command and control of these forces beyond the regiment normally falls to the individual PLAN Naval Bases.^{ix} CDMF forces may also be subordinate to Maritime Guard District Headquarters (水警区) which is a first-level naval organization affiliated with the naval base and fleet.³⁶ Likely, higher headquarters may change depending on the peacetime or wartime circumstances for which they are deployed or task organized. There is also at least one reference of these forces having a chief of the staff department and political commissars, implying a certain level of political command and control structure at the regiment level, which is normal for the PLA.³⁷

CDMF regiments are divided into two categories, fixed and mobile. Fixed regiments typically operate rail-based TEL systems and are geographically fixed.³⁸ Mobile regiments operate wheeled TELs which deployed from their barrack can ostensibly setup and fire from any suitable location. While there is evidence of both fixed and mobile regiments, the East Sea and South Sea Fleets appear to be mobile regiments and the North Sea Fleet appears to have both types of regiments. Based on CDMF training and operations, individual regiments may have one or more barracks, storage facilities and improved firing positions. Depending on theater, mobile and fixed regiments may have differing sets of capabilities.^x

Within a fixed regiment there are the command, control, and fires company; the weapons and technology preparation company; and the logistics company. The command, control and fires company is responsible for coordinating the fires efforts with the overall guidance from higher command as well as the preparation of rail-based TELs. TELs are usually concealed under bunkers and deployed to the forward end of the bunker by rail.³⁹ For these regiments, command and control facilities are in solid permanent fortifications nearby.⁴⁰ The weapons and technology preparation company is responsible for storage, maintenance and arming of the different weapons systems. The logistics company is responsible for the procurement of military supplies, the ordnance, fuel, finance, management, medical support, maintenance of facilities and equipment, alarms and other logistics needs.⁴¹ With the stand-up of the PLA's Joint Logistics Support Force in 2015, some of the roles may have changed for the logistics company such as acquisition of things like fuel and other commodities.

viii “分队” (fēnduì) or “teams” has been translated here as “batteries.”

ix For a list of the known MUCDs see Appendix 1 ; Units with MUCDs beginning with 91XXX – 92XXX are known to be subordinate to the PLAN according to page xxxii and page 88 in the 2022 Directory of PRC Military Personalities.

x For the purposes of this paper, the CDMF barrackss in the Eastern, Northern and Southern Theater Commands will be the primary focus of the research.



CDMF troops unload crated missiles for preparation.⁴²



One battalion shown reloading shore-to-ship missile TELs.⁴³

Within a mobile regiment there two primary battalion types, the Launch Battalion and the Technical Battalion. Launch battalions oversee operating the ASCM TELs, the command and control (C2) vehicles and other supporting vehicles. They have C2 Companies, Launch Companies and Supporting Companies. The C2 company and Launch Company move the TELs and C2 vehicle to the launch positions, ready the vehicles for launch, and execute the command to fire.⁴⁴ Individual members of the launch battalions are also cross trained to be able to operate one TEL by themselves.⁴⁵ The Support Company within a Launch Battalion is likely in charge of operating the support vehicles that augment the battalion such as refueling vehicles, medical and combat support vehicles, radar vehicles as well as utility vehicles.⁴⁶ In an extended deployment, or when there is a perceived need for sustained fire, an individual battalion's basic complement of vehicles may be augmented with mobile cranes and reloading vehicles from the Support Company.⁴⁷

The Technical Battalion supports the Launch Battalion with technical needs and service

for the weapons systems and vehicle maintenance and preparation.⁴⁸ Technical Battalions likely include a Munitions Technician Company, a Vehicle Technician Company, and a Support Company. The Munitions Technician Company oversees munitions storage, handling, and preparation.⁴⁹ In preparation, additional preloaded missile canisters may be readied to be loaded onto TELs at-location. The Vehicle Technician Company is likely in charge of maintenance and readiness of all the regiment's vehicles.⁵⁰ The Technical Battalion's Support Company likely provides other services to the overall barracks.

On average, mobile regiments have in total at least twenty TEL and C2 vehicles under their control. Adding in one of each support vehicle type to each launch battalion brings a CDMF regiment's total vehicles to between 24 to up to 40 vehicles, or between five at its most basic and ten vehicles per battalion depending on the vehicle mix. Solitary mobile CDMF battalions, such as found in the Southern Theater Command, may have five or more vehicles under their control.



One CDMF launch battalion with YJ-12Bs sets up for an exercise in the ETC.⁵¹

CDMF Weapons Systems

In the past twenty years, Chinese missile technology has seen dramatic improvements. One component of the PLA's focus on missile development has been to create land-based variants of other field-tested missile systems, for example the YJ-62. Land-based variants can be loaded in various configurations onto wheeled vehicles to enable "shoot-and-scoot" operations from shore. For the CDMF, the chassis that carry these missile systems are based on the WS2X00 series chassis, a similar chassis used across different PLA services. In terms of manufacturing, this means that new missile system chassis can be built at a more rapid pace, or they can be retrofitted to accommodate different missile variants.

Primary Missile Chassis Specifications				
Missile System	Chassis	Chassis Operating Range and Engine Specs.	Chassis LxWxH	Other attributes
YJ-62	Variant of Wanshan 2400 (WS2400) 8x8 ⁵²	80 kph, maximum load 41 tons 650km ⁵³	11.44 m X 3.05 m X 2.97 m ⁵⁴	The WS2400 is mounted with three YJ-62 missiles in cylindrical tubes. Variants can include additional crew seating area directly behind truck cab with space for up to 4 additional crew members.
YJ-12B	Variant of Wanshan 2600 (WS2600) 10x8	70 kph 650 Km	16.35 m X 2.85 m X 3.05 m ⁵⁵	The WS2600 variant is mounted with three YJ-12B missiles in square tubes to accommodate the shape of the missile. This key difference can help to identify the two different systems.

Using wheeled TELs has enabled mobile CDMF regiments to fundamentally operate differently than their predecessors, the fixed CDMF regiments. The WS2X00 chassis has expanded mobility, allowing for expanded options in firing locations. Wheeled vehicles tend to be more energy efficient and faster than tracked vehicles, meaning they have a longer range and can deploy quicker. This translates into mobile CDMF regiments operating from improved positions that can be 50 km or further from the regiment's home barracks. Certain CDMF exercises also indicate that CDMF regiments are training for longer range (100km+) deployments in support of firepower needs in different regions.⁵⁶ However, wheeled chassis are less capable of traversing difficult terrain. As such, launch battalions are known to use both improved and unimproved firing locations.

Improved firing positions generally are comprised of four concrete firing pads and an additional space for the C2 vehicle towards the back of the formation. Certain improved locations also appear to have additional aprons and adjacent land for bivouacs or additional missile reloads, reloading trucks and cranes. Due to limitations on the WS2X00 chassis' mobility, many of the improved positions have specific access roads that connect to a minor or major thoroughway, and generally do not connect to minor roads. Unimproved or temporary firing locations vary quite radically depending on the mission needs.⁵⁷ The difference between the two types of locations is small but important. Although unimproved firing locations may hold significant strategic value for surprise and optimal firing trajectories, in periods of bad weather the wheeled WS2X00 chassis may have more difficulty in reaching these positions. As such, CDMF battalions when deployed tend to favor improved positions for training; however, they are increasingly deploying to temporary positions in attempt to achieve more accurate "training for a real war."⁵⁸

A relatively unique aspect of the CDMF is their use of underground facilities (UGFs). Since early years, shore-to-ship missile battalions have practiced firing and immediately egressing to concealment or UGFs.⁵⁹ The speed of the WS2X00 chassis allows for a faster turnaround between launch and egress.

For longer-duration deployments out of barracks, CDMF units have erected temporary bivouac and storage facilities. At these locations, TELs are generally concealed in a rudimentary way.⁶⁰



A launch battalion of the Eastern Theater Command's 3rd CDMF Regiment mustering for an exercise after camouflaging their equipment.⁶¹



A launch battalion of YJ-62 ASCMs from the Northern Theater Command's 11th CDMF Regiment setting up TELs for a combined surface fleet and CDMF exercise.⁶²

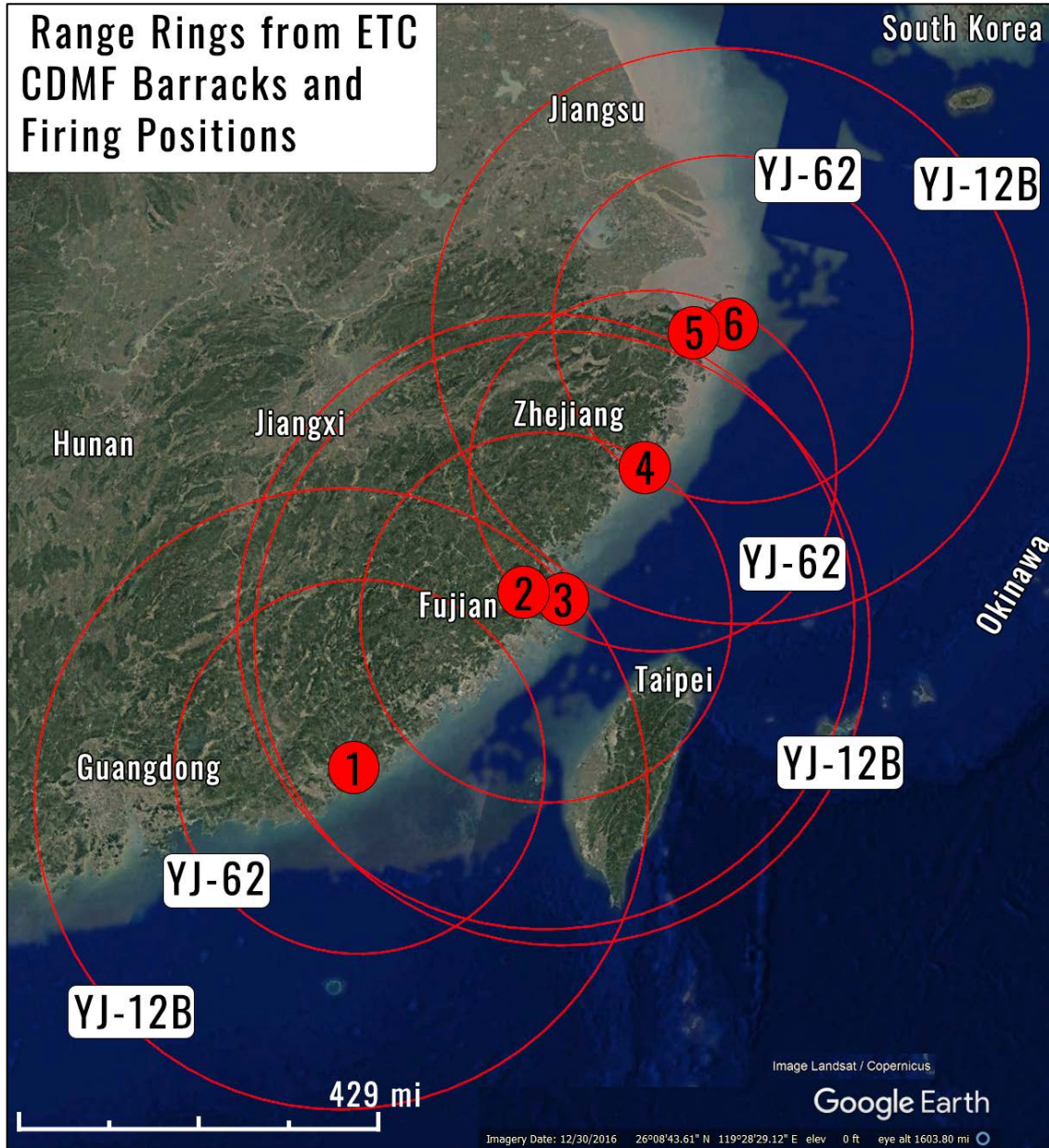
Anti-ship Missile Systems of the CDMF ⁶³				
Missile system (year first fielded)	Range	# of launchers	Characteristics	Status
YJ-8A (early 1990's)	43 km	N/A	Subsonic second generation ASCM	Inactive, replaced by newer missile systems
YJ-83 (1998)	230 km	Unknown, likely retired	Subsonic cruise flight (.9 mach), supersonic (1.4 mach) terminal flight	Active, beginning in 1998 with unknown number currently in use
YJ-62 (2005)	277 km	Estimated 104 (when added with YJ-12B) ⁶⁴⁵¹	Subsonic	Active
YJ-12B/ CM-302 (2018)	463 km	Estimated 104 (when added with YJ-62)	Supersonic	Active
YJ-18 (2021)	463+ km	N/A	subsonic cruise with supersonic terminal velocity	Inactive, but possible future fielding due to ground-based launch variants ⁶⁵

