"Set Sail" Action Plan for 5G Applications (2021-2023)[1]

---

[1] Translator's note: CSET translated a draft version of this Action Plan into English in 2021. This translation is available online at:
https://cset.georgetown.edu/publication/set-sail-action-plan-for-5g-applications-2021-2023-draft-for-comments.

5G fusion applications are an important engine driving economic and social digitalization, networkization (网络化), and intelligentization (智能化). This plan has been especially drawn up in order to: Implement the spirit of General Secretary Xi Jinping's instructions regarding the acceleration of 5G development, give major impetus to the comprehensive, coordinated development of 5G, thoroughly carry forward the 5G empowerment of countless businesses and industries, spur the formation of a high-level development model in which "demand pulls supply, and supply creates demand," drive the upgrading of modes of production, living, and governance, and foster new dynamism (新动能) to expand economic and social development.

I. Overall Requirements

(a) Guiding Ideology

While taking Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era as the guide, and comprehensively implementing the spirit of the 19th Party Congress and the Second, Third, Fourth, and Fifth Plenums of the 19th Central Committee, let us accomplish the following: firmly establish the new stage of development (新发展阶段), implement the new concept of development (新发展理念), construct the new pattern of development (新发展格局), orient ourselves to the main battlefield—the real economy—orient ourselves to the needs of economic and social digital transformation, carry out overall planning of development and security, adhere to the laws of 5G application development, make an effort to link together 5G application innovation chains, production chains, and supply chains, coordinate and push ahead with technology fusion, industry fusion, data fusion, and standards fusion, create new products, new business formats (新业态), and new models relating to 5G fusion applications, and provide solid support for digital transformation, intelligent upgrading, and integrating innovations in all economic and social realms.

(b) Basic Principles

Insist on the pulling force of demand. Give full play to the decisive role of the market in the allocation of resources. Reinforce the mainstay status of enterprises in 5G application development, and further unleash the demand potential of consumer markets, vertical industries, society, and people's livelihoods (民生) vis-à-vis 5G applications. Invigorate 5G application innovation.

Persist in being innovation-driven: With a focus on the personalization requirements of 5G industry applications, intensify technological innovation, strengthen key technology and product research and development (R&D), and lay a technological and industrial foundation for 5G application development. While

adhering to the objective pattern of gradually introducing 5G technologies, standards, industries, networks, and applications, stay in close tandem with international standards, and promote 5G application development in a focused way.

Persist in making breakthroughs in key areas. With a focus on 5G development key links, make an effort to solve key cross-cutting problems such as protocol and standard interoperability, the construction of an application ecosystem, and strengthening the industrial base. Support pioneering breakthroughs for key fields that are characterized by a solid foundation, a clear model, and broad prospects. Guide large-scale implementations of 5G applications for the purpose of demonstration.

Insist on coordination and linkages. Strengthen communication links among all parties, and expedite collaboration across departments, industries, and areas of research. Give free rein to the enthusiasm of industries and localities; introduce and implement new policy measures supporting 5G application development. Bring the pulling role of leading enterprises into play, and push forward deep interactions and collaboration between upstream and downstream enterprises. Form a "group competition" ("团体赛") model.

(c) Overall Objectives

By 2023, the development level of China's 5G applications should be significantly higher, as their comprehensive strength continues to grow. Create a new ecology wherein information technology (IT), communications technology (CT), and operational technology (OT) are deeply fused; achieve deep and broad dual breakthroughs in 5G applications in key fields, raise the dual pillars of technological industry and a standards system; and further improve basic capabilities in areas such as networks, platforms, and security so that, gradually, 5G applications will "set sail on a great voyage."

– **Major increases in the key metrics for 5G applications.** The 5G individual subscriber penetration rate exceeds 40%, and the number of subscribers surpasses 560 million. 5G network access traffic accounts for more than 50%, and 5G network efficiency improves markedly. The annual growth rate in the number of 5G Internet of Things (IoT) terminal subscribers exceeds 200%.

– **5G application results become prominent in key fields.** With regard to personal consumption, create a batch of new business services, new modes, and new business formats for new types of "5G+" consumption so that subscribers' "sense of gain" significantly improves. In industry verticals, the 5G application penetration rate surpasses 35% for large industrial enterprises. In electric power, mining, and other such fields, duplicate and disseminate 5G applications on a large scale. Further expand the scope of 5G + Internet of Vehicles (IoV) pilot projects. Boost the digital

transformation and upgrading of traditional industries such as agriculture and water conservancy. With regard to society and the people's livelihoods, create a batch of model projects in 5G+ smart education, 5G+ smart healthcare, and 5G+ culture and tourism, and further raise the quality of 5G+ smart city construction. Create over 100 5G application benchmarks in each key industry.

