

Innovation prospers Sustainability



For IAPH Sustainability Port Project Award
March 2021



China Merchants Group

China Merchants Port Group

i) SmartPort

Sustainability Port Projects

ii) Co-ordinated Port





01

China Merchants Group

- •Founded in 1872
- •Centennial State Owned Entreprise A conglomerate operating and stationing in Hong Kong
- •First State Owned Entreprise owns two Forbes 500 corporates

China Merchants Group (CMG)

- Foundedin1872
- Developed first cross oceans sea route
 Developed first bank in China
 Developed first insurance company in China
 Founded first batch of national corporates



China Merchants Group Centennial State Owned Entreprise(SOE) – A conglomerate operating and stationing in Hong Kong CMG was founded on 26 Dec 1872 and commenced operation on 17 Jan 1873 in Shanghai. A pioneer of national industry and commerce and "A microcosm of the development of a national corporate within a century" and one of the four main SOEs stationing in Hong Kong

Key Stages in Port and Shipping Business Development





2

3



5

Constructed piers once established

piers in Shanghai

Owned 5

Acquired
Shanghai Steam
Navigation
Company

Established piers in Vietnam

Established and managed first customs clearance house in China

Yr 1872

Yr 1874

Yr 1877

Yr 1878

Yr 1887













Pier No.1 of CMG in Hong Kong and Macau

CMG Building at No.9, the Bund, Shanghai

First Commercial Vessel – Aden

China's inland river, coastal routes, and South Asia, East Asia, Pacific and Atlantic routes

Core industries under CMG



China Merchants Group is a comprehensive large-scale state-owned enterprise group whose business mainly focuses on the three core industries of transportation, finance, urban and comprehensive development and operation of parks



Transportation

"Connecting the world and connecting China" is the goal for China's transportation system. It also reflects the current status of CMG's transportation and infrastructure and engineering businesses which include ports, highways, energy transportation and logistics, ship repair and marine engineering.



Finance

CMG's financial business covers four major areas: banking, securities, insurance, funds and asset management. It established CMG's brand in the financial industry and formed a diverse financial industry with its own characteristics, comprehensive categories and spectrum of group financial system.



City and Park

CMG provides comprehensive solutions for city development and industrial upgrading, covering education, culture, office building, park, cultural creative industries, featured industrial cities, long-term rental apartments, residences, hotels, complexes, commerce, cruises, health, and elderly care, etc. In the business sector, the development and operation of cities and parks covers more than 60 cities and regions around the world.





02

Overview of CMPort

- Strategic vision
- Business Scale
- •Global layout

Strategic Vision



Our Vision:

To be a world's leading comprehensive port service provider!

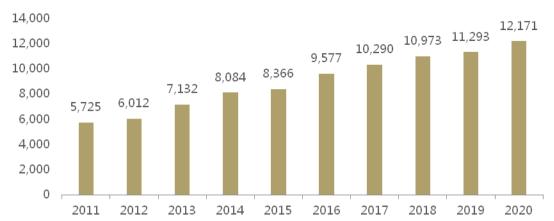


Business Scale



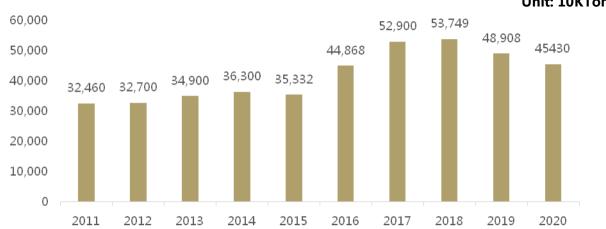
CMPort 2011-2020 Container Cargoes Throughput

unit: 10KTEU



CMPort2011-2020 Bulk Cargoes Throughput

Unit: 10KTon



			CHINA WERCHANTS POR
\sim	Rank	Port	2020 (10KTEU)
	1	Shanghai	4,350
	2	Singapoe	3,660
	3	Ningbo-Zhousan	2,872
	4	Shenzhen	2,655
	5	Guangzhou	2,317
	6	Qingdao	2,201
	7	Busan	2,196 (2019)
	8	Tianjin	1,835
	9	Hong Kong	1,796
	10	Dubai	1,495 (2019)



	Yr2019	Yr2020
Container throughput	112,930KTEU	121,710KTEU
Bulk Throughput	4.9b Ton	4.5b Ton
Revenue	121.24 b	126.19b
Total profit	108.07 b	68.01b

Source: Annual Report

Global Port Network









03

Sustainability Port Project

i) SmartPort

Innovation prospers Sustainability



Underlying factors:

- •The port is a convergence of international trade and logistics
- •Most of the world's economically prospered regions are originated from port, more than 50% of the global economy is concentrated in coastal belt with a width of 100km
- •A basic, hub-type, cargoes moving facility is no longer able to sustain growth of economic activities and socio development of the region

China Merchants Group (CMG) and China Merchants Port (CMPort) adopted the "Port – Park - City" model turning its home base in Shekou, Western Shenzhen from a fishing village to a modernized city 40 years ago where Shekou Container Terminal, Chiwan Container Terminal and other port and logistics activities stemmed to achieve over 10million TEUs throughput in Year 2020 when pandemic was prevailed worldwide.

With proven business success, two strategic port projects, namely "Mawan SmartPort "and "Coordinated Port Project" are going to further accelerate development of "Trade – Finance Eco System" growth in Western Shenzhen as well as The Guangdong – Hong Kong - Macao Greater Bay Area region.

More than Operational Efficiency



We can:-

- Optimal use of existing port capacity
- •Enable just in time arrival of ships
- •Handle increasing ship size
- Process and documentation flows
- Enhance intra-port and hinterland mobility
- Achieve digital optimization of infrastructure
- •Use digital applications more innovatively and cost efficiently
- •Handle major infrastructural and service challenges in ports

We will be happy to see:-

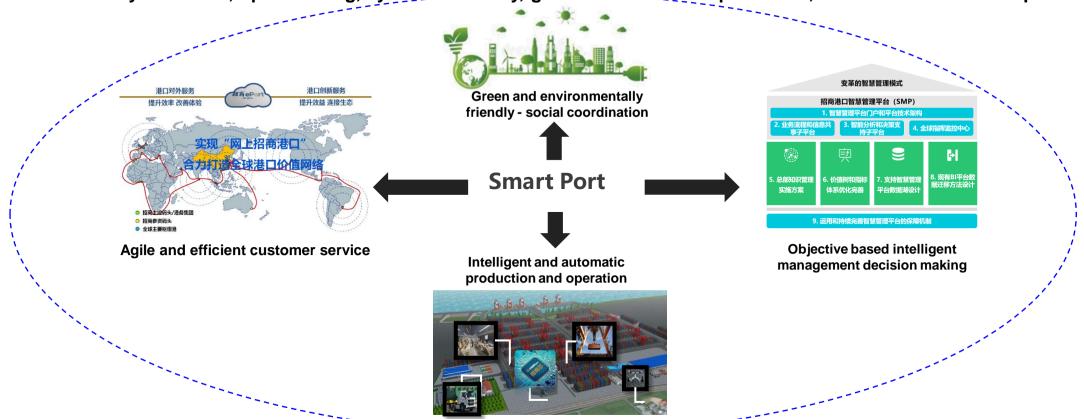
- •80% reduction in yard operation personnel
- •30% improvement in comprehensive operation efficiency
- •30% higher efficiency in customs clearance
- •50% less construction cost on automatic terminal building
- •50% reduction in safety hazards
- •90% reduction in carbon emissions
- Exceeding 10 billion yuan social and economic benefits
- * Above figures is estimation upon design of the business model and related infrastructure

Construction of SmartPort to empower industry transformation and upgrading



Our definition of a smart port:

- •Deployment of 5G communication, Internet of Things, Big data, Artificial Intelligence and other new generation of information technology and port services as the core gears
- •Realize self-perception and extensive interconnection of port elements, intelligent and automatic production and operation, objective based intelligent management and decision-making capability, and agile and efficient customer service
- •In-depth integration of various resources, technologies, services, and management to achieve a modern port model featuring multi-boundary attributes, open sharing, system_efficiency, green-environmental protection, and sustainable development



Smart ports drive the construction of smart cities



The port is a key node of international trade and logistics, a fondamental hub-type facility, and an important support for economic development

Most of the world's economically developed regions are integrated with ports, and more than 50% of the global economy is concentrated in coastal areas with a width of 100km from the coastline.

China Merchants has created the "Port – Park - City" model (Shekou model) in Shenzhen, and the area around the port has become a cluster for urban, industry and economic activities.



Sea and land transportation hub, the natural interface between the inland and the sea



Radiate economic hinterland

The core of international logistics transshipment hub drives peripheral logistics services and radiates the hinterland economy



World trade transit

As a key node of international logistics, the port supports international trade through the collection and distribution of goods



Global resource allocation

The development of the shore area as a resource allocation hub is of great significance to the integration of production factors and the development of industrial clusters

Smart application: port machinery equipment automation/remote control



Through the 5G/wired hybrid networking mode, China Merchants Core's CTOS seamlessly connects with the equipment automatic control platform to realize the remote control of the quay crane and the automated rail mounted gantry crane; quay crane remote control realizes a one-to-

one remote operation mode; automated rail mounted gantry crane, one operator can control 6 devices.





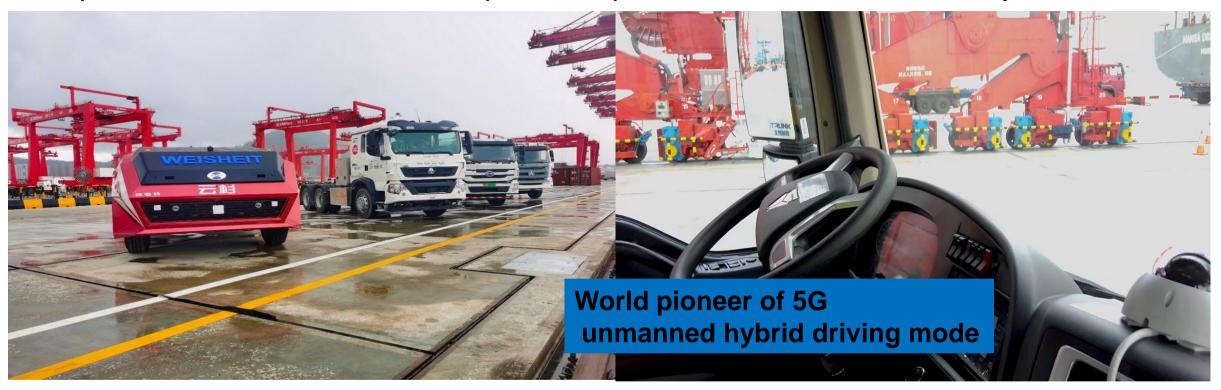
Smart application: Unmanned driving of trucks in the port



L4 level smart port automated unmanned trailer, in a limited environment (in the closed area of the terminal), the unmanned system completes all driving operations;

Self-developed unmanned vehicle fleet scheduling management system can realize real-time status monitoring, optimal route planning scheduling, and support mixed operation of unmanned and manned trailers working together;

At present, 15 x 5G driverless trailers have been put into field operation test, and it will reach 30 units in May 2021.



Smart application: Unmanned inspection in the air/ground



Upon availability of 5G private network, a new way of using defined drone/robot inspection can inspect equipment and specific areas, return high-definition video, improve equipment utilization, and empower the overall safety of terminal

yard operation inspection/quay side ship operation inspection/equipment, specific area inspection

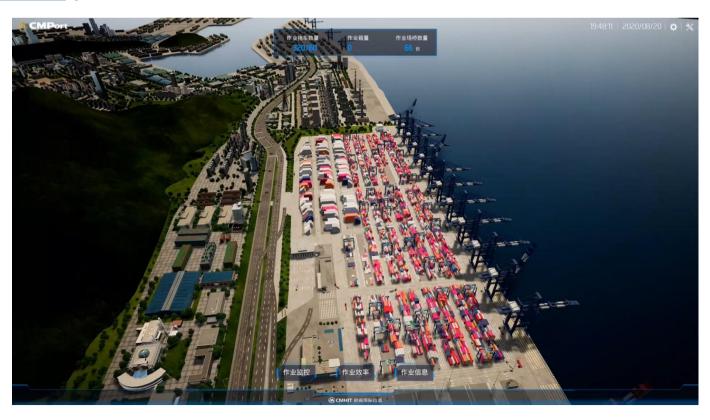


The world's first 5G network- defined drone module

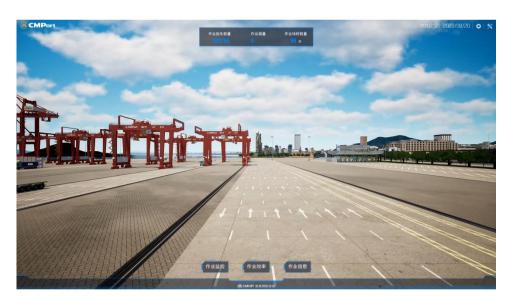


Smart application: Analog simulation supported by digital twin technology





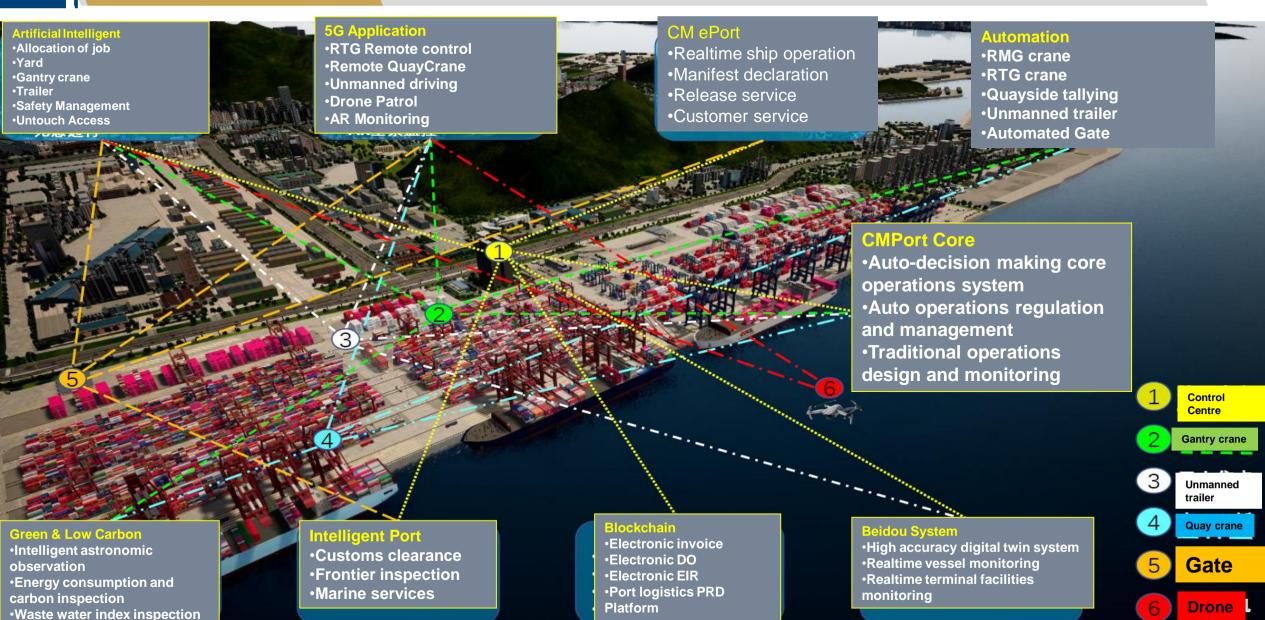
Based on the 5G private network, it supports the access of massive Internet of Things/monitoring equipment in the port. For the first time in the port industry, digital twins, Beidou positioning and other technologies are used to create an analog simulation system for port production management, and production elements and operations in ports such as existing equipment, vehicles, and goods in their "past tense, present tense, and future tense" of the process can achieve the rehearsal, practical operation and resumption of port production, and realize the production optimization of Mawan Smart Port.





Application of 9 Intelligent elements in MaWan SmartPort simulation





- To ensure a solid business cases, behind the fully-automated operation is the joint task of a self-developed operating system CMCore and powered by a group of cutting-edge intelligent technology, including 5G, high-precision BeiDou Navigation Satellite System, artificial intelligence and blockchain
- China Merchants Port's "5G Smart Port" project is a benchmark setting project jointly constructed by China Merchants
 Port and ten industry-leading partners including China Mobile and Huawei based on the 5G Smart Port Innovation
 Laboratory
- Relying on China Merchants Port's independent research and development, world-class smart port core system-China Merchants Core CTOS, closely surrounding on the major smart elements of 5G, Beidou positioning, artificial intelligence, and blockchain, to create "safe, stable, efficient and intelligent" port environment
- In-depth use of 5G technology. Comprehensive use of 5G network slicing, MEC edge computing, UPF sinking and other
 technologies to build a 5G exclusive network to support the construction of a smart port in Mawan Port. At the same time,
 in a high-quality network environment, a series of 5G applications such as 5G remote control, 5G smart tally, and 5G
 unmanned driving have been realized
- Possess leading drones and high-precision positioning capabilities. The drone's airborne communication module (Hubble One) and the 5G+Beidou-based high-precision positioning solution platform used by the project's drones are industry-leading and have strong product competitiveness
- Have a clear business model. The project has formed a variety of business models including 5G network construction cooperation charges, 5G private network (slicing, MEC, UPF sinking, etc.) cooperation charges, comprehensive equipment and service cooperation charges, which can be replicated and promoted on a large scale





03

Sustainability Port Project

ii) Co-ordinated Port

Co-ordinated Port



By means of Digital Optimization of infrastructure Innovative and cost efficient use of digital applications to handle major infrastructural and service challenges in ports

Derived from "Mawan SmartPort" CMPort has developed "Co-ordinated Port Project" to achieve :-

- -Optimal Use of existing port capacity
- -Just in time arrival of ships
- -Handling of increasing ship sizes
- -Process and documentation flows
- -Intra-port and hinterland mobility
- -Digital innovation and adaptation in response to Covid 19 crisis





Guangdong-Hong Kong-Macao Greater Bay Area (GBA) has 5+2 customs regime, 9+2 cities, and the import and export market size is huge



9 +2 cities in Guangdong-Hong Kong –Macao Greater Bay Area:
 Guangzhou、Shenzhen、Huizhou、Dongguan, Zhongshan、Zhuhai、Foshan、Jiangmen、Zhaoqing + Hong Kong and Macao

Major economically vibrate cities



Guangdong-Hong Kong-Macao Greater Bay Area is divided into 5 +2 customs regime :
 Guangzhou, Shenzhen, Huangpu, Gongbei, Jiangmen + Hong Kong and Macau

Complex customs clearance environment



 Hub ports in Guangdong-Hong Kong-Macao Greater Bay Area had handled approximately 70Million TEUs in 2019

Co-ordinated Port Business model





Berth at other ports

Berthing at Shekou Port is equivalent to berthing along the inland port. Ship agent at Shekou will enter ship activities and entry and exit declarations to Shekou Customs Transportation System and will enter the original manifest/pre-declaration to the inland port Customs Manifest System on behalf of the ship operator at the same time



Customs clearance at place of origin

Trading companies complete import and export clearance in their origin territories and accept inspection and release instructions from the inland port customs



Allocation to facilitate circulation

Containers are transferred between the two supervised region by allocated barge, and these two modules of barge allocation and in-transit supervision through the blockchain platform are effectively monitored to assist customs supervision.

Co-ordinated Port



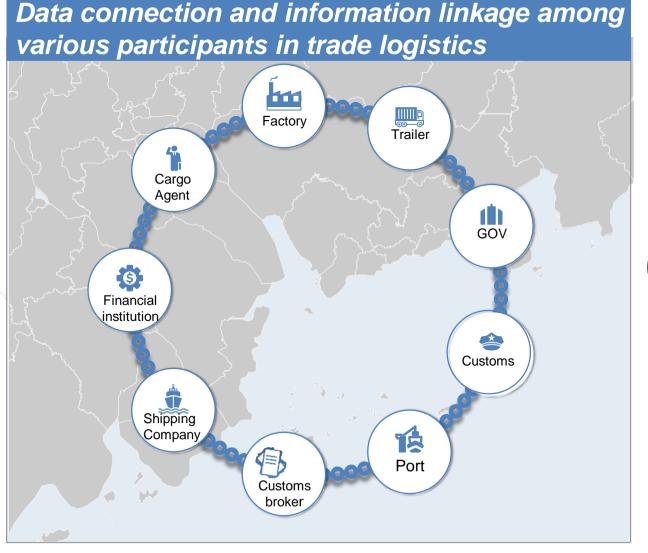
- It is initiated and steered by China Merchants Group and jointly built by Ping An Group under the strong support
 of the Shenzhen Municipal Government, Shenzhen Customs and Guangzhou Customs in the Guangdong-Hong
 Kong-Macao Greater Bay Area (GBA)
- This "new digital optimization infrastructure" is demonstrating innovative and cost efficient use of digital
 applications to handle major infrastructural and service challenges in ports by means of optimizing use of
 existing port capacity both at inland port near its hinterland with the international port to advance and
 synchronize customs clearance process and documentation flows to enhance intra port and hinterland mobility
- Through the comprehensive use of blockchain, big data, artificial intelligence, cloud computing and other
 technological empowerment, establishes core port logistics data standards and platforms, streamlines cargo
 clearance procedures, enhances the comprehensive competitiveness of ports, realizes regulatory technology
 and model innovation, and comprehensively improves the regional cross-border trade and business
 environment, thus the GBA customs clearance logistics platform is constructed, and the interconnection and
 intercommunication among the major customs in GBA can be realized
- Shekou (International Port) and Shunde (inland port)becomes the first "co-ordinated port" model in GBA. The interconnected and shared blockchain network of the entire trade process of customs, logistics, enterprises, banks, insurance, etc. gradually realizes the long-term vision of "precision supervision, intensive logistics, intelligent operation, process visualization, and financial inclusiveness". The project is targeted to cover about 18 Inland Transportation ports of Pearl River Delta Region by 3rd guarter 2021.

Socio Economic Benefits



- To promote the rapid economic integration and development of GBA, high-quality and new pattern development are of great significance to intensify construction of the "trade + finance" ecosystem, that can allow more companies to attach and survive in the ecosystem
- It unlocks resources of the inland terminal, seamless docking, and rapid customs clearance of goods, which is important for the development of the port economic zone and the manufacturing industry
- Create four pillars of service to help industrial transformation and upgrade. Smart port, Smart supervision, Smart trade and Smart finance
- The co-ordinated port customs clearance module and the barge in-transit supervision module have been completed, and trial run is achieved with "one declaration, one inspection, and one release" between Guangzhou Customs and Shenzhen Customs
- After the combination port logistics and trade facilitation service platform is officially launched, customers who deliver
 goods to Shunde New Port (Inland Port) are deemed to be delivered to Shekou (the western port of
 Shenzhen/International Port), and vice versa. Operating costs, efficiency and effectiveness are improved, and it helps
 the healthy and sustainable development of cross-border trade in the GBA

Help all participants in cross-border trade improve efficiency and reduce costs





Port:Overall logistics management

Overall planning of transportation capacity and resources, integrated operation of port clusters, realizing full utilization of resources



Factory: Efficient transfer

The transit time limit for export trade has been reduced from 4.5 days to less than 2 days, meeting all import and export business transit customs clearance requirements



Customs: Coordinated and precise supervision

Blockchain realizes cross-verification of information of all parties, exchanges of customs information, mutual recognition of supervision, and mutual assistance in law enforcement

Engagement and buy in of societal stakeholders



- The world's factory is no longer competing via labor intensive process to produce low-skilled goods. It is now one of the high-tech factories, manufacturing smart and high value-added products. This is particularly true in GBA which has a chain of what it takes to be a high-tech manufacturer
- In the Bay Area, there are leading innovation and technology companies like information and technology giant Huawei, civil drone maker DJI and world's largest genome research organization BGI Group. At the upstream, basic research at the top universities provide a steady flow of innovative ideas and talents. It also has a good doorway to make foray into the international market, with Hong Kong's well-established professional services and its flexible and free trade environment. The Bay Area itself is a market big enough to create strong demand for consumption
- **GBA** will strive to upgrade itself into a greener, safer and cleaner world's factory in the coming years. As the Mawan Smart Port story illustrates, it takes efforts by several generations to achieve that kind of transformation

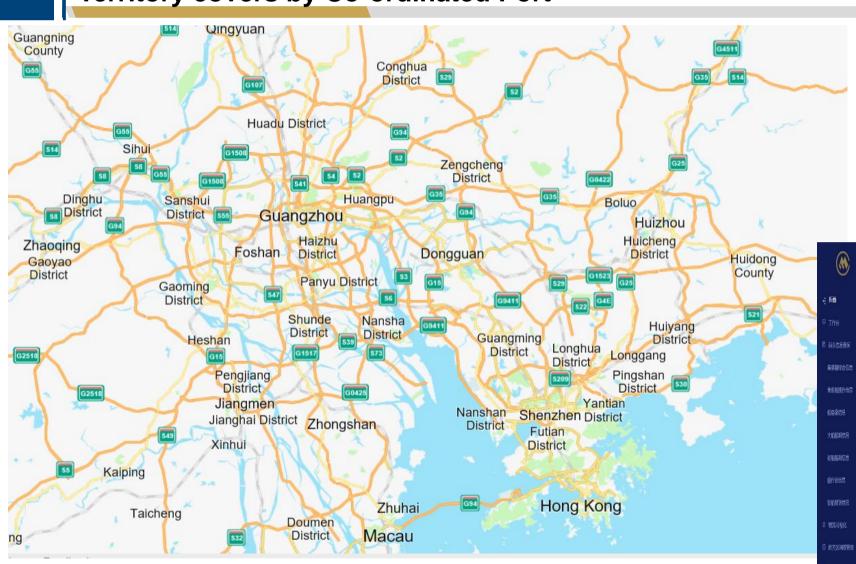
Original and innovative character of the projects



- The project is also committed to building the Mawan Smart Port into a 5G application demonstration project, and
 forming a comprehensive smart port solution. Relying on the global port asset allocation and operation capabilities of
 China Merchants Port, it will be further replicated and promoted to ports in China and the Belt and Road countries.
 Accelerate the empowerment of 5G to the port industry
- China Merchants Port has built the "Mawan Smart Port", the first and even the leading smart port in the Guangdong-Hong Kong-Macao Greater Bay Area in the Mawan Port Area, western Shenzhen, to support Shenzhen's goal of building a global ocean center city with practical actions. It was promoted by means of "one design, phased construction, and phased completion and commissioning". The 4# berth will be completed in March 2021 and will enter the Mawan Smart Port's overall project completion and preparation for production
- Mawan Smart Port will be completed in the first half of 2021 and will be put into full production
- In addition to linking with Guangzhou Customs, "Co-ordinated Port" will also link with the customs of Huangpu, Zhuhai, Shantou, Zhanjiang and other places, and extend the service coverage to the hinterland and the facilitation on hinterland port connectivity with main ports are able to contribute reduction on carbon emission.

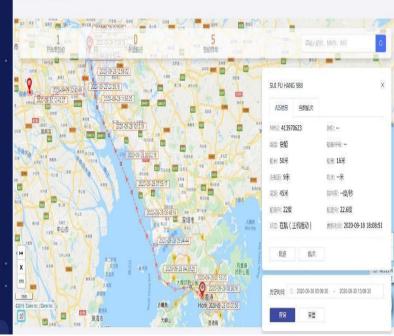
Territory covers by Co-ordinated Port





 In addition to linking with Guangzhou Customs, "Coordinated Port" will also link with the customs of Huangpu, Zhuhai, Shantou, Zhanjiang and other places, and extend the service coverage to the hinterland

Customs GPS Supervision



Measurable Benefit of the project



On the sustainability of the port 80% reduction in yard operation personnel 30% improvement in comprehensive operation efficiency upgrade Import and export customs clearance efficiency by more than 30% 50% less than the construction cost of automatic terminal

On the sustainability of the environment Safety hazards reduced by 50% Reduce carbon emissions by 90%

* Above figures is estimation upon design of the business model and related infrastructure



Vision and leadership deployed by the senior management



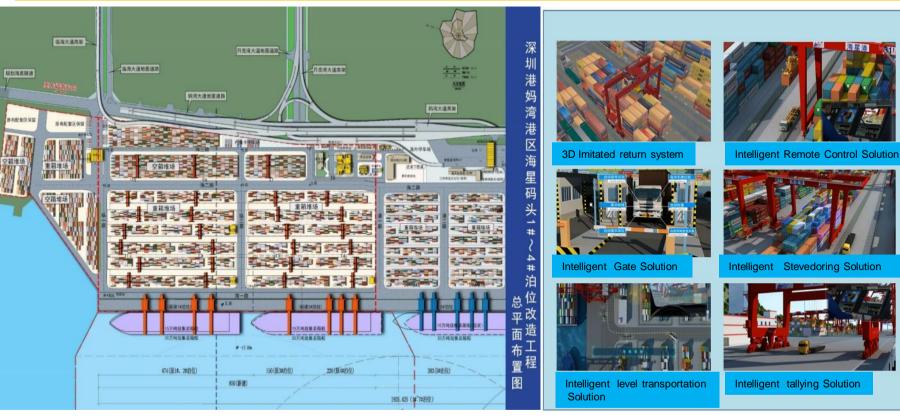
- The main body of the "Mawan Smart Port" construction project is the Haixing Port Development Co., Ltd., a subsidiary of China Merchants Port Group. The Mawan Port Area in western Shenzhen has been dominated by labor-intensive bulk cargo business before the implementation of the project. It used to be the Shenzhen Special Economic Zone. Construction and development have made important contributions
- The project plans to transform and upgrade the original 4 old bulk cargo berths in the Mawan Haixing Port Area into a new port area with 2 200,000-ton special container berths that can dock the world's largest container ships
- The construction plan is adopting the most advanced technology today to realize automation and intelligent operation and management, and the overall layout of the port area will be more optimized, which can improve the effective use and benefits of land resources. To meet the planning requirements for industrial upgrading in Shenzhen and Qianhai Shekou Free Trade Zone
- At that time, the Mawan Smart Port will serve as a model for the transformation and upgrading of traditional
 Chinese terminals and the output of future smart port construction plans. Through the construction of 5G smart
 port full-scenario applications, a 5G smart port China plan will be formed, which will be replicated and promoted
 to China Merchants Ports and ports in countries along the Belt and Road
- With reference to the Mawan Smart Port project, combined with the global industrial layout of China Merchants
 Port, it is estimated that the social and economic benefits will exceed 10 billion Yuan

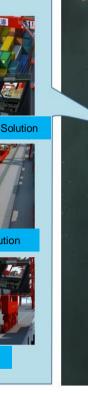
Innovative Strategy



We are committed to creating a model for the smart transformation of traditional terminals and providing solutions for the industry in the future

"Mawan Smart Port" is based on nine smart elements (China Merchants Core, China Merchants ePort, Al artificial intelligence, 5G, Beidou high-precision positioning, automation, smart port, blockchain, green and low-carbon) to create a "safe, stable and efficient, smart" digital intelligent system to build a world-class smart port, demonstrating the cutting-edge development.



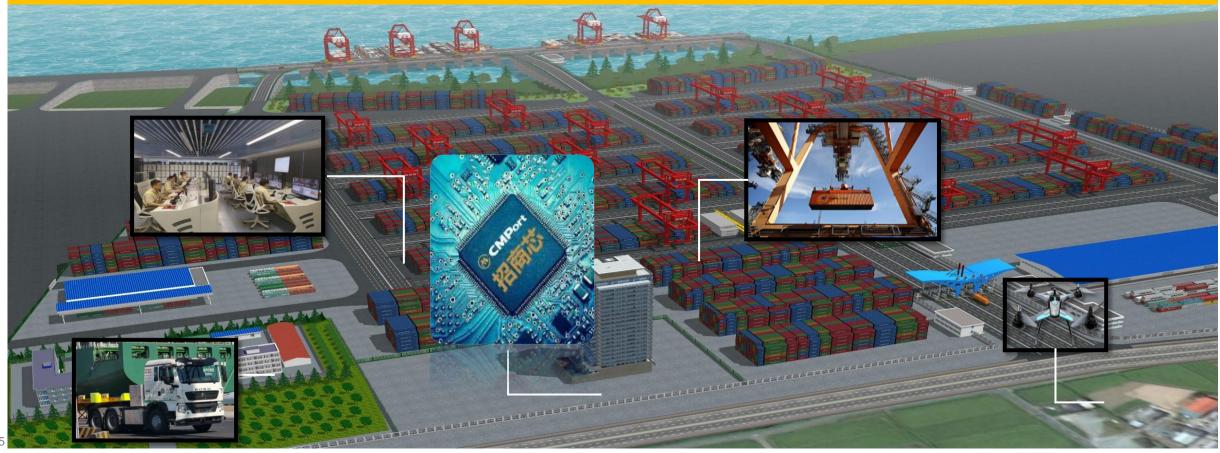


Join hands with all parties to promote the transformation and upgrading of the port industry



Construction of smart ports is a vehicle to provide our customers more value added services, to upgrade the smart port is able to assemble innovative technologies to transform and upgrade port industry .To sustain these values , we need to work together.

CMPort is willing to interact and co-operate closely with partners from all walks of life to exchange these global industrial wisdom.







■ Thanks for Your Attention