

Innovation prospers Sustainability



For IAPH Sustainability Port Project

Award

March 2021

01

China Merchants Group

02

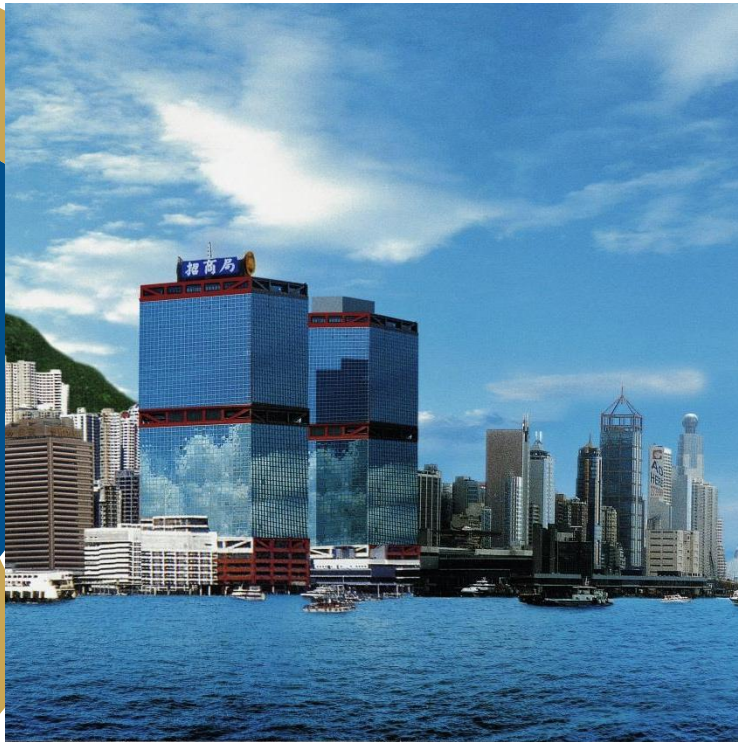
China Merchants Port Group

03

Sustainability Port Projects

i) SmartPort

ii) Co-ordinated Port



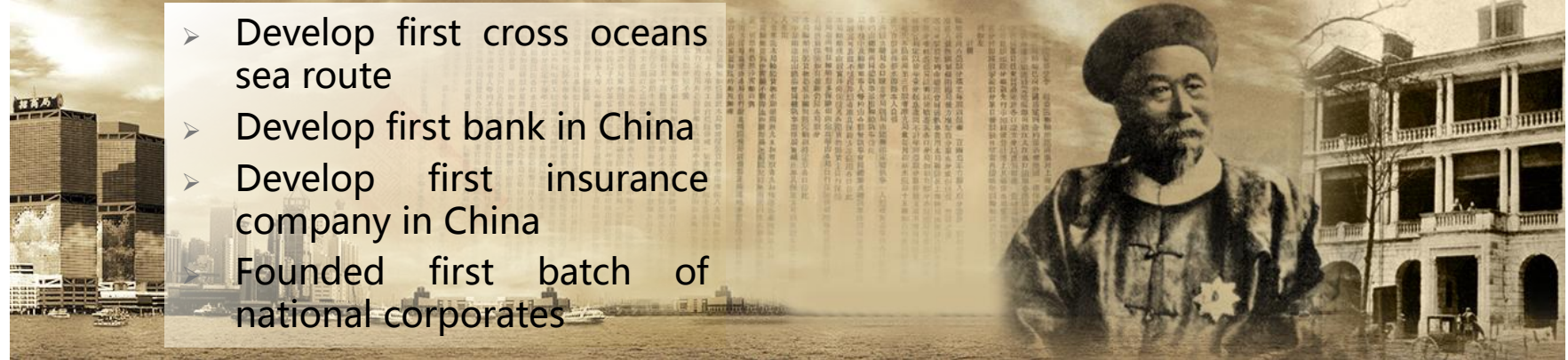
01

China Merchants Group

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

China Merchants Group (CMG)

- **Founded**
- **in 1872**



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

Yr 2020

Total Asset

10.4
Billion

Operating Income

8148
Billion

Total Profit

1754
Billion

SOE Ranking

No. **1**

China Merchants Group

Centennial State Owned Enterprise – 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

Development of Port and Shipping business under CMG



Pier No.1 of CMG in Hong Kong and Macau



CMG Building at No.9, the Bund, Shanghai



First Vessel - Eden



Core industries under CMG

Three “World-Class”: world-class comprehensive port service provider, world-class shipping company with core competitiveness, world-class smart logistics comprehensive service platform provider

Four “National Leads”: China’s leading highway investment and operation and transportation technology integrated service provider, China’s leading marine equipment and cruise ship building company, China’s leading city and park integrated development and operation service provider, and with unique characteristics Chinese leading financial holding group



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, complete 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.



