**Announcement of Changzhou’s List of Major Technological Demands for Breakthroughs by Means of “Open Competition Mechanism” in 2022**

To support Changzhou’s “532” development strategy to become a world-class city for smart manufacturing and a pivotal hub in the Yangtze River Delta, we require global resources for sci-tech innovation. These will help our industries make breakthroughs in technologies that are high-end, are key to a technology system, or are widely used in various fields.

According to Notice 70 in 2022 issued by the Changzhou Bureau of Science and Technology, the list of requirements for Changzhou’s Sci-Tech Projects Up for Bid 2022 are:

1. **Projects for Bid**

A total of 27 sci-tech projects up for bid （see Attachment 1） have been announced, mainly in intelligent manufacturing and life sciences & health care. The announcement is valid until August 30, 2022.

1. **Bidding Requirements**
2. For Domestic Bidders

Bidders should be domestic colleges/universities, research institutes, sci-tech companies, innovation alliances, and other businesses or organizations with R&D capacity, while also meeting the following conditions:

（1）Capable of undertaking the contractor’s proposed tasks, with strong R&D capacity, excellent research conditions, and a stable team.

（2）Capable of providing feasible solutions for the proposed technical requirements, with independent intellectual property rights （IPR）.

（3）The bidder and the contractor shall not be each other’s sponsor, investor, shareholder, director, executive, creditor, etc.

（4）Has good financial status and standardized management, showing good records of research ethics and business integrity, with no “bad credit” recorded in the past three years.

1. **For Bidders from Overseas/Hong Kong/Macao/Taiwan**

Bidders should be colleges/universities, research institutes, sci-tech companies, innovation alliances, and other businesses or organizations with R&D capacity while meeting the following conditions:

（1）Has a strong R&D capacity, showing good records of research ethics and business integrity, and capable of providing feasible solutions for the proposed technical requirements.

（2）The bidder and the contractor shall not be related as branches of the same corporation within or outside China or in a parent-subsidiary relationship, etc.

（3）When the bidder and the contractor enter into cooperation, their acts shall abide by the laws and regulations of each other’s country or region while acting there.

（4）If the bidder and the contractor sign a cooperation agreement, the agreement shall be standardized and rigorous, specifying the responsibilities and tasks for both sides, with specific provisions on IPR. The agreement shall be signed by authorized representatives from both sides with their names and official seals, or by other people authorized by the representative（s） in a written statement. Each signatory’s name, employer, department, and job title shall be specified. An agreement in a foreign language should be submitted with its Chinese version at the same time, with the Chinese version prevailing in case of inconsistency.

1. **Bidding Process**

1. Filling in documents. Eligible bidders shall submit the *Form for Domestic Bidders and Proposed Solutions* within the validity period. For bidders from overseas/Hong Kong/Macao/Taiwan, they may entrust a partner in China to submit the application documents. A document in a foreign language should be submitted with its Chinese version at the same time, and the Chinese version shall prevail in case of inconsistency.

2. Submitting the documents. The required documents shall be sent in digital form （Word） together with their scanned copies to Changzhou Science and Technology Resources Coordination Service Center （Email: **czkjpg@126.com**） before August 30, 2022. Late applications will not be accepted.

3. Assessment by authorities. Changzhou Science and Technology Bureau, together with all the contractors, will organize experts to evaluate the qualifications of each bidder and the provided solutions, after which the contractors will decide on the proposed list of bid winners with reference to the experts' judgments.

4. Announcement on the successful bidders. The proposed list will be announced by the Changzhou Science and Technology Bureau on the website of Changzhou Technology Innovation （http://kjj.changzhou.gov.cn/）, after which projects with no objection will enter the contract/agreement signing stage.

1. **Contact**

The Service Division of Changzhou Science and Technology Resources Coordination Service Center: Tel. 0519-88101380; English Consulting Tel. 008651988123707;Email: czkjpg@126.com.

