Prakash Panneerselvam
Amit Mukherjee

China-Pakistan Economic Cooperation (CPEC) Project: Satellite Imagery Analysis of Port Development at Makran Coast

National Institute of Advanced Studies
Bengaluru, India

NIAS Report NIAS/CSS/ISSSP/U/RR/14/2020

China-Pakistan Economic Cooperation (CPEC) Project: Satellite Imagery Analysis of Port Development at Makran Coast

International Strategic & Security Studies Programme (ISSSP)
NATIONAL INSTITUTE OF ADVANCED STUDIES
Bengaluru, India

Published by
National Institute of Advanced Studies
Indian Institute of Science Campus
Bengaluru - 560 012
Tel: 2218 5000, Fax: 2218 5028
E-mail: publications@nias.res.in

NIAS Report: NIAS/CSS/ISSSP/U/RR/14/2020

ISBN: 978-93-83566-40-2

Typeset & Printed by
Aditi Enterprises
aditiprints@yahoo.com

Table of Contents

Acknowledgement

We are grateful to Prof. Rajaram Nagappa for his vision and esteemed guidance during the preparation of the report. We would like to thank and express profound gratitude to Prof. Lalitha Sundaresan for sharing her technical expertise all through the process of creation of the report. We are grateful to Prof. Srikumar Pullat for his valuable support in the making and publication of the report. We would like to express our gratitude to the Director of the Institute Prof. Shailesh Nayak for his support that provided primacy and encouragement to the work. We would like to extend our thanks to faculty of ISSSP for their constant support and encouragement.

About Authors

Dr. Prakash Pannerselvam

E-mail: prakash.p@nias.res.in

Dr Prakash is an Assistant Professor with the International Strategic & Security Studies Programme, NIAS. He holds a Ph.D in Japanese Studies, School of International Studies, and Jawaharlal Nehru University (JNU). He was the first Visiting Fellow to Japan Maritime Self-Defence Force (JMSDF) Staff College, Tokyo. He is a recipient of Japan Foundation Fellow (2011) and Okita Memorial Fellowship (2008). Prior to joining NIAS, he was working with Confederation of Indian Industry (CII) in Defence & Aerospace Sector. Moreover, Prakash was a trained merchant mariner with Poompuhar Shipping Corporation Ltd.

Dr. Amit Mukherjee

E-mail: amukherjee@nias.res.in

Dr Mukherjee is an Assistant Professor in International Strategic and Security Studies Program at the School of Conflict and Security Studies in National Institute of Advanced Studies, Bangalore. He has a Ph.D. in Defence and Strategic Studies from University of Pune. Prior to joining NIAS he was previously a Post Doctoral Fellow (PBC Fellowship) at the National Security Studies Center, University of Haifa, Israel, from 2013-2016, where he is an (Honorary) Research Fellow 2016-2019. He was also an Israel Asia Leaders Fellow 2014-2015, and a visiting fellow at IDSA, New Delhi, 1st October 2016 – 30th June 2017.

List of Tables

List of Figures

China-Pakistan Economic Cooperation (CPEC) Project: Satellite Imagery Analysis of Port Development at Makran Coast

Introduction

The China-Pakistan Economic Cooperation (henceforth, The CPEC) project, part of China's grand strategy of the Belt and Road Initiative (BRI) and Maritime Silk Route (MSR), is planned to resurrect the Old Silk Route by connecting Kashgar (Western China/Xinjiang region) to the Gwadar Port in Pakistan. Initially the project was estimated to be around US $46 billion, however, at present, the investment has reached a whopping US$63 billion. This encompasses a wide of range of projects such as building of the Gwadar Port, the Gwadar Special Economic Zone (SEZ), the Suki Kinari hydropower plant in Khyber, wind power projects, the M-4 highway connecting Shorkot and Khanewal in Punjab etc. The project has the potential to boost the fragile economy of Pakistan and also reduce the economic disparities arising from unequal development and distribution of resources among the various provinces of Pakistan. The project is especially significant because of the undiscovered natural resources in the Makran Coast and the proximity of the Gwadar Port to the Strait of Hormuz (which is at a distance of 400 km approximately). The strategic location of the Gwadar Port and its proximity of the Strait of Hormuz will serve to decrease the time, cost and dependency of China over the Malacca Strait for its energy imports from West Asia. It became necessary to seek an alternative route to the Malacca Strait due to the threat of piracy problems and also because it could be blocked by US and its allied powers. Additionally, the western part of China i.e., Xinjiang lacks the much needed industrial and human development. This has lately given rise to extremist activities and Islamic radicalism, which can be contained by promoting development in this region. Hence, the CPEC can be considered as a –potential game-changer for both China and Pakistan to bridge socio-economic gaps and stimulate development.

The revival of the Old Silk Route by the current Chinese regime signifies Beijing's aspiration to become a global power by investing in key sectors like connectivity, trade, energy and technology. CPEC is one of the key elements in the BRI and MSR initiative, and it is of vital importance for China, both politically and economically. At the same time, the multi-billion dollar projects will have a major impact on Pakistan's overall development. Maj Gen Samrez Salik says "Initiation of CPEC, as a lynchpin of BRI, has transformed Pakistan's relevance and now it is again emerging at the centre stage of global politics but with economic relevance."[1] The connectivity project and military cooperation between China and Pakistan suggests that India's influence in the region will be undermined. The development

1 The World in Transition, https://www.hilal.gov.pk/eng-artical/the-world-in-transition/MjEw.html.

of the Gwadar Port also coincides with the Pakistan Navy's plan for "Westward Expansion" by modernising the naval port in the Makran Coast. The string of naval port in the Makran Coast is a serious threat to India's maritime interest in the Arabian Sea. Development of the port in the Makran Coast would further enhance Chinese connectivity with the Persian Gulf, North Africa and West Asia. This geostrategic location is advantageous for China to monitor vessel movements in the region. The emerging geopolitical situation in the Arabian Sea restricts manoeuvring space for India. Therefore, the study looks at the port development in the Makran coastal region, and how the CPEC is transforming naval port development along the Makran Coast. The study uses open source satellite images to analyse the development of Gwadar Port and PNS Akram (Gwadar), Jinnah Naval Base (JNB) and PNS Ahsan (Ormara), PNS Makran (Pasni), PNS Siddiq (Turbat) and the naval station, Jiwani Peninsula. The objectives include carrying out various interpretation methods to verify the claimed rapid development of the Makran Coast.

Chinese Maritime Connectivity and the Makran Coast: An Overview

The China-Pakistan land communication was opened in 1968 via Pakistan Occupied Kashmir (POK) and Xinjiang (through the Mintaka Pass). The 500-mile Karakoram highway through the Khunjerab Pass was also built with the help of the Chinese in 1978. This road route is considered to be of great economic importance, as well as of strategic value because these roads provided access to the Chinese forces and allowed them to move rapidly through important Himalayan passes and outflank Indian forces stationed in the Ladakh region.[2] The strategic intent of the Chinese hasn't changed since the 1962 war. The Indian strategic establishment, as well as experts in the Department of Military Affairs are of the view that the CPEC is designed to counter New Delhi's rising profile in the Indian Ocean. Economically, linking of the Gwadar Port with the Chinese landlocked region provides a greater economic and energy advantage for Xinjiang province. Regarding the energy security concerns faced by China, the transit route through the Gwadar Port would not only increase the efficiency with which energy is transported but it will also provide alternative route to the Malacca Straits (See Table1). In the case of an emergency or a war-like situation in the South China Sea, China might use its access to Gwadar Port as an energy life-line for the Chinese economy.

Table 1: Energy Route via Gwadar Port/ Straits of Malacca

Routes	Present Length via Straits of Malacca & South China Sea (in miles)	Length via Gwadar Port (in miles)	Transport efficiency gain
Europe to Eastern China	27, 027	9, 597	65%
Gulf to Eastern China	10,537	2,295	78%
Europe to Western China	24,402	12,222	50%
Gulf to Western China	7,912	4,920	38%

Source: Saeed Akram, CPEC and Gwadar deep sea port-changing face of Pakistan, Business Reader, Jan 27, 2017, http://epaper.brecorder.com/2017/01/27/36-page/844454-news.html.

2 Yaacov Vertzberger, The Political Economy of Sino-Pakistani relations: Trade and Aid 1963-82, *Asian Survey*, Vol.23, No.5 (May, 1983).

Apart from enhancing energy imports and its resultant economic impact, the CPEC route is strategically important for China to establish itself as a maritime power in the Indian Ocean. According to Dr. James Holmes, renowned naval expert and China watcher, China, being a great aspirant to sea-power, has both military and non-military vessels in its national fleet. In his testimony on China's Military Reforms and Modernization: Implications for United States, he says "If it floats, it is probably an element of Chinese sea-power - official or unofficial."[3] For China, sea-power is not only about building naval ships, submarines, and naval-air arms, but also land based systems, which can provide an active support to its "anti-access and area-denial" strategy." Once China establishes its security in and beyond the first island chain, the Chinese Communist Party leadership can focus on secondary threats such as access to energy and trade routes in the Indian Ocean. The Chinese investment in port development in Djibouti, Pakistan and Sri Lanka is indicative of their intent to build overseas support to The People's Liberation Army (PLA) Surface Fleet. The PLA-Navy fleet deployed overseas can use the ports built with Chinese assistance to perform a regular patrol in these theatres to protect the vital sea-lane leading to China. Pakistan, China's strategic partner in the region is well placed to protect the former's interest in the region.

Geo-strategic location of Makran Coast

Pakistan's coastline is 990 km long, extending from the Indian border in the east to the Iranian border in the west. Based on the topography and physical features, the coast is divided into two parts – the Sindh Coast and the Makran Coast. While the Sindh Coast is 320 km long, the Makran coastline is 670 km long. The Makran Coast has four *tehsils* including Gawadar, Jiwani, Kulanch and Ormara. The Gwadar Port and the Jinnah Naval Base in Ormara are the two prominent ports in the region. The Gwadar Port is witnessing a major thrust in development because of The CPEC project, which will result in strengthening Pakistan's economy. Pakistan is also using this opportunity to broaden its maritime focus in the region by developing naval ports in Ormara, Pasi, Jiwani and a naval air station at Turbat, which is approximately 200 km from the Gwadar Port as part of Pakistan Navy's "Westward Development." Pakistan's expanding naval footprints along the Makran Coast is of serious concern for India as its total energy dependency is on gulf oil.

Development of the Makran Coast took place in three phases. Phase-I of the port development activities was from 2002-2006,[4] and at that time, the Chinese investments were touted to be around 80 perecent.[5] Phases that have already seen completion include development of berth and related port infrastructure at an estimate of US$248 million. Phase-II, which is an ongoing project at an estimated cost of US$1.6 billion includes four new berths, one grain terminal, one roll on/roll on (RO-RO) terminal, two oil terminals, a four-lane expressway, an international airport, a floating liquefied natural

3 Hearing on China's Military Reforms and Modernization: Implications for the United States, United States-China Economic and Security Review Commission (2018).

4 NDMA.gov.pk – *Pakistan Economic Survey 2010-2011*, pp 20.

5 Sushant Sareen, Corridor Calculus China Pakistan Economic Corridor & China's Comprador Investment Model in Pakistan, pp 78. 2016.

gas terminal, a 2292 acre Special Economic Zone (SEZ), a desalination plant, and a power plant.[6] Towards this end, several stages in the civil area construction have been completed and can be viewed using open source satellite images and interpretive analysis. This includes the growth that is visible in the semi-urban and urban residential infrastructure. Though this growth may be considered to be marginal, substantial growth is beginning to become visually identifiable, especially in townships in the now major port cities of Gwadar and Ormara.

What can be considered as visible increase in development is the growth in military infrastructure in the post 2013 CPEC declaration. Though there is gradual developmental activity in the Makran Coast military infrastructure growth post 2000, the sudden spurt of development coincides with the post CPEC period after 2013. This has been co-related with available open source literature, satellite imagery and geo-spatial analysis to bring out a report to illustrate the developments and analyse their significance.

Study Area: The total area of the Makran coastline is about 990 km. Of this, the largest coastline is of that of Gwadar, which is about 600 km. The domain of the study area ranges from 24ºN to 26ºN and 61ºE to 65ºE which is the extent of the area of interest (AOI).

Figure 1: Markers for the Makran Coastline

Source: Gwadar Development Authority.

Methodology: The study was carried out to investigate the changes that have taken place in the Makran Coast (post-2013), especially after the Chinese corporation, China Overseas Port Holding Company, took over the development work through the CPEC framework. Satellite imagery, combined with

6 AiMin Deng, Alassane Yeo*, LiHui Du, A Study on Gwadar Port International, Competitiveness using Porter's Diamond Model, *World Journal of Innovative Research (WJIR)*, ISSN: 2454-8236, Volume-4, Issue-1, January 2018 Pages 01-07.

geographic information system (GIS) software, provides deeper insights into geographical data, details of the facility, and construction which can lead to the appreciation of a progressive change in AOI. The extent of the AOI was mapped as per the relevance of the details and does not necessarily reflect the exact boundary or perimeter of the enclave under study. The sources used were Google Earth Imagery along with GIS software like QGIS. Other than this, several remote sensing data were used to study the AOI along the coast of Makran. Various open source information was used to corroborate the on-ground position within the limitations of available data and imagery. Some techniques like timeline based change detection and calibrated calculations were used to decipher certain dimensionalities of the structure under study to better estimate their purpose. The report is structured in the following manner: Each port under study is focuses on contextualising the strategic dimensions of the CPEC and its connection to the port development activities. This is followed by the geospatial and imagery analysis of the port facilities, under sections - Area (describes the geo-location), Description (describes the features at the location-AOI), and Assessment (the analysis).