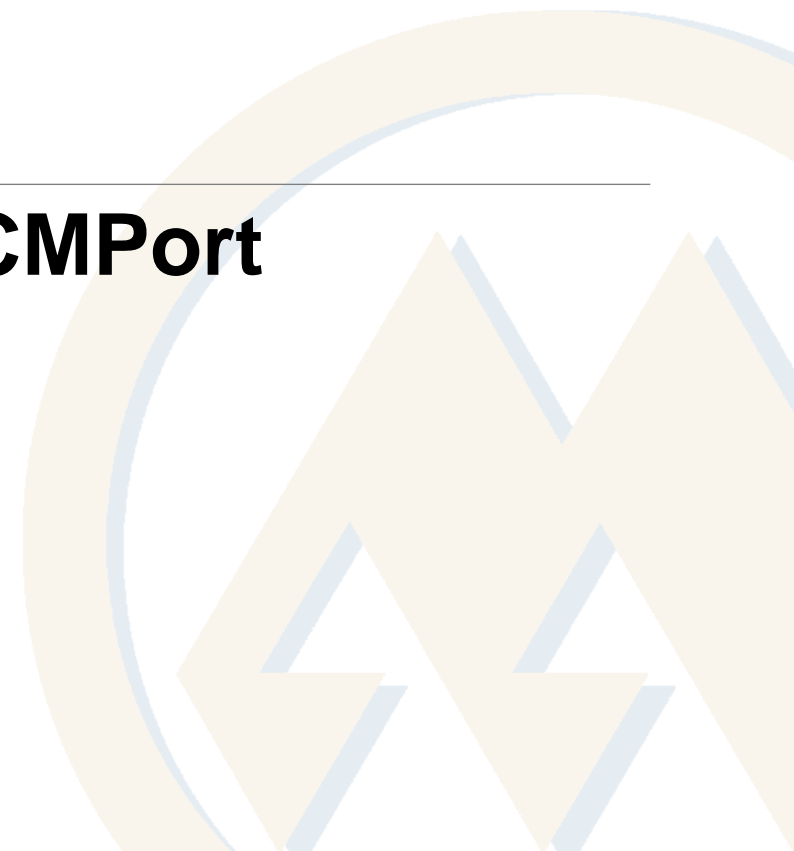
02

Overview of CMPort

Strategic vision

Business Scale

Global layout



Strategic Vision

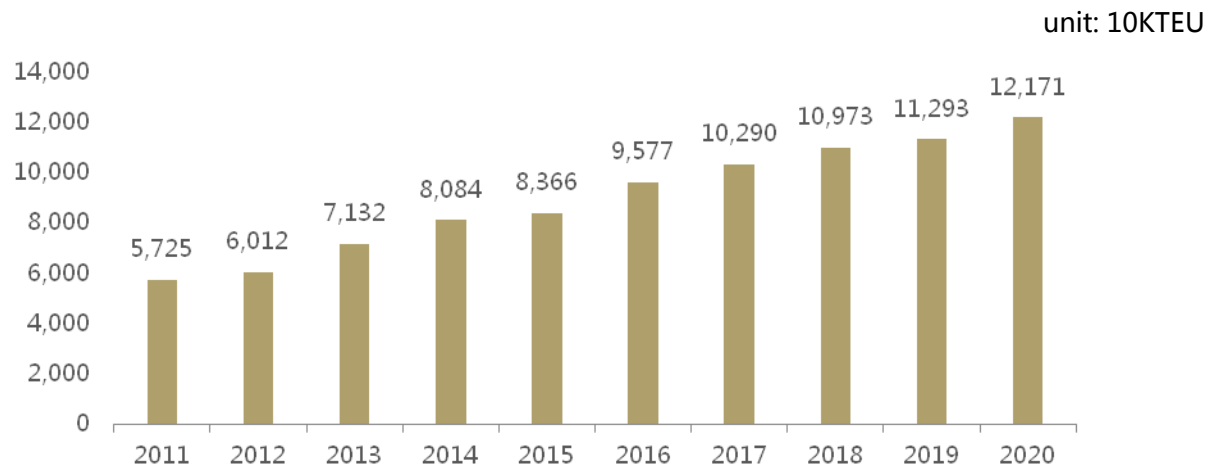
Our Vision :