The CDMF has been continuously upgrading the ASCMs that it fields. Most mobile CDMF regiments began fielding the YJ-62 in 2005. The YJ-62 is a subsonic, sea-skimming munitions with an inertial guidance system an active terminal sensor.⁶⁶ The reported range of the YJ-62 is 277 km. As of 2018, several of the mobile CDMF battalions within regiments have begun transitioning to employing the YJ-12B. The YJ-12B is an upgraded ground-launched variant of the YJ-12 air-launched ASCM and the YJ-12 used on several of the PLAN's surface combatants. With a range of 463 km, this sea-skimming cruise missile has supersonic speeds with varying reports of between Mach 2.5 and Mach 4.⁶⁷ The missile is reported to have radar terminal guidance and carry a 200kg high-explosive fragmentation warhead.⁶⁸ Most of the CDMF regiments across the different Theater Commands equip their battalions with some mixture of YJ-62s and YJ-12Bs with individual battalions fielding the same system. The YJ-12B is fielded in specific battalions within the three regiments of the Eastern Theater Command. The 12th Regiment in the Southern Theater Command transitioned from the YJ-62 to the YJ-12B between 2017 and 2018.^{xi} The individual battalions within the Spratly Islands are also reportedly YJ-12B battalions.⁶⁹ In the future, the CDMF may continue to upgrade individual battalions within the regiments to the latest in the YJ-series of missiles as the technology continues to develop.⁷⁰

^{xi} See discussion of the Southern Theater Command barracks in a later section

Locations of CDMF Regiments^{xii}

Eastern Theater Command CDMF Barracks and Firing Position Locations^{xiii}



^{xii} The PLA is broken into five geographic Theater Commands: the Eastern Theater Command, Southern Theater Command, Northern Theater Command, Western Theater Command and Central Theater Command. Theater Commands are referred to by their abbreviations: ETC, STC, NTC, WTC, and CTC.

^{xiii} YJ-12B is stated to have a ~250 nm range whereas the YJ-62 is stated to have a ~150 nm range. The numbers in this graphic correspond to Table 1 “Description of CDMF Barracks.” Range rings are located on firing positions that are known to use the associated ranged missile system. ; Google Earth 7.3, (2023) Taiwan Strait 24°36'5.24"N, 119°44'55.07"E, (Accessed April 11, 2023)

Description of NTC CDMF Barracks and Firing Positions				
#	Name of Location	Coordinates	Barracks Attributes	Date Built
1	盐鸿海军岸导营区, Yanhong CDMF Barracks, 2 nd CDMF Regiment home barracks ^{xiv} Unit 92768	23°37'29.42"N, 116°51'16.47"E	Known to field YJ-62 and YJ-12B anti-ship missiles. ⁷² Possible training location for CDMF battalions. Upgraded in 2020-2022 to include two additional underground facilities and one above ground hardened facility. ^{xv}	Completed circa 2009, upgraded in 2020-2022.
2	南屿海军岸导营区, Nanyu CDMF Barracks, 1 st CDMF Regiment home barracks, Unit 92383	25°57'0.49"N, 119°10'58.07"E	Known to field YJ-62 since 2020, likely also fields YJ-12B. ⁷³ One known hardened pad operating location appx. 46.5 km east at Zhaixia.	First completed in 2010 with two underground storage facilities built during original construction. Construction of two additional underground storage facilities occurred between 10/2019 and 06/2020 with other construction of different facilities ongoing as of 01/2021.
3	平潭岛海防46团某部, Pingtan Island, possible battalion of 1 st CDMF Regiment or independent battalion	Barracks: 25°33'31.56"N, 119°52'26.62"E Firing positions: Northern: 25°33'31.56"N, 119°52'26.62"E Southern: 25°32'22.07"N, 119°51'24.88"E	Smaller, possibly 46 th unit of the Coastal Defense force subordinate to the 1 st Regiment of the CDMF or an independent battalion. The barracks has a northern and southern firing position on the island. This unit may field the YJ-12B.	Circa 2005, firing positions at the northern position appear to have been either refurbished or upgraded with concrete pads between August 2020 and February 2021. The southern firing position was upgraded in 2021 to have a hardened garage facility and larger parking apron.
4	洞头《海岸霹雳第一团》 Dongtou CDMF battalion, possible separately located battalion of the “Coastal Thunderbolt 1 st Regiment” firing position	Barracks: Possibly 27°49'10.73"N, 121°10'20.34"E OR 27°50'38.17"N, 121°9'22.03"E Firing positions: Known 27°50'44.29"N, 121°11'2.37"E	Use of this location is shown in a November 4 PLA video demonstrating the stand-up of a new “Coastal Thunderbolt Group.” ⁷⁴ The barracks’ location appears to be on the southeastern point of the	This seems to be an old firing position constructed circa 2010-2013 that was recently used last November. The barracks was built roughly around the same time as the firing

^{xiv} The location of Yanhong and its proximity to Shantou would intuitively place it under control of the South Sea Fleet, however, reporting by the PLA usually refers to this barracks as “东部战区某一个海军岸导团” or “An ETC Regiment of the PLAN CDMF” which indicated that it falls under the Eastern Theater Command.

^{xv} Identified in time-lapse satellite imagery from Google Earth

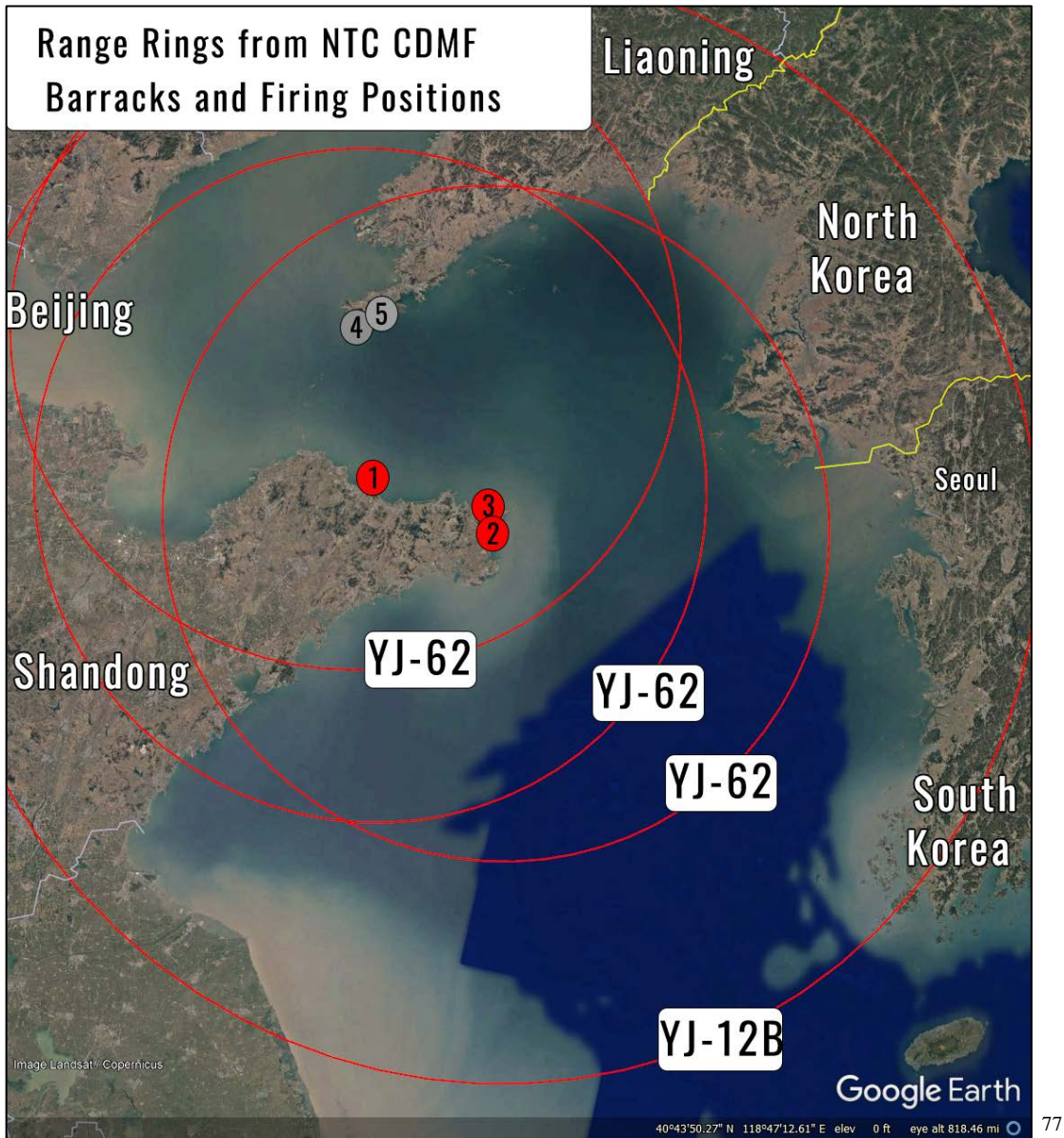
			island, but is unconfirmed. Appears to field YJ-62 systems currently.	position as an addition to a radar facility. The barracks was upgraded in 2020 to include larger parking space for vehicles.
5	仰岛湾海军岸导营区, Yangdao Bay Barracks, 3 rd CDMF Regiment home barracks	Barracks: 29°52'38.25"N, 122° 0'34.98"E Firing positions: unknown	The barracks has Northern and Southern locations. Reportedly home to the CDMF Third Regiment unit 92706 (岸导三团 92706 部队). Currently fielded systems include the YJ-62 and YJ-12B.	Southern- built pre-2009, with expansion for what appears to be vehicle storage. Northern expansion to upgrade facilities in 2010. Undergoing large expansion project to potentially include new underground storage as of Apr 2021
6	舟山海军岸导营区, Zhou Mountain CDMF Barracks, possible battalion of 3 rd CDMF Regiment	Barracks: 29°53'36.33"N, 122°25'0.23"E Firing: 29°53'25.12"N, 122°25'28.02"E	Barracks is newly built, and known to use the YJ-12B. This barracks may be subordinate to Yangdao Bay and the Third CDMF Regiment or an independent battalion.	Barracks construction completed in February of 2022. Firing position completed as of March 2021.

In the ETC, the bulk of the CDMF barracks are occupied by mobile regiments and positioned across from Taiwan, specifically on the northern and southern entrances to the Taiwan Strait. The Nanyu and Pingtan regiments are located at the closest point of mainland China to Taiwan, potentially as point defense against Taiwanese vessels, or to hold targets in the northeastern entrance of the Taiwan Strait at risk. Likewise, on the southern entrance, the Yanhong regiment plays a similar role in providing firepower to block off the southwestern entrance to the strait. All three of these regiments field YJ-12B missiles, which greatly extends their reach over and around Taiwan. With the YJ-12B, these three barracks may also play an important role in a joint firepower strike made against Taiwanese naval assets. Furthermore, the PLA may use individual battalions from these regiments to signal and deter U.S. vessels conducting transits of the Taiwan Strait or conducting joint exercises with Japan in the East China Sea around Okinawa.

The battalion at Zhou Mountain and regiment at Yangdao may be meant for more defensive purposes than the other ETC regiments. The Zhou Mountain battalion may also belong to the Third CDMF Regiment or be independently controlled. According to an official report from PLA's Central Military Affairs, Zhoushan is a potentially older CDMF battalion that only recently was equipped with "new" ASCMs. Based on the context and video of the equipment, "new" implies the YJ-12B.⁷⁵ With the YJ-12B, these units can provide defensive cover for the approaches to the ports of Ningbo and Shanghai, two of the largest and most important cities on this stretch of coastline. Likewise, these units provide protection to Chinese access to the Chunxiao gas fields in the East China Sea and Chinese commercial shipping in the East China Sea, one key objective of the ETC.⁷⁶ These locations may also pose an exceptional threat to U.S. and Japanese forces that often hold naval exercises within their weapons engagement zone.