#### Attachments:

1. Changzhou’s List of Major Technological Demands for Breakthroughs by Means of “Open Competition Mechanism” in 2022

2. Form for Domestic Bidders and Proposed Solutions

3. Form for Overseas/Hong Kong/Macao/Taiwan Bidders and Proposed Solutions

#### Changzhou Science and Technology Bureau

July 2022

Attachment 1

Changzhou’s List of Major Technological Demands for Breakthroughs

by Means of “Open Competition Mechanism” in 2022

| No. | Rewarder | **Technological Needs** | **Reward （Unit: CNY 10,000 Yuan）** | **Detailed Technological Needs** | **Key Technological Indicators for Assessment** |
| --- | --- | --- | --- | --- | --- |
| 1 | Wanbang Digital Energy Co., Ltd. | Digital twin and safety of energy storage batteries | 300 | The application of digital twin technology in the energy storage industry is still at the stage of exploration and validation in China and abroad. Energy storage battery system is a comprehensive and complex system integrating multiple disciplines, which is highly compatible with the application direction of digital twin technology. The research will focus on the energy storage battery in the charging station, follow the objective law of production and operation of energy storage battery and applies the digital twin technology, striving to make key technological breakthrough and conducting industrial application research in mechanism exploration, health evaluation and operation state prediction, with focuses on three aspects: digital twin theory of energy storage battery, R&D of keytechnology and experiments in typical application scenarios.  （1）Detecting/monitoring the internal thermochemical and thermal state of the battery by sensors to simulate the electrochemical and physical properties of the battery.  （2）Simulating and emulating the operating conditions of energy storage battery based on cloud computing and a large amount of sensor data; simulating the physical environment and mechanism of battery operation at the same time, and carrying out mathematical modeling of the electric and magnetic fields.  （3）The coupling of multi-physics （mechanical-electrical-thermal  -chemical） in the energy storage battery under different operating conditions. | 1. The digital twin technology controls the deviation of voltage and current of energy storage battery within 5%, and controls the predicted deviation of internal resistance and other indicators within 15%.  2. Establishing a set of battery cloud monitoring and warning system to manage the whole service cycle of battery, with over 95% coverage for the problems concerning battery operation.  3. Predicting the optimum operating condition, controlling  battery charging and discharging,  and prolonging the service cycle  of battery.  4. Applying for 5 invention patents. |
| 2 | New United Rail Transit Technology Co., Ltd. | High-voltage silicon carbide 3-in-1 electric drive technology for passenger cars | 1000 | The 3-in-1 drive assembly system of electric vehicle is based on the 2-in-1 drive system, while integrating the controller, removing the high-voltage wiring harness required by the 2-in-1 drive system, reducing volume and weight of the assembly and improving the utilization of space. The reducer and the motor are directly connected, and the motor and the electric control device are also directly connected, which reduces the energy loss in transmission and improves the integration efficiency. The greatest challenge for the 3-in-1 electric drive technology is whether 1+1+1>3. The silicon carbide motor controller, flat-wire oil-cooled permanent magnet synchronous motor and reducer are the key technologies for the development of the high-voltage silicon carbide 3-in-1 drive system assembly in this project.  1. Architecture design of the high-voltage power distribution system and auxiliary power supply system, and the distribution strategy of the energy in the vehicle;  2. Electromagnetic design, cooling structure design and thermal simulation analysis of the high-speed permanent magnet synchronous motor;  3. Integration, lightweight and compact design of the permanent magnet motor, the reducer and the motor controllers;  4. Thermal design, low system stray inductance design, scenario algorithm design and commissioning of silicon carbide motor controller;  5. Oil-cooled 3-in-1 structure design;  6. Design and manufacturing of the high-speed and high-torque reducer. | 1. The high-voltage silicon carbide 3-in-1 electric drive technology for passanger car achieves a high level integration of silicon carbide motor controller, motor and reducer, 10-sec. peak torque: 410 Nm, 10-sec. peak power: 200 kW, maximum motor speed: 16,000 rpm;  2. Silicon carbide motor controller, rated voltage: 800VDC, rated power: 90kW, peak output power: 200kW@700-850VDC, maximum efficiency ≥99%, torque dynamic response time <60ms;  3. Permanent magnet synchronous motor applies vector control, rated voltage: 800VDC, peak power ≥ 200kW @ 700-850VDC, peak torque: 410Nm, continuous power: 90 kW, continuous torque: 150Nm, maximum efficiency ≥ 97%.  4. Single-speed reducer, speed ratio 9.5-10.5, peak input torque ≥ 410Nm, maximum input working speed > 16000rpm, comprehensive working efficiency ≥ 97%. |