– **Continually improve the 5G application ecosystem.** With preliminary construction of mechanisms for coordination and linkages across departments, industries, and areas of research, form a new 5G application harmonization and innovation model in which government departments guide, leading enterprises provide the driving force, and small- and medium-sized enterprises assist in a coordinated way. Incubate a batch of widely influential 5G application solution providers and form more than 100 kinds of 5G application solutions. Complete a system framework for basic general purpose and key-industry 5G application standards, and develop more than 30 standards for key industries.

– **Significantly strengthen critical basic support capabilities.** 5G network coverage levels continually improve. The number of 5G base stations owned per 10,000 persons is over 18, and more than 3,000 5G industry virtual private networks (VPNs) are built. Build a batch of 5G fusion application innovation centers, and further increase the capabilities of application innovation-oriented public service platforms. Further improve 5G application security safeguard capabilities. Create 10 to 20 5G application security innovation demonstration centers, and establish 3 to 5 areas as demonstration models. Basically form a security safeguard system adapted to 5G application development.

II. Breaking Through Critical Links of 5G Applications

    (a)   Actions to Establish a 5G Application Standards System

1. Accelerate efforts to clear the way for cross-industry protocol standards. Strengthen overall planning and coordination of important standardization matters across departments, industries, and areas of research, and establish sound mechanisms for cooperation with relevant standardization organizations. Achieve protocol interoperability and mutual recognition of standards as soon as possible. Systematically advance the building of a 5G industry application standards system and the implementation of related policy measures. Accelerate the drafting of integrated application (融合应用) standards. Bring the industrial and organizational advantages of 5G application industry arrays fully into play, and spur the implementation of integrated application standards.

2. Develop integrated application standards for key industries. Systematically advance

research on key-industry 5G integrated application standards, and clearly define directions for standardization, strengthen development of basic general purpose standards, integrated equipment standards, and key-industry solution standards. Accelerate the process of standardization and generalization; pursue breakthroughs in researching and formulating key-field integrated standards.

3. Enact a batch of critical standards for key industries. Bring into play the leadership roles of leading enterprises in each key industry, further strengthen collaboration among all parties, and join forces to push forward iterations, evaluations, and optimizations of 5G industry application standards. Spur applications of relevant standards in key industries.

Box 1: 5G application standards system building and dissemination project
Build a 5G application standards system. Accelerate development of basic general purpose standards for chips and modules, networks, platforms, security system architectures, application requirements, and terms and definitions. Launch industry demand-oriented enhancement technology standards research relating to deterministic networking (确定性网络), enhanced uplink rates, high-precision positioning, and counter-electromagnetic interference, and accelerate the conversion of innovative technologies and applications into standards. Accelerate the drafting of key-industry integrated application standards, and advance development of industry integrated terminal device and network building standards. Promote 5G application standards for key industries. Select key fields such as healthcare, industry, and media, and lead the way in pushing for implementation of 5G application standards. Improve the public service capabilities of 5G application standards. Launch testing, evaluation, and certification for industry 5G application standards, and advance the conversion of innovative technological achievements into standards. By the end of 2023, form a basic general purpose and key-industry 5G application standards system, and complete development of more than 30 critical standards for key industries.

(b)   Actions to Strengthen the 5G Industrial Base

4. **Strengthen efforts to tackle problems (攻关) relating to critical systems and equipment.** Continually advance R&D on 5G enhanced technology base stations, and solidify medium frequency 5G industrial capabilities. Organize the launch of 5G millimeter wave base station R&D and terminal-to-terminal testing. Accelerate the maturation of technologies and products, and lay an industrial foundation for 5G millimeter wave commercial use. In accordance with the current stage-specific (阶段性) characteristics of different versions of 5G international standards (R15 with a focus on high-rate large bandwidth applications, R16 with a focus on high-reliability low-delay applications, and R17 with a focus on medium-and-high-speed large-connection applications), launch technologies, industrialization, and introduction of applications in a stage-by-stage manner.

5. **Accelerate efforts to remedy industry shortcomings.** Intensify inputs into baseband chips, radio frequency (RF) chips, and critical RF front-end components. Accelerate efforts to break through technological and industrialization bottlenecks, and drive efforts to raise the overall level of the industry including design tools, manufacturing processes, critical materials, and core intellectual property (IP). Accelerate R&D and industrialization of lightweight 5G chip modules and millimeter wave components. Further improve the price-performance ratios of terminal

modules, meet the personalization requirements of industry applications, and increase industrial basic support capabilities. Support instrument R&D as it relates to high-precision, high-sensitivity, and large-dynamic-range 5G RF, protocols, and performance. Bring about the fastest possible breakthroughs in high-end chips and core components used in instruments.