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

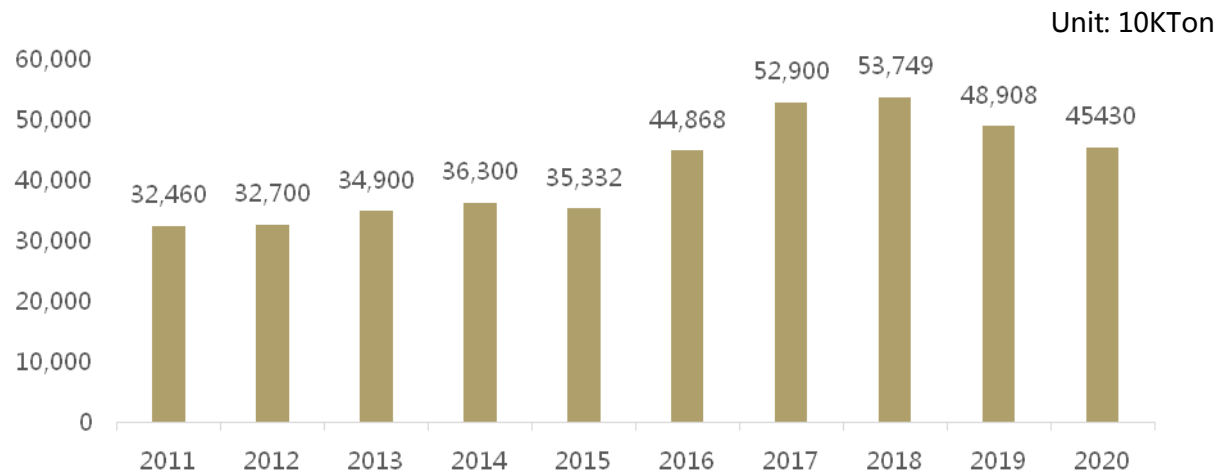


Business Scale

CMPort 2011-2020 Container Throughput



CMPort 2011-2020 Bulk Cargoes Throughput



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)

 **CMPort**
招商港口 SZ.001872

	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



03

Sustainability Port Project

i) SmartPort

Innovation prospers Sustainability



- 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 to turn 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 Smart Port “ and “Co-ordinated 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
- Just in time arrival of ships
- Handling of increasing ship sizes
- Process and documentation flows
- Intra-port and hinterland mobility
- Digital Optimization of infrastructure
- Innovative and cost efficient use of digital applications to
- handle major infrastructural and service challenges in ports

