

中国移动5G赋能产业数字化转型

China Mobile's 5G Empowers Digital Transformation of Industry

中国移动 俞承志

China Mobile Chengzhi Yu

经济社会数字化呈现“五纵三横”特点，5G正在开启数字经济新时代

Digital Transformation of Economy and Society Presents New Features:

“Five verticals, three horizontals”, 5G is opening a new era of digital economy



5G+4G

赋能**连接能力**，长期共存，在4G基础之上结合5G技术打造更高质量的通信网络

Empowering the **ability to connect** and coexist, it can combine 5G technology to build a higher quality communication network based on 4G

5G+AICDE

融合**数字技术**，推动5G与人工智能、物联网、云计算、大数据和边缘计算等新数字技术的紧密融合，加强能力建设

With **digital technology**, it can drive close integration of 5G with new digital technologies such as AI, IoT, cloud computing, big data and edge computing, and strengthen its capacity

5G+Eco

共建**产业生态**，与社会各界共同构建资源共享、合作共赢的“5G+”新生态

Strive to build a **new "5G +" ecology** of resource sharing and win-win cooperation with social community



社会信息流动的主动脉
Information Artery of society

产业转型升级的加速器
Accelerator of industry transformation and upgrade

数字社会的新基石
New cornerstone of digital society

中国移动建成全球最大5G网络，5G客户规模不断增加

China Mobile is Building the Largest 5G Network of the World, Leading the 5G Market and SA Industry

覆盖全国

Nationwide Coverage

技术先进

Advanced Technology

品质优良

High-quality

 **38.5万** 5G基站
385,000 5G Base Stations

 **340** 城市商用
340 cities launched commercial service

 **1.3亿** 5G用户
130 million 5G users

勇攀珠峰

"5G" climbed up the Mount Everest

- 海拔6500米开通全球，海拔最高的5G基站

Built the world's highest 5G base stations at an altitude of 6,500 meters.



25万 SA基站数
250,000 5G SA Sase Stations 

40+ SA城市商用
40+ cities launched 5G SA commercial service 

深入矿井

"5G" worked down the mind

- 井下534米建成全国首个井下5G智慧煤矿

The first smart coal mine built at 534 meters down the mine.

建立5G专网+平台+应用能力体系，加速产业数字化转型

Establish a Converged System with 5G Enterprise Network + Platform + Application Capability
to Accelerate Industrial Digitalization

1 打造5G精品专网

Establish 5G boutique enterprise network

优享模式

high performance network

切片1 (Slice 1)

切片2 (Slice 2)

网络切片
Network Slices

专享模式

localized network



UPF

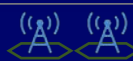


园区
Industry Part

增强覆盖、边缘计算
Enhanced coverage +
Edge computing

尊享模式

Private network



专用基站、专用无线资源
Dedicated base station +
Dedicated wireless resources

2 构建5G+AICDE能力体系

Build a 5G+AICDE capability system

九大行业平台

9 one



5G+AICDE通用能力平台

5G+AICDE general capability platform



3 丰富细分行业应用场景

Rich industry application scenarios



创新5G专网服务，实现“网随业动、按需建网”

Innovative 5G Enterprise Network Service supporting “On-demand dynamic Network construction”

率先发布5G专网产品，提供“优享、专享、尊享”三种服务模式

Take the lead in releasing 5G enterprise network products, Providing three service modes: high performance network, localized network, private network

优享模式

high performance network

切片1 (Slice 1)

切片2 (Slice 2)

网络切片
Network Slices

公网公用

Public network, public use



普通道路 VS 公交专用道
Normal roads VS Bus-lanes

专享模式

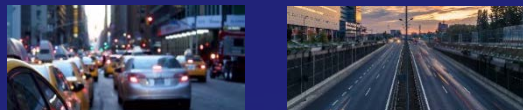
localized network



增强覆盖 + 边缘计算
Enhanced coverage + Edge computing

公网专用

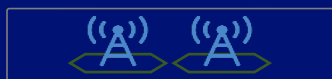
Public network, dedicated use



普通道路 VS 高速公路
Normal roads VS Highways

尊享模式

Private network



专用基站、专用无线资源
Dedicated base station + Dedicated wireless resources

专网专用

Private network, private use



普通道路 VS 高铁线路
Normal roads VS High-speed trains

从“以网络为中心的服务”向“以服务为中心的网络”转变，满足行业客户“四个转变”需求

Transformed From network-centric service to service-centric network to meet the “four changes” requirements of customers