| 3 | PGTEX CHINA CO., LTD. | High-efficiency and high-precision machining technology and equipment for carbon fiber composite components | 400 | Current state in China and abroad: the following shortcomings exist in the machining of carbon fiber composite components by conventional machining: low machining efficiency; damage to the machining surface such as burrs, cracks and delamination, which leads to poor quality; components are prone to deformation. At present, ultrasonic composite cutting is applied as the main technology for machining carbon fiber composite components worldwide. With DMG in Germany as the representative, foreign machine tool manufacturers enjoy monopoly in ultrasonic machining technology. The Ultrasonic Series ultrasonic machine tools produced by DMG reduce the machining force up to 50%. Description of this research project: （1） Process optimization of the ultrasonic composite machining for carbon fiber composite materials. （2） Establishment of the ultrasonic composite machining process database for carbon fiber composite components. （3） Development of the high-integration technology for CNC system and ultrasonic system. （4） Trial production, testing and application of the high-precision ultrasonic composite machining equipment prototype. | 1. Developing 1 set of high-precision ultrasonic composite machining equipment prototype. Machining stroke （X/Y/Z）: 600×700×500mm; maximum load of the workbench: 350kg, workbench diameter: 480mm; spindle speed: 20000r/min, drive power: 25KW, torque: 86N.m; ultrasonic vibration frequency: 15~55KHz, maximum amplitude ≧ 15μm; X/Y/Z triple-axis positioning accuracy: 0.005mm, A/B/C-axis positioning accuracy: ±10``.  2. Developing a carbon fiber ultrasonic machining process database, including ultrasonic frequency, amplitude, cutting force, precision and other parameters.  3. Machining more than 5 kinds of carbon fiber composite components in trial production, delamination ratio γ≦1.1, roughness≦2μm.  4. Applying for more than 3 patents; training 5 technical personnel. |
| 4 | Changzhou Ectek Automotive Systems Co., Ltd. | Key technology of hybrid drive system for heavy-duty vehicles | 200 | 1. Current state in China and abroad  China has introduced stricter environmental regulations for commercial vehicles in recent years, especially heavy-duty vehicles.With the development of automotive electrification technology, the electric transmission technology of heavy-duty vehicles has become the focus of research and development. Hybrid heavy-duty vehicles realize electric or mechanical transmission, make full use of the advantages of power sources such as engines or power battery packs, achieving low fuel consumption, low emissions and other goals, thus enjoying good application and development prospects.  2. Description of this research project  The research focuses on the key technology of the hybrid power system of heavy-duty vehicles, mainly developing the high-precision model of the hybrid power system of heavy-duty vehicles; formulating the energy management strategy for the hybrid power system of heavy-duty vehicles and developing efficient, real-time online energy management; establishing the high-precision identification method for hybrid power drive motor; developing the fault diagnosis and proper management methods for the complex electromechanical system of the hybrid power, establishing a set of scientific development process and system for electric control of the hybrid power system of heavy-duty vehicles, and being capable of developing the electric control technology fully independently. | The technology should be applied on typical vehicles and meets the following indicators:  1. Compared with the conventional approach, the new approach improves online energy optimization by 5%.  2. Energy recovery rate ≥20%.  3. Online parameter identification precision meets the requirements for control, and the motor torque and speed control precision should be ≤ 3%.  Fault tolerant time interval FTTI=20~100ms, fault detection time≤5ms; troubleshooting time≤5ms.  4. Fault tolerant time interval FTTI=20~100ms, fault detection time≤5ms; troubleshooting time≤5ms. |
| 5 | ProwillTechnology （Changzhou） Co., Ltd. | Pre-filled syringe needle loading equipment and process control technology | 500 | 1. Current state in China and abroad: pre-filled syringes are the third generation syringes with certain advantages such as accurate dose, excellent drug compatibility, safe and convenient use, etc., and are widely used in the packaging of vaccines, and genetic, anti-thrombotic and medical cosmetology products, and are the Covid-19 vaccine packaging material specified by the China Association for Vaccines. But the manufacturing equipment for the pre-filled syringes are provided by German, Italian and US enterprises, therefore all such equipment in China are imported. Due to the Covid-19 pandemic, the delivery period of these equipment by the foreign manufacturers is as long as 18-32 months, which is unable meet the production demand of the pre-filled syringes.  2. Equipment functions: This equipment is used to load and fix the needles of pre-filled syringes, and the technological processes include: needle loading, adhesive injection, curing, repeated curing, pull-out test, needle perpendicularity and sharpness check, etc.  3. Description of this research project: Development and successful application of the needle loading process technology and equipment of pre-filled syringes: （1） assurance of needle sharpness; （2） no adhesive permeation; （3） no scratches on the syringe; （4） increase of production capacity. | 1. Production capacity: 3000pcs/hour;  2. Up-to-standard rate: over 95%;  3. Energy consumption: 15 cubic meters of compressed air/hour;  4. Dimension requirements: adhesive thickness ≤ 1.5mm, needle deflection ≤ 4°, needle length: 16.0±1.2mm;  5. Initial fixing force of adhesive ≥ 20N;  Achievement indicators: （1） Intellectual property rights: 12 patent applications, including 5 inventions, 7 utility models and 6 authorized patents; （2） Papers: publishing 3 papers; （3） Technical standards: leading the development of three enterprise standards; （4） Producing prototype. |