Dongtou is a stand-out case within the ETC, and is likely an independently stationed battalion under the 1st Regiment. The actual barracks on Dongtou is not easily identifiable, but is likely on the southern portion of the bay opening. While a set of vehicles that relatively closely resembles the makeup of a CDMF battalion is visible at the southern location, it is unusual for these forces to be collocated with other PLA units or infrastructure. It is possible that units stationed at Dongtou are only temporarily deployed to this location and that there is no permanent presence here. This location has been filmed being used and firing the YJ-62 from this location, the regiment could assist in the blockade of the opening of the Taiwan Strait. Furthermore, units at this location may have a clearer missile trajectory on targets operating in Taipei or around the eastern part of the tip of Taiwan.

Northern Theater Command CDMF Barracks and Firing Position Locations



Description of NTC CDMF Barracks and Firing Positions				
#	Name of Location	Coordinates	Barracks Attributes	Date Built
1	芝罘岛反舰飞弹营区, Zhifu Island CDMF Barracks, 11 th CDMF Regiment home barracks	37°36'46.52"N, 121°22'11.94"E	Known to field YJ-62 missiles. ⁷⁸ This barracks has an eastern and western side with multiple improved firing positions within its proximity. Both sides of the barracks underwent expansions starting from 2006 and ending in 2021.	Original facilities completed pre-2006, reconstructed between 2006-2011, further improvements in 2015 and 2021.

2	Improved firing positions for 11 th CDMF Regiment	37°19'31.35"N, 122°35'7.09"E	Contains two to three sets of improved firing positions, likely for the 11 th CDMF Regiment.	First set of firing positions built pre-2010. Second set built in the winter of 2015. Third set expanded in 2018.
3	Unimproved firing position for 11 th CDMF Regiment	37°25'21.39"N, 122°39'2.34"E	One unimproved firing position shown being used by a YJ-12B CDMF battalion in March 2021	Beach-side open and flat area that appears unimproved
4	铁山 Iron Mountain, Unknown Regiment (unverified) fixed CDMF Regiment	38°43'32.50"N, 121°11'48.43"E and 38°43'37.60"N, 121°10'15.45"E	Two firing positions with one battalion each. Both appear to be fixed ASCM battalions. The first mobile battalion appears in April 2006.	Both firing positions pre-date 2006.
5	老虎尾安放炮兵 Tiger Tail Coastal Defense Artillery	38°47'44.06"N, 121°15'35.52"E	Two battalions of fixed coastal defense artillery.	Pre-dates 2006.

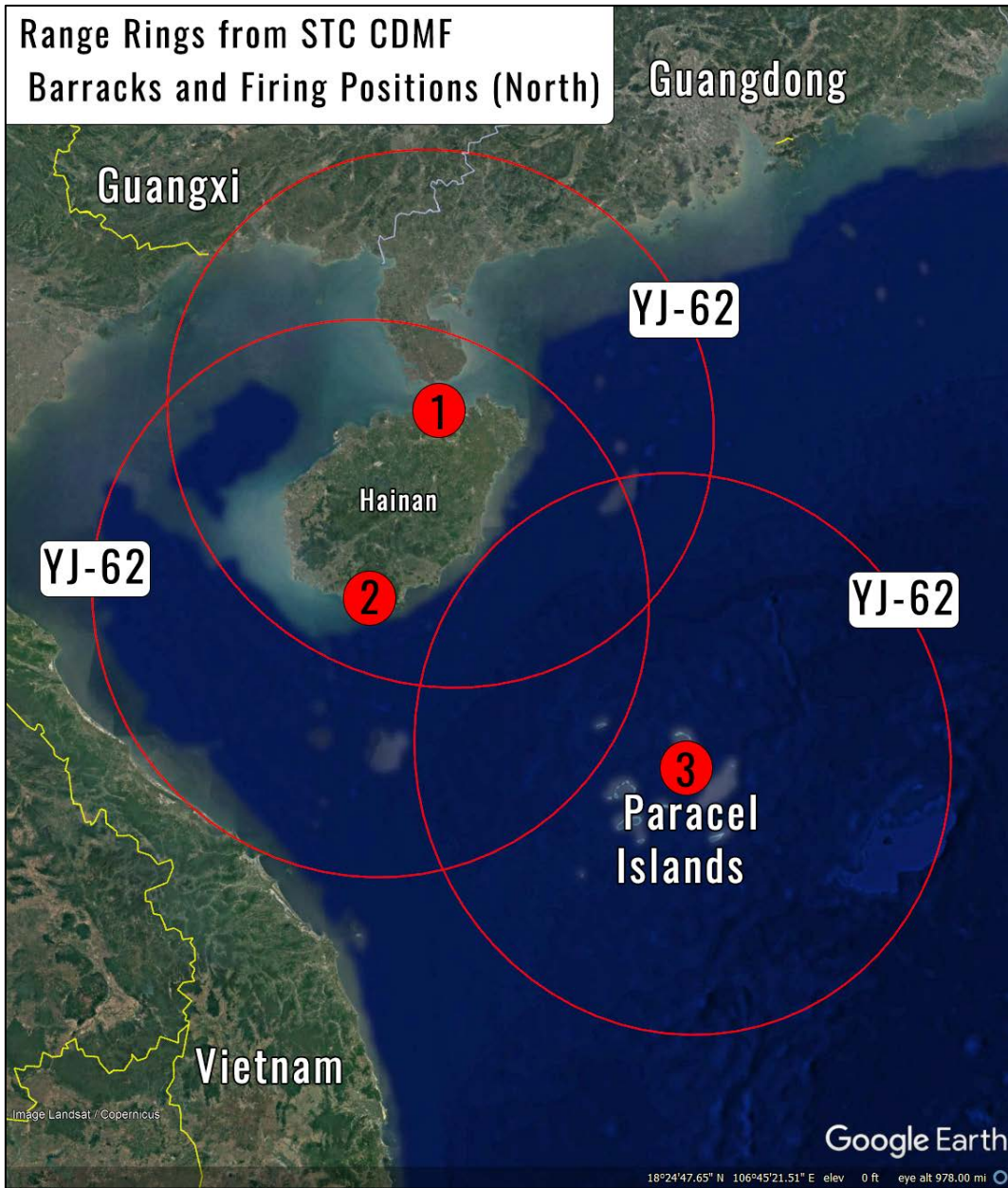
Coastal Defense positions in the Northern Theater Command are mainly on the tips of the Shandong and Liaodong peninsulas and seem to be geared towards more defense of the Bohai Sea. The Zhifu Island barracks on the Shandong peninsula is home to a full CDMF regiment, likely the 11th Regiment and has multiple improved firing positions along the coastline extending for ~60 miles eastwards. As the primary CDMF regiment on the coastline, it has received a lot of attention in the media and is equipped with YJ-62 batteries.⁷⁹ Based on the number of garages at this location, there are probably at least four battalions of YJ-62s at this location.

On the Liaodong peninsula there appears to be one unidentified CDMF regiment comprised of two fixed batteries. These batteries operate using a rail-mounted systems, possibly a variant of the YJ-62. For these fixed positions, TELs are stored in bunkers directly behind the firing position and are rolled out when active. At these fixed positions, beginning in 2006, TELs can be seen occupying the western position intermittently. At the eastern position, revetments seem to have been replaced with ASCM systems between 2021 and 2022.

Not far away from the fixed CDMF positions are several different batteries of Coastal Defense artillery. These archaic capabilities still seem to be active, but are unlikely to play a significant role in operations.

Both the Shandong and Liaodong peninsula are strategic locations for the CDMF s as when activated they can functionally block off the entrance to the Bohai Sea. Staggered as they are, this set of CDMF units provides the ground-based component of a layered anti-ship strike capability intended to prevent enemy incursions into the Bohai sea or operate within the area. Furthermore, as power-projection, the regiment at Zhifu Island can hold ships operating around South Korea's Western coast at risk. These units may be able to assist in blockading Seoul from the Chinese mainland in the event of conflict.

Southern Theater Command CDMF Barracks and Firing Position Locations



Description of STC CDMF Barracks and Firing Positions

#	Name of Location	Coordinates	Barracks Attributes	Date Built
1	海口海军岸导营 ☒ Haikou CDMF Barracks, previously 12 th CDMF Regiment ⁸¹	20° 1'18.50"N, 110°16'24.11"E	CDMF barracks seems to be one component of the larger naval base.	Original construction pre-2006, upgrades in 2013 and 2016. The regiment appears to have moved from this location in between 2018 and 2021.
2	三亚海军岸导营 ☒ Sanya CDMF Barracks, currently 12 th CDMF Regiment ⁸²	18°21'9.85"N, 109°25'1.40"E	Contains two to three sets of improved firing positions, likely for the 12 th CDMF Regiment.	The entirely newly built barracks began construction in 2016 and was completed in February 2022. The 12 th Regiment relocated to this location shortly after completion of the barracks.
3	Woody Island, reported deployment of YJ-62 CDMF battalion	16°50'28.56"N, 112°20'5.51"E	Several garages house at least one PLAN HQ-9 battalion and it is plausible that the same garages or nearby garages house at least one battalion of the CDMF	Reported deployment and test firing of YJ-62 TELs on Woody Island. ⁸³ Possible garages for HQ-9s or YJ-62 systems were built in early 2016 and between January 2021 and April 2022
4	Subi Reef (unconfirmed)	North: 10°56'34.38"N, 114° 5'38.71"E South: 10°55'55.32"N, 114° 6'7.13"E	Northern and Southern facilities for one battalion of YJ-12B ⁸⁴	North: Construction began at the end of 2016 and was finished by mid-2017 South: Construction began in late 2016 and finished by the end of 2017
5	Fiery Cross Reef (unconfirmed)	9°33'23.82"N, 112°54'19.05"E	Facilities for one battalion of YJ-12B ⁸⁵	Construction began in late 2016 and completed in December 2017
6	Mischief Reef (unconfirmed)	9°54'9.08"N, 115°34'34.13"E	Facilities for one battalion of YJ-12B ⁸⁶	Construction began in July 2016 and completed by February 2018

Haikou barracks with six YJ-12B battalions and at least three YJ-62 battalions visible in March 2018.⁸⁷



In the Southern Theater Command there is only one verifiable regiment which is the 12th CDMF Regiment and its barracks.⁸⁸ The 12th Regiment first appeared in Haikou beginning in July of 2014 with two battalions of YJ-62. By December of 2014, four battalions of TELs, or a full regiment-size contingent, occupied the barracks. Over time, several different larger sets of TEL battalions cycled through this location with notable examples of the YJ-62 and the YJ-12B present. The YJ-12B is distinguishable from the YJ-62 due to its larger chassis and square missile containers. Rotations of these battalions peaked in October 2017 with six battalions of the YJ-12B and four YJ-62 battalions visible at the barracks. In 2018, the batteries began cycling out

of Haikou with only two battalions of YJ-62 remaining as of early 2019. The barracks currently appears empty as of now save for some unidentifiable covered objects.