① 普通公众的网

Network for public users

工业生产的网

Network for industry customers

② 数据出厂的网

Network with Open Data

数据本地的网

Network with Data localization

③ 固定模式的网

Network with fixed model

柔性定制化的网

Network with flexible customization

④ 尽力而为的网

Best effort Network

可靠确定的网

Deterministic Network

5G+智慧工厂：加速制造业数字化转型升级，大幅节约人力成本

Smart Factory: Accelerating the Digital Transformation and Upgrade of the Manufacturing Industry and Significantly Save Labor Costs

典型应用 Typical Application

5G+机器视觉
5G+ Machine vision

5G+数据采集
5G+Data collection

5G+AR辅助
5G+AR auxiliary

5G+云化AGV
5G+Cloud AGV

应用价值 Value

物理世界 → 数字世界 劳动密集 → 少人化/无人化 流水线作业 → 柔性制造 产品制造商 → 服务提供商
Physical world → Digital world Labor-intensive → Robotized/ unmanned Pipelining → FMS Manufacturers → Service providers

爱柯迪 全5G工厂

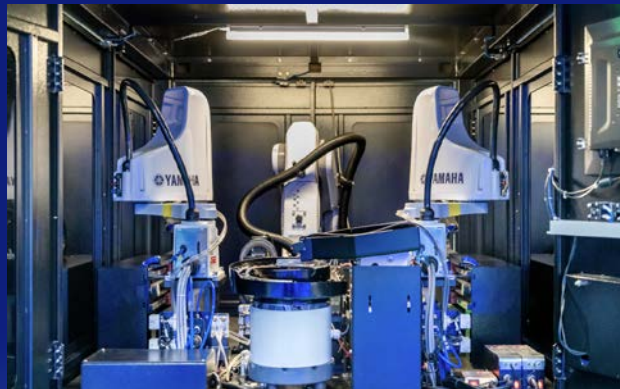
The first 5G flexible factory



- 中国移动打造的**首个全5G柔性工厂**，产线随时调整、随时投产
The first 5G flexible factory built by China Mobile enables it to adjust production line and put into operation at any time.
- 以5G **SA+MEC**专网为基础，打造5G数字车间等**12个**应用场景
Based on **5G SA+MEC** private network, China mobile creates **12** application scenarios including 5G digital workshop.

精研科技 5G+AI质检

AI quality inspection



- 4.9GHz大带宽**，**500Mbps**超高上行上传高清图片，质检效率提升**30倍**，人力成本节省**70%**
4.9GHz bandwidth, **500Mbps** ultra-high upload high-definition pictures, the quality inspection efficiency is increased by **30 times**, and the labor cost is reduced by **70%**
- 边缘计算助力质检结果**大数据分析**，精密调整注塑参数，减少损耗。
Edge computing helps quality inspection with **big-data analysis** and reduces loss.

5G+智慧钢铁：有效解决工序流程复杂问题，显著提升生产效率



Smart Iron and Steel: Effectively Solves Complex Problems in the Process and Significantly Improves Production Efficiency

典型应用 Typical Application

5G+无人天车

5G+Unmanned crane

5G+无人料场

5G+Unmanned stock ground

5G冶炼高清视频安防

5G+Smelt HD video security

5G+冶金AR远程协作

5G+AR metallurgical remote cooperation

应用价值 Value

作业危险系数高→无人化

High operating risk → Unmanned

检测耗时长、易错→产品不良品率降低10%

Complex Detection → Product defective rate reduced by 10%

现场运维监测→远程运维检测

On-site monitoring → Remote detection

湖南湘钢 5G无人天车 5G unmaned crane



- **全国首例5G无人天车投入生产线正式商用**
The first 5G unmaned crane put into production line and has been officially commercial.
- **三个转变：4小时→8小时、现场→控制室、男性→女性操作员**
Three changes: 4 hours to 8 hours, on-site monitor to control room, male to female operators
- **“高清视频上传+下行实时控制”通常是一个闭环**
A closed-loop: "HD video upload + real-time control".

湖南湘钢 5G+AR远程装配 5G AR remote operation



- **全国首个5G+AR远程装配案例，疫情期间国内同款设备首个投产**
First case of 5G+AR remote assembly case in China put the devices into production during the coronavirus period.
- **利用AR眼镜通讯替代传统现场支撑，提升设备维护效率**
Instead of on-site inspection, using AR glasses can improve equipment maintenance efficiency.