| 6 | Ackam （Jiangsu） Industrial Technology Co. Ltd | Technological development of core equipment for air wave steam power exchange network of public works | 350 | Current state in China and abroad:  Usually a condenser is added to recover soft water from the low quality steam from public works with gauge pressure <1 bar, resulting in waste of thermal energy and increase of fixed investment; for high-pressure steam from public works, conventional technical measures of flow restriction + water spray is often adopted to reduce superheat, pressure and temperature, resulting in waste of pressure energy and thermal energy, which is not accord with China's goals of "carbon neutrality & peak carbon dioxide emissions". Integrated technology of steam power exchange network is an effective solution for this problem, but we have encountered a bottleneck in R&D of the core power exchange equipment.  Air wave steam power exchange technology takes advantage of the high pressurization ratio of the wave rotor, one of its power exchange characteristics, to achieve a higher pressurization ratio. It features significant advantages in applications of steam pressurization and reduction of superheat, with pressurization efficiency much higher than that of injection pressurizer; it has two-phase pressurization properties and is better than conventional turbine equipment. The development of this core equipment for steam exchange in public works has important and practical value for improving energy efficiency management in the system and reducing carbon emissions.  Description of this research project:  1. Research on the mechanism of air wave steam power exchange includes the self-cooling and temperature reduction mechanism of high-pressure steam by means of air wave expansion, and the shock wave pressurization mechanism of low-quality driven steam.  2. R&D of air wave steam power exchange prototype and prototype testing.  3. Creating a thermodynamic model of the core equipment based on the steam pneumatic process according to the integrated technology solution of air wave steam power exchange network, and studying the feasible solution for the intelligent and efficient steam thermal management of the integrated air wave power exchange model.  4. Dynamic sealing technology for ventilation device. | 1. Establishment of a structural solution suitable for air wave steam power exchange equipment, R&D of special core equipment for air wave power exchange, which will become an innovative cutting-edge technology.  2. The prototype developed meets the indicators, speed < 2900RPM, expansion ratio < 3.0, pressurization ratio > 1.2, ejection rate > 25%.  3. Developing a feasible intelligent steam management solution containing air wave power exchange equipment.  4. Applying for more than 3 patents. |
| 7 | HHC Group Corp. | Research & development of automatic special assembly line for micro-motor manufacturing | 230 | The assembly line for micro-motor manufacturing is comparatively conventional and backward, therefore R&D of the key technology of the manufacturing process and manufacturing & assembly line is required to realize the process flow management and automation of the manufacturing process, and to improve production efficiency, reduce energy consumption and save manufacturing cost. This project focuses on the automatic special assembly line for micro-motor manufacturing, including automatic assembly of motor shoes, visual inspection, and fully automatic equipment unit for screw rod, to develop an integrated and high-end intelligent manufacturing for micro-motor production and inspection, with the 2 main targets as follows:  1. The project applies intelligent robot module for automatic intelligent control, and conducts R&D for precision and consistency of the adhesive coating module and dispensing. The manufacturing capacity of the unit should meet the adhesion angle, adhesion height, adhesion strength and other product technical requirements; the project develops integrated visual inspection unit to perform intelligent detection of the casing and magnetic shoe assembly parts. Therefore this unit requires the visual inspection with precision and efficiency to check inside the casing.  2. R&D of the intelligent screw rod assembly unit. In order to develop efficient intelligent assembly process, this unit needs to make a breakthrough in the key issues of precise positioning of the screw rod assembly, hierarchical control of multi-mechanism system, process inspection and analysis methods, etc. | 1. Magnetic shoe adhesion strength: ≥3000N （single piece）;  2. Magnetic shoe time: 6pcs/min;  3. Reject rate ≤ 1% （batch quantity 10000pcs）;  4. Compatible with all products in 40 Series and 60 Series;  5. Adhesive coating area ≥85%;  6. Visual inspection NG misjudgment rate ≤500PPM;  7. The runout value of finished product after assembly of the screw rod ≤ 0.2mm;  8. With intelligent control system and data management capabilities, and can be integrated with MES and other systems;  9. The intellectual property rights should be owned by our company. |