Although the 12th CDMF Regiment is the only known full-size regiment within the STC, it is quite likely that additional independent CDMF fall under its control. Notably, reports indicate that several battalions of YJ-12B have been moved to the various man-made islands within the South China Sea (SCS). These battalions at Woody Island, Fiery Cross, Subi, and Mischief Reefs would fall under the control of the STC.⁸⁹ The large number of CDMF battalions at Haikou seem to corroborate the SCS island deployments, but may have several other possible explanations. First, as a major port, Haikou may be the staging ground for these systems before being shipped overseas to purchasing countries like Pakistan or Algeria. Second, the CDMF regiment at Haikou may have undergone an weapons systems upgrade from the YJ-62 to the YJ-12B. Third, and the most likely scenario, given the timing and the fact that the 12th CDMF Regiment at Sanya is known to field the YJ-62, is that Haikou was used as a staging ground for further deployment of YJ-12B systems to the SCS islands. The report of missile being staged here occurs in March of 2018, and the last visible siting of the six batteries of YJ-12Bs at Haikou is March 2018. Correspondingly, there appear to be four sets of facilities across Fiery Cross, Mischief and Subi Reefs that each could accommodate a YJ-12B battalion. Although it is difficult to confirm that the identified facilities are certainly for CDMF battalions, the facilities in question take a similar form across the reefs. They are comprised of a tall garage with large garage doors and a command and control building close by. The four garages and control buildings were built between mid-2016 and late 2017 showing visible signs of tire tracks around the buildings as of April 2018, the same time that the six YJ-12B batteries were visibly moved from Haikou. The buildings also face strategic directions, covering entrances into the South China Sea and spanning the distance across the sea from the Philippines to Vietnam. While in use, the large garage doors would likely be opened to allow the TELs to fire from

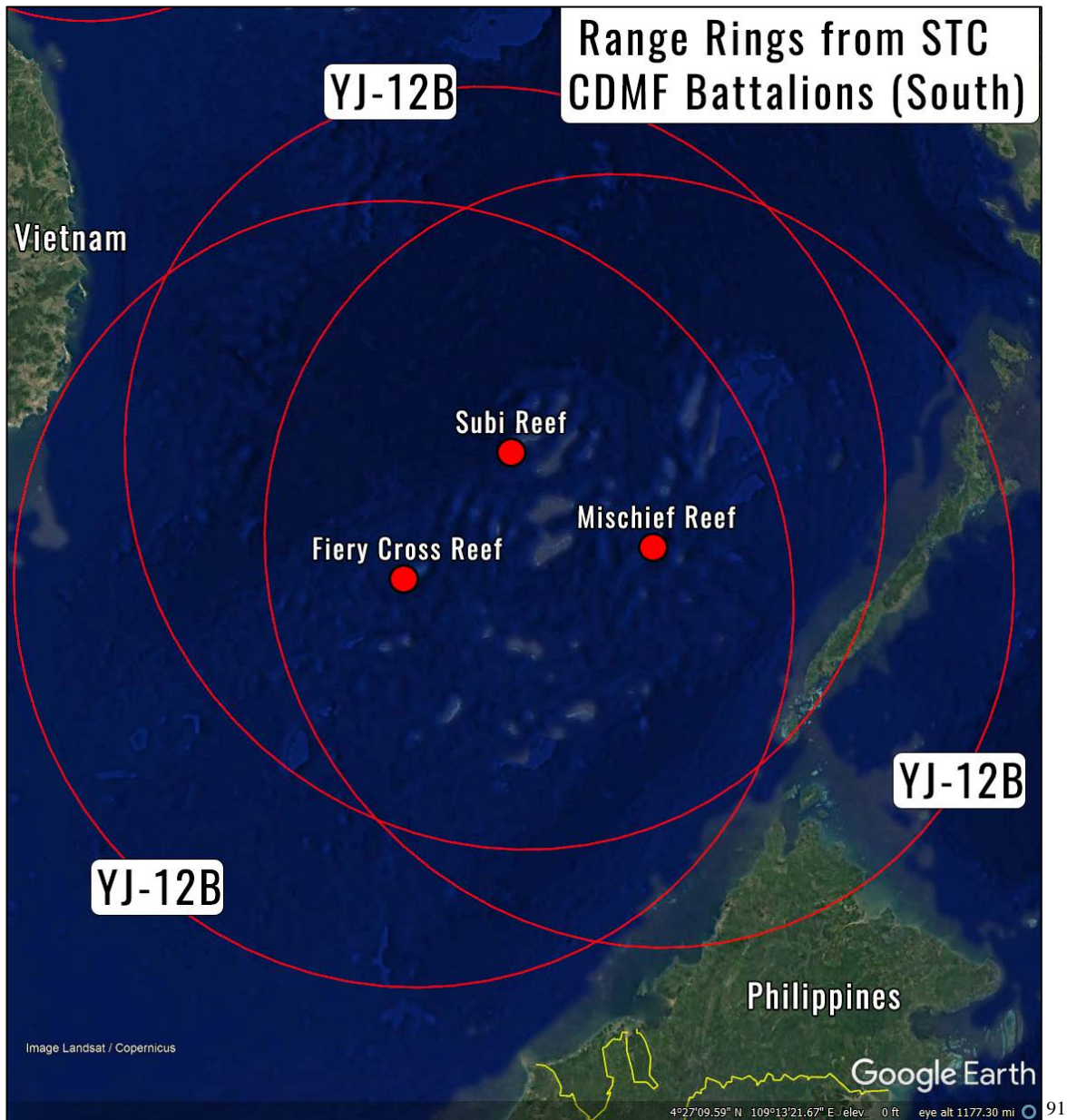
within. A smaller retractable garage door at the back of the buildings appears to be for allowing the escape of the backblast when firing missiles.



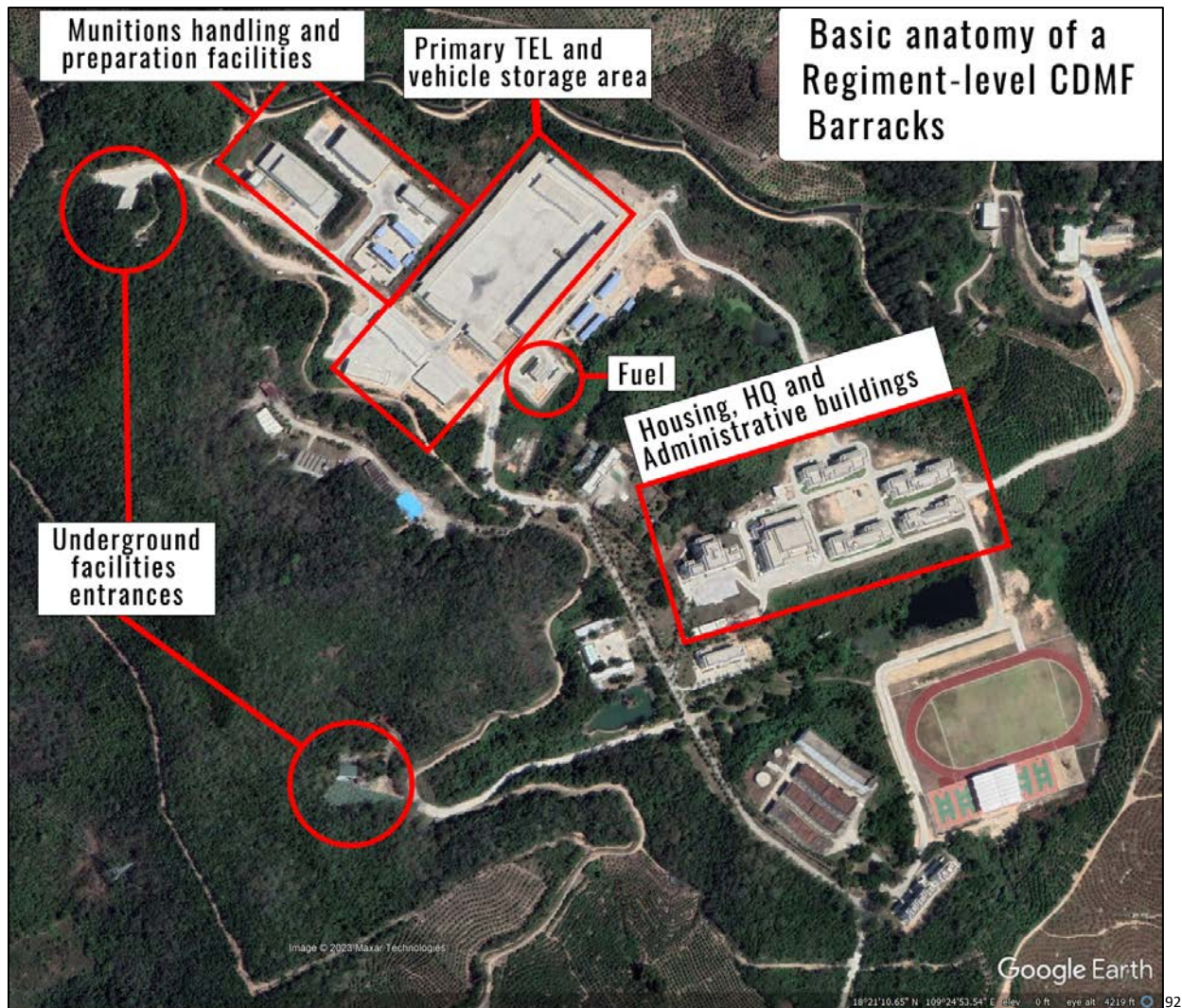
CDMF battalion shelters on Fiery Cross, Subi and Mischief reefs.⁹⁰

The location of the 12th CDMF Regiment in Sanya clearly provide a defensive shore-to-ship missile layer to the defenses of Yulin naval base, one of the largest and most strategic naval bases in the STC. Furthermore, this regiment is likely responsible for blocking off the strategic line of communication connecting Hanoi to the South China Sea. From Sanya, these units could apply pressure to Vietnam if conflict erupts within the South China Sea. A battalion on Woody Island can provide a wide coverage of the overall body of water and creates overlapping rings of coverage between Sanya and the reefs further South. Woody Island may

also play an important role in contesting South China Sea freedom of navigation operations that the U.S. and its allies and partners regularly conduct in the area. From Fiery Cross, Mischief and Subi Reefs, CDMF battalions can contest the connections from the Sulu Sea to the SCS as well as the entire southwest entrance to the sea. Due to the contested nature of this body of water, China's stationing of these "defensive" assets on the reefs may provide some level of credibility to the Chinese domestic audience with the Chinese Communist Party's claims of sovereignty over the area.



Basic Anatomy of a Regiment-level CDMF Barracks



Regiment-level CDMF barracks are, at the most basic level, comprised of five core components. The 12th Regiment at Sanya (above) is the most recent new build barracks and serves as a useful guide to identifying the layout of CDMF facilities.

The first core component of the barracks is the TEL and vehicle storage areas. Usually arranged into a U-shape or L-shape, these garages are generally built to hold at least four battalions, or twenty vehicles. Garages that hold the TELs are generally taller than the other garages to accommodate the height of the vehicles. Certain regiment-level barracks, like Yanhong and Yangdao have expanded garage facilities and additional open-air parking for TELs and support vehicles.

Second, there is also normally a gas station or other fuel source co-located with the garages to refuel the vehicles.

Third, barracks usually have weapons handling and preparation facilities. These are relatively large facilities and handle arming the warheads, fueling the missiles, and loading them into canisters. As the building has a garage door entrance, reloading trucks are probably

brought into the facility for loading additional fires at the firing location.⁹³ These facilities may act as a central weapons handling facility for independent battalions operating near the regimental barracks as smaller battalion-level barracks do not appear to have these facilities. It may be that the battalion-level barracks rely, to some degree, on receiving reloads from the regiment-level barracks via transport trucks and cranes.

Fourth, they are normally accompanied by at least two underground facilities which may be used for a variety of purposes including weapons and vehicle storage or to shelter from attacks. In the case of larger barracks like Yanhong, Nanyu, Yangdao Bay, and Zhifu Island there are additional UGFs.

Fifth, barracks generally have on-site housing as well as administrative or headquarters buildings. The headquarters building likely functions as a local operations center as well as the central hub for communicating with battalions that may be forward deployed. During wartime the headquarters may relocate to provide protection from potential incoming strikes.

In addition to the primary facilities, each regiment-level barracks will have a suite of supporting facilities for the daily needs of the barracks.

Geographically, CDMF barracks normally are found on the fringes of cities that occupy strategic terrain such as peninsulas or entrances to bays or straits. Barracks often have access to larger roadways, but do not seem to be connected by rail for resupply. Regiment-level barracks are almost always located in relative proximity to the major or minor naval bases of a Theater Command, however Zhifu Island in the NTC is one stand-out where this is not the case. In this case, strategic interests, such as protecting the entrance to the Bohai Sea is a likely reason for location selection.