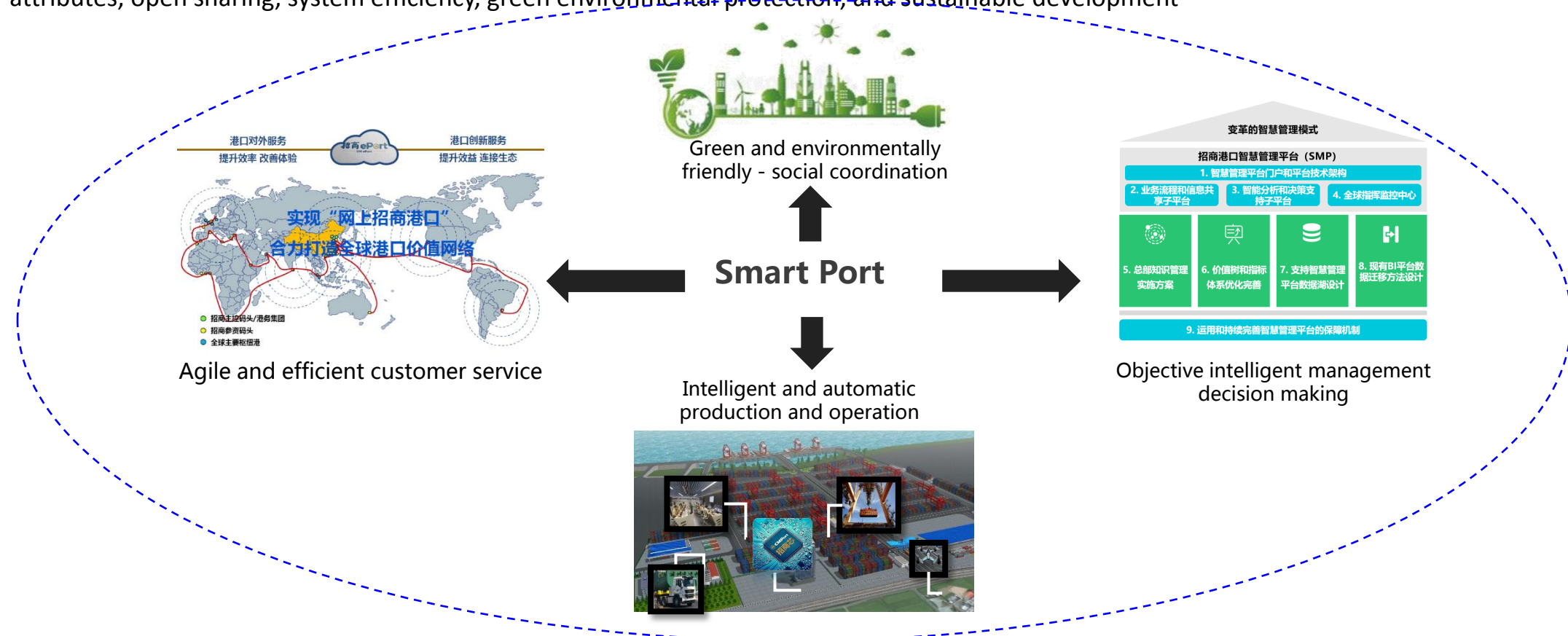
We will be happy to see:-

- 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
 - Safety hazards reduced by 50%
 - Reduce carbon emissions by 90%
 - Social and economic benefits exceeds 10 billion yuan
- * Estimation upon design of the business model and related infrastructure

Smart port construction empowers industry transformation and upgrading

Our Interpretation of smart port:

- With 5G communication, Internet of Things, big data, artificial intelligence and other new generation of information technology and port services as the core
- Realize self-perception and extensive interconnection of port elements, intelligent and automatic production and operation, objective and intelligent management and decision-making, 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 basic, 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

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: 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 and scheduling, and support mixed operation of multiple unmanned trailers;