6. **Accelerate the maturation of terminal devices for new types of consumption.** Give impetus to the spread of 5G-based wearable devices, smart home products, ultra high-definition (UHD) video terminal devices, and other mass consumer products. Push forward with the in-depth development of embedded SIM (eSIM) wearable devices and services, and research ways to further expand application scenarios. Push forward with engineering breakthroughs in virtual reality, augmented reality, and other immersive devices. Make key breakthroughs in key and core technologies (关键核心技术) such as near-eye displays, rendering, perception and interaction, and content production, and make an effort to reduce product power consumption while raising product supply levels.

Box 2:   5G product projects geared to meet industry needs

Strengthen the adaptability of the 5G base station industry. Develop special-purpose 5G base stations adapted to various industry needs in high-temperature, high-humidity, explosion-proofing, and other special scenarios. Expand R&D into new types of base stations adapted to large-uplink (大上行), low-delay, large-connection, and high-precision positioning requirements, and meet 5G industry application requirements. Promote large-scale commercial use of 5G modules. Build industrialization systems with graded and categorized (分级分类) modules, and guide industry in launching precision product R&D oriented towards differentiated scenario needs. Continually improve the environmental adaptiveness of modules, and continually lower the threshold to scaling up applications. Build industry terminal product systems. Enrich the forms of industry-oriented terminal products, and truly realize 5G industry terminal-to-site, terminal-to-production line, and terminal-to-industrial park. Accelerate the R&D and iterative evolution of all kinds of industry terminal devices such as 5G module-based high definition (HD) cameras, industrial routers and gateways, on-board internet devices, and automated guided vehicles (AGV). Push forward with accelerated predetermining of 5G capabilities and open interfaces in R&D and production of industrial high-end equipment. By the end of 2023, effect a significant improvement in the provisioning capabilities of 5G base stations and modules that meet industry requirements, and achieve a gradual maturation of 5G industry terminal products and high-end equipment.

III. Key Fields for Enabling 5G Applications

7. **5G + information consumption.** Advance the fusion between 5G and smart homes, and deepen application of technical means such as sensor control, voice control, and remote control. Develop 5G technology-based smart home appliances, smart lighting, smart security monitoring, smart speakers, new wearable devices, and service robots. Continually diversify avenues for applying 5G. Accelerate the dissemination of smart products such as cloud augmented reality/virtual reality (AR/VR) head-mounted displays, 5G + 4K cameras, and 5G omnidirectional VR cameras, stimulate consumption of new types of products and content, and spur the development of the consumption of new kinds of experiences.

8. **5G + integrated media.** Launch promotion of the use of 5G backpacks, UHD cameras, 5G television production trucks, and other such equipment. Use 5G technology to accelerate the intelligentized upgrading of each link in traditional media including production, interviews, editing, and broadcasting. Promote high-tech and new video services, and push forward with implementing and applying 5G New Radio (5G NR) radio and television, and provide radio and television and emergency broadcast services. Launch 5G + 8K live broadcasting and 5G + omnidirectional interactive video and audio services, and foster 360-degree spectator experiences. Promote the popularization of 5G in major competitions by means of major events such as the 2022 Beijing Winter Olympics and Winter Paralympics.

(b)   Actions to Deepen Industry Integration Applications

9. **5G + industrial internet.** Advance deep fusion of 5G modules with AR/VR, remote control devices, machine vision, AGV, and other industrial terminal devices. Accelerate the use of 5G in transforming industrial intranets, and create 5G fully connected factory models. Form network deployment models in which IT networks are fused with production control networks. Promote "5G + industrial internet" in the service of core phases of production. While centered on links such as R&D and design, production and manufacturing, operations management, and product services, and with a focus on "5G + industrial internet" development of key industries, create typical application scenarios, continually launch "5G + industrial internet" pilot program demonstrations, support deepening applications of 5G in smart manufacturing fields such as quality testing, remote operations and maintenance (O&M), multi-machine collaboration, and human-computer interaction, continually strengthen guidance through demonstrations, and promote the duplication and dissemination of mature models in more industries and fields. Create an industrial ecosystem, and promote local applications. Encourage each

locality to build a "5G + industrial internet" integrated application pilot zone, and continually expand applications of 5G in fields such as raw materials, equipment, consumer products, and electronics.