Color Coding: Following closely on international colour coding schemes for such analysis, the following colour representation has been allocated:

Black	Red	Orange	Yellow
Boundary Wall	**Military Infrastructure**	**Extension/ New Construction/ Expansion**	**Civilian Infrastructure**

Gwadar Port & PNS AKRAM

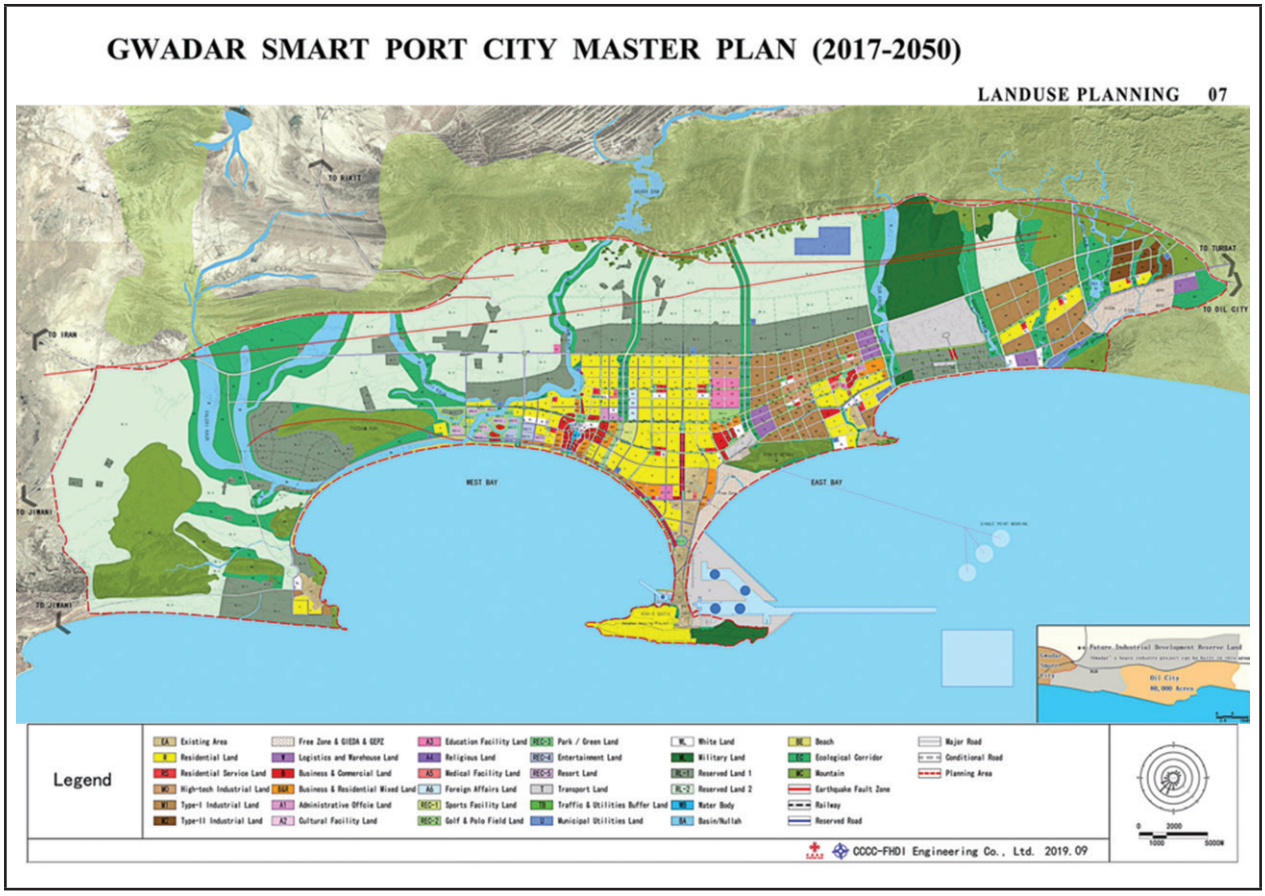
The Gwadar Port has the strategic advantage of being close to the oil transit route and at a distance from the Indian coast. Karachi and Qasim are the two main ports that handle the major share of Pakistan's trade and shipping activity. The Gwadar Port is now emerging as the flagship project of the CPEC, after a strong role was envisioned for it in the connectivity project to link landlocked Xingjian province to it. Gwadar is limited as a port, but it has the potential to grow as a major economic hub in the region. The Gwadar Port Master Plan (GPMP) estimated the port output to be 42-65 million tons in the short-term (2005-2020), while in the long-term (2021-2055) the forecast was estimated to be 321-345 million tons. Experts say, that major ports handle cargo more than 600 million tons. Thus, as Gwadar is expected to handle roughly half the output of a major port, it will be classified as a medium sized port. At the same time, however, the World Port Index–2019 report confirms that the Gwadar Port lacks key facilities like oil terminal, dry dock facility, railway connectivity and supplies like fresh water, fuel etc.

Table 2: World Port Index – 2019

Port	Harbour Size	Harbour Type	Shelter	Channel	Anchorage	Cargo Pier	Oil Terminal	Max Size Vessel	Good Holding Ground	Turning Area	Lift (100 ton plus)	Supplies (Water, Fuel Oil, Diesel Oil)	Repair	Dry Dock	Railway
Gwadar	M	CN	F	H	H	G	-	M	-	Y	-	-	-	-	-
Karachi	M	CN	G	K	K	H	G	L	Y	Y	Y	Y	C	L	L
Qasim	S	CN	G	J	J	J	L	M	Y	Y	-	Y	C	-	-

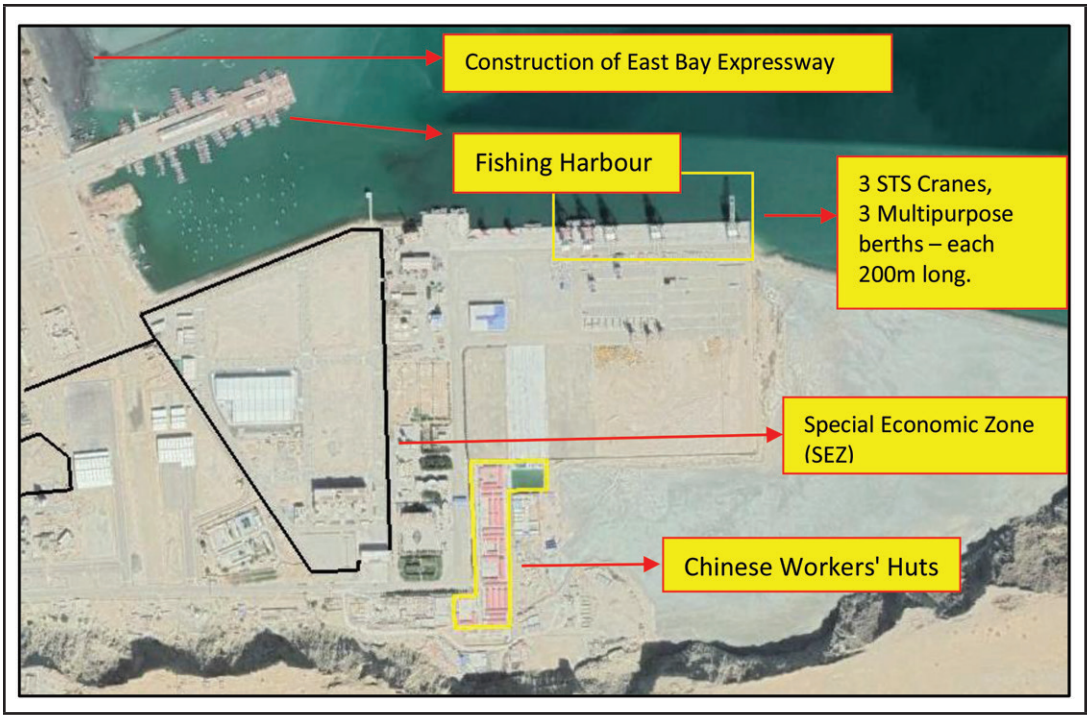
Source: World Port Index - 2017, National Geospatial - Intelligence Agency, United States Government. Harbour Size: M - Medium, S - Small; Harbour Type: CN - Coastal Nature; Shelter: F - Fair, G - Good; H - 12.5 - 13.7 m, K - 9.4 - 10.7 m, J - 11.0-12.2 m; C - Limited, L - large; Y - yes, N - no.

Figure 2: Gwadar Smart Port City Master Plan



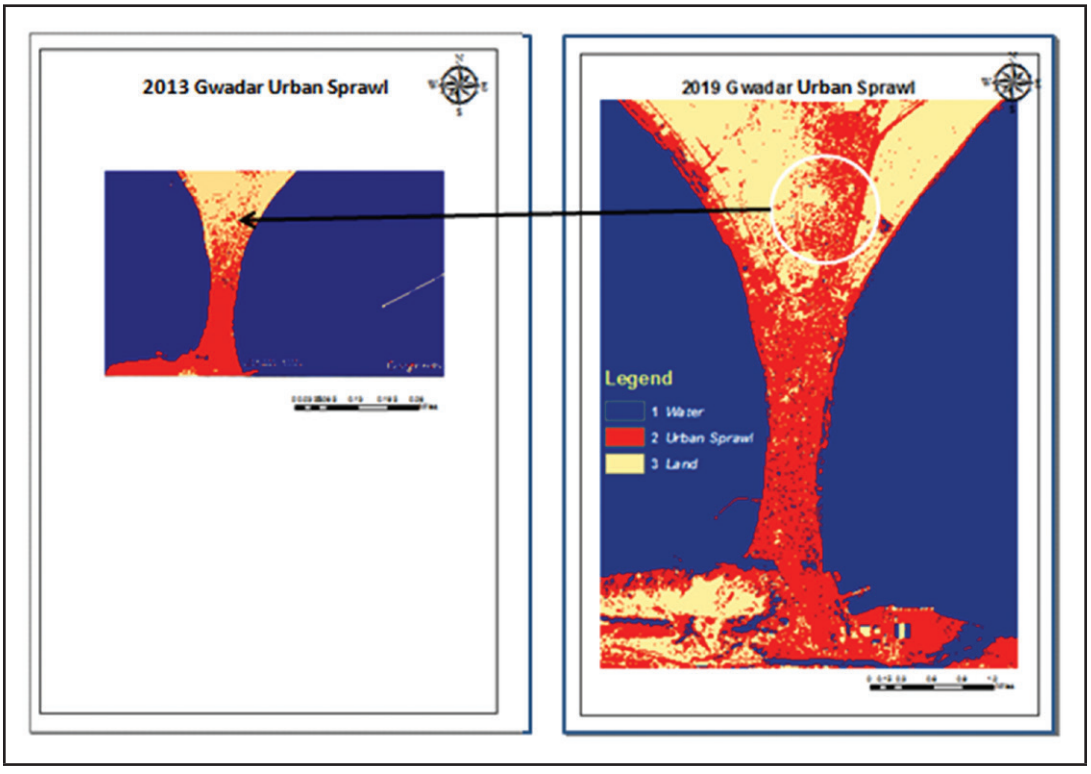
Source: Gwadar Development Authority.

Figure 3: Gwadar Port and AOI



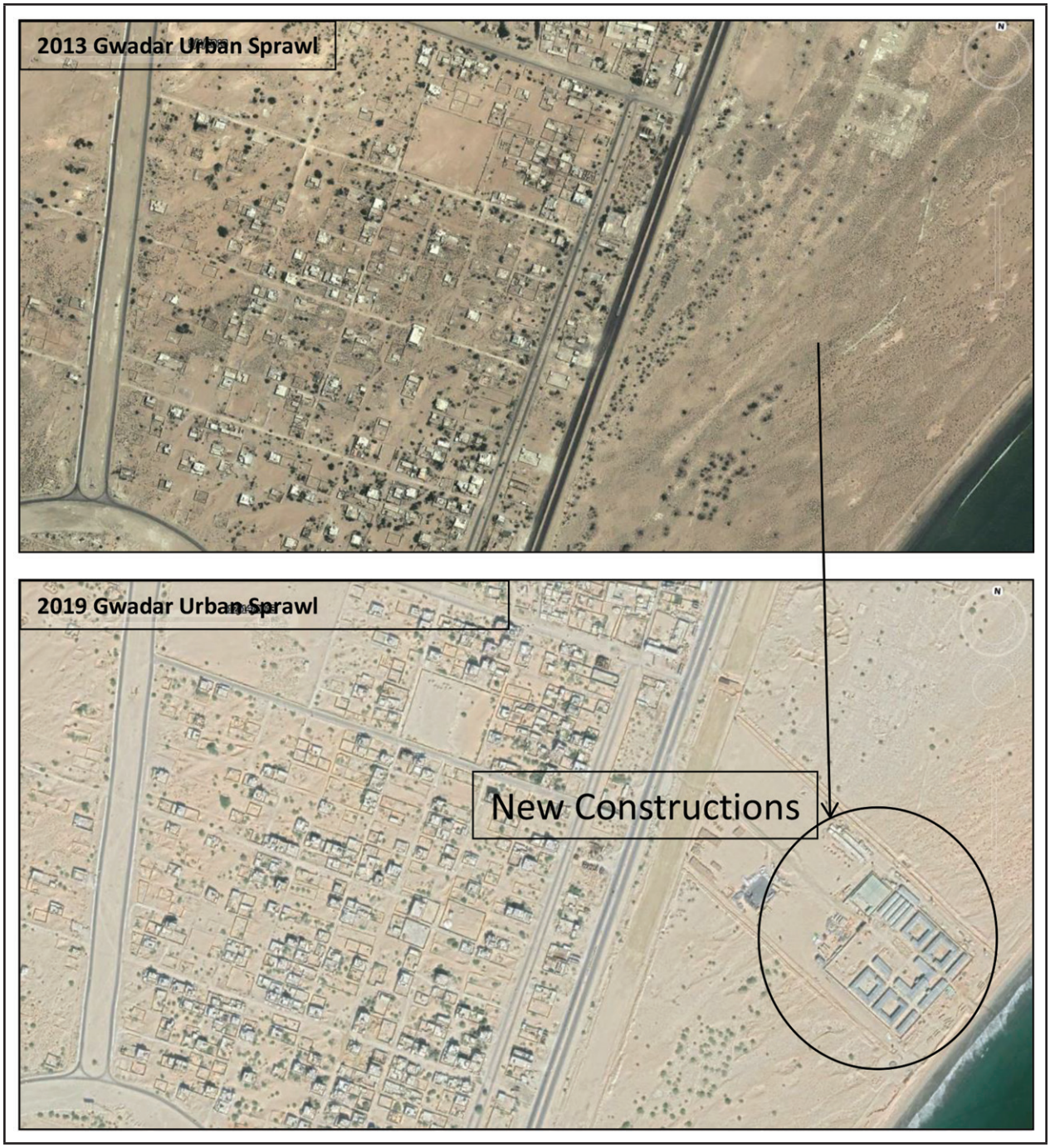
Source: Google Earth, DOI: 07/12/2019.