| 8 | Sibeier Electric Co., Ltd. | Technology of 2P DC1500V moulded case circuit breaker that meets the requirements of intelligent manufacturing and is suitable for new energy systems | 300 | 1. Project background  The technology is used in DC1500V inverter system to achieve grid parity for photovoltaic power generation. As the conventional DC circuit breaker, with its low voltage, cannot solve the problem of single-pole full-voltage breaking, it is unable to meet the new energy application scenarios.  Our company has decided to conduct R&D of high-voltage moulded case circuit breaker for new energy system as a special project, to change the status quo and lead the development of the industry. The product also meets the requirements of intelligent manufacturing.  2. Description of this research project  （1） Research program  This circuit breaker uses air as the medium for arc extinction. It establishes a mathematical model and carries out digital simulation of the breaking process based on the magneto-hydrodynamics theory of the switching arc. High-speed cameras are used to capture the whole process, dynamically displaying the motion state of the arc and comparing with the simulation results to select the optimal solution.  （2） Difficulties in R&D  1） Heavy current under short circuit fault and low current of critical load when the breaker disconnects under high voltage;  2） The flashover distance is zero when the breaker disconnects, that is, no arc spraying out of the casing;  3） Modular design meets the requirements for intelligent manufacturing. | The core components of the high-voltage DC moulded case circuit breaker applies modular design,facilitating automatic production and assembly/testing/checking and meeting intelligent manufacturing requirements.  1. Casing frame class Inm: 630A  2. Rated current In: 250A-630A  3. Number of poles: 2 （bipolar series connection）  4. Rated insulation voltage Ui （V）: 1600  5. Rated impact withstand voltage Uimp （kV）: 8  6. Rated operating voltage Ue （V）: 1500  7. Rated ultimate short-circuit breaking capacity Icu （kA）: 15  8. Rated operating short-circuit breaking capacity Ics （kA）: 100%Icu  9. Single-pole short-circuit breaking capacity Iit （kA）: 2.5  10. Electrical service life （times）: 1000 |
| 9 | Changzhou Mingseal Robot Technology Co., Ltd. | Development of motion control technology for high-speed and high-precision dispensing robots | 300 | At present, there is a wide gap between the domestic dispensing and mounting robot system with the high-end foreign drive control brand, especially in the motion control performance. By virtue of decades-long theoretical development and industrial practice and experience accumulation in the field of precision motion system, Europe, US and Japan enterprises （Yaskawa, Panasonic, Siemens, Elmo, etc.） have occupied the key supply positions in the equipment system for a long time with series of motion control servo products.  Description of this research project: 1） Developing the whole-cycle dynamics model of dispensing motion system; 2） Conducting a systematic and in-depth research on the positioning vibration mechanism of the dispensing motion system to find out and solve the root cause; 3） Conducting research on the high-speed and high-precision positioning control strategy and algorithm of the integrated motion system with drive control to solve the problem concerning high-speed and high-precision positioning.  Therefore, in order to meet the development needs of "high efficiency, high precision and high reliability" precision equipment, the problems at present in respect of motion control in system model theory and motion control system architecture should be solved as soon as possible. It is the inevitable course we must take to improve the performance of high-speed and high-precision equipment for semiconductor and precision electronics in China. | 1. Improving the displacement error build-up time of the dispensing robot's shaft motor by more than 50%: the displacement error built-up time should be within 2 control cycles compared with the current 4-5 control cycles.  2. Reducing the Integral of the Absolute Error （IAE） of the dispensing robot's shaft motor by more than 50%: the following displacement error should be reduced by 50% on the basis of the current displacement error.  3. Improving the positioning accuracy of the end load of the dispensing robot: under the same positioning time, the positioning accuracy of the end load of the robot should be improved from the current 25-35um to less than 10um.  4. Improving the positioning time of the dispensing robot （dispensing efficiency） by more than 80%: under the same positioning accuracy, the vibration attenuation cycles of the end load of the robot should be reduced from 8-10 at present to 4-6. |
| 10 | Jiangsu ETHONS Electric Co., Ltd. | Bottom protection robot with uninterrupted operation for power distribution equipment | 300 | The condensation and moisture will invades into the power distribution equipment from its bottom such as wire inlet and corroded opening, causing equipment failure.  There is an urgent demand to develop the "bottom protection robot with uninterrupted operation for power distribution equipment" for the construction in narrow and complicated space without power cut.  Technical difficulties and key points:  1）Narrow space （<50cm）, deep （about 5m）, waterproof, moisture-proof, rust-prevention, etc. in a narrow space;  2）The workers need to move around the large number of cables and wires for complete construction;  3）As the shapes of the holes and gaps at the bottom vary, the workers should seal both small and large-size holes and gaps （2cm）;  4）There may be standing water in the space for a long time, so the equipment should be able to operate under the environment of high humidity;  5）It is not needed to open the cabinet door of the equipment, therefore, will not affect the normal operation;  6）There is no light in the space, so the construction may be affected by atomization when the protective material is sprayed. Construction quality and scope should be monitored to ensure complete protection without uncovered places, and the equipment should provide "visualized" quality monitoring means for operation. | Key