10. **5G + Internet of Vehicles.** Strengthen the coordination of the automobile, communications, and transportation industries, enhance connections between government, industry organizations, and enterprises, and jointly establish a complete 5G and IoV testing and evaluation system, so as to ensure end-to-end interoperability of applications. Refine typical scenarios that can be extended at scale and have closed-loop commercialization, and boost user acceptance levels. Accelerate growth of the in-vehicle penetration rate of cellular V2X (C-V2X) communication modules, as well as roadside deployments.[2] Accelerate exploration of business models and application scenarios, support creation of national-level IoV pilot zones, and push forward with coordinated planning and building of IoV infrastructure and 5G networks. Select representative areas in key cities, suitable road sections, and key highways, accelerate 5G + IoV deployment, and promote the innovation and application of C-V2X technology in areas such as industrial parks, airports, ports, and mines. Establish a mutual-trust, mutual-recognition IoV secure communications system that is cross-industry and cross-regional.

11. **5G + intelligent logistics.** Strengthen innovation of 5G logistics applications in industrial parks, warehouses, communities, and other such places. Promote the application of 5G in express delivery via driverless vehicles, smart sorting, dark warehouses, smart wearables, smart identification, and other such scenarios. Accelerate the building of IoT data access, computing, and application platforms for 5G-based logistics. Push forward with construction of automated, smart logistics equipment and infrastructure that are supported by "terminal-edge-cloud" (端边云) coordination, and help to realize automated shipping, smart warehouses, and whole-process monitoring in the logistics industry.

12. **5G + intelligent ports.** Develop 5G-assisted positioning products suitable for port container environments, and accelerate the digital transformation and construction of automated piers, container yards, and container depots. Push forward with full-process, full-cycle digitalization of port construction, maintenance, and operation. Accelerate construction of intelligent port infrastructure, and promote the application of 5G in robotic inspection, remote tower crane hoisting, automated guided shipping, self-driving container trucks, smart stocking, and other such

---

[2] Translator's note: The first three sentences under "10. 5G + Internet of Vehicles" did not appear in the draft version of this Action Plan. CSET's English translation of the draft is available online at: https://cset.georgetown.edu/publication/set-sail-action-plan-for-5g-applications-2021-2023-draft-for-comments.

scenarios. Boost port intelligentization.

13. **5G + smart mining.** Accelerate the development and certification of 5G communication devices that are explosion-proof and otherwise meet the requirements of mining environments. Advance construction of integrated infrastructure for open-pit mines and underground mining areas, including 5G network systems, smart mining area control platforms, and enterprise cloud platforms. Promote applications of 5G in all kinds of mines such as energy mineral, metallic mineral, and non-metallic mineral mines. Expand 5G application scenarios in the mining industry such as remote control and self-driving. Advance remote controlled and clustered operation of key equipment in borehole core mining (井下核心采矿), and unmanned equipment operation in deep and highly dangerous mining areas, and in open-pit mining areas achieve smart operations, continuous operations, and driverless transportation.

14. **5G + smart electricity.** Achieve breakthroughs in critical technologies such as 5G deterministic delays, timing precision, and security safeguards in key scenarios of the electric power industry. Build power communications management support systems and edge computing platforms that integrate 5G. Launch upgrading and transformation of 5G-based industrial control and monitoring networks, and promote application scenarios such as the automation of the O&M of power generation equipment and of power distribution and collection of information relating to transmission line and substation inspections and power consumption. Achieve visualization of production in power generation, intelligentization of control in power distribution, automation of monitoring in power transmission and transformation, and real-time data collection for electricity consumption.

15. **5G + smart oil and gas.** Launch R&D of special 5G terminal devices suitable for the complex environments of oil fields and oil wells. Advance the development of multi-protocol smart 5G data collection gateways and monitoring products, and achieve effective links with communication interfaces in the oil and gas sector. Implement in-depth applications of 5G in such business scenarios as HD video monitoring, pipe leak monitoring and testing, smart robotic inspections, and hazardous chemical product transportation monitoring in all stages, from oil fields and oil wells to pipelines and on to gas stations. Provide safe and efficient intelligentized support for oil and gas extraction, transmission via pipelines, and oil and gas refining.

16. **5G + intelligent agriculture.** In accordance with the digitalization requirements of agriculture and rural areas, push forward in a focused manner with wide coverage, low cost-oriented 5G technologies and applications. Enrich 5G application scenarios in smart agriculture. Accelerate 5G application innovation relating to

smart agricultural machinery and agricultural robots in agricultural production links such as autonomous agricultural operation trials. Develop applications of 5G in such fields as agricultural product cold chain logistics and e-commerce live broadcasting. Strengthen 5G fusion applications for digital villages, and raise the informatization (信息化) levels of rural governance and public services. Use 5G to promote the extension of educational, cultural, and medical resources to rural areas, and spur rural information consumption.

17. **5G+ smart water conservancy.** Push forward with deep integration of 5G technology with the water conservancy industry. Apply 5G, IoT, remote sensing, edge computing, and other such new technologies to raise perception levels for key elements in water conservancy. Combining BeiDou positioning, AI, and other technologies, and research top-level design and model algorithm implementation for AI construction systems that are for water conservancy project construction scenarios. Achieve breakthroughs in 5G human-computer coordination applications.