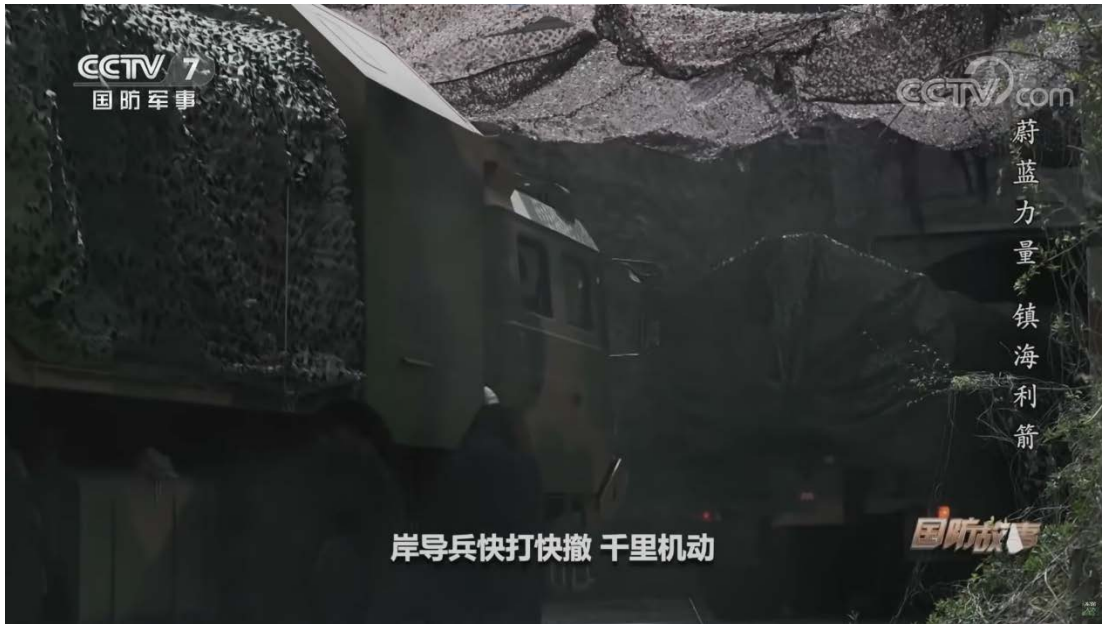
As of now, each individual barracks is rather unique in its layout. This is likely due to the trend of newer CDMF barracks utilizing older facilities as they are stood up and expanded. The ultimate layout of a CDMF barracks is based on the geography it occupies. Over the entirety of the regiment-level CDMF barracks examined, every single one of them has undergone significant and large-scale upgrades in recent years.

Underground Facilities in the CDMF

In the 2006 *Science of Campaigns*, there is a heavy emphasis on increasing the survivability of firepower against an adversary's strike. To achieve this, the PLA has emphasized using terrain to increase concealment, building sheltered fortifications, and to place "As much as possible, hide personnel, equipment and war materials underground."⁹⁴ Across multiple services, the PLA has been working to harden its military facilities and increase the survivability of its firepower along its borders. For the PLA Air Force, they have been building hardened, buried, and concealed aircraft hangars along airfields close to Taiwan.⁹⁵ The CDMF appears to be making similar improvements to their survivability by building underground bunkers for storage of personnel, vehicles or munitions and by adopting a mobile force. Beyond first-strike survivability, bunkers and maneuverability or concealment provide a level of security from observation by satellites and can obfuscate the number of military assets that a given facility holds.

Following the Tiananmen Square incident and Desert Storm, the PLA understood that adversarial threats to their homeland were very real, specifically the threat of U.S. naval power. During the Third Taiwan Strait Crisis of 1995-1996, the U.S. sailed its destroyers and aircraft carrier through the Taiwan Strait. At the time the PLA was unequipped to contest or deter these operations effectively. To address this issue the CDMF began iterating newer ASCM systems, beginning with the YJ-8A and the YJ-83. The 2008 Financial Crisis caused another fundamental shift in Chinese thinking. CCP leadership viewed this event as heralding the end of the West's global supremacy. Part of the recognition of this shift became recommitment to ensuring that China would be able to achieve the "Great rejuvenation of China," including unifying Taiwan with the mainland. In the event of conflict over the Taiwan Strait, like during the Taiwan Strait crises, the U.S. could use its naval capabilities to counter PLA invasion forces or to conduct punishing strikes against the mainland.⁹⁶ Because CDMF and other land-based forces generally home-base in a fixed location, it means that these units are more vulnerable to preemptive or counter attacks. Around 2008, multiple branches of the PLA began building UGFs to shield their long-range fires. The CDMF also built new UGFs at many barracks during this time. However, UGFs were not a new phenomenon in the CDMF.

UGFs play an important role in the CDMF's operations. From the time that they fielded the HY-2 Silkworm barracks had UGFs for missile storage and other uses. These facilities were quite extensive and would double as a bomb shelter for the vehicles and crews of the CDMF battalions after they had expended their munitions. Although the HY-2 has since been retired, the practice of using UGFs for munitions storage and defensive shelter is still being used by modern CDMF units.⁹⁷ Older UGFs, built during the HY-2 Silkworm days are seemingly still in use, however newer UGFs are being built at different barracks to accommodate the increasing size and role of the modern CDMF.



Modern CDMF TELs shown egressing to UGFs at Zhifu Island after firing their missiles.⁹⁸

Across the CDMF, each regiment-level barracks has built and are expanding their underground facilities. In the Yanhong and Nanyu barracks, UGFs were constructed roughly at the same time as the refurbishment of the barracks during the stand-up of the regiments. At Yangdao Bay, two new UGFs were added in 2020 and 2022. At the oldest barracks, Zhifu Island in the Northern Theater Command, there are a complex series of tunnels connecting the eastern side of the barracks to the western side as well as tunnels to the improved firing positions on the coastline. In addition, there are also at least three new UGFs at Zhifu Island that were completed in 2016. Likewise, with the completion of the Sanya barracks, two new UGFs were included in the basic build of the facilities.

The emphasis on building new UGFs for the CDMF implies that these forces are both building magazine depth, if the UGFs are used for munitions storage, and building survivability in the event of preemptive or counter attacks.

Conclusion

Although the Coastal Defense force is a relatively small component of the PLA Navy, its capabilities and missions are important to understand to better understand the PLA's military strategy around its periphery. As the PLA pursues joint warfighting and the operational range of its conventional forces expands, the mission of safeguarding China's homeland and perceived territorial waters will fall more on forces such as the CDMF. These front-line units, given geographic limitations, will allow the PLA to focus its power projection capabilities outward while providing the defensive fires to contest adversarial naval operations in their range. However, as a land-based and relatively fixed force, the CDMF will be especially vulnerable to targeting. The CDMF seems to have embraced this challenge by reorganizing their CDMF regiments.

The reorganized CDMF regiments, have been built with key PLA doctrinal concepts in mind. At the forefront of this is the "informationized" nature of these regiments, or their ability to leverage multi-domain intelligence, surveillance, and reconnaissance capabilities to prosecute their targets.⁹⁹ Not showcased until recently, these new regiments have also participated in some of the most-joint exercises seen to date by the PLA, the August 2022 and April 2023 military exercises around Taiwan. Of course, exercises do not entirely equate to performance in combat. However, newer CDMF regiments have been conducting an extensive number of exercises, under varying weather and electromagnetic conditions, to try and improve their fighting capabilities and resiliency in combat.

PLAN strategy has emphasized the need for various capabilities, including long-range fires, to create an integrated multi-dimensional firepower capability. Creating such a system with the CDMF in the close and mid-range, such as in the regional waters around China, enhances the overall power projection of the PLAN surface fleet.¹⁰⁰ As a unique land-based component of the PLAN, the CDMF can allow for more close and medium range strike options in either offensive or defensive anti-ship operations without risking valuable naval vessels in the fight.

Like other land-based long-range fires within the PLA, the reorganized CDMF regiments have the concepts of mobility, concealment, and survivability baked into their operating concepts. From their UGFs, prepositioned launch sites, "random launch" tactics, and cross-regional mobility, the CDMF has focused on being unpredictable and survivable. This makes the challenge of countering these kinds of forces extremely difficult. Furthermore, it increases the survivability from strikes made on these forces, providing a persistent presence of these units in conflict.

In combat operations, specifically in Joint Firepower Blockades, PLAN base defense, interdiction of sea-lines of communication, and keeping unwanted naval assets out of China's periphery, the CDMF can be highly effective. In peacetime, the CDMF may act as a deterrent for other regional actors, especially those that participate in Freedom of Navigation exercises in what China perceives as its territorial waters such as the South China Sea or the East China Sea. For example, CDMF batteries from the ETC and NTC could hold U.S. or Japanese naval vessels at risk as they participate in East China Sea exercises, such as the 2020 "Keen Sword" exercise.¹⁰¹ The CDMF regiments' location, mobility and range may also facilitate Beijing's coercion of countries that neighbor China such as Vietnam, the Philippines, South Korea, and Japan. For these countries, the CDMF represents an anti-ship cruise missile threat to both their commercial traffic and naval vessels operating out of key cities. For Beijing, simply having this land-based capability may serve a deterrent and coercive factor for geopolitical issues

concerning these countries. In the event of conflict, shore-to-ship missiles will complicate deconflicting and maintaining sea-based supply chains for many regional countries. Further studies should consider how the CDMF may impact regional shipping and supply chains if China does find itself in conflict.

Across the CDMF, construction of facilities and fielding new equipment has accelerated in the past five years. PLA investment in this force has translated into a fairly large increase in the capability of the CDMF as well as the overall capabilities that the PLAN brings to a fight. The political winds are in the favor of the CDMF, having official praise for their innovation and aptitude in exercises as well as their historical roots in the defense of the homeland. As the PLAN's surface fleet continues to pursue operations farther from China's coastline, the CDMF will likely continue to expand and modernize.

This paper has aimed to identify and document the People's Liberation Army Navy Coastal Defense Missile force, its command-and-control structure, capabilities, operating concepts, infrastructure, and sought to bring awareness to its importance in multi-domain and joint operations on China's periphery. Although much was uncovered during research for this paper, it is far from an exhaustive study of the CDMF. There are still components of the larger Coastal Defense force as well as future roles and missions of the CDMF that need further study. Due to the limitations of Chinese sources, further research should be conducted on how CDMF is integrated into joint operations. Further studies may also explore in detail the CDMF's role in specific joint operations that the PLA may undertake on its periphery. Furthermore, as the CDMF continues to grow, newer regiments or facilities will need to be identified and catalogued. Using this research as a baseline, it is possible to begin to unpack the CDMF, its role in defense of the Chinese mainland and its integration into PLA operations.

Appendix I – Details of CDMF Barracks

ETC CDMF Yanhong Barracks (23°37'29.42"N, 116°51'16.47"E)¹⁰²



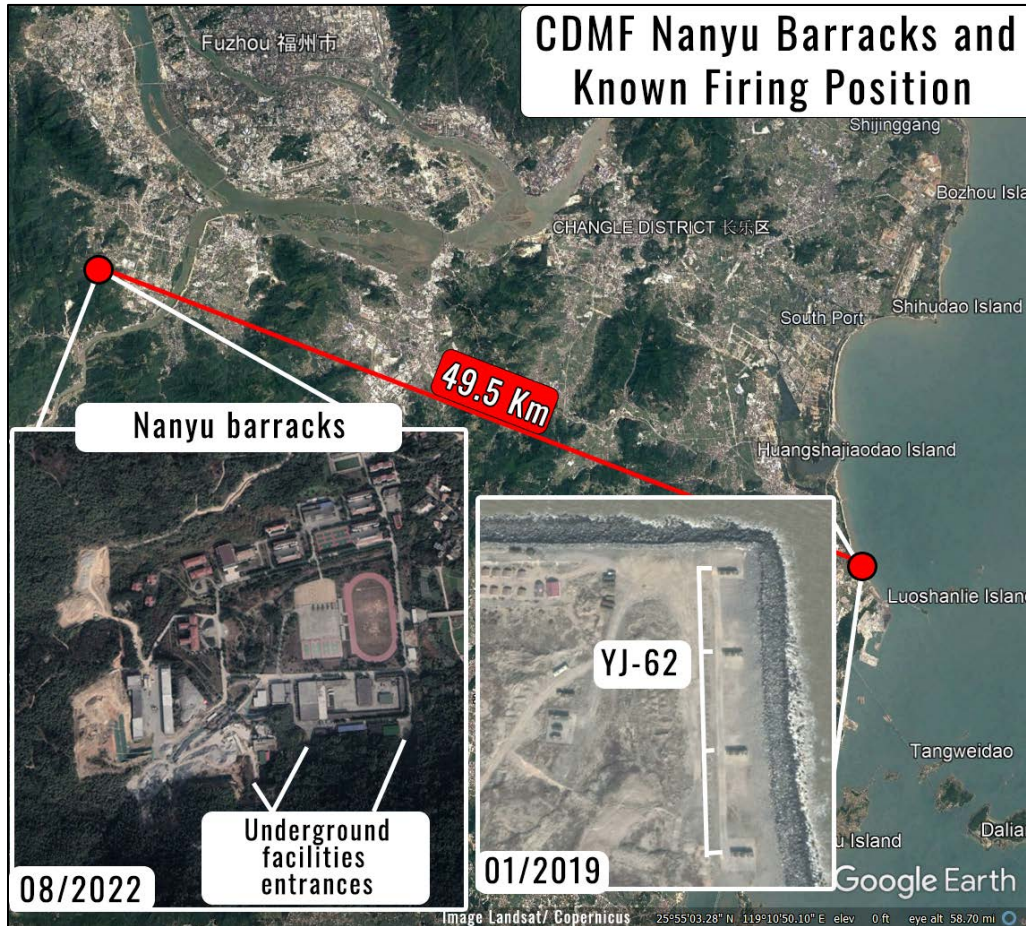
Yanhong is the home barracks of the CDMF 2nd Regiment and has two known improved firing positions. The first, 47.5 km south of the barracks is a large concrete pad that was built between 2020 and 2022. As of September 2022, one battalion of YJ-12Bs have been long-term deployed at the firing position.¹⁰³ Additional supporting vehicles appear along the roadside leading to this firing position. The second firing position, 11.8 Km to the northeast of the barracks appears to have been a makeshift location turned semi-permanent with the addition of the staging grounds in August, 2020. This location is often used during military exercises to deploy a YJ-62 battalion to train under “real wartime scenarios” as a quick reaction force to simulated threats within the Taiwan Strait.¹⁰⁴ TELs involved in these exercises likely remained in location for a brief period with soldiers utilizing the area to the East for additional support vehicle parking, storage, and bivouac sites.