technical indicators of the operating robot system:  1. Able to operate in space of conditions as follows: height<50cm, depth>5m, width>3m;  2. Workable environmental conditions: maximum humidity 90%, temperature 0~40℃;  3. The robot needs to work with our independently developed high-expansion, fast-curing foaming material for spray operation on the equipment base plate of the operating space, and needs to flexibly move around the interlaced cables and wires in the space; single spraying operation area is not less than 15m2, andthe operation should be finished within 1 hour;  4. Achieving visualized monitoring at the same time with construction: the operating space is basically devoid of light, and there may be atomized substances affecting monitoring during operation;  5. Meeting the uninterrupted operation needs of 35kV and below power distribution equipment: the robot system needs to meet the electromagnetic compatibility requirement under high-voltage electric field. |
| 11 | Jiangsu Branch of China Academy of Machinery Science and Technology Group Co., Ltd. | Key technology development of high-speed and high-torque motorized spindle for titanium alloy ultrasonic combined machining | 350 | Current state in China and abroad:  Titanium alloy is a material difficult for machining, and the spindle speed is required to be under 1000r/min in high-efficiency machining, and usually 200~400r/min; generally the spindle speed is required to be around 3000~8000r/min in high-speed operation, with problems such as high temperature during cutting and machining, cutting deformation, severe cold-working hardening or material sticking to the tool, resulting in tool wear and poor surface quality. Ultrasonic-assisted machining is applied as an advanced technology worldwide for machining of titanium alloy parts. Foreign enterprises such as Multifactor in Switzerland, IBAG have occupied a dominant position in the motorized spindle market. The motorized spindle produced by IBAG features torque up to 300N•m and a maximum speed of 140,000r/min. The motorized spindle produced by the domestic manufacturer Jiangsu AI MACH has a maximum speed of 15,000r/min and rated torque of 38.8N•m; the motorized spindle developed by Guangzhou Haozhi has power of 20kw and torque up to 203N•m, but the maximum speed is only around 10,000r/min. At present, the high-speed and high-torque motorized spindles for titanium alloy machining in China are still entirely dependent on imports.  Description of this research project:  （1）Digital design and structure optimization of cooling system of motorized spindle. （2）Simulation and optimization of dynamic balance of motorized spindle. （3）Development of high-precision assembly process of high-speed, high-torque motorized spindle. （4）Prototyping, testing and application of high-speed, high-torque motorized spindle. （5）Development and optimization of ultrasonic composite machining process for titanium alloy. | 1. R&D of 3 kinds of motorized spindles for ultrasonic composite machining machine tools （different torque/speed）. Power≥25kw; maximum speed: 20000r/min; maximum torque: 100N•m and above; temperature rise≤18 ℃.  2. Making breakthroughs in 2 key technologies: the design technology of motorized spindle cooling system, and the high-precision assembly process technology of high-speed, high-torque electric spindle.  3. Workign with ultrasonic composite machining machine tool for trial production of titanium alloy parts of more than 5 kinds, Ra<0.3µm.  4. Establishment of the process database for titanium alloy machining, including machining by 3 kinds of motorized spindles, covering cutting force, machining precision and other parameters, and the total number of data is not less than 1000.  5. Applying for more than 5 patents and being awarded 3 authorized patents. |
| 12 | CENTURAY Technology （Changzhou） CO., LTD | Key technology of intelligent manufacturing of super copper wire for new energy vehicle electric drive system | 500 | With the accelerated popularity of new energy vehicles worldwide, how to significantly improve the efficiency of new energy vehicles has become a key issue. The conductivity and mechanical properties of conventional copper wire have been explored to the limits, and the problem has severely constrain the performance of new energy vehicles for further improvement. The development of the new energy vehicle industry is calling for a new generation of high-performance materials. Research on high-performance super copper wire （including but not limited to high-performance super copper wire based on copper alloy and copper/nanometer tubes and other composite materials） has been made to produce high-performance conductors. Theoretical calculations and experimental studies have shown that the material's conductivity, thermal conductivity, mechanical properties and other aspects fully surpass the conventional copper wire, and will usher in a profound transformation for new energy vehicles.  As a domestic leader in the fields of high-strength, high-conductivity copper alloy and high-purity, oxygen-free copper for new energy vehicles, CENTURAY has followed the demand of cutting-edge technology development and has been engaged in the R&D project of high-performance super copper wire based on its leading copper alloy technology, and the R&D investment budget of the project exceeds CNY 50,000,000 Yuan. | 1. Super copper wire includes but is not limited to copper alloy and composite material based on copper/ nanometer tubes;  2. Copper alloy and composite material should meet the production requirements of melting （upward continuous casting is preferable）, cold machining （rolling, drawing）, etc.;  3. Diameter range of super copper wire: φ2.0mm ~ φ4.0mm;  4. Resistivity of super copper wire at 20℃≤1.90×10-8Ω•m, resistivity at 180℃≤2.57×10-8Ω•m. |