Figure 4 (a): Change Detection Urban Sprawl Gwadar Town 2013-2019



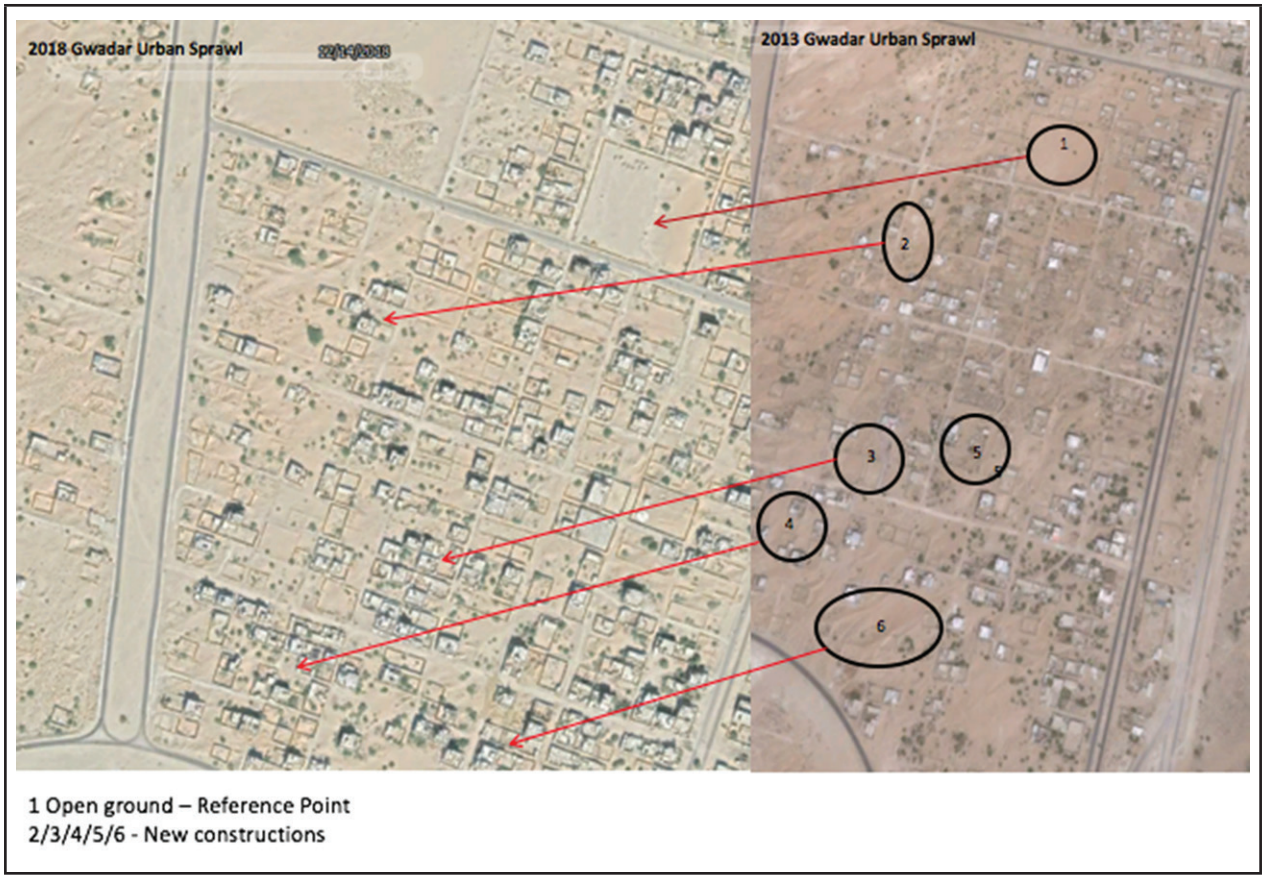
Source: Authors (The base image for the year 2013 image was sourced from Google Earth Historical Archive and for the year 2019 Sentinel-2 data was used).

Figure 4 (b): Growth in Urban Areas



Source: Google Earth.

Figure 4 (c): Growth in Urban Areas



Source: Google Earth.

Area: The area under study is between 25°6'56.23"N and 62°19'47.33"E and 25°6'13.29"N and 62°21'7.20"E and includes around 8 sq km of port infrastructure.

Description: Construction activity and subsequent developmental projects are taking place on a large scale in the Gwadar Port area through the CPEC initiative to turn it into an important commercial hub. Thus, infrastructure, including container stacking area, reefer cargo space, empty container stacking area, storage yard, hazardous cargo storage yard, control tower, communication station (Very High Frequency (VHF)/ Digital Selective Calling (DSC), including INMARSAT-B) and Coast Guard building are being constructed with all modern amenities. The AOI also has the Gwadar Free Zone.

Assessment

Close monitoring of the CPEC developments especially in Gwadar, the crown jewel of the works, seems to suggest that work is on track and may be completed by 2030, as reported.[7] Although it is a painstaking job to keep accurate tabs on the timeline and development status through published reports, a general overview was done to check whether the work was continuing or had been halted. It was found that the development sometimes has been slower than expected but regular progress

7 PTI | No Slowdown on CPEC Projects, Sep 30, 2019.

is visible in this 3000 km connectivity from Xingjian to Gwadar. Among the three phases in the development project, Phase – I has been completed. Phase – II is in progress and under it, 27 new projects[8] are going to be implemented. This also includes The Gwadar East Bay Expressway, the new Gwadar International Airport, breakwater construction, dredging for berthing and channels, development of Gwadar Free Zone, water treatment facility, hospital, vocational centre, and a smart port city.[9] Some of the features mentioned above are visible in the imagery as projects that are either completed or are near completion. The East Bay Expressway is said to be completed upto 60 percent. The Gwadar International Airport, which is coming up 14 km north of the city centre of Gwadar, will be Pakistan's largest international airport. The airport is being built with Chinese grant assistance at a cost of US$ 246 million.[10] In 2019, construction activity for the new airport was commenced, and construction of the airport will be completed in the next two years. The present area, as seen in Figure 3, represents 60 percent completion of construction of the Gwadar Port Project. The Smart City Project (not visible in Figure 1) land parcel has been done, and the task is said to be 20 percent complete.[11] The breakwater and dredging terminal, the Expressway connectivity to the International airport, water treatment plants, hospital, and vocational college are at the stage of 10 percent to 15 percent completion, with only feasibility studies having been carried out thus far.[12] The 18.98 km long East Bay Expressway is said to be almost 46 completed.[13] However, the satellite image shows only 20 percent has been completed. This six-lane expressway, along with a provision of a 30m wide railway corridor is supposed to connect the Gwadar Port with the Makran Coastal Highway (N-20) through the 2300 acres Free Trade Zone of the Gwadar Port.[14] However, work on some extensions of the rail road, supposed to run parallel to the six-lane East Bay road[15], has been stopped approximately 15 miles from the starting point.

Construction has already started for the development of the 2300 acre Gwadar Free Zone, slated to be a tax exemption zone. The Gwadar Free Zone will give economic benefits like 23 years tax holiday, attractive incentives and opportunities to bolster upcoming businesses, and drive trade and commerce to help Pakistan strengthen their economy.

The Chinese workers' hut, marked in the image above (Figure 3), is to be guarded by two battalions of Special Forces. The Pakistan military is also planning to raise a division headquarters of the 44 Light Infantry in Gwadar as a security measure to protect the economic corridor between China and Pakistan.[16] However, so far, only ad hoc arrangements have been made by recruiting and deputing

8 PTI| Economic Times, 30th August 2019.

9 Cpec.gov.pk/gwadar

10 Pakistan's Gwadar International Airport will be the largest in the country, Gulf News, March 31, 2019, https://gulfnews.com/world/asia/pakistan/pakistans-gwadar-international-airport-will-be-the-largest-in-the-country-1.63033953

11 cpecinfo.com

12 cpecinfo.com

13 http://cpecinfo.com/construction-work-on-gwadar-east-expressway-under-cpec-completed-46-says-parliamentary-secretary-for-planning/

14 http://cpec.gov.pk/project-details/32

15 Google earth imagery analysis

16 Pakistan to raise new division HQ in Gwadar to protect the US$60 billion economic corridor to China https://theprint.in/world/pakistan-raise-division-hq-gwadar-protect-60-bn-economic-corridor-china/304585/

1000 police and local law enforcement personnel.[17] Various other business centres, like the Trade Promotion Centre, have been completed (Figure 3). The two images (Figure 4a and 4c) show the development that has taken place from 2012 to 2019.

Since Gwadar is the third deep water port of Pakistan after Karachi and Qasim, its development as a civilian port may reduce its military value when compared to other ports that are being developed as naval bases. The string of Pakistani Naval bases that are getting upgraded will create a large area of engagement for any attacker. This is intended to thin the attack concentration thus increasing the defense in depth concept. A Pakistan media report suggests that "China would deploy its naval ships in coordination with the Pakistan Navy (PN) to safeguard the Gwadar Port."

Phase – I included construction of three multi-purpose berths 600m in length, with a capacity of 30000 and 250000 DWT(Discrete Wavelength Transform), as is visible in Figure 3. Phase – II, which officially began in 2013, has plans to build four container berths along the 3.2 km shoreline (indicated tentatively in Figure 4). This is to be followed by one grain terminal, one RO-RO terminal and two oil terminals, along with a four-lane highway to join the Makran coastal highway, the east Bay Expressway to the International airport, a floating gas station for 500 million cubic capacities, a thermal power plant, a desalination plant and a 2300-acre Free Zone (shown in Figure 1).

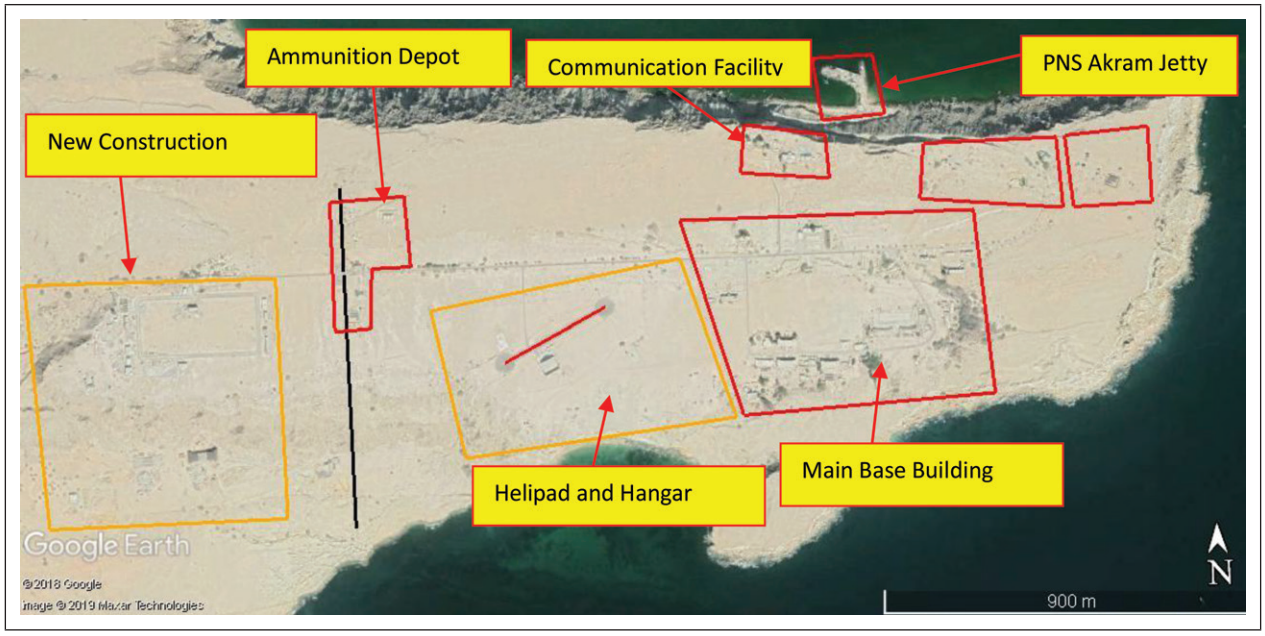
Expansion of the Gwadar Township has been observed, as well as in other areas where CPEC developmental activities have taken place. The Gwadar region has witnessed visible growth in housing and town development as seen in Figure 4 (a). The change detection method was used to detect and verify changes that have taken place. Unsupervised and supervised classification was used to check for growth in the AOI. Positive developments have been seen in the AOI. Sentinel and Landsat Images were used along with Google Earth (GE) images for temporal data. Overall, open source satellite imagery of the Gwadar Port shows that a lot of development has taken place in the post-CPEC period. The current rate of development will help Pakistan positively to achieve the target by 2050 (Gwadar Master Plan (2017 - 2050)).

PNS Akram

PNS Akram is the first naval base commissioned at the Makran coast in 1987. PNS Akram's prime responsibility is the overall protection and security of the Gwadar Port. For the protection of the Gwadar Port, supportive stations like PNS Siddiq in Turbat, and PNS Makran have been raised with air power prowess. PNS Akram does not keep a large contingent of armed units other than special units, called the 3rd and 4th battalion, that are created for the purpose of harbour defence.