(c)   Actions to Serve and Provide General Benefits to Society and for the People's Livelihoods

18. **5G + smart education.** Accelerate the R&D of 5G instructional terminal devices and AR/VR instructional digital content. In combination with AR/VR, holographic projection, and other technologies, implement scenario-based interactive instruction, and create immersive classrooms. Promote support for 5G technology vis-à-vis educational private networks. In light of specific application scenarios, research and institute technical norms for networks, applications, and terminals in key phases of online education. Expand the promotion of 5G in smart classrooms, holographic instruction, campus security, educational management, comprehensive evaluation of students, and other such scenarios. Improve informatization capabilities at each stage, including instruction, management, scientific research, and service.

19. **5G + intelligent healthcare.** Launch R&D of 5G medical robots, 5G ambulances, 5G medical access gateways, and smart medical equipment. Strengthen deployment of 5G medical and health network infrastructures. Optimize, in a focused way, nationwide coverage for 3A hospitals,[3] disease prevention and control centers, convenience clinics (便民医疗点), and combined medical and elder care institutions. Create 5G networks and 5G medical edge-cloud [platforms] that are oriented

---

[3] Translator's note: In China's hospital categorization scheme, a grade A tertiary hospital (三级甲等医院), abbreviated "3A hospital" (三甲医院), is a large, technologically advanced teaching and research hospital that provides both general and specialized medical services and serves a large region. "Tertiary" (三级) is the largest size category of Chinese hospital, with 500 or more beds. "A" (甲等) is the top quality category, indicating the hospital has the most advanced technology, equipment, and treatments.

toward in-hospital healthcare and remote healthcare. Enrich application scenarios for 5G technology in the healthcare industry. Promote 5G in a focused way in such contexts as urgent care, remote diagnosis, and health management. Accelerate the incubation of new business formats of technologically advanced, smart healthcare services that have superior performance and obvious effectiveness.

20. **5G + culture and tourism.** Achieve breakthroughs in key general purpose technologies for digital content. Advance critical technology R&D relating to UHD video codecs, terminal-cloud coordinated rendering, and iterative reconstruction. Develop AR/VR immersive content, 4K and 8K video, and other such applications adapted to 5G networks. Create AR/VR business support platforms and cloud-based (云化) content aggregation and distribution platforms. Push forward development of 5G-integrated social networking, broadcasting and viewing, esports, digital arts, and other such interactive content industries. Spur innovations that integrate 5G with equipment for culture and tourism, protection of cultural relics, and ice and snow. Push forward the development of online digitalized experience products for scenic areas and museums. Foster cloud tourism, cloud live streaming, cloud-based exhibitions, online performance broadcasts, and other new business formats. Encourage the development of customized, experiential, smart, interactive, and other new modes of culture and tourism consumption. Create new immersive cultural and tourism experience scenarios.

21. **5G + smart cities.** Expand applications of UHD video monitoring, patrol robots, smart police terminal devices, smart emergency terminal devices, and other such products in such areas as urban security and emergency management. Build real-time, precision security [threat] prevention and control systems. Accelerate deployment of products such as smart meters in municipal management, environmental monitoring, and other such fields. Explore the possibility of building digital twin cities; improve urban perception capabilities (城市感知能力). With a focus on information for the benefit and convenience of the people, accelerate the dissemination of 5G technology-based smart government services. Taking communities, industrial parks, and blocks as the basic units, accelerate digital transformation. Form a batch of 5G smart community comprehensive solutions, and provide new all-encompassing, digitalized community life services. Promote innovative applications of 5G technology in the construction of new types of urban infrastructure based on digitalization, networkization, and intelligentization. Comprehensively raise the construction quality and operating efficiency of cities.

IV. Raising 5G Application Support Capabilities

   (a)   Actions for a Strong Foundation of 5G Network Capabilities

22. **Improve public-oriented 5G network coverage.** Accelerate construction of 5G standalone networks, and expand 5G network urban and rural coverage. Continuously create 5G high-quality networks, and promote coordinated development of the "double gigabit" networks.[4] Build new 5G networks that comprehensively support IPv6, and make an effort to increase IPv6 traffic on 5G networks. Strengthen 5G network coverage in indoor settings, in underground spaces, at key transportation hubs, and along main routes. Promote 5G public networks on high-speed rail, and improve network service quality in typical scenarios. Promote the use of medium and low frequencies to expand 5G network coverage in rural and remote areas.