| 13 | Jiangsu HongyunMechanical Manufacturing Co., Ltd. | Development of double-rotor continuous mixing device for wet slurry of lithium battery | 400 | As lithium battery manufacturers are constantly pursuing manufacturing efficiency and reducing productioncost, the slurry process has gradually developed from the conventional dual planetary mixer （P/D mixing hollander） to a continuous slurry system.  Description of this research project:  （1）Developing a continuous mixing rotor with a highly tensile wedge-shaped rotor structure by means of digital twin technology for the lithium battery slurry processing to ensure a high-quality, high-efficiency mixing process.  （2）Reducing the risks of excessive metal ion content in the slurry products due to wear and material corrosion during processing and improving product quality through the material research and structural design of the core components of the equipment.  （3）Design and development of a continuous mixing pilot plant for wet-process anode slurry for lithium battery with a production capacity of 100L/h: a high-efficiency mixing device integrating mixing, fine dispersion, degassing and other operations.  （4）Design and development of a continuous mixing device for wet-process anode slurry for lithium battery with a production capacity of 1200L/h: a high-efficiency mixing device integrating raw material feeding, pre-mixing, mixing, fine dispersion, degassing and other operations. | 1. Mixing performance: compared with the current kettle mixing equipment, the mixing uniformity of the continuous mixing equipment designed and developed should be improvd by more than 20%.  2. Metal ion content in the lithium battery slurry: compared with the current kettle mixing equipment, the metal ion content in the lithium battery slurry produced by the continuous mixing equipment designed and developed should be improved by more than 50%.  3. Level of automation: the continuous mixing equipment designed and developed should meet the requirements of fully automatic production, and compared with the current process, this equipment should reduce the labor costs and labor intensity by more than 80%.  4. Production capacity: the production capacity of the double-rotor continuous mixing pilot plant should be no less than 100L/h; and the production capacity of the double-rotor continuous mixing production device should be no less than 1200L/h. |
| 14 | Jiangsu Intell Motor Technology Co., Ltd. | Development of high-speed, high-precision and high-efficiency spindle servo system | 320 | High-speed, high-precision spindle servo system for CNC machine tools is of advanced technology and complex production process, and high barriers for entry into the market. At present, foreign-funded manufacturers are the major players in the market, and the domestically manufactured high-speed, high-precision spindle servo system for CNC machine tools has a substitution rate of less than 20% against the imported products. There is still a wide gap in R&D capabilities and technical performance between domestic enterprises and foreign manufacturers, and the Chinese manufacturers are striving to catch up.  Description of this research project: 1. Improving the performance for high-speed, high-precision and high-efficiency by improving the motor structure and the machining process for motor parts; 2. Achieving high-speed, high-precision and high-efficiency of the motor by improving the algorithm of the driver software. The implementation of this project is of great significance to the performance improvement of high-end CNC machine tool industry, and may also drive the domestic spindle servo system industry to further promote R&D and manufacturing competence in high-speed, high precision products, which is beneficial to enhancing the competitiveness of China in the field of intelligent manufacturing. | 1. Expanding torque range: 18~72N.m;  2. Speed: rated speed: 2,000 r/min, range of speed adjustment: 1-24,000r/min.;  3. Motor efficiency≥91%;  4. Durability: ≥ 8000 hours;  5. Power range: 3.7~15KW. |
| 15 | Jiangsu Hengli Hydraulic Co., Ltd. | Solution for specialized sensor of digital hydraulic cylinder | 350 | A new-generation digital hydraulic cylinder is required to, not only deliver mechanical force as a hydraulic cylinder, but also output digital signal to its system, so that an intelligent system is provided. With the features of intelligence and low weight, we need to, not only solve the existing bottleneck problem of the traditional product, but also reduce the cost of the hydraulic cylinder and make its performance more stable by optimizing the structure of oil cylinder and integrating it with the active control of the system. Specifically, we provide the following three solutions:  （1）Solution I: Hall induction sensor. Put the magnet onto the internal piston of the oil cylinder, and the Hall element, on the external surface of the cylinder barrel. When the piston moves, the magnetic field gets through the barrel, and the Hall element is influenced by the change of the magnetic field and outputs digital signal, so that the real-time position and speed of the oil cylinder are identified;  （2）Solution II:Magnetostrictive sensor. A breakthrough is made at the principles of the traditional magnetostriction. Put the magnet onto the piston, and the sensing elements like waveguide wire, on the external surface of the cylinder barrel. When the piston moves, the magnetic field gets through the barrel, and the Hall element is influenced by the change of the magnetic field and outputs digital signal, so that the real-time position and speed of the oil cylinder are identified;  （3）Solution III: Microwave sensor. The hydraulic oil conducts the microwave emitted by probe, and the piston reflects the microwave, on the other hand, the probe receives the microwave, so that the position and speed of the piston are identified.  