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

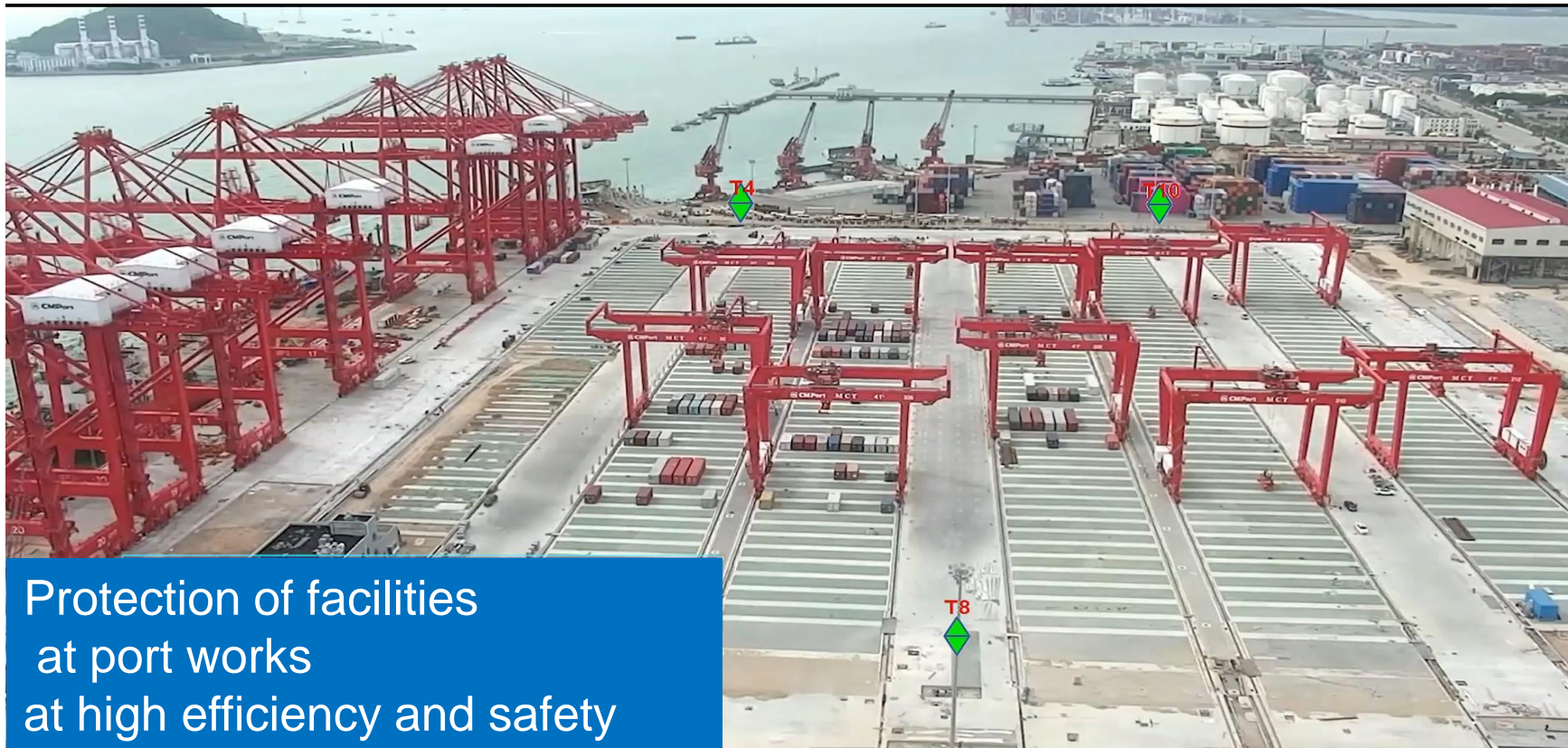


**World pioneer of 5G
unmanned hybrid driving mode**

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 the terminal

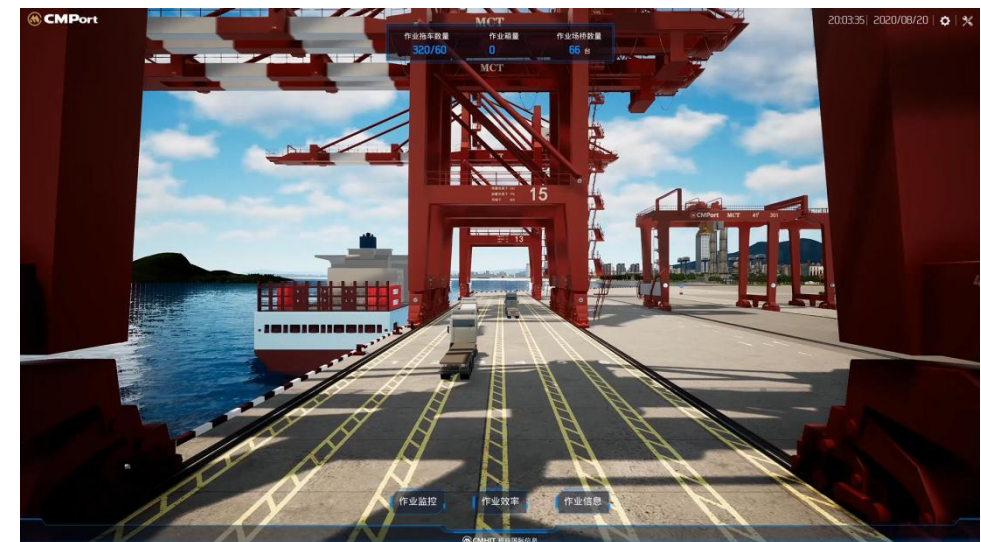
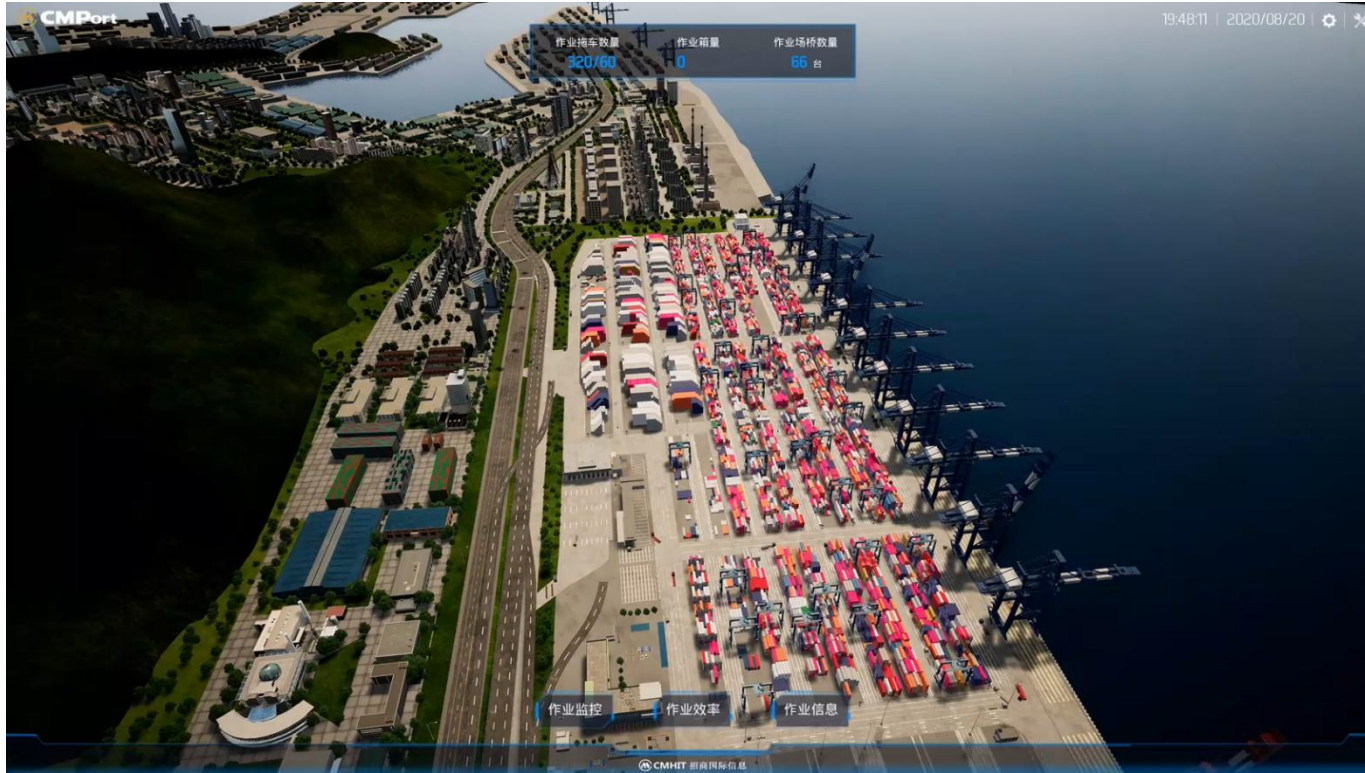
Yard operation inspection/quay side ship operation inspection/equipment, specific area inspection