The barracks is quite expansive with roughly 11 large garages capable of holding at

least eight vehicles each. There is also uncovered parking for additional TELs or other vehicles. Due to the large storage capacity, both for vehicles and for munitions, it is possible that this barracks is a central hub for training and deploying CDMF forces in the Eastern Theater Command or for training new CDMF battalions. In addition to the visible above-ground garages, there are also four entrances to UGFs, use for munitions storage or concealment and protection of the units. There has also been the addition of one large munitions handling and preparation facility at a central point to the UGFs. Because the CDMF likely uses this barracks for training, it seems to be one of the first barracks to field newer missile systems such as the YJ-12B. In the future, this is a probable location to field the latest shore-to-ship missiles in the PLA's inventory, including a future ground-based variant of the YJ-18.¹⁰⁵

During blockade operation, both the northern and southern firing positions can be used to close off the southwestern entrance to the Taiwan Strait. In addition to the CDMF forces, the Type-022 Houbei FFGs can be deployed in conjunction with the shore-to-ship missiles for a layered fires effect.

ETC CDMF Nanyu Barracks (25°57'0.49"N, 119°10'58.07"E)¹⁰⁶



The Nanyu Barracks has one known improved firing position roughly 49.5 Km to the southeast of the barracks. The position appears to have been established between 2014 and 2016 and has been used in response to U.S. Freedom of Navigation Operations (FONOPS) in the South China Sea and navigations of the Taiwan Strait. The first instance in which CDMF forces are seen at this firing location occurs in September, 2017.¹⁰⁷ In the preceding four months the U.S. had conducted three FONOPS in the South China Sea.¹⁰⁸ In January 2019, four YJ-62 TELs were quickly setup and promptly recalled before and after a U.S. navigation of the Taiwan Strait exercise.¹⁰⁹ Accompanying the deployment of the battalion of YJ-62s are what appears to be several bivouacs along with additional equipment west of the TEL pads. This is consistent with the equipment that accompanied the YJ-62 battalion in the Yanhong roadside deployment, however in this case, more temporarily. Despite only evidence of this one improved firing location, this barracks is likely to have other improved firing positions that it can use. Additionally, given the proximity, the CDMF battalion at Pingtan may fall under the command of the 2nd Regiment at Nanyu. Nanyu and the battalion at Pingtan would be primarily responsible for holding Taiwanese naval assets in the Matsu Islands or adversaries' vessels traversing through the northern entrance of the Taiwan Strait at risk.

ETC CDMF Pingtan Barracks (25°34'4.53"N, 119°49'47.06"E) ¹¹⁰



Pingtan Island has two known firing positions, one southern and one northern. The northern firing position was built prior to 2005, and was upgraded in 2021 with reinforced firing pads. The firing position also has a nearby facility likely used for personnel for sustaining long-term deployments of the battalion on the pads. These facilities were upgraded in 2020 with a concrete parking area. In April 2021 and August 2022, one battalion of YJ-12Bs can be seen occupying the firing pads, and are covered in camouflaged tarps. The southern firing position was also built prior to 2005. This position appears to have been rather dormant until 2018. In 2021, the base underwent upgrades, namely the expansion of the parking space and the addition of a garage. The new garage facility is consistent with those that a battalion of the CDMF would use. The forest directly north of the barracks was cleared in early 2021, likely to build additional reinforced firing pads for the TELs. In the summer of 2021, several temporary bivouacs appear to have been built to support additional personnel at this location.

Both the northern and southern firing position appear to have their home barracks roughly 4.3km away in Wucheng Village, however this is unconfirmed, and may change depending on the facilities that are built at the southern firing position. As of July 2022, there was a dramatic increase in the number of military vehicles in the set of buildings at Wucheng.

The barracks at Pingtan likely has two battalions and personnel to sustain the northern and southern firing positions simultaneously. For command and control, this barracks and its battalions may be independent or fall under control of the Nanyu barracks and the CDMF 2nd Regiment.

Pingtán Island was involved in the 2023 “Joint Sword” military exercises around Taiwan, notably with PLA Army PHL901 rocket artillery firing into the Taiwan Strait.¹¹¹ Pingtan was also involved in further live-fire exercises around Taiwan.¹¹² Although the CDMF was not highlighted, it is very likely that they were involved. During peacetime, these batteries hold at risk any ships traversing the northern part of the Strait. In conflict, they would either be used to seal off this opening of the Strait, or to possibly be the anti-ship leg of a joint firepower strike against Taiwanese ports. These firing positions, equipped with the YJ-12B can also range the Senkaku Islands to the East.

ETC CDMF Dongtou Operating Location (27°50'44.29"N, 121°11'2.37"E)¹¹³



The Dongtou location is unique when compared to the rest of the ETC CDMF locations. Although the PLA released a video showing the northern firing position being used and calling the battalion part of the “Coastal Thunderbolt 1st Regiment”, there is no obvious barracks location on this island or the adjacent islands which are connected by bridge. It seems highly unlikely that any missile battalions affiliated with the Dongtou firing positions would originate from the mainland due to logistical challenges, which indicates that the barracks on these islands may be an irregular barracks or that a single battalion of the 1st CDMF Regiment is stationed on the island. There is a lot of construction on the island as of 2022, so it is possible that a new barracks and infrastructure will be developed here. In the interim, any battalion here could occupy other facilities or older barracks. There are a few building complexes that look capable of housing one or more CDMF battalions, but none were clearly identifiable. However, the firing positions associated with this location is quite clear. It is possible that the barracks may either be on the southern part of the island or north of the northern firing position in newly

built facilities. The northern radar facility on the island was built between 2018 and 2020, making it plausible that additional future construction may include garages for the TELs. Construction at the radar facility includes three radar systems, and access road and support buildings. Additionally, to the west of the radar facilities are additional military buildings that are denoted as belonging to “Coastal artillery” in Chinese maps.

The southern firing position appears to be an upgraded radar facility that was originally built between August 2013 and October 2014. The original facility included a small building with two radomes, a larger headquarters-style building and a small sea-facing parking pad that can be seen with various military vehicles across time. Between 2018 and 2020, further upgrades were made to the southern firing position. These upgrades include an increase in the size of its parking apron, within which various vehicles can be seen, including a possible CDMF battalion. The southern firing position also may serve as a temporary holding area for TELs as there is relatively direct road access between the northern and southern firing positions. The northern firing position was originally constructed in 2014, prior to the expansion of its adjacent port. The original concrete pad was clearly slated for a defensive position as the independent vehicle launch pads were constructed and immediately painted in a camouflage pattern. Celebrating the 70th anniversary of the founding of the PLA Navy, CGTN highlighted this firing position in a video in which the CDMF is showcased firing YJ-62s from this position and one other location.¹¹⁴ The northern firing position was also highlighted a second time in November 2021. Although the video footage between the 2019 and 2021 videos appears remarkably similar, the weather conditions in both differ, implying that this firing position was used on at least two separate occasions to demonstrate the capability of the CDMF.

Despite the unknowns, this CDMF battalion is described as having recently received new missile equipment and was praised for being able to take the equipment and operate it without guidance.¹¹⁵

ETC CDMF Yangdao Bay Barracks (29°52'38.25"N, 122° 0'34.98"E)¹¹⁶

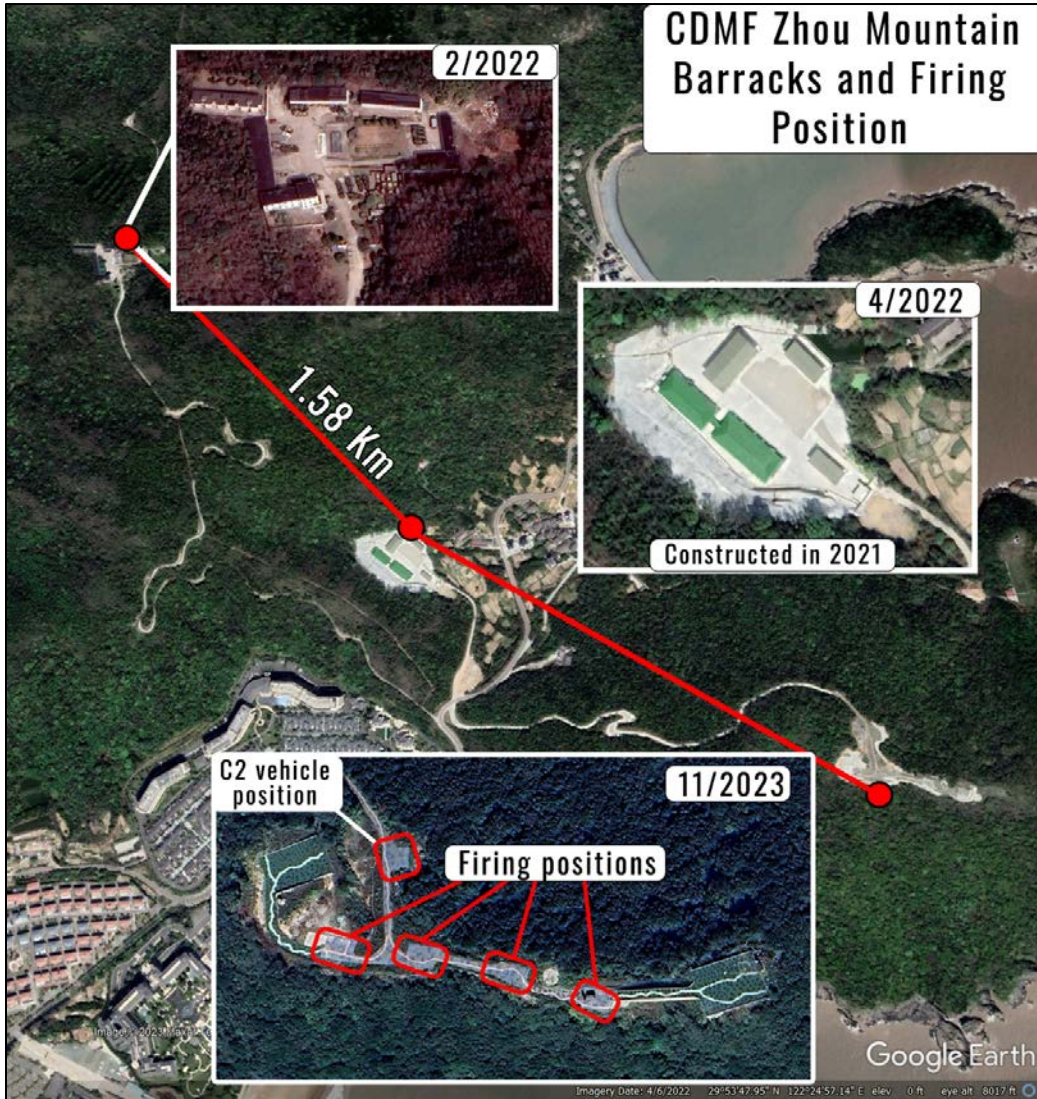


Yangdao Bay is home of the 3rd CDMF Regiment which has recently gone through a complete renovation. The original Yangdao Bay barracks was built prior to 2005. In late 2017, construction began on one large underground facility. In March 2021, major reconstruction of the existing buildings and new construction began. New construction includes four additional barracks, one additional garage, an upgrade to the northern garage facilities and at least two entrances to new underground bunkers. In addition, what appears to be a new set of munitions preparation and handling facilities was completed in June of 2023 adjacent to the new underground facilities. Construction at the barracks was completed as of November 2023. With the new garage space the barracks could accommodate more than four battalions of vehicles. There appears to be at least three CDMF battalions operating out of this location with at least one battalion of YJ-12Bs and one battalion of YJ-62s confirmed.