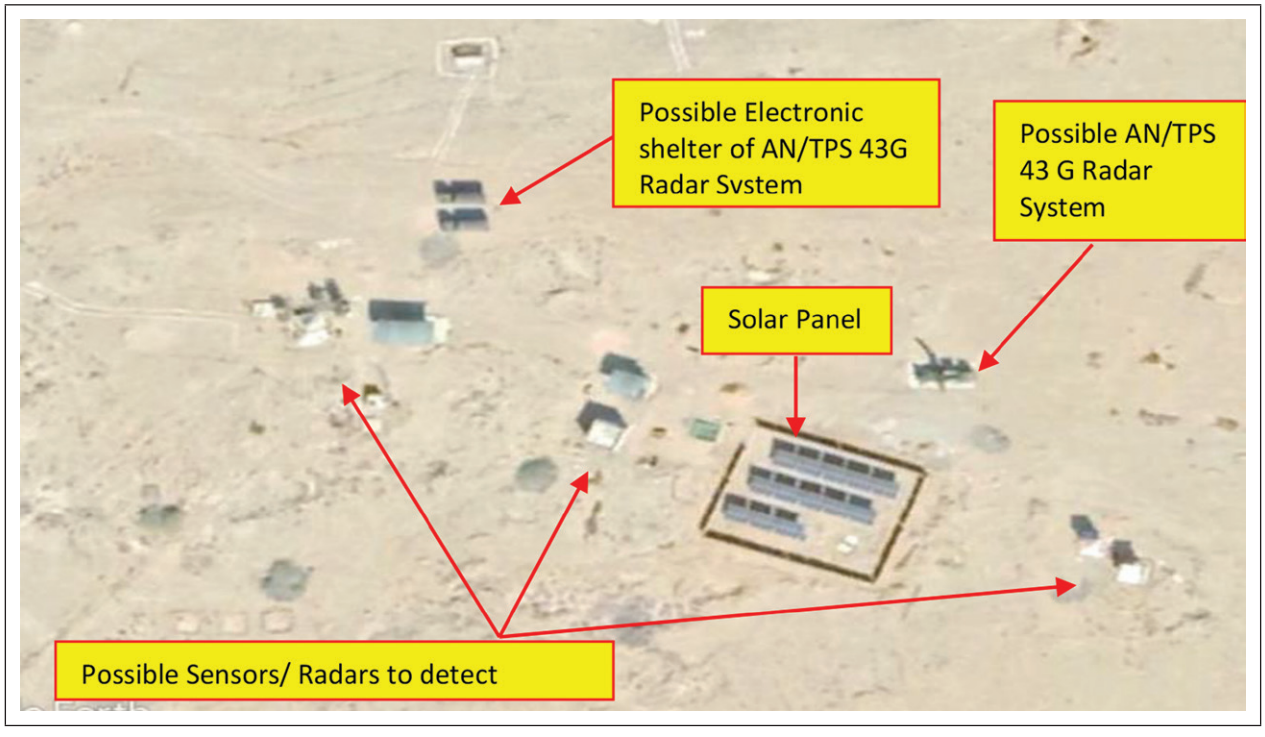
17 reuters.com/article

Figure 5: PNS Akram



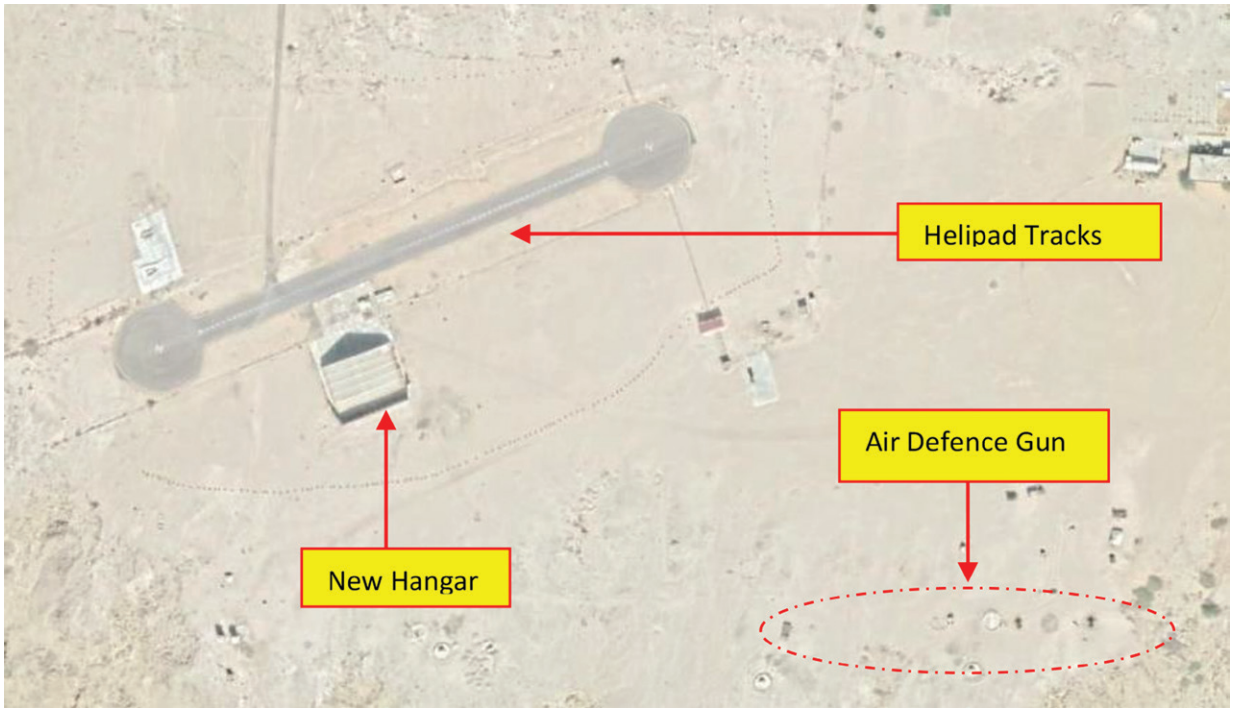
Source: Google Earth, DOI: 02/08/2019.

Figure 5 (a): Eastern Section PNS Makran, including a picture of the Radar System AN/ TPS 43G



Source: Google Earth, DOI: 02/08/2019.

Figure 5 (b): Helipad, Hangar facility and Air Defence Gun



Source: Google Earth, DOI: 02/08/2019.

Area: The area under study is between 25°6'20.88"N and 62°21'7.20"E and 25° 5'39.50"N and 62°23'2.80"E. The runway which has a two sided helipad landing zone is 270 m long. To one side is a hangar which is about 1700 sq m in area. There also appears to be an underground storage facility on the south west of the airfield. Newer construction is coming up near the seaside, spanning an area of 2 sq km within fixed, as well as expanding boundaries.

Description: AOI has a placement of Air Defence Gun on the south east section of the location, as seen in the image. A helipad is observed with scope for landing/take off of two rotor crafts.

Assessment

The administrative and auxiliary infrastructure of PNS Akram, the first naval establishment on the Makran Coast, has either been newly constructed or is being upgraded. A whole new block of construction is coming up, as seen in Figure 5. This would include possible radar sites at the eastern and the southern positions from the main administrative block Figure 5 (a). The AN/TPS 43G (Figure 5(a)) could be a an probable type of radar, which were deployed only after 2017. The southern coastal ridge appears to have a series of (three) coastal radars. Since there is no major airfield in this base, it is highly unlikely that it is a homing radar system for incoming friendlies. These early warning scanning radars are meant to be used at the time of real aggression. It is also possible that it is a variant of the 3D IBIS-150 Chinese radars that were recently procured by Pakistan.[18] Immediately before this is a series

18 Manish Shukla, After the Balakot strike, Pakistan deploys Chinese air defence missile systems along border DNA India, https://www.dnaindia.com/india/report-after-balakot-strike-pakistan-deploys-chinese-air-defence-missile-systems-along-border-2732449

of possible air defence weapons. South-west of the main administrative block, a newer construction is taking place. These appear to be offices and barrack structures. Most of these constructions began around 2005 - 2006 but the construction activity seems to have received a boost only after 2011 - 2013.

The satellite images of the region also reveal (Figure 5 (b)) a double helipad structure. The 22m by 40m heliport has a hangar capable of storing two helicopters under a shed. The hanger and the concrete structure were upgraded after 2013. It is observed that the site hosts several communication antennae systems indicating a higher frequency of communications and surveillance capabilities appropriate to its higher defence management role. The images reveal that at the northern edge of the camp, there appears construction of a hardened building, which could be the infrastructure for storing weapons. One portion of its boundary wall has been extended for a probable usage for larger items. This development has also taken place post 2013. The newer extension, that hosts several new buildings and houses, is a large area of 290m x 140m area. Development of this place took place at a rapid pace between 2017 and the current date and it is still in the process of development.

The PNS Akram jetty (Figure 5) has the capacity to park speed craft/ patrol craft belonging to the Pakistan Navy, used for providing security to larger Pakistan marine vessels traversing through the area of operation. Development of the new compounded colony at PNS Akram took place during the pre and post 2013 timeframe, and most of it was completed recently, about a year ago. The colony has tall multi storey buildings and the foundation has been laid for another set of buildings. The entrance to PNS Akram is adjacent to the blocks housing Gwadar Port facilities.

Ormara - Jinnah Naval Base & PNS Ahsan

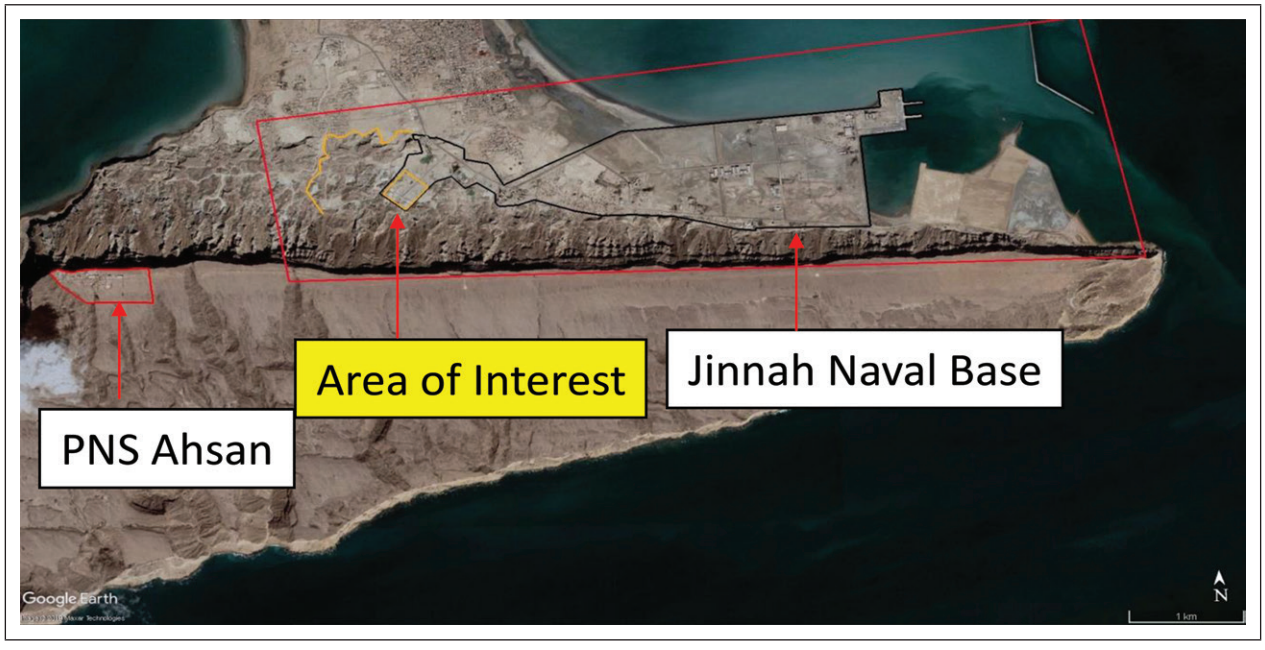
Jinnah Naval Base (JNB), Pakistan's strategically located second largest naval base, located 285 km east of the Gwadar Port, plays a strategic role in providing seaward security to Gwadar Port. As discussed earlier, Gwadar base is a commercial port, though it does have a small naval unit and task force for protection of its maritime installations from both external and internal security threats. Jinnah Naval Base, located at Ormara, Baluchistan province, was developed to provide a second line of defence and protection of sea-lanes leading to the Gwadar Port, and other principal ports in Pakistan. JNB has been upgraded in recent times to provide logistic and technical support for berthing naval vessels of different sizes, as well as submarines. JNB would be equipped to undertake overhauling of naval ships and submarines in the future.

JNB was developed in the aftermath of Pakistan's 1971 war with India, after the Indian navy's daring attack on the Karachi Port which exposed its vulnerability to external attack. Even now, Pakistan's two primary ports of Karachi and Qasim are vulnerable to enemy blockade during wartime, and terrorist attacks in peacetime. In 2011, Pakistan Naval air station - PNS Mehran – was attacked by Tehrik-i-Taliban (TTP), a terrorist organisation, and managed to destroy two P-3C Orion surveillance aircraft and inflict heavy casualties on Pakistan's military forces. The terrorist attack on the naval installation came as a huge shock for the Pakistan military. This led to major repositioning of assets and creating a new naval base at Ormara to decongest the Karachi area.

The Gwadar and Ormara Ports have been developed as an alternative to the Karachi Port. Ormara, located 350 km west of Karachi, has emerged as an alternative base for Pakistan to deal with existential threats from India. Ormara base has a three distinct advantages over Karachi port - 1) It is safer than other naval ports due to geographical location, 2) It increases Pakistan's seaward defence and protects sea-lane trade routes with Gulf States, 3) Submarines can operate freely without the fear of being hemmed in by the enemy.[19] More recently, JNB has also inducted a new guided cruise missile system, Zarb, which is a sub-sonic land based anti-ship cruise missile (ASCM) to support the seaward defence of Pakistan.[20] The Zarb Weapon System is speculated to be the export variant of the Chinese YJ-62 defence system, armed with a semi-armour-piercing (SAP) time-delayed, 300 kg high-explosive warhead that can engage with the target at a maximum range of 280 km.[21]

Development of the Gwadar Port under the CPEC project has placed JNB in a prominent position. In case of an emergency, the Pakistan Navy at the Jinnah base can respond quickly and swiftly. Pakistan is also expanding its capabilities to protect other important sea lanes from the Red Sea to Karachi.

Figure 6 (a): Combined View of Facilities at Ormara



Source: Google Earth.

Area: The base is between 25°12'0.06"N, 64°37'39.14"E and 25°11'20.70"N 64°41'41.17"E and spread around seven to eight sq km and growing. Three regions lie within the AOI that include the PNS JNB, PNS Ahsan and an unmarked hardened site in the middle. JNB is spread around 10 sq km, built on the allocated 2500 acres and is still under development.