5G+智慧港口：推动港口实现自动化、智能化，有效提升生产效率



Smart Port: Promote automation and intelligence in ports, and effectively improve production efficiency

典型应用 Typical Application

5G+港机远控

5G+Port Machinery remote operation

5G+智能理货

5G+Smart tally

5G+无人水平运输

5G+Unmanned transportation

应用价值 Value

高危作业→少人化/无人化

High-risk operations → unmanned

耗时长、易错→高效、准确

Time-consuming and error-prone → efficient and accurate

单车智能→网联智能

Single Intelligence → Networked Intelligence

宁波舟山港 5G 港机远控

Port Machinery remote operation



- 全球最大货物港，5G港机远控实现1人远程操控4台龙门吊，提升效率和安全

The world's largest cargo port; 5G port machinery remote control enables 1 person to remotely control 4 gantry cranes, improving efficiency and safety

- 平均时延低至8-10ms，PLC控制可靠性高达99.999%

The average delay is as low as 8-10ms, and the PLC control reliability is as high as 99.999%

福建厦门港 5G 无人水平运输

Unmanned transportation



- 5G全场景智慧港口实现车路协同自动驾驶、动态厘米级高精度定位

5G all-scenario smart port realizes autonomous driving and high-precision positioning

- 节约46%一线人力成本，助力港口无人化运行

Save 46% of labor costs and help ports realize unmanned operation

5G+自动驾驶：车路协同示范区需求旺盛，低速自动驾驶应用逐步落地

5G Autopilot: Strong Demand in Demonstration Areas of vehicle-road coordination and low-speed autopilot applications are gradually implemented

典型应用

Typical Application

5G+智能网联示范区

5G+ Intelligent Networking Demonstration Zone

5G+智慧高速

5G+Smart High Speed

5G+智慧公交

5G+Smart Bus

5G+网联无人车

5G+ Unmanned Vehicle

应用价值

Value

盲区多、感知难→高精度自动驾驶

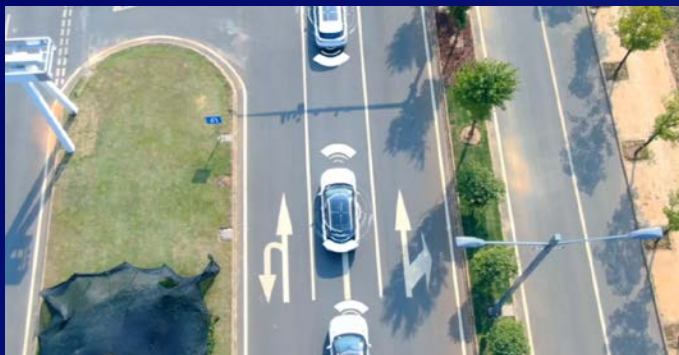
Many blind spots, difficult perception → high-precision automatic driving

计算决策不完善→车路协同精准决策

Incomplete calculation decision → vehicle-road coordinated precise decision-making

武汉经开区 5G车路协同示范区

road collaboration demonstration zone



- **智慧的路**：打造5G与车路协同、高精定位结合的示范区，**国内首张城市开放道路自动驾驶商用牌照**

Smart Road: Create a demonstration zone combining 5G, vehicle-road coordination and high-precision positioning, and **the first commercial license for autonomous driving on open roads in China**

东风 5G网联自动驾驶车

Dongfeng Group 5G Autopilot



- **聪明的车**：联合东风集团打造5G网联自动驾驶车辆，完成5G网联协同控制及5G远程驾驶保障

Smart car: cooperate with Dongfeng Group to build 5G connected autonomous vehicles, complete 5G connected collaborative control and 5G remote driving guarantee.

典型应用 typical application

(院内)5G+智慧医院
(In-hospital) 5G+ Smart Hospital

(院间) 5G+远程医疗
(Interhospital) 5G+ telemedicine

(院外) 5G+应急救援
(Outside the hospital) 5G+ emergency rescue

应用价值 Value

医院服务能力不足→提高效能
Insufficient hospital service capacity → improve efficiency

医疗资源分布不均→共享稀缺专家资源
Uneven distribution of medical resources → sharing scarce expert resources

河南郑州医院 5G应急救援

The First Affiliated Hospital of Zhengzhou University 5G emergency rescue



- 国内首个移动化5G应急救援,应急救援实现了从转运到施救的重要一步,为患者赢得“黄金一小时”

The first mobile 5G emergency rescue in China, the emergency rescue has achieved an important step from transport to rescue, winning the "golden hour" for patients.

武汉医疗机构 5G移动床旁会诊

5G mobile bedside consultation



- 通过5G移动床旁医疗车在武汉实现远程重症会诊,助力全国抗疫
Realize remote critical illness consultation in Wuhan through 5G mobile bedside medical vehicle, and help the nation fight the epidemic.