23. **Strengthen industry-oriented 5G network provisioning capabilities.** Accelerate improvements to critical technology support capabilities such as end-to-end network slicing, edge computing, and high-precision indoor positioning. Push forward with industry-oriented 5G coverage in free trade zones, industrial parks, corporate factory areas, medical organizations, and other key areas. Support the construction of 5G industry virtual private networks in each locality in light of local requirements. Explore new modes of network construction to form local pilot effects.

24. **Strengthen 5G frequency resource safeguards.** Continue to do the necessary interference coordination work for radio stations such as 5G base stations and satellite tracking stations. Give impetus to frequency shifts in 700 MHz band radio and television services. Accelerate deployment of 700 MHz band 5G networks. Publish 5G millimeter wave frequency plans at appropriate times, and explore the possibility of instituting a tendering system for 5G millimeter wave frequency use licenses. Launch research into 5G industrial dedicated frequency requirements and other radio system compatibilities. Research and formulate 5G industrial dedicated frequency use licensing models and regulations suited to China.

(b)   Actions to Co-Mingle the 5G Applications Ecosystem

25. **Accelerate the development of cross-disciplinary integrating innovation.** Support telecommunication operations, communication equipment, vertical industry, information technology, and internet enterprises in launching, in line with their own strengths, technological innovation, integration innovation, service innovation, and data application innovation for 5G integration applications. Deepen integrating innovations for 5G, cloud computing, big data, AI, blockchain, and other such technologies. Strike effectively with a technological "one-two punch." Continually

---

[4] Translator's note: The "dual gigabit" networks ("双千兆"网络) refer to 5G mobile networks and fifth generation fixed networks (F5G; 千兆光网).

cultivate new untapped markets (新蓝海) for 5G applications. Form a batch of application solution providers who understand both 5G and their industries. Compile a list of 5G application solution providers. Support numerous businesses in making the digital transformation, drive scaled-up development of chips and modules, and spur coordination and linkages both upstream and downstream.

26. **Promote 5G fusion application policy innovations.** Encourage and support each locality in allowing 5G application scenarios to bloom in line with local characteristics and industry strengths, and accelerate the implementation of applications with local characteristics. Create 5G application innovation pioneer zones which have notable coordination effects, powerful radiating capabilities, and clear business models. Explore new modes of disseminating applications. Advance scaling up of applications in key industries by using successful experiences to drive widespread adoption (以点带面) and through in-depth promotion.

27. **Launch the building of 5G application innovation vehicles.** Relying on 5G application industry arrays, and with leading enterprises and scientific research units as the founding entities, build a batch of 5G fusion application innovation centers, and launch application innovation-oriented technological and industrial services. Relying on leading enterprises in the industry, institutions of higher learning, and scientific research institutes, accelerate the building of dual innovation vehicles such as 5G application incubators and makerspaces, and perfect innovation vehicle operating modes. Give free rein to the local industry aggregation strengths of incubators and makerspaces. In line with local industry characteristics, promote the transfer and conversion of achievements in 5G technologies and application solutions.

28. **Strengthen support for 5G application general purpose technology platforms.** Focusing on the key general purpose technology requirements of such key fields as industrial manufacturing, transportation, and healthcare, rely on leading enterprises in the industry, institutions of higher learning, and scientific research institutes to launch a joint effort to tackle problems in key technologies of 5G industry application. Build key-industry general purpose technology platforms to solve technological bottlenecks holding back the duplication and spread of industry applications. Provide focused support for building 5G-integrated general purpose technology platforms such as outdoor BeiDou high-precision positioning, indoor 5G cellular independent positioning, AI, UHD video, and AR/VR. Provide basic capabilities for cross-industry 5G applications.

Box 3:   Demonstration projects for fostering a 5G application innovation ecosystem

---

Incubate 5G application solution providers. Push leading enterprises to make the most of their technological and market advantages. With an orientation towards key industries, come out with 5G application total solutions and integrated products, and form a batch of highly innovative, leading 5G application solution providers that have an obvious driving effect. Guide small- and medium-sized enterprises which have technological advantages in niche scenarios (细分场景) and industry knowledge and experience in bringing out 5G application solutions and mature products that are deeply integrated with industry needs, and form a batch of 5G application solution providers centered on niche scenarios for key industries. Create industry leading models. Mobilize the enthusiasm of key-industry leading enterprises, and bring their demand-orienting and resource-integrating roles into play. Connect key 5G application links, and create a batch of 5G application demonstration examples. Provide demonstrations and guidance for 5G scale applications. Build 5G integration application innovation centers. Promote whole-production-chain coordinated innovation for 5G applications, carry out product engineering breakthroughs, and increase the efficiency of converting S&T innovation and achievements into practical applications (成果转化). Continually build and perfect 5G application warehouses, and strengthen supply-demand linkages and resource sharing among innovation factors of production (创新要素). Provide 5G application high-end R&D services and producer services. Support the building of application testing and verification laboratories oriented towards the needs of key industries. Accelerate the formation of 5G application service capabilities such as technology verification and quality testing. Create 5G application innovation pilot zones. Invigorate innovation in all localities, and vigorously launch application innovation policy pilot projects. Optimize the 5G application development environment, explore new 5G network building and application development models, and create a batch of 5G application innovation pilot zones. Under overall planning, promote particular 5G applications for each locality nationwide, and give free rein to industry aggregation effects in such areas as Beijing-Tianjin-Hebei, the Yangtze River Delta, and the Guangdong-Hong Kong-Macao Greater Bay Area. Strengthen area linkages, and give impetus to the building of a batch of 5G industry bases. Encourage qualified localities to intensify support, and form a batch of replicable, promotable 5G application projects. Hold regular "Blooming Cup" ("绽放杯") 5G application invitationals, and promptly publish outstanding examples of 5G integration applications to accelerate 5G application implementation and dissemination.