19 J G Nadkarni, Pakistani navy gets new port, URL: https://www.rediff.com/news/2000/jul/27nad.htm, July 27, 2000.

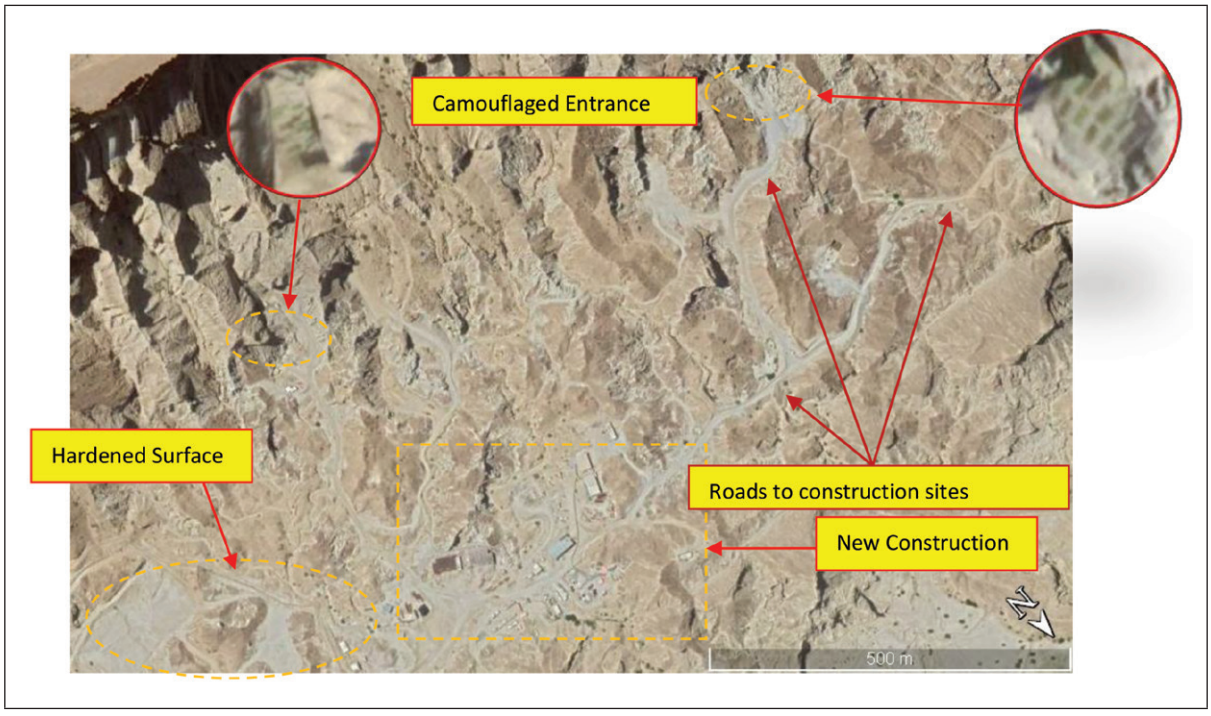
20 Pakistan navy launches Land Based Anti-ship Missiles, Navy News Magazine, https://www.paknavy.gov.pk/NAVY_NEWS/Navy%20News%20English.pdf

21 Gabriel Dominguez, Pakistan Navy releases images of Zarb coastal defence system, HIS Jane's Defence Weekly, URL: http://www.janes.com/article/79542/pakistan-navy-releases-images-of-zarb-coastal-defence-system, 24 April 2018.

Figure 6 (b): Hardened Site with Built-up Features

Source: Google Earth, DOI: 14/10/2019.

Figure 6 (c): Construction Site of Possible Underground Facility



Source: Google Earth, DOI: 14/10/2019.

Figure 6 (d): Enlarged Figure

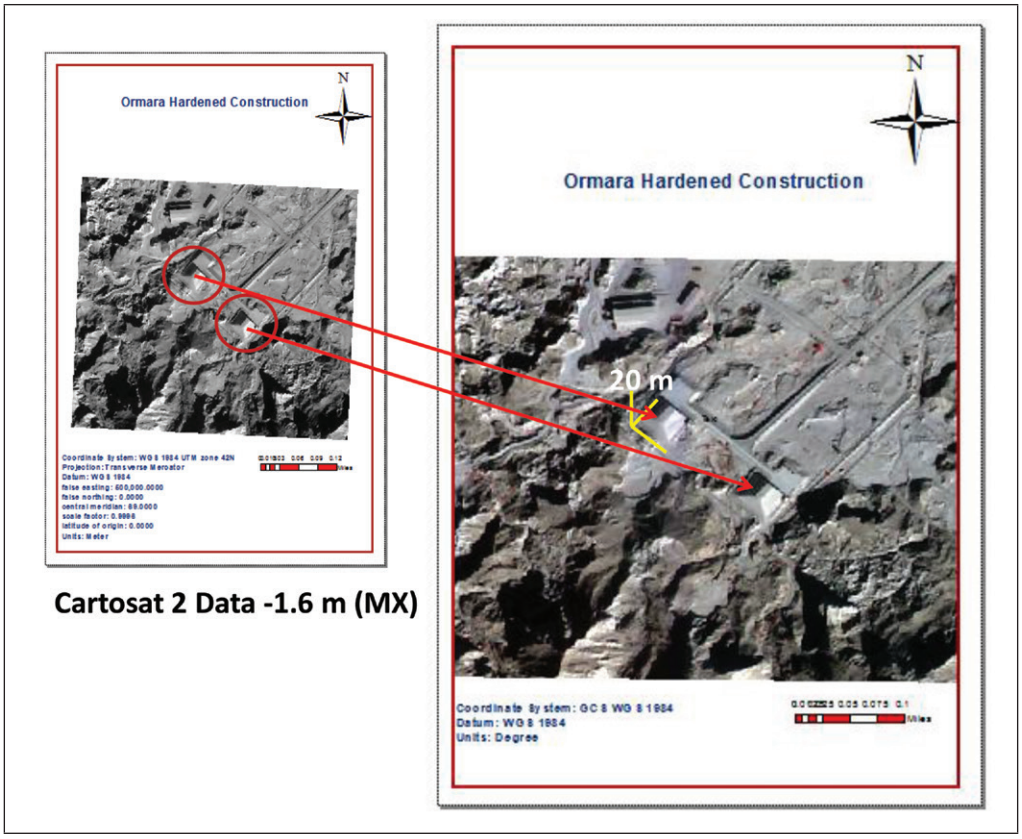
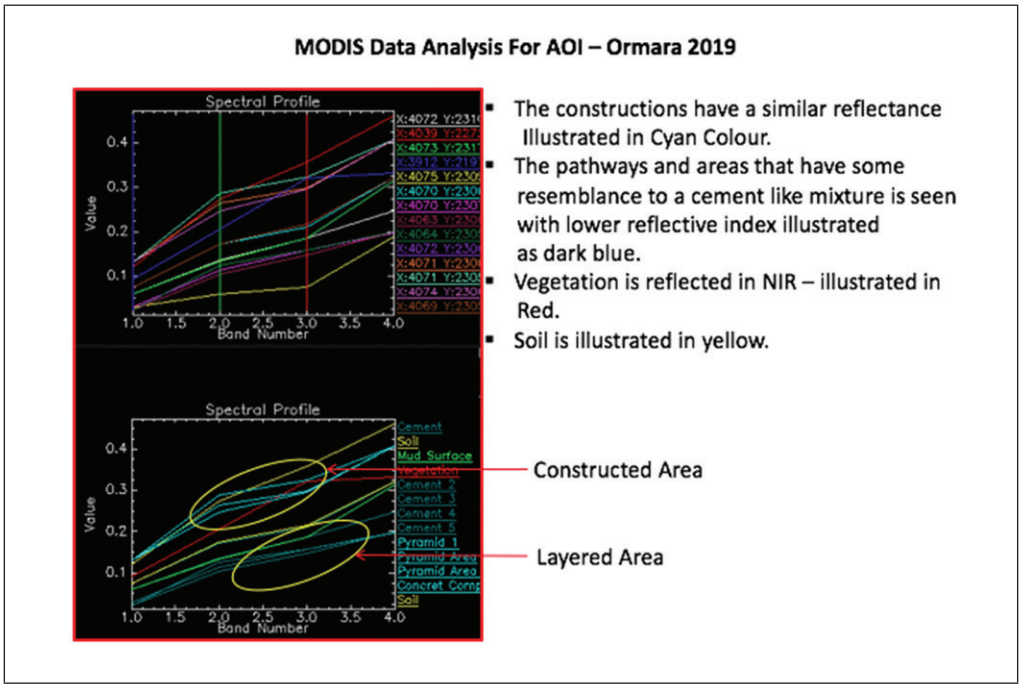


Figure 6 (e): Spectral Signature for Similarity Matching in the ROI.



Description: Ormara is situated 350 km from Karachi by road and about 240 km west of Karachi by sea. It is also about 230 km east of Gwadar, which makes it midway between Karachi and Gwadar. Thus, it is strategically located and it can reach for support on either side using the available air and naval resources at the JNB. The base is flanked by the sea in the north and the eastern end, and is covered with mountainous terrain on one side, providing a natural cover that serves to camouflage it from the southern end. The topography of this place, with a two km ridgeline at a height of 1584 m, provides it with a natural vantage point.

The JNB can berth eight warships and submarines. It has two piers, two wharves and an artificial harbour with a 3.5 km long approach channel and a basin. The central portion of the AOI has a hardened built-up area that houses several underground facilities. Two pyramid/ trapezoid like structures are visible in the ROI. The height of these structures is around 20m and they are built over an area that has been over-laid with material like concrete/ cement. The whole area has been laid out with artificial turf Figure 6(d). The pyramid shaped structures could be used for storing tall items like missiles. The structure is quite similar to the silo like structures in Nekoma, North Dakota in the USA, which were used to house powerful radars and Intercontinental Ballistic Missiles (ICBMs) in the mid 70s[22]. The layout is similar to the one in North Dakota that has a myriad of underground tunnel networks of complex functionality military in nature, from test sites to storage to launch of long range missiles, to radar installations. To check the spread and layout of the construction facilities, a spectral analysis was carried out with Moderate Resolution Imaging Spectroradiometer (MODIS) data that boards a spectroradiometer with 250m resolution. Though the resolution is low in this particular case, its accuracy is high. Several other methods like converting DN radiance values to reflectance values[23] was carried out using multiple images like GE, Landsat, Sentinel and National Remote Sensing Centre (NRSC) sourced Cartosat 2s data. The results matched, indicating the difference in local terrain geophysical signatures to the artificial surface around this facility as seen in the Spectral Analysis Chart - Figure 6(d). For the sake of labeling the nomenclature of spectral signatures, words like cement and concrete have been used. However, these are used merely for labeling purposes, since more a detailed analysis of the material is needed to classify them as cement and /or concrete, a process that is beyond the scope of the exercise at this stage. Since there is no *in-situ* verification possible, the best possible option was to use the spectroradiometer data from the MODIS satellite, which is the next best source for getting the nearest spectral values.

Fig 6 (b, c) shows the construction site of the possible underground facility. The newer features that can be seen under the recent development include a new security perimeter and the possible entrance for the construction site. There is also an entrance for JNB and a checkpoint at the entrance. The naval base has an elaborate network of a security perimeter. There is a workers' site that seems to lead to an underground base covered with a shed-like structure. Several concrete structures with entrances at the sides raised at three to five meter above the ground can be seen. The camouflaged tunnel opening is

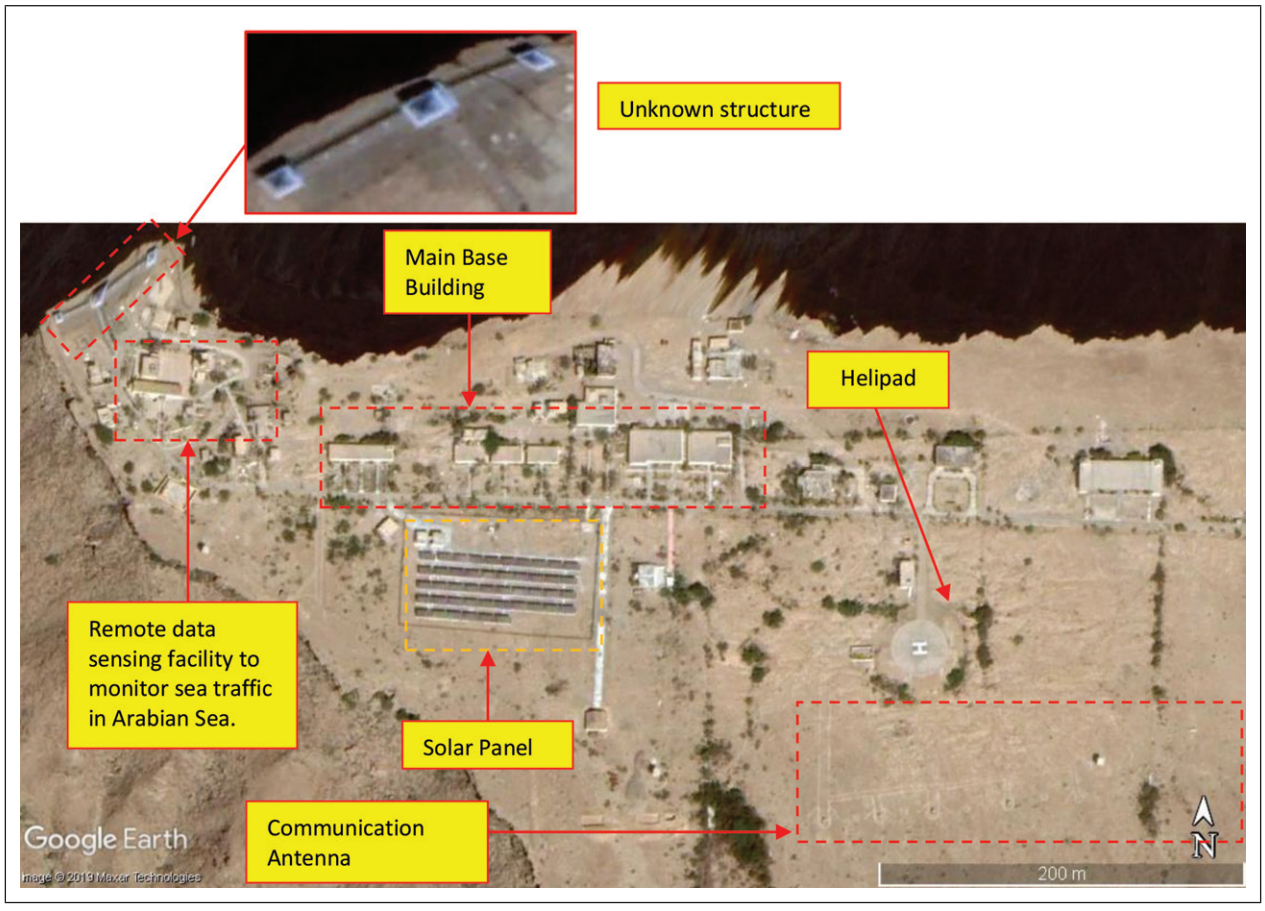
22 The Pyramid of North Dakota, https://www.atlasobscura.com/places/pyramid-north-dakota

23 Simone Kotthausab. Thomas E.L., Smithb Martin J.,Woosterbc C.S.B., Grimmondab, Derivation of an urban materials spectral library through emittance and reflectance spectroscopy, ISPRS Journal of Photogrammetry and Remote Sensing Volume 94, August 2014, Pages 194-212

visible in the open source image. The road connecting to different construction sites indicates that a high level of construction activity is taking place. This particular area located adjacent to JNB has seen major transformation in the last few years.