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



Artificial Intelligent

- Allocation of job
- Yard
- Gantry crane
- Trailer
- Safety Management
- Untouch Access

5G Application

- RTG Remote control
- Remote QuayCrane
- Unmanned driving
- Drone Patrol
- AR Monitoring

CM ePort

- Realtime ship operation
- Manifest declaration
- Release service
- Customer service

Automation

- RMG crane
- RTG crane
- Quayside tallying
- Unmanned trailer
- Automated Gate

CMPort Core

- Auto-decision making core operations system
- Auto operations regulation and management
- Traditional operations design and monitoring

Green & Low Carbon

- Intelligent astronomic observation
- Energy consumption and carbon inspection
- Waste water index inspection

Intelligent Port

- Customs clearance
- Frontier inspection
- Marine services

Blockchain

- Electronic invoice
- Electronic DO
- Electronic EIR
- Port logistics PRD Platform

Beidou System

- High accuracy digital twin system
- Realtime vessel monitoring
- Realtime terminal facilities monitoring

- 1 Control Centre
- 2 Gantry crane
- 3 Unmanned trailer
- 4 Quay crane
- 5 Gate
- 6 Drone

Strong partnership and collaboration with commercial stakeholders



- 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

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 Smart Port” 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

Project background : Context of Greater Bay Area (GBA)

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

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 quarter 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

Data connection and information linkage among various participants in trade logistics



Manage

Port: Overall logistics management
Overall planning of transportation capacity and resources, integrated operation of port clusters, realizing full utilization of resources