(c)　　Actions to Raise the Safety and Security[5] of 5G Applications

---

[5] Translator's note: The Chinese word 安全 encompasses the meanings of both "safety" (protection from accidental harm) and "security" (protection from deliberate harm). In this translation, it is variously

29. **Strengthen 5G application safety and security risk assessments.** Construct total life cycle security management mechanisms for 5G applications. Guide enterprises in incorporating 5G application safety and security risk evaluation mechanisms into the 5G application R&D and dissemination work flows. Synchronously plan, build, and operate safety and security management and technical measures, and synchronously implement them with 5G applications. Properly perform supervision and inspection of 5G applications and key information infrastructure, and raise the safety and security level of 5G applications.

30. **Launch promotion of 5G application safety and security demonstrations.** Encourage each locality and enterprise to create 5G application safety and security innovation demonstration centers. Research and develop standardized, modularized, replicable, easy-to-disseminate 5G application safety and security solutions, and launch 5G network security technology application pilot programs for demonstration and dissemination of applications. Promote the popularization of optimal practices of leading enterprises in industrial production, energy, transportation, healthcare, and other key industries. Promote the use of commercial passwords in 5G applications, and properly evaluate the security of password applications.

31. **Improve the safety and security evaluation and certification capabilities of 5G applications.** Support the building of 5G safety and security evaluation institutions.[6] Construct a safety and security assessment system for 5G applications and network infrastructure, and launch safety and security evaluations and capability certification for 5G applications and infrastructure.

32. **Strengthen 5G application security provision support services.** Support 5G security S&T innovation and the conversion of core technologies into practical applications, and encourage 5G security innovation enterprises to relocate to national cybersecurity industrial parks (国家网络安全产业园区). Strengthen 5G security service model innovation, and promote 5G security technological cooperation and capability sharing. Encourage cross-industry, cross-disciplinary formulation of integrated application scenario security service programs. Strengthen discovery, sharing, and coordinated handling of 5G network security threat information.

---

translated as "safety," "security," or "safety and security" at the translator's discretion.

[6] Translator's note: In the earlier draft of this Action Plan, this sentence read "Support the building of 5G safety and security institutions **in line with international practice**" [translator's emphasis]. CSET's translation of the draft Action Plan is available online at: https://cset.georgetown.edu/publication/set-sail-action-plan-for-5g-applications-2021-2023-draft-for-comments.

Box 4:	**Project to Forge 5G Application Safety and Security Capabilities**
Improve 5G application safety and security management capabilities. Perfect the 5G application safety and security standards system, and strengthen propaganda on and implementation of standards. Support qualified enterprises and units in strengthening the building of 5G application safety and security assessment, testing, and certification capabilities. Support the launch of 5G application safety and security self-assessments and third-party assessments. Strengthen provisioning of 5G application safety and security products and services. Promote the development of endogenous security and safety (内生安全), zero trust security, dynamic segmentation (动态隔离), and other key security products. Innovate and launch 5G application safety and security services in areas such as risk identification, situation perception, safety and security evaluation, and network status trust management. Improve service-based 5G application safety and security assurance capabilities. Disseminate and popularize 5G application safety and security solutions. Form atomized, fine-grained 5G application security solutions for different scenarios and business segments. Support relevant enterprises in creating a batch of 5G application safety and security innovation demonstration centers. Launch coordinated R&D, exhibition and dissemination, testing, personnel training, and other such work relating to security solutions. Support qualified localities and industrial parks in concentrating launches of 5G application safety and security pilot project demonstrations. Through multiple designations and simultaneous development, strengthen the dissemination and popularization of 5G application safety and security solutions.