PNS Ahsan

Figure 6 (f): PNS Ahsan (Remote Data Station, Mianwali)



Source: Google Earth, DOI: 14/10/2019.

Area: The development of this AOI, located between 25°11'32.77"N and 64°0.62‹36»E, and 25°11'19.28"N and 64°36'24.04"E. PNS Ahsan was commissioned in 1991. It has not gone through any major infrastructural changes. The PNS AHSAN is a 520m by 250-m area zone. This includes buildings, ground stations and one helipad.

Description: PNS Ahsan is probably host to a remote data station for the monitoring of traffic connected to Mianwali. It has helipads and base administration buildings.

Naval Enclaves in Ormara

Figure 6 (g): Naval Housing and New Residential Encampments

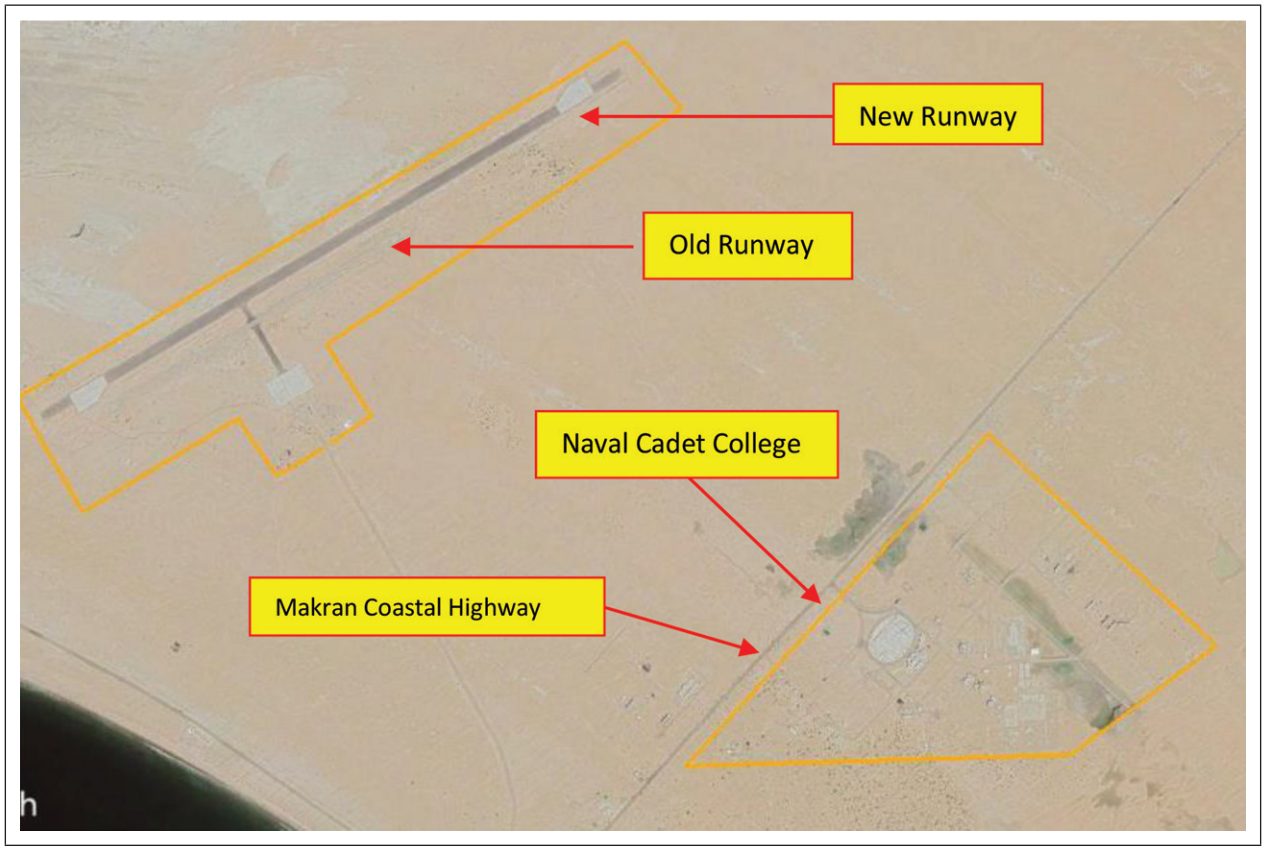
Source: Google Earth, DOI: 14/10/2019.

Area: The study area is at 25°13'39.75"N and 64°37'10.04"E of the AOI. The naval residential area is around three sq km.

Description: The newly constructed residential buildings are for sailors and officers as can be seen in the AOI. The AOI shows the boundary for encampment of residential facilities in Ormara.

Airport and Naval Cadet College in Ormara

Figure 6 (h): Runways and the Naval Cadet College



Source: Google Earth, DOI: 14/10/2019.

Area: The study AOI area is roughly 15 sq km situated at 25°16'29.63"N and 64°35'10.64"E. This includes JNB, a cadet college with a three sq km area, and the new airport area around two sq km.

Description: A new cadet college has been opened in the area. The new runway is 3000m long while the old runway is 2000m in length.

Assessment

Pakistan's expansion of maritime security interests in the west coast saw a host of upgradations and development of various naval ports and associated facilities. JNB is one of the most prominent ones among the 2006 developments.[24] The emphasis is on JNB because it may be entrusted with guarding the naval frontline immediately after Karachi. The Port base was commissioned in 1995 and completed in 1998. It is said to be undergoing major refits and developments for training and residential camps. The project is said to have included land use area of 7000 acres and an operational area of 555 acres.

24 Google Earth Imagery shows the timeline of major developments after 2006.

The housing colony is supposed to be constructed over 600 acres. The compound is supposed to have a transport pool, a supply depot, naval headquarters, a fire brigade station, workshops, a boat pool, a mosque, a sports complex, harbour master, a mess hall, an auditorium, a hospital and a library. The bungalows and apartments have an area of 35 k sq ft each.[25] The earlier parameter is being expanded, and there is clear indication of construction after the year 2012-2013. This place also houses the New Naval Housing Board. The expansion of the Naval Housing Board is also an indication of the growing role and responsibility of the base area at Ormara.

The geo-location of naval facilities at Ormara has always been in the middle, between Gwadar and Karachi. Since the Pakistani Navy is in the process of procuring eight Chinese submarines, the Ormara base is an alternate option for basing submarines between the ports of Karachi and Jiwani (keeping in mind their respective proximity to India and Iran).[26] Since Gwadar has a major civilian port infrastructure, it might be safer to have berthing facilities for ships, submarines and other naval vessels at Ormara, away from bases located near international boundaries. This will lead JNB to be accorded high priority, and once in operation, it can become a very active base. According to Pakistani media reports, a Pakistan Naval officer has been quoted as saying that with the capacity to reduce the response time from eight to six hours, JNB has the potential to match for India's emerging Blue Water Navy capabilities. JNB will also be in a position to facilitate the monitoring of the entire Makran coastline of Pakistan.[27] JNB is said to have a submarine base, although from geospatial and remote sensing methods only berthing areas have been detected and no open source visible confirmation of a Submarine Penn has been found. The hardened sites (Figure 6 (b)) are the areas where it is possible to have submarine support facility. The hardened construction suggests an underground facility at the AOI. The two pyramid like structures (Figure 6 (c)) could be used for storing missiles/ nuclear armament. The height of this structure is about 20m. This area is surrounded by support infrastructure and a main administrative complex (Figure 6 (b & c)). There is an entrance gate to the construction site and tire tracks show the frequent movement of trucks, which can be observed through the time-line view of Google Earth. Several upcoming structures also suggest that considerable construction activity is taking place in the area.

According to the observation of Imagery Analysts, the entire fleet of Pakistani Navy was found missing from the base area during the Indian response after the Pulwama attack.[28] It is observed that during military conflicts with India, the Pakistani Navy tends to re-deploy some of its naval ships to Omara. The Pakistani Navy's movement of ships from one base to another, at the onset of a possible threat from India, has been often mentioned by many strategic experts . This phenomenon was also observed during the 2011 terrorist attack on PNS Mehran in Karachi, the main battleships were shifted to Ormara base.[29] Hence, the newly upgraded base at Ormara, with its deep encampments away from

25 www.ECIL.com

26 Teshu Singh, China's Growing Naval Footprint in Pakistan, https://www.vifindia.org/print/4529

27 Mian Abrar, Jinnah Naval Base – Navy expands strategic outreach to West Coast, Persian Gulf, https://www.pakistantoday.com.pk/2016/01/13/jinnah-naval-base-navy-expands-strategic-outreach-to-west-coast-persian-gulf/

28 Col Vinayak Bhat (retd) Pakistan's entire navy has been out at sea after India bombed Balakot, https://theprint.in/defence/pakistans-entire-navy-has-been-out-at-sea-after-india-bombed-balakot/204122/

29 Fearing attack, Pak moves away warships from Karachi, The Indian Express, Aug 05, 2011.

the shoreline, is expected to provide it with a defensive capability against its potential enemy. By January 2017, Chinese built corvettes were stationed at this base, thus making it a medium naval base, second in capacity to Karachi.

The runway in the north west of the town is adjacent to the new runway (Figure 6 h). The old runway is 2000 m long, indicating that it is a military airfield equipped for a shorter take-off and landing for fighter Falcon aircrafts and others like the JF 17 in the Pakistani Airforce Inventory. The 3000m long second airfield is newly constructed to support heavier carrier and cargo transport aircrafts. The entire stretch of the land mass at the cliff side has an extended connectivity all along the stretch from the eastern extremities of JNB to the western extreme location of PNS Ahsan. The new runway will facilitate the operation of heavier aircrafts, making long range connectivity possible.

PNS Ahsan, constructed in the 1970s, is a coastal radar station for surveillance, and logistics support base to provide security for Pakistan army and navy. It is situated at a height of 1575 ft on a natural hammer head and is the highest point on the ridgeline. Previously known as Mianwali, it was commissioned in 1991. Its roles include seaward surveillance, Electronic Intelligence (ELINT) gathering, secondary HQ,[30] a communication relay station, control station for air defence for Ormara bases, refueling helicopters and resupplying bases, administrative support and providing logistic support.[31] Its enhanced role is to increase surveillance capability. Its infrastructure development started to show 2009 onwards, where newer construction on the western side can be seen, though it is not clear what this infrastructure is. Its shape suggests a long building with three pillared masts. There is indication of ground markings which suggests that some type of communication antennae has been placed there, though it is not clear in the open sourced Google images. It is estimated that the full objectives of the coastal radar stations that were supposed to be put up, have not been done till 2016.[32] The base provided logistical support and intelligence to the Pakistan Army and played an integral role in the Balochistan conflict.

Pasni - PNS Makran

Another regional port, Pasni, located in the Makran Coast is strategically important for the security of the Gwadar Port. Pakistan Maritime Security Agency (PMSA) was established in 1996 at Port Pasni to regulate fishing activity. Later, the PMSA base was assigned the additional responsibility of surveillance, patrolling, Search and Rescue (SAR) operations and conducting anti-smuggling operations with other PMSA ships at sea.[33] As the Gwadar Port became functional, the PMSA base in Pasni was given the additional responsibility to provide seaward security cover to the Gwadar Port.[34] There is also PNS Makran, one of the three active naval air stations in Pakistan located at Pasni, which is used for both rotary and fixed wing aircrafts. The air station located adjacent to the Gwadar Port

30 www.paknavy.gov.ok/ahsan.htm

31 Listing available at global security.org

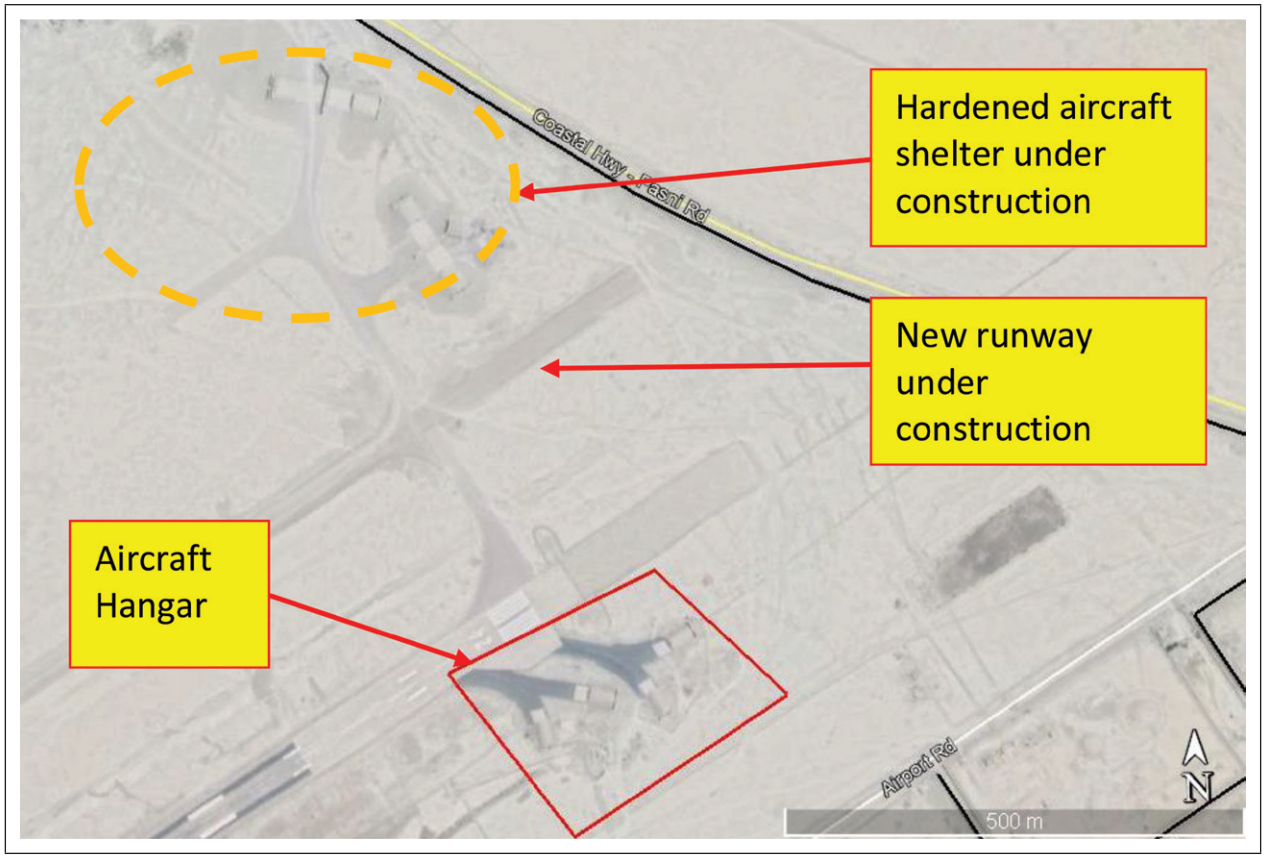
32 Anit Mukherjee and C. Raja Mohan (2016) India's Naval Strategy and Asian Security, Routldge: Oxon.