5G 融入千行百业，成为千行百业的 5G

5G is Integrated into All industries and Becomes 5G for Those

100+ 应用场景 **100+** 集团级龙头示范项目 **2000+** 省级区域特色项目

100+ Application scenario, **100+** group-level demonstration projects, **2000+** provincial-level regional characteristic projects

<p>5G 智慧工厂 5G Factory 10↑</p> <ul style="list-style-type: none"> 远程控制 Remote control 机器视觉 Machine Vision 	<p>5G 智慧钢铁 5G Steel 2↑</p> <ul style="list-style-type: none"> 无人天车 Unmanned Crane AR远程协作 AR remote collaboration 	<p>5G 智慧矿山 5G Mine 2↑</p> <ul style="list-style-type: none"> 无人化采 Unmanned mining 井下融合组网 Underground integrated networking 	<p>5G 智慧港口 5G Port 4↑</p> <ul style="list-style-type: none"> 港机远控 Remote control of port machine 智能理货 Intelligent tally 	<p>5G 智慧医院 5G Hospital 12↑</p> <ul style="list-style-type: none"> 远程会诊 Distance consultation 应急救援 Emergency rescue
<p>5G 智慧文旅 5G Cultural Tourism 3↑</p> <ul style="list-style-type: none"> 互动游览体验 Interactive tour experience 遗址重现 Site reappearance 	<p>5G 自动驾驶 5G Autopilot 14↑</p> <ul style="list-style-type: none"> 高精度定位 High-precision positioning 货运/园区自动驾驶 Freight / Park autopilot 	<p>5G 行业视频 5G Industry Video 4↑</p> <ul style="list-style-type: none"> 5G视频会议 5G vedio meeting 5G高清监控 High-definition video monitoring 	<p>5G 智慧校园 5G Campus 12↑</p> <ul style="list-style-type: none"> 远程同步课堂 5G synchronous classroom, VR智慧教学 VR teaching 	<p>5G 智慧银行 5G Bank 7↑</p> <ul style="list-style-type: none"> 数字人客服 Digital customer service 金融云问 Cloud--oriented finance
<p>5G 智慧电力 5G Electricity 5↑</p> <ul style="list-style-type: none"> 配网差动保护 Differential protection of distribution network 电网自动化三遥 Three remote of automatic power grid 	<p>5G 智慧城市 5G City 15↑</p> <ul style="list-style-type: none"> 智慧城市运营管理中心 Smart city operation management center 应急响应 Incident Response 	<p>5G 智慧园区 5G Park 3↑</p> <ul style="list-style-type: none"> 可视化指挥调度 Visible dispatch system 一体化物业管理 Integrated Property Management 	<p>5G 网联无人机 5G UAV 5↑</p> <ul style="list-style-type: none"> 无人机高层消防 UAV high-rise fire fighting 无人机巡查 UAV inspection 	<p>5G 云游戏 5G Cloud Gaming 2↑</p> <ul style="list-style-type: none"> 广域云游戏 Wide Area Network cloud game 局域网电竞 LAN network E-sport field

第三届工信部“绽放杯”斩获过半奖项
50%+ awards in the 3rd MIIT "Blooming Cup"

一等奖 6/10
First Prize

二等奖 16/20
Second Prize

三等奖 19/30
Third Prize

优秀奖 64/120
Merit Award

总计 105/180
Total



工程机械远程控制

Remote Control of Construction Machinery

配网差动保护

Differential Protection of Distribution Network

无人矿卡作业

Automated Truck Work

智慧城市管理运营中心

Operation Center of Intelligent City

5G4K/8K超高清视频直播

5G Ultra-HD Video Telecast

立体安防

Three-dimensional Security

医疗机器人

Medical Robot

智能理货

Intelligent Arrangement

远程控制 AGV

Remote Control

井下设备采集

Underground Equipments Collection

高清视频监控

HD Video Monitoring

远程控制桥机

Remote Control Bridge Crane

和对讲

HD Video Intercom

千里眼

HD Video Monitoring

5G赋能千行百业，共创5G美好未来

5G Technology Empowers Thousands of Industries

to Create a Wonderful Future with 5G

无人机农业植保

UAV Agricultural Protection

水产养殖

Fish Culture

工业旅游体验

Interactive Tour

遗址重现

Reappearance of Raics

智慧城市管理运营中心

Operation Center of Intelligent City

无人机农业植保

UAV Agricultural Protection

云视讯

HD video Conference

博物馆导览

Museum Guide

5G云办公

5G Cloud Office

可视化指挥调度

Visual Command and Dispatch

无线站坪调度

Wireless Dispatch of Station Site

无人驾驶车接驳

Driverless Vehicle Connection

云AR交互式教学

Cloud AR of Interactive Education

博物馆导览

Museum Guide