Ease

Company: 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

collaboration

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



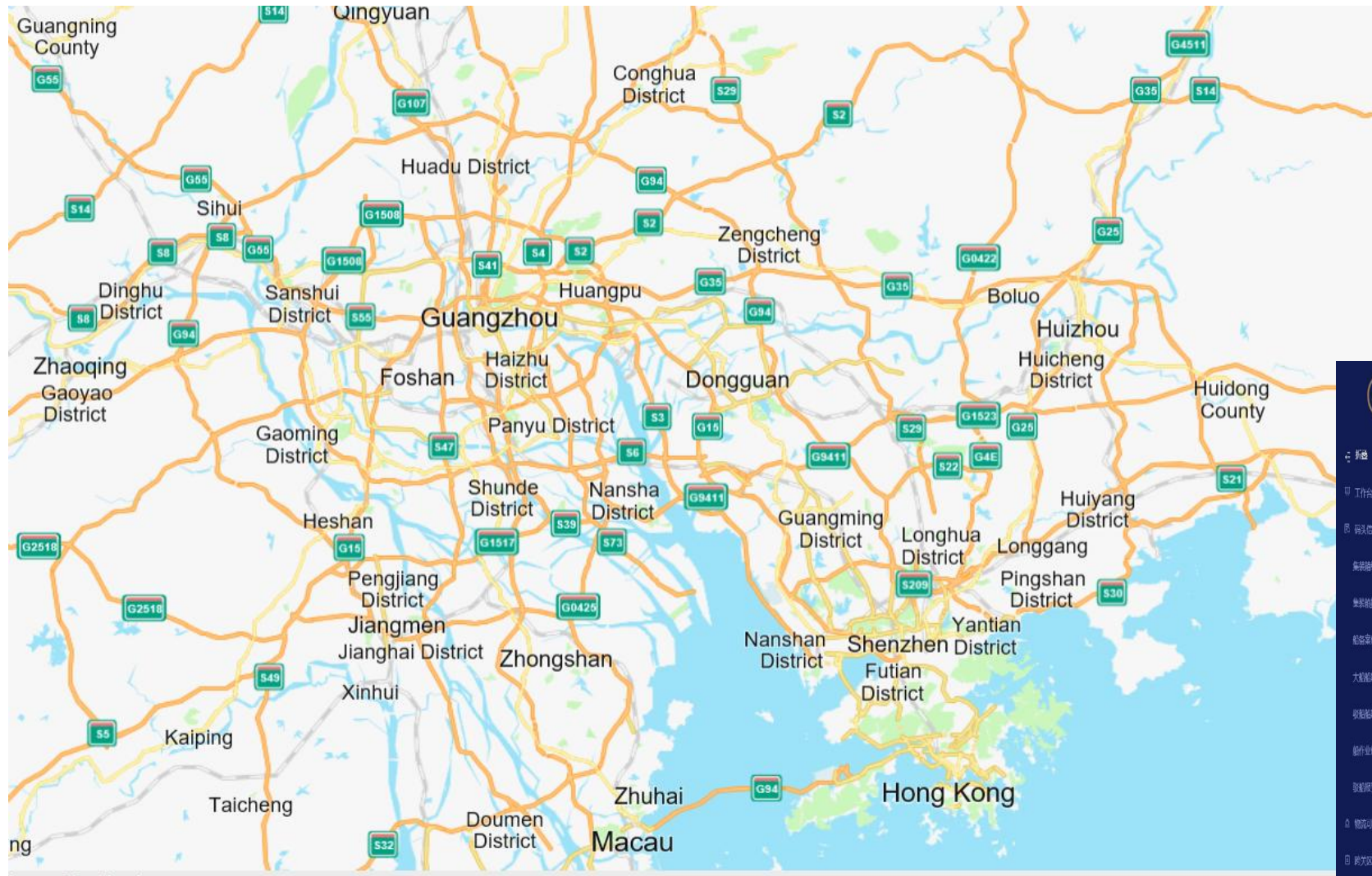
- The world's factory is no longer competing via labor intensive process to produce low-skilled goods. It is now one of the high-tech factories, manufacturing smart and high value-added products. This is particularly true in GBA which has a chain of what it takes to be a high-tech manufacturer
- In the 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



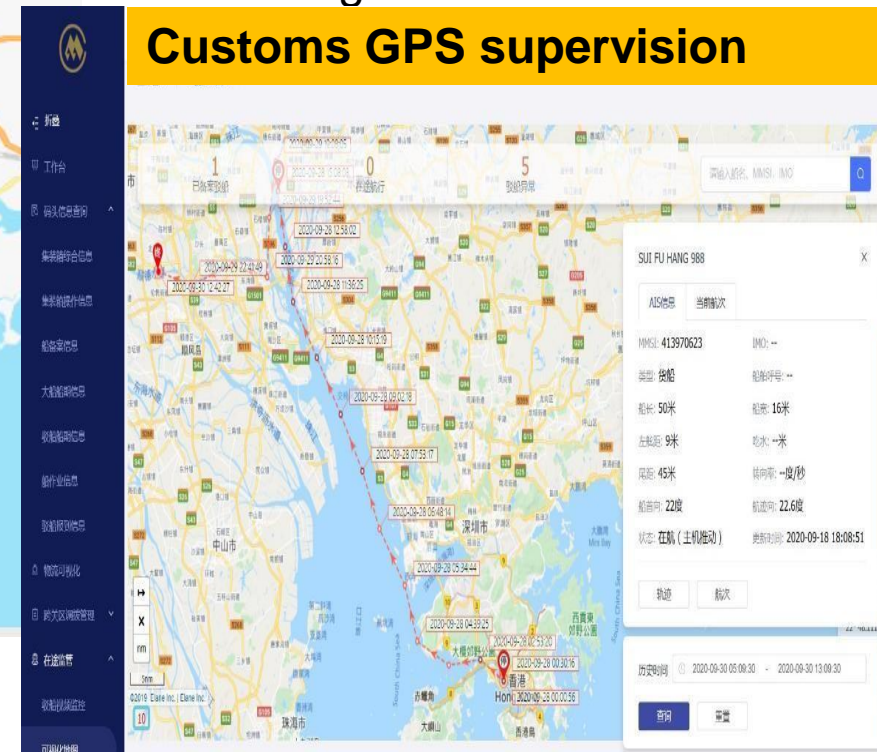
- The project is also committed to building the Mawan Smart Port into a 5G application demonstration project, and forming a comprehensive smart port solution. Relying on the global port asset allocation and operation capabilities of China Merchants Port, it will be further replicated and promoted to 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, "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