The technical bottlenecks that may exist in the above solutions:  1. Magnetic barrel and magnetic field sensing. How to form a stable magnetic field that can be sensed;  2. An optimized program for the Hall element and the layout of the magnetic field in the principles of the Hall Effect;  3. A detailed program for implementing the principles of magnetostriction;  4. The relation between the microwave conduction in the hydraulic oil and the interference factors, such as pressure, temperature, cleanness, etc. | 1. Indication error: ±0.2mm  2. Operation temperature: -40℃~+120℃  3. Applicable speed: 1m/s  4. Maximum stroke: Customizable  5. Hydraulic medium: Compatible general hydraulic oil;  6. Waterproof class: IP69K. |
| 16 | Changzhou Lemeng Pressure Vessel Co., Ltd. | Laser-TIG composite welding technology for 304 stainless steel plate of medium thickness and its equipment development | 300 | The laser-TIG composite welding has more powerful adaptability and weldability than the single laser welding, and is more suitable for modern welding, the laser-TIG composite welding technology. It has broader development space and application prospect in the pillar industries in the national economy such as automobile production, ship manufacture, and also provides a feasible solution for the welding of dissimilar and difficult materials. In recent years, the countries like U.S., Germany, Japan and Ukraine has made a huge investment in the research of the laser – arc composite welding technology to expect it to be widely applied in the intelligent manufacture field.  Changzhou Lemeng Pressure Vessel Co., Ltd. is devoted to the R&D, design and production of all kinds of pressure vessels, vacuum cavities and semiconductor device parts, and provides its customers with turnkey solutions. Currently, it is developing the laser-TIG composite welding technology for the stainless steel plate of medium and high thickness over 400mm, the proposed R&D investment is 3,000,000, and the development is carried out together with scientific research institutes. Thelaser-TIG composite welding technology is developed against the mechanical properties of 304 austenitic stainless steel such as low heat conductivity, large linear expansion factor and high content of alloy elements, and the influence of the technical parameters on the welding quality is researched. The description of the major research: （1） To establish a whole system for the laser-TIG composite welding to enable the laser-TIG composite welding of 400mm stainless steel plate of medium and high thickness; （2） To study and analyze the interaction mechanism of laser heat source and arc heat source, and the influence of the ratio of energy on the penetration capability and welding seam forming of the laser-TIG composite welding by comparison experiments of TIG welding, laser welding and the laser-TIG composite welding; （3） To study and analyze the influence of laser wire spacing, defocusing amount, laser power and other technical parameters on the forming, defect and mechanical performance of the laser-TIG composite welding seam,and to study and analyze the mechanism of the influence of the introduction of arc on the microstructure and microhardness of the laser-TIG composite welding seam; （4） To develop a complete system of the laser-TIG composite welding processes for 400mm stainless steel plate of medium and high thickness, and its optimal technical parameters. | 1.Welding speed for single-pass welding of 400mm-thick 304 stainless steel plate up to: 6m/min  2. Tensile strength of plumb joint （MPa） >630MPa; elongation >76%;  3. Welding seam porosity ≤0.2%; local clustered or chain porosity≤0.1%;  4. Length or diameter of defects like round porosity lower than 0.1mm; number of such defects less than 2;  5. A system of the laser-TIG composite welding equipment. |
| 17 | Jiangsu LaiteBeidou Information Science & Technology Co., Ltd | Digital twin-based safety monitoring system for underground engineering | 200 | During urban construction and development, there are often rockburst, large collapse, subsidence and other geological and engineering disasters in the tunnels, underground parking lot, civil air defense engineering, cave depot and military facilities, which bring huge risk to the construction, operation or maintenance of engineering. Therefore, research is carried out against monitoring and early warning delay and slow danger control response caused by greater influence of artificial factors on the accuracy of the measurement data of underground engineering space, lack of approach of 3D model construction, and low data processing precision and reliability.  Description of this research project:  （1）To develop and produce an intelligent automatic data collection vehicle based on underground space, in order to enable autonomous navigation and positioning in a enclosed space and automatic collection of point locations and image data;  （2）To provide an AI management, integration and analysis technology of a huge amount of multi-source heterogeneous monitoring data;  （3）To establish a holographic sensing intelligent diagnosis and safety risk control software platform. | Patrol route automatically planned according to the structure of underground engineering  1. Patrol speed not lower than 20km/h, navigation and position precision not