Located approximately 1.75 kilometers to the northwest is the Ningbo shipyard and 5 kilometers to the northwest is the Daxie Island port, home to Type 039 SSKs.¹¹⁷ Because of

these strategic assets nearby, and considering that the Zhou Mountain CDMF battalion is located nearby, it is likely that the Yangdao Bay CDMF barracks is primarily intended for defensive purposes, although longer range systems such as the YJ-12B that are known to be at Zhou Mountain allow these locations to range far into the East China Sea. There are no readily identifiable pre-positioned firing pads for this barracks beyond Zhou Mountain.

ETC CDMF Zhou Mountain Barracks (29°53'36.33"N, 122°25'0.23"E)¹¹⁸



Zhou Mountain (舟山) is a relatively newly upgraded barracks and firing position for the CDMF and appears to be either an independently operating battalion or a detached battalion of the 3rd CDMF Regiment. The primary barracks was built pre-2003 and the road, concrete slab office building and garages at secondary barracks were upgraded in 2015-2016. In 2017, the battalion operating here can be seen occupying the concrete slab at the secondary barracks. The firing position to the southeast of both barracks was established in early April of 2020 and was completely operational as of November 2023. In 2021, the secondary barracks was completely overhauled, with the PLA constructing two office buildings and three garage facilities, enough to hold at least one full battalion. One PLA video promotion of the CDMF for the 74th anniversary of the PLAN shows this battalion's facilities up-close and it appears that it is fielding the YJ-12B.¹¹⁹ The TELs are identifiable as YJ-12B by the squared tops of the missile canisters on the vehicle and are likely the same vehicles shown setting up and firing in a later sequence of the video. While the secondary barracks houses the battalion, the northwestern

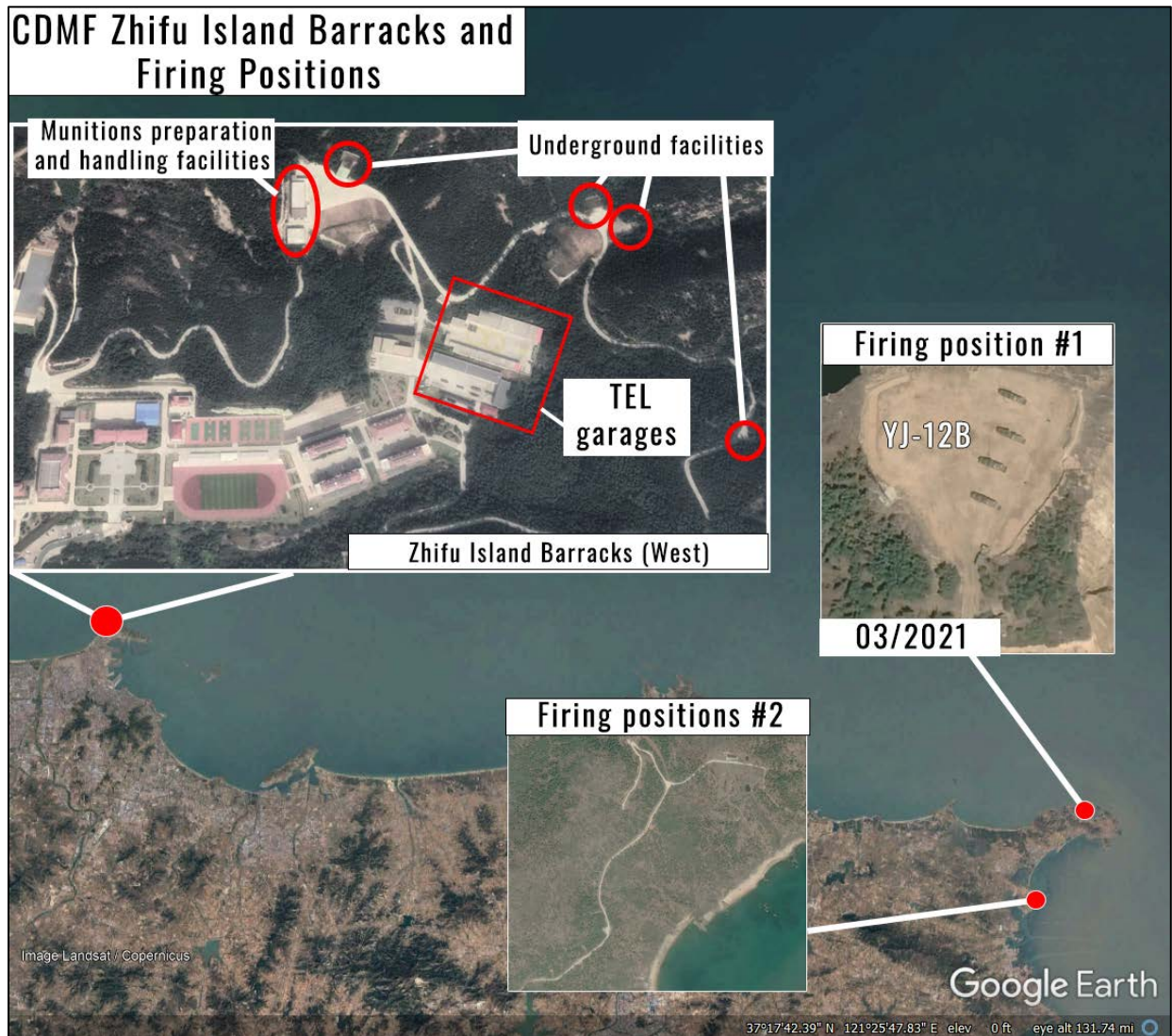
facility has constructed temporary shelters for larger vehicles, possibly additional TELs.

Based on its location, this location may be used in more of a power projection role. With the YJ-12B, this location can range out East to the Chunxiao gas fields in the East China Sea, a strategic resource for China.¹²⁰ Additionally, the range of the YJ-12B can hold at risk most of the East China Sea, which is especially relevant for Japanese civilian and naval shipping traversing this waterway. It also poses a threat to U.S. and Japanese forces that conduct routine naval exercises in the area. Furthermore, this barracks may be used in a defensive blockade of the Yellow Sea or Okinawa if Beijing felt threatened of adversarial ships traversing those waters. Most obviously, this barracks in conjunction with the Yangdao Bay barracks provide a defensive anti-ship missile layer to Ningbo and Shanghai.



One CDMF battalion fielding the YJ-12B prepare for an exercise at the Zhou Mountain barracks.¹²¹

NTC CDMF Zhifu Island Barracks (37°36'46.52"N, 121°22'11.94"E)¹²²

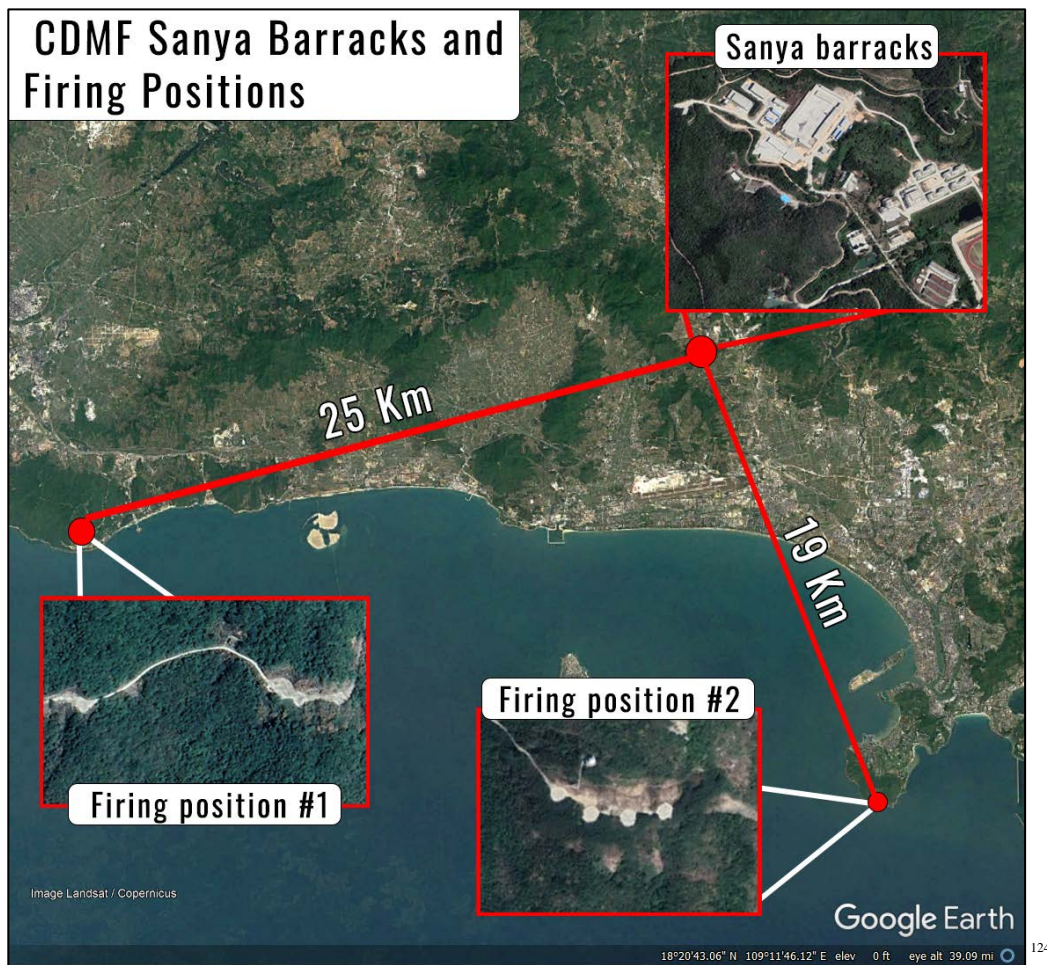


Home to the 11th CDMF Regiment, the Zhifu Island Barracks has both an East and a West section. The Western section is where the CDMF regiment is located. The original barracks here was completed pre-2004, and between 2006 and 2011 the entire barracks was overhauled. In 2013, buildings on the eastern section of the barracks were cleared to make way for an expanded garage facility. The new facility appears to have capacity for four launch battalions, enough for a full regiment with the first TELs appearing at the new lower garages in 2014. In 2013, construction began on two additional underground facilities as well as a munitions preparation and handling facility. The munitions preparation and handling facility was completed in 2014 and the additional underground facilities were completed in 2016. In 2015 the upper garage facility underwent an overhaul. Completed in 2016, the upper garages have the capacity to house additional barracks support vehicles, however it is unclear exactly which vehicles are housed here. With the extended length of the upper garage facility at ~70 feet compared to the ~50 feet of the lower garages, it is possible that the upper garages are used

to house YJ-12B TELs.

Beyond the firing positions directly attached to the barracks, the first off-location firing position associated with the Zhifu Island Barracks is 115 km to the East. In March 2021, a battalion of YJ-12B TELs can be seen operating at this position. The second off-location firing position is 112 km East of the barracks. This position appears to be an older improved firing location with sections of the mountain side cut away to provide protection for TELs. The first set of improved positions at this location predates the renovations of Zhifu Island Barracks. In 2015, a second set of improved firing positions were added at this location. A third and final set of improved firing positions was added to this location in 2018.¹²³ If equipped with the YJ-12B and YJ-62, the Zhifu Island Barracks would play a pivotal role in both defense of the Qingdao naval base to the South as well as blockading or interrupting an adversarial naval blockade of the Bohai and Yellow Seas. Furthermore, it could participate in a Joint Firepower Blockade of Seoul, holding shipping to and from South Korea's capital at risk.