33 See, Pakistan Maritime Security Agency, URL: http://www.pmsa.gov.pk/rishad.php.

34 Ibid

will act as a secondary airbase, says Commander Shahid Ahmed, the commanding officer of PNS Akram.[35] However, the newly commissioned PNS Siddiq at Turbat Balochistan is assigned to protect the Gwadar Port and CPEC routes.

Figure 7: PNS Makran



Source: Google Eart, DOI: 25/8/2018.

Area: The study area of Makran at this AOI, located at coordinates 25°17'25.48"N and 63°20'35.91"E consists of about 6.5 sq km of constructed area.

Description: PNS Makran is a forward operating base of the naval air arm in Pasni. The base consists of fuel dumps in both over and under-ground facilities. It has a new runway being constructed along with the existing runway of 3000 m. It also appears to have a weapons storage facility. The expansion of the base is under way with the perimeter being extended at the southern location. Its spread is over 968 acres in addition to 15 acres provided later. This encampment also houses aircraft hangers near the ends of the runways.

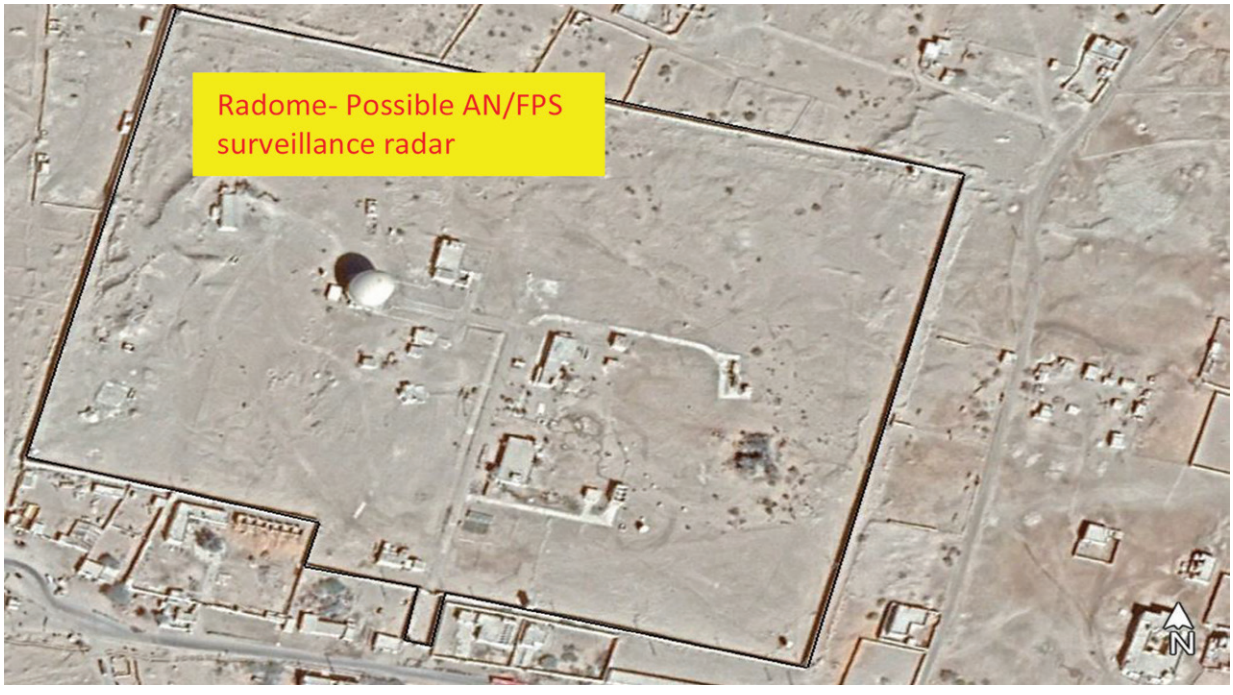
35 Naval network providing security to Gwadar port, Dawn, 15 March 2017.

Assessment

PNS Makran was built in 1988. It has a 3000 m runway capable of airlifting large aircraft like Illyushin II-78 and C-130 Hercules. The naval air base can provide support for multiple tasks like airlifting troops, flying transport and fighter jets. A lot of developmental activities have taken place in the recent past. Several new hangers have been constructed (Figure 7). The addition of hanger facilities at three different locations for multiple aircrafts shows its military-readiness for both offensive and defensive roles. Positioned between Gwadar and Ormara, it has the capacity to interdict and divert enemy forces or any other naval or air assets during a sea-bound attack. The aircrafts that operate from PNS Makran are Fokker 27, Aerospatiale Alouette III & II helicopters, Harbin Z-9, Westland Sea King, Mi 4, patrol aircrafts and trainers. There is an underground section where the weapons may be stored for safety. The hangers are 100m by 25m approximately. They can store four to six fixed winged aircrafts in the Pakistani inventory or about eight rotor- crafts of average dimensions.

The new runway under construction appears to be an even larger one (previous was 3000m), and hence it will be able to facilitate operations of different types of aircraft. When both air strips become operational, the loading capacity for sorties will become double. The oil storage at this location has measured dimensions of 5m, 10m and 35m, indicating a large capacity.[36] This makes PNS Makran a heavy ordinance capable base, which increases its strategic importance primarily for the security of the CPEC trade route. An underground arms storage facility, which has a hardened structure of 5 m height approximately, is visible.

Figure 7 (a): Radome



Source: Google Earth, DOI: 25/8/2019.

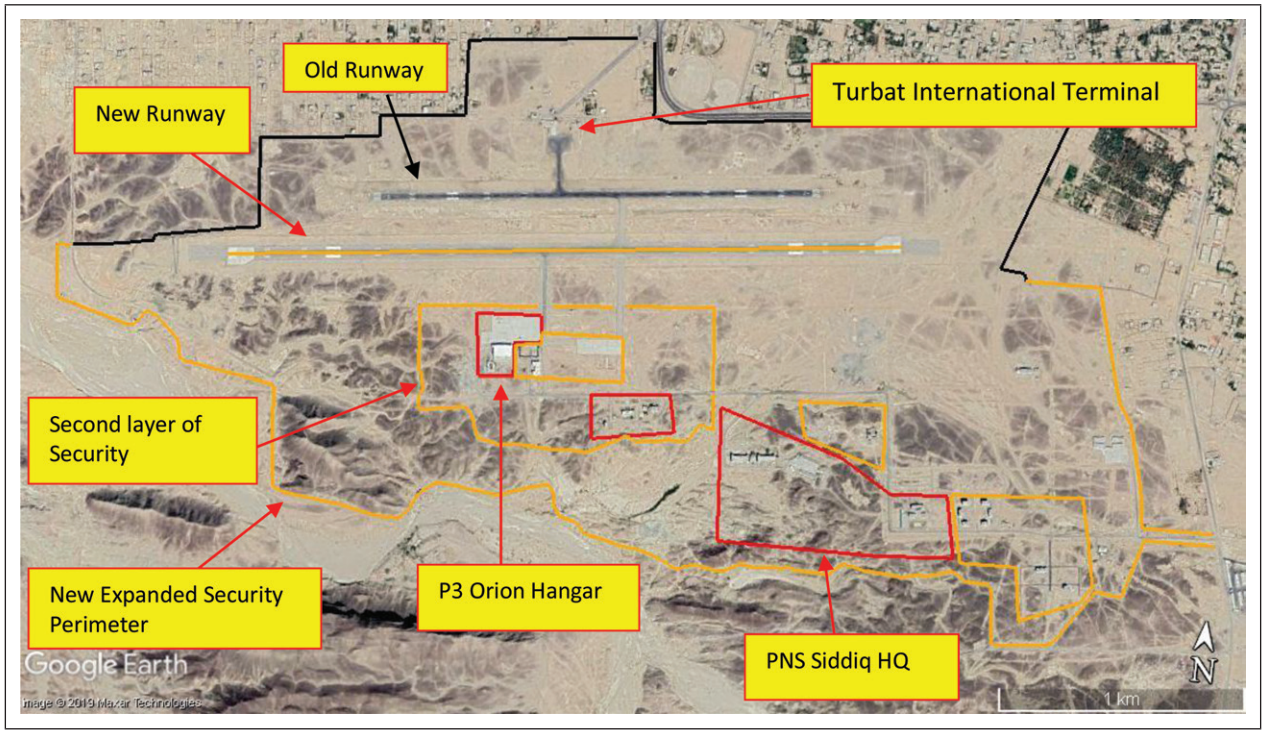
36 Estimates of fuel storage capacity derived using Google Earth Imagery and using units – diameter and length of aboveground tanks. Rand.org/RR1265

At the south east corner of the AOI, one can observe four dome shaped features with a base diameter of 25 m and a dome diameter of 5 m (Figure 7). These have entrances in the western section. These features resemble oil storage tanks. The timeline feature in GE shows the shallow depth of the construction, indicating a storage facility for ordnance or oil. Along with this, Pasni holds a radar station and its maritime security agency is over a 200 sq km area approximately. The radar station adds to the surveillance capability of the PNS Makran facility in this region.

Turbat: PNS Siddiq

The new naval airbase of Pakistan Navy, PNS Siddiq, is located at Turbat, the second largest city in southern Balochistan province. The international airport proves to be a great advantage for PNS Siddiq. During the opening ceremony, the Minister for Defence, Khawaja Asif, pointed out that the "Naval facility will boost Pakistan Navy›s capability for the defence of the country, enhance the naval power over the Arabian Sea and especially its strategic reach westwards."[37] He also mentioned that the naval base has a dual role to play: 1) to provide a vital link for naval operations, 2) provide the required support to the CPEC Project. Unlike PNS Mehran and PNS Makran, the naval air base PNS Siddiq is located deep inside Balochistan and provides a proper cover for Pakistan naval-air operations over the Arabian Sea.

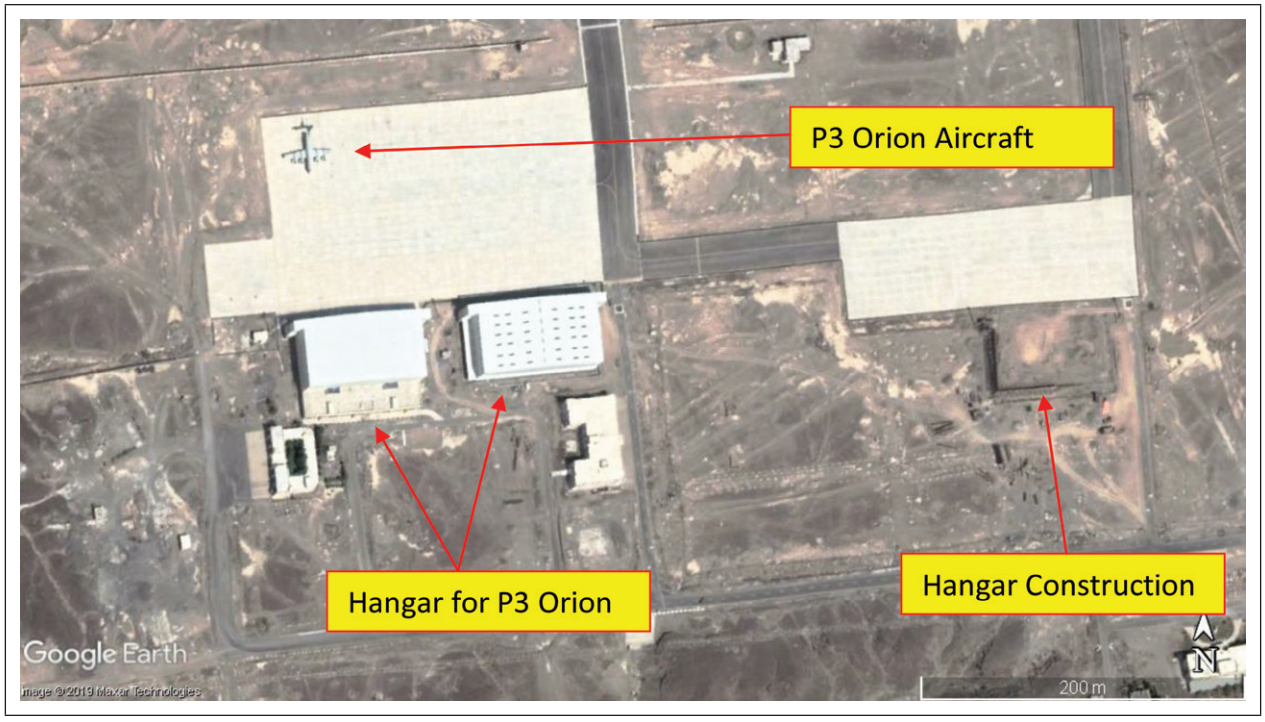
Figure 8 (a): PNS Siddiq



Source: Google Earth, DOI: 02/8/2019.

37 Naval Air Station in Turbat becomes operational, will provide support to CPEC, https://www.dawn.com/news/1335356

Figure 8 (b): Airfield at PNS Siddiq



Source: Google Earth, DOI: 02/8/2019.

Area: The AOI Turbat is a city at latitude-longitude coordinates of 26° 0'14.76"N and 63° 3'39.03"E and is spread across 30 sq km. The AOI has a large section with new construction of about seven km. The inner construction also includes a perimeter compound of around four km, within which, newer infrastructure has been raised.

Description: The AOI has a new runway which is 3000 m long as compared to the old one which was 1800 m long, new hangars under construction and a parking zone for aircrafts like P3C Orion.