By the end of 2023, create 10 to 20 5G application safety and security innovation demonstration centers, and establish 3 to 5 areas as demonstration models, and basically form a safety and security assurance system adapted to 5G application development. | |

V. Assurance Measures

(i) Strengthen overall planning and linkages. Strengthen departmental coordination and linkages among ministries and provinces. Complete organic linkages with regard to standards, industry, construction, applications, policies, and other aspects. The relevant industrial main oversight departments (主管部门), taking 5G applications as a key direction for industry development planning and action plans, shall make full use of the relevant special funds. Continually guide industries and enterprises in intensifying inputs, and accelerate the development of 5G industry applications. Encourage local governments at all levels to keep focused on work such as 5G application implementation,

ecosystem building, industry incubation, and network building, actively introduce and implement policy measures, and spur accelerated implementation of 5G integration applications. Support in-depth coupling and tight linking of upstream and downstream enterprises. Form a highly efficient, organic cooperative model. Establish expert advisory committees for the dissemination of 5G applications to provide guidance and decision-making support on strategic and future-oriented issues in the dissemination of applications.

(ii) Optimize the development environment. Increase the tilt of government procurement expenditures toward the 5G application field. Promote 5G applications first and foremost in public services fields such as urban management, education, healthcare, and culture. Intensify propaganda on 5G application template projects and demonstration models. Rely on industry-finance cooperation platforms to create a "5G + finance" development ecosystem. Using industry-finance cooperation pilot projects as vehicles, launch industry-finance linking activities for 5G application scenario innovation. Perfect the 5G application innovation enterprise service system, and intensify support for small- and medium-sized enterprises. Encourage more market entities to enter the field of 5G application innovation ventures. In an orderly way, channel all kinds of social capital[7] to establish 5G application investment funds, and expand investments in 5G key-industry applications and critical industry links. Encourage support for listing and financing qualified 5G application innovation enterprises on the STAR Market[8] and ChiNext,[9] and expand enterprise financing channels. Support the principle of inclusive and prudential supervision (包容审慎监管). Strengthen coordinated supervision, and accelerate research into 5G application-related laws and regulations in key fields such as autonomous driving and telemedicine. Explore new supervision models.

(iii) Training talent teams. Firmly establish a foundation for training 5G talent. Support precision talent training that is jointly carried out by institutions of higher learning, scientific research institutes, and enterprises. Encourage

---

[7] Translator's note: The Chinese term 社会资本, translated literally as "social capital," refers to any source of funding outside of government budget outlays. This term encompasses investment by private individuals and private institutions. However, investment from state-funded entities such as state-owned enterprises (SOEs), including state-run banks, also falls under the umbrella of "social capital."

[8] Translator's note: The STAR Market (科创板) is also known as the Sci-Tech Innovation Board of the Shanghai Stock Exchange. It was launched in July 2019 and markets itself as China's equivalent of the NASDAQ exchange in the United States.

[9] Translator's note: ChiNext (深圳证券交易所创业板; 中国创业板; 创业版) is a NASDAQ-style subsidiary board of the Shenzhen Stock Exchange (深圳证券交易所; 深交所).

enterprises, institutions of higher learning, and scientific research institutes to jointly establish laboratories, training bases, professional schools, or interdisciplinary research centers. Strengthen the building of shared project practice bases. Advance 5G-related professional upgrading and digital transformation. Properly implement "1+X" credentials system[10] pilot projects in 5G-related fields. Launch security technology skills competitions, and organize 5G-related occupational training and certification. Expand the range of 5G talent mining and selection channels, and train a batch of well-rounded talents who both understand 5G communication technology and have professional experience in the industry. Conduct 5G knowledge-related science popularization activities directed toward the public, and improve the digital skills of the entire population.

(iv) Promote international cooperation. Support the building of 5G application overseas dissemination channels and service platforms, and support outward investment for mature 5G applications. Bring the coordinating role of international organizations into play, and encourage enterprises to participate in the work of 5G international standardization organizations. Encourage domestic enterprises to strengthen 5G application cooperation overseas. Provide superior products and services to countries or regions of the Belt and Road Initiative.[11] Create new platforms for international cooperation.

(v) Properly perform monitoring and evaluation. Strengthen policy result assessments and dynamic adjustments. Establish a 5G development monitoring system, and build a panoramic 5G network map. Normalize monitoring of the progress of 5G applications and industry, and promote the comprehensive, coordinated development of 5G.

---

[10] Translator's note: The "1 + X" credentials system ("1+X"证书) is shorthand for "'academic credentials + certain professional skill level credentials' system" ("学历证书+若干职业技能等级证书"制度).

[11] Translator's note: The "Belt and Road Initiative" ("一带一路"), abbreviated BRI, refers to the Silk Road Economic Belt (丝绸之路经济带) and the 21st Century Maritime Silk Road (21世纪海上丝绸之路).