STC CDMF Sanya Barracks (18°21'9.85"N, 109°25'1.40"E)



The CDMF's Sanya Barracks is one of the only regiment-level barracks that was a completely new build. Construction of the barracks began in October 2016 and was completed by February 2021. Around the same time that it was completed the 12th CDMF Regiment moved from Haikou to this location. Since relocation, the 12th Regiment has been featured in several PLA videos of exercises as well as a recent propaganda video promoting the PLAN's role in defending the sovereign territory of China.¹²⁵ In the same video, footage of Firing Position #1 can be seen. This firing position, roughly 25 kilometers from the barracks, is potentially an older Coastal Defense artillery position that was refurbished in 2020. Firing Position #2 was built at the end of 2019 and has four reinforced concrete pads. Although there is no evidence of the CDMF using this position, the timing of its construction along with the layout of the reinforced pads suggests that it is intended to provide a different vantage for defense of the nearby Yulin naval base.

At this location, the Sanya barracks has multiple roles. One of the roles is to provide long-range fire support to naval vessels operating in the South China Sea. Another role Sanya plays would be to seal off the Beibu Gulf, effectively providing the anti-ship fires to a blockade of Hanoi. A third role is defense of Yulin naval base with its strategic assets like aircraft carriers, surface combatants and submarines.

Appendix II – Analysis of Underground Facilities and Their Construction

Yanhong Underground Facilities¹²⁶



The Yanhong Barracks pre-dates the establishment of underground facilities. This is likely due to the reported retrofitting of older barracks for the new model of CDMF regiments. At Yanhong, two underground facilities were constructed in 2008 to 2009, around the same time that the 1st "Coastal Thunderbolt" Regiment was established.

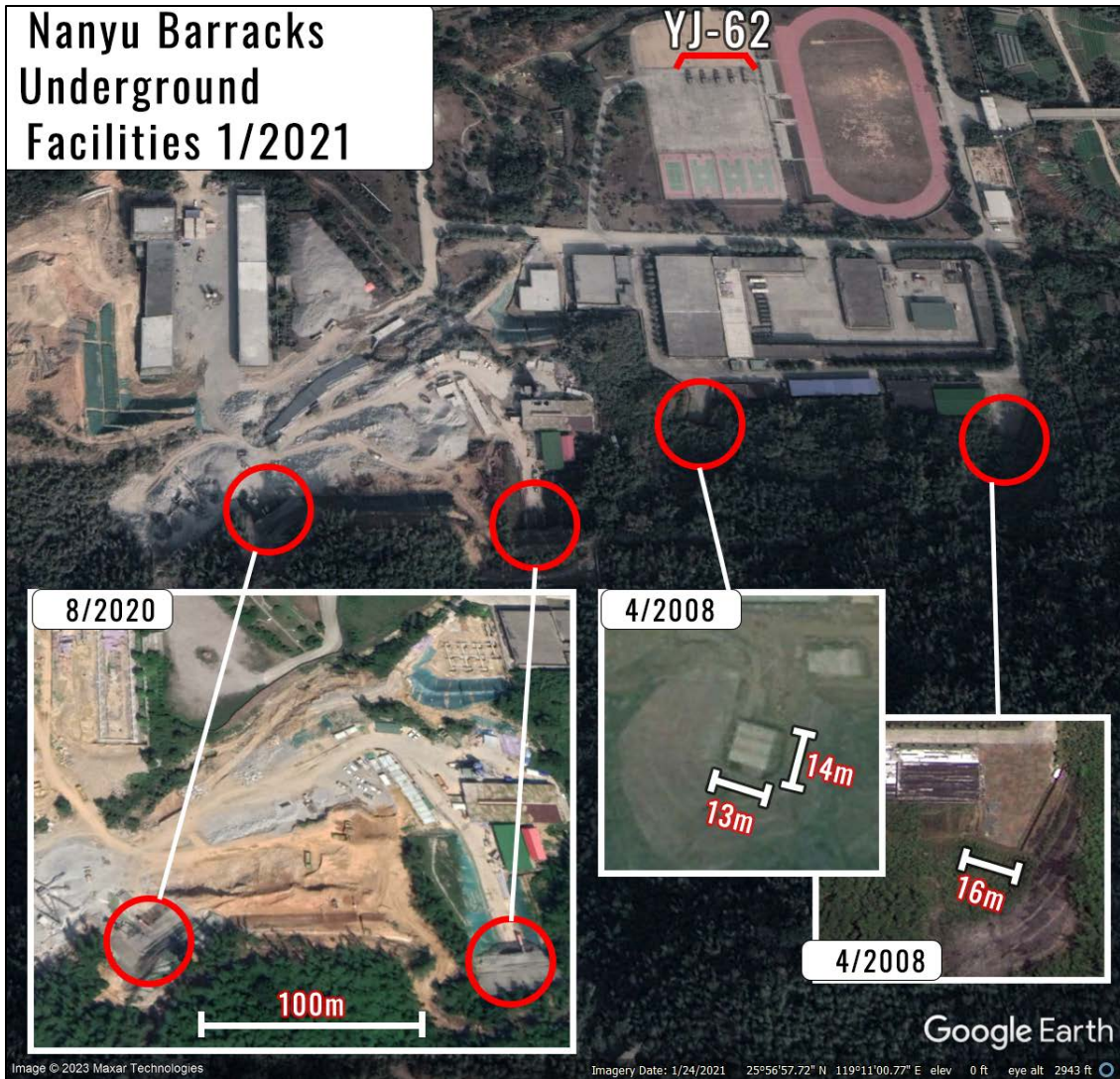
Construction of the UGFs occurred in two phases: the initial excavation of the facility, followed by the construction of a large entrance way. During initial excavation, the opening of the facility is exposed, however the depth of the excavation remains unclear. It is evident that in the construction of these facilities the PLA takes advantage of the mountainous terrain to cut into the mountain and to build roadways in the valleys in between the mountain sides. Another type of tunnel-like UGF is built into the mountain side at Zhifu Island. This type of connects the western and eastern side of the barracks and has been shown to be used as a sanctuary for

battalions after firing their missiles.¹²⁷ UGFs at this location are likely multi-purpose for munitions storage, TEL storage and shelter.

The third and fourth underground facilities were added to the complex between 2021 and 2022. During construction the PLA also built an above ground facility and an elevated parking platform. Entrances to the third and fourth facility are roughly 11 meters across and appear to be nearly two stories high using the newly constructed adjacent building as a reference point. This makes the entrances large enough for a wide variety of vehicles and TELs.

Adding additional hardened munitions storage onto the pre-existing barracks at Zhifu Island supports the theory that the PLA views CDMF and CDMF-like forces as vulnerable to preemptive or counter attacks. Increasing the number of UGFs is meant to increase the survivability of these units and their equipment to maintain resiliency during conflict.

Nanyu Underground Facilities¹²⁸



Nanyu's UGFs predate the standup of the 2nd Regiment under the new organizational model. Initial construction of two underground bunkers here began in 2008-2009, again, roughly at the same time of the establishment of the 1st "Coastal Thunderbolt" Regiment. Construction followed a similar progression as the bunkers at Yanhong, however, these bunkers were built substantially closer to the main grounds of the barracks. The two original entranceways constructed for the bunkers measure roughly 13 meters by 14 meters for both entrances. The amount of underground space here is once again unclear.




In mid-to-late 2020, this barracks began construction of two additional UGFs slightly to the southwest of the original two. The entrance ways to these new facilities have been covered in netting, obfuscating their size, but they appear to be roughly the same size as the original facilities built in 2008. In addition to the two new UGFs, there also appears to be other construction projects underway at the barracks, including additional underground and above ground facilities.

Yangdao Bay Underground Facilities¹²⁹



Yangdao Bay's first UGF on the northern side of the barracks began construction between August of 2017 and January of 2018. Excavation of the facility appears to have been completed at the end of 2018 and construction of the entranceway to the facility started in early 2019. Full construction of the underground facility was completed in March of 2020, with visible use of the facility based on the tire tracks leading into and out of the entranceway. The entranceway to the underground facility measures roughly 12.5 meters wide, 22 meters long and 12 meters tall. With these dimensions, any number of vehicles or equipment may be able to use the facility, however the actual space within the underground portion of the bunker is unknown. A second set of UGFs (pictured above) was built between 2021 and November 2023. This new set of UGFs resembles the tunnel-like UGFs found at Zhifu Island. Here, the new UGF appear to be quite expansive and links the new munitions handling and preparation facilities with the other facilities on the eastern side of the barracks. The new munitions handling and preparation facility as well as the underground facility were likely built to prepare for the full stand up of the CDMF 3rd Regiment at this barracks. Completion of the new garage facilities on the northern section of this barracks and several different visible missile systems there seems to confirm that the 3rd Regiment has indeed moved to this barracks.

Appendix III – Additional CDMF Regiment Information

Military Unit Cover Designators and Details of the CDMF Regiments¹³⁰				
Regiment	Location, TC	Units (MUCD)	Leader	Unit Patch
1 st Regiment	Nanyu, ETC	92383	Unknown (possibly Col Zhong Xiaojun 钟晓军) ¹³¹	
2 nd Regiment	Yanhong, ETC	92768 (unconfirmed)	Col Wan Zhongwei 万中 伟	
3 rd Regiment	Yangdao Bay, ETC	92706 (unconfirmed)	Unknown, possibly Regiment Leader Gao Haijun (he is identified as a regiment leader) ¹³²	
11 th Regiment	Zhifu Island, NTC	91980 ¹³³	Unkown, 郭斌 Guo Bin is the Political Commissar and Secretary of regiment Party Standing Committee	
12 th Regiment	Sanya, STC	91172	Unknown	

Appendix IV – Persons and Titles of the 1st Regiment

Positions/ Affiliations within the ETC CDMF 1 st Regiment ¹³⁴			
Title	Rank/ (Grade ?)	Name (As of April 2019)	Responsibilities
政治工作处主任 Director of the Political Work Office	COL/LTC / Regiment Leader	任刚 Ren Gang	
团长 Regiment Commander	COL/LTC / Regiment Leader	钟晓军 Zhong Xiaojun	
团政委 Regiment Political Commissar	COL/LTC / Regiment Leader	苏升 Su Sheng	
营长 Battalion Commander	LTC/MAJ / Battalion Leader	黄杰 Huang Jie	
作训参谋 Training Staff Officer	Unknown	李林 Li Lin	
营士官 Battalion NCO – multiple within the Regiment	Unknown	朱光辉 Zhu Guanghui	单车指挥员 Individual vehicle commander 7 个岗位考 passed seven position examinations to be appointed NCO
连班长 Company Leader	Unknown	李成伟 Li Chengwei	

ENDNOTES

A quick note on sourcing: Where possible, original or primary sources were used to conduct research. Due to the limitation on certain information, other sources such as blogs or secondary reporting have been used to fill in gaps in research.

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² People's Liberation Army Navy Unabridged Encyclopedia Standing Committee, *The People's Liberation Army Navy Unabridged Encyclopedia*, Haichao Publishing House, Beijing, 1998, Pg.377

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⁴ Long Yunhe and Zhong Kuirun, 走向深蓝 – 中国人民海军发展纪实 [Towards Deep Blue (Water Navy) – A History of the Development of the PLA Navy], April 1, 2009, <https://www.chinanews.com.cn/gn/news/2009/04-16/1649086.shtml>

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⁷ Ibid.

⁸ Combat Decoding, 海军力量发展迅速, 岸防武器成闲置品, 岸防力量还有必要发展么? [With rapid development of naval power, coastal defense weapons have become idle products. Is it necessary to develop coastal defense forces?], Baidu Baijiahao, December 12, 2022, <https://baijiahao.baidu.com/s?id=1719847268225316551&wfr=spider&for=pc>

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¹⁹ 中国军队岸舰导弹部队：从近岸走向远海的新型岸防 [PLA Shore-to-ship Missile Force: From Near Shores to Far Seas, A New Model of Coastal Defense], CCTV-13

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