Assessment

Turbat is a vital connection point for transportation, as well as being a base for naval operations. It is also strategically placed to provide the required support to the CPEC Project The original airport runway length of 1,829 m was sufficient for most aircrafts like Fokker F-27, Hawker 850 and ATR 72-212A, but the new runway with a length of 3000 m can lift P-3C Orion and other fixed wing aircraft, as well as the various helicopters operated by the Pakistan Navy. Since PNS Siddiq is centrally placed at about 120 km from the strategic deep water ports of Gwadar and 187 km from Ormara,[38] it will play an effective role in defending the Makran coast from external threats. The P3C Orion can carry out reconnaissance activities to a range of 4400 km. This adds a certain amount of strategic depth to the Pakistani military. The interior location of PNS Siddiq also provides 'depth in defence' for a defensive role. Turbat also houses an international terminal which will play a key role for supplies from foreign neighbours in case of hostilities breaking out and the PNS Siddiq comes into action.

38 Calculated using Google Earth measurement (approximations).

Jiwani Peninsula

Jiwani, a large peninsula jutting out into the sea, is located between Gwadar and Chabahar along the Gulf of Oman. The expansion of the Gwadar Port has brought the Jiwani peninsular region under the fold of the CPEC project. The Jiwani Peninsula is located in the Balochistan province 40 km west of the Gwadar Port and 35 km east of the Iranian border. The peninsula, located in the mouth of the Strait of Hormuz, is geo-strategically an important choke point, with a high flow of energy goods like liquified natural gas and oil. The small peninsula jutting out into the sea has a small fishing port and an airstrip which was earlier used by the Allied powers during World War II as a forward base in the Gulf region.

China needed to set up a second foreign naval base in Jiwani Peninsula near Gwadar for its warships and merchant vessels, even though it had entered into a strategic partnership with Djibouti in Africa to establish a military base there and use the existing naval facility at Djibouti. The base was established to facilitate the Chinese People's Liberation Navy (PLA-Navy) curb anti-piracy activities around the Gulf of Aden (GOA) and assist the Chinese Peacekeeping Force in Africa. During the 2004 Tsunami in the Indian Ocean, China faced international criticism for not despatching PLA for relief activity. Countries, including Japan, which deployed its naval vessels for relief missions raised doubts about PLA's lack of capacity and the experience of its navy and air force to carry out relief activities in an area outside the country.[39] Therefore, in case of any humanitarian assistance/disaster relief (HA/DR) mission in the region, the Djibouti base was equipped to respond quickly to crisis in the region.

China envisioned a greater role for the Djibouti base to fulfil its international obligation by maintaining the safety of international maritime routes, thereby maintaining regional and world stability. The naval facility was to be a useful asset for China in terms of both "geopolitical importance and economic stakeholdership" in the Indian Ocean. It is also important to note that the Chinese naval base located next to the Oback terminal would ensure that Chinese military forces could be rapidly mobilised to protect China's commercial investments and efficiently deliver military assistance, observes Abhijit Singh Senior Fellow and Head of Maritime Policy Initiative at ORF, New Delhi. Nevertheless, distance constrains Djibouti base's response time to any crisis in the Gwadar port area which is located approximately 1,500 nautical miles away. Hence, the focus on building a naval base in Pakistan seemed to be a logical conclusion for China, and Jiwani Peninsula, with its distinct features, offered China the crucial advantage of projecting its naval power in the Arabian Sea.

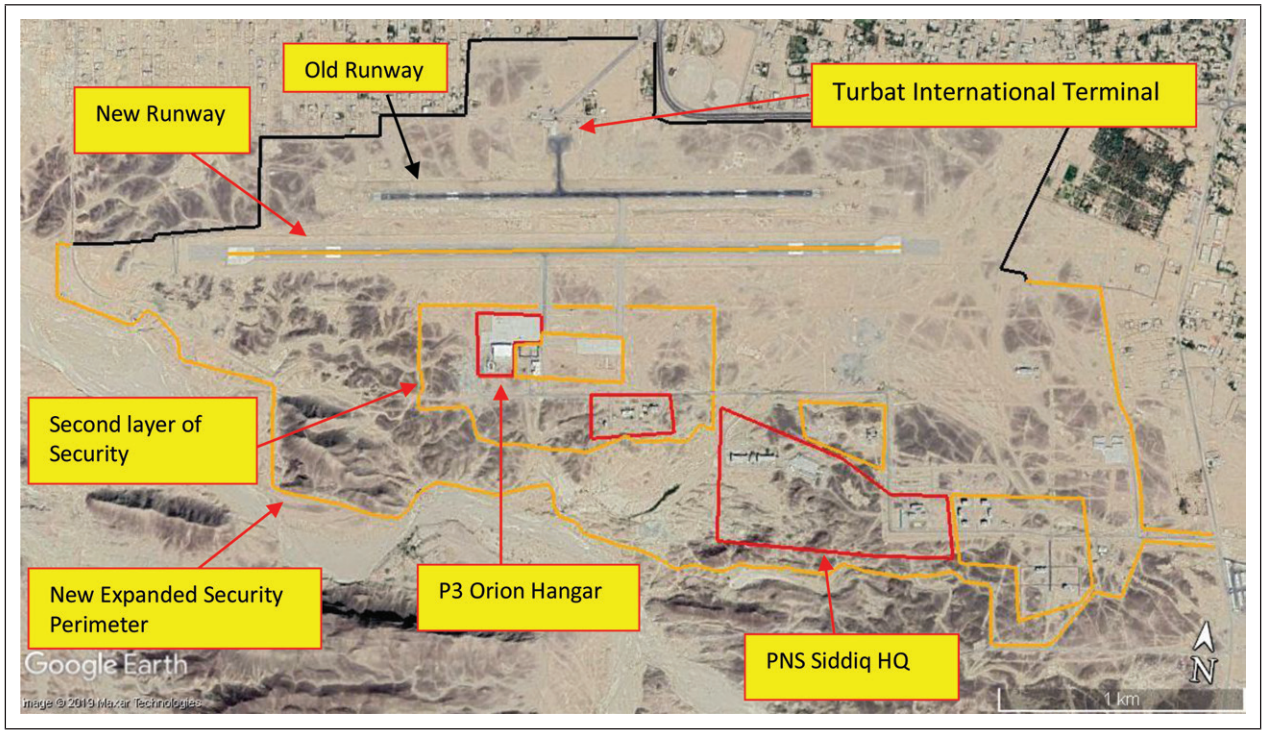
The Pentagon report titled "Military and Security Development involving the People's Republic of China 2017" voiced serious concern about the strategic intent of China in finding an alternative base in the Indian Ocean. The report pointed out that Pakistan would become another place for a Chinese military base in the Indian Ocean.

39 Indian Ocean Tsunami and International Cooperation, http://www.nids.mod.go.jp/english/publication/east-asian/pdf/2006/east-asian_e2006_02.pdf

> "China most likely will seek to establish additional military bases in countries with which it has a longstanding friendly relationship and similar strategic interests, such as Pakistan, and in which there is a precedent for hosting foreign militaries."
>
> - Military and Security Developments involving the People's Republic of China, 2017

The Pentagon report was followed by an article published in a Washington based website, *The Daily Caller,* in which US Army Retired Col Lawrence Sellin confirms that a high-level meeting was held between Chinese and Pakistan officials to "build a naval base and an expansion of the already-existing airport on the Jiwani Peninsula."[40] A news report that appeared in The Namibian in 2014 also confirmed that China was planning to build 18 "Chinese Overseas Strategic Support Bases" in the Indo-Pacific.[41] It outlined the establishment of a "fully functional centre" in Pakistan (Gwadar) for large replenishment warships, submarines and weapons maintenance etc. As the Gwadar Port emerged as an important gateway for the CPEC Project, the prospect of Chinese warships being positioned permanently in Pakistan waters seems real. China harbours great geopolitical interest in the Indian Ocean Region (IOR) and in its quest for developing new naval ports shows its intention of establishing Chinese supremacy in the region.

Figure 9: Jiwani Naval Station



Source: Google Earth, DOI: 14/2/2019.

40 http://dailycaller.com/2018/01/01/dont-be-alarmed-but-china-could-be-building-a-military-base-in-pakistan/

41 https://www.namibian.com.na/index.php?id=130693&page=archive-read

Area: The structure in Jiwani at 25°3'4.99"N and 61°46'14.16"E suggests it belongs to the Pakistan Navy. The Jiwani Naval Base houses a small military encampment with about less than one sq km of infrastructural development. This includes a military administration area, a helipad, perimeter fencing, and an early warning system.

Description: The early warning system, which is a phased circular array antennae, was found adjacent to the Pakistan Naval Base in Jiwani. A similar kind of structure has also been found in the Pakistan Army and Navy military compound. In this AOI, the Pakistani Navy has put up the circular array antennae which is to be seen in the vicinity of a communications facility.

Assessment

Jiwani Peninsula's proximity to the Persian Gulf makes the region strategically important for Pakistan and China. It is at the extreme western side of the Makran coastline. The base is host to a few communication systems. Most of these systems appear to have been in existence since early 2000. The communication array antennae are adjacent to two towers that appear to be in a mesh arrangement, indicating a communications tower. A solar array and some new buildings have also been constructed in the last decade showing an increase in the naval facility. The solar array may have been added to provide continuous power supply for critical systems that are responsible for surveillance and communication with the naval HQ at Karachi. The airport at Jiwani is not operational, but the presence of Pakistan's Frontier Force camp at the airport premises shows that the airport is of significance for the Pakistan military during times of conflict. The whole region is amassed with isolated pockets of military constructions. The importance attached to the naval station given its proximity to the Persian Gulf and its role as a front line station for combat duties lacks presence of such facilities. It appears to be more of a surveillance and monitoring facility still undergoing developments and upgrades. There are several unknown storage facilities that have sprung up in the last half of the decade. It indicates that though development is slow in this station, it is taking place gradually. Being an isolated small town of fishing folk, the infrastructure may be short of what is usual in larger towns and cities.

Conclusion

From the open source image analysis, it is verifiable that the CPEC Project is driving the development activity in the Makran Coast. The commercial establishment in the Gwadar Port and Town area is rapidly growing since the beginning of the CPEC Project. Adjacent to that, the naval facility in Gwadar, Pasni, Ormara, Jiwani and Turbat have also assumed importance because of the CPEC Project and witnessed tremendous growth post-2013. The growth in the naval ports and infrastructure facilities shows that Pakistan Navy is broadening their scope in the region. The port development also coincides with Pakistan's naval strategy to develop a deep port in the Makran Coast to counter the Indian Navy's blockade of the Sindhu coast. Pakistan, aiming to build a sea-based deterrence capability against India's "Nuclear Triad", might use the facility in Ormara for submarine basing facility and a "secondary" naval base next to Karachi to protect Pakistan's seaward defence against a possible Indian Navy attack. Ormara is approximately 400 nautical miles from the Indian Coast and its unique advantage in the

Arabian Sea, where marine traffic originating from the Persian Gulf can easily camouflage the acoustic signature of submarines. The Chinese, also seeking to establish a naval base in Jiwani Peninsula might exploit the sea condition in the Arabian Sea to carry out their submarine activity in the region.

India views these latest developments in the Makran Port as a major security challenge to India's interest in the Arabian Sea and the Persian Gulf. India has officially expressed its concern to the Chinese authority about the illegitimacy of the CPEC projects which run through the Indian territory, illegally occupied by Pakistan. The projects passing through the Indian territory of Kashmir is a direct violation of international norms. Moreover, the upcoming Gwadar Port and naval port development close to the international sea-lane is a major threat to India's maritime security.

The amount of development taking place along the Makran Coast is likely to change the future of Pakistan's outlook towards the region. On the other hand, Pakistan Navy's "westward development," to strengthen the naval base along the Makran coast like Gwadar (PNS Akram), Ormara (Jinnah Naval Base), Pasni (Pakistan Maritime Security Agency (PMSA) and PNS Makran) and Jiwani area is a significant upgradation of Pakistan's naval strategy. These major ports have also had the responsibility of protecting the CPEC routes. Geospatial Analysis of the region along with image interpretation has revealed that there is consistent growth visible in the region, both pre and post the 2013 period. Though the growth is not measured in terms of quantitative figures, relative analysis is visible through visual interpretation and classification techniques. Assessment of growth in urban areas and naval areas both maritime and inland were mapped and studied for growth and change through change detection methods. Visible growth in urban and military encampments suggests a rapid rate of development post 2013 in several bases like Ormara and Gwadar, while the growth is moderate in places like Pasni and Ahsan. The road and other projects, that are also part of the CPEC initiative, are of significant military importance in the Makran Coast. Given that newer urban townships are planned in areas such as Gwadar, there is direct connection between China's investment in the CPEC Project and the growth in Pakistan's Makran coastal region.

Document Control Sheet

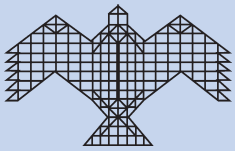
1.	**Document No.**	:	NIAS/CSS/ISSSP/U/RR/14/2020
2.	**Title**	:	China-Pakistan Economic Cooperation (CPEC) Project: Satellite Imagery Analysis of Port Development at Makran Coast
3.	**Type of Document**	:	Research Report
4.	**No. of Pages and Figures**	:	vi + 34 pages, 2 Tables and 22 Figures
5.	**No. of References**	:	41 References
6.	**Authors**	:	Dr Prakash Panneerselvam & Dr Amit Mukherjee
7.	**Originating school**	:	School of Conflict and Security Studies
8.	**Programme**	:	International Strategic and Security Studies Programme (ISSSP)
9.	**Collaboration**	:	N/A
10.	**Sponsoring Agency**	:	N/A

11. **Abstract:**

The study looks at the port development in the Makran coastal region, and how the CPEC is transforming naval port development along the Makran Coast. The study uses open source satellite images to analyse the development of Gwadar Port and PNS Akram (Gwadar), Jinnah Naval Base (JNB) and PNS Ahsan (Ormara), PNS Makran (Pasni), PNS Siddiq (Turbat) and the naval station, Jiwani Peninsula. The objectives include carrying out various interpretation methods to verify the claimed rapid development of the Makran Coast.

12. **Keywords:**
CPEC, Makran Coast, Gwadar Port, Jinnah Naval Base, Chinese naval base

13.	**Security Classification**	:	Public
14.	**ISBN**	:	978-93-83566-40-2



National Institute of Advanced Studies

The National Institute of Advanced Studies (NIAS) was conceived and established in 1988 by the vision and initiative of the late Mr. J.R.D. Tata primarily to nurture a broad base of scholars, managers and leaders to address complex and important challenges faced by society through interdisciplinary approaches. The Institute also engages in advanced multidisciplinary research in the areas of humanities, social sciences, natural sciences and engineering, as well as conflict and security studies.