Customs GPS supervision



The screenshot displays a web-based interface for Customs GPS supervision. On the left is a dark sidebar with navigation options. The main area shows a map of the Pearl River Delta region with a red line indicating a vessel's movement path. A pop-up window for vessel SUIT FU HANG 988 provides the following details:

属性	当前值
MMSI	413970623
船名	快船
船长	50米
左舷吃水	8米
高度	45米
航速	22.6度
航向	22.6度
状态	在航 (主机推动)
更新时间	2020-09-18 18:08:51

At the bottom, there is a time range selector for the data, currently set to 2020-09-30 05:00:30 to 2020-09-30 13:00:30.

Measurable Impact 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%

* 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, AI 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

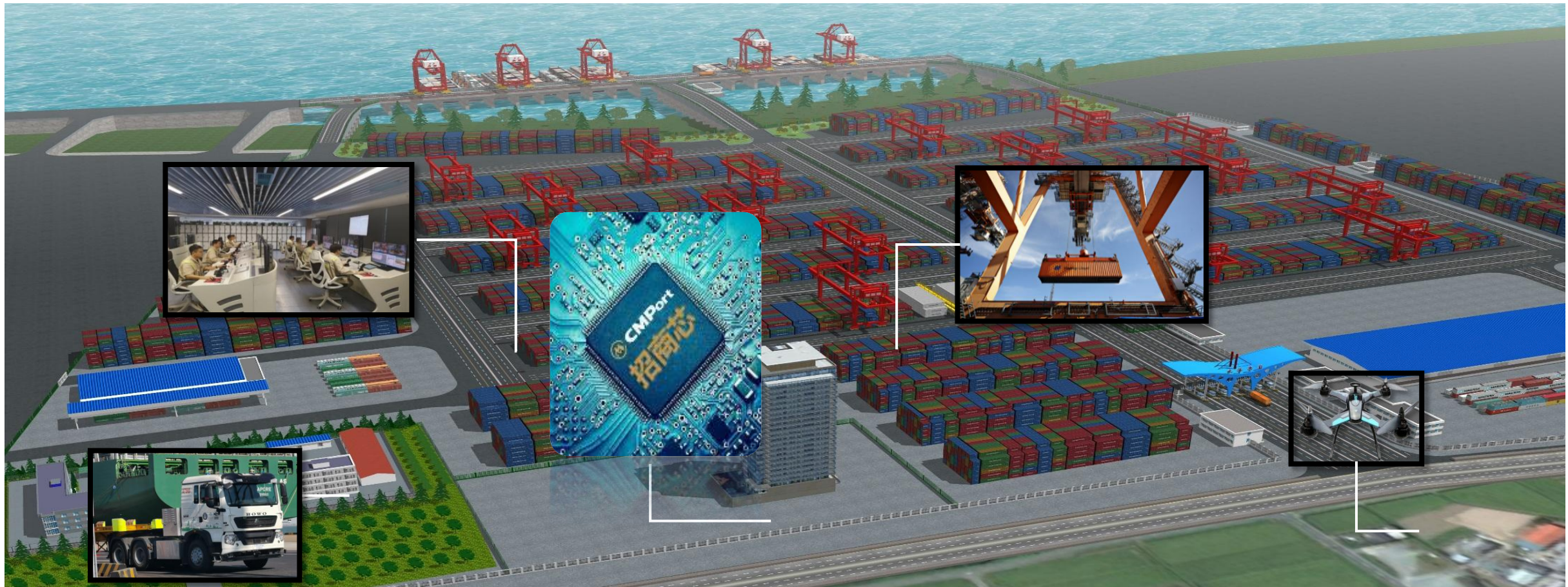


- 3D仿真回放系统
3D Imitated return system
- 智慧远程控制方案
Intelligent Remote Control Solution
- 智慧闸口解决方案
Intelligent Gate Solution
- 智慧堆场解决方案
Intelligent Stevedoring Solution
- 智慧水平运输方案
Intelligent level transportation Solution
- 智慧堆场方案
Intelligent tallying Solution



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

- Relying on the construction of smart ports to provide our customers with more flexible value services To upgrade the smart port to a gathering place, and a place of innovation for innovative technologies, we need to work together and work together We are willing to interact and cooperate closely with partners from all walks of life to jointly build a world wisdom exchange.





■
■ **Thanks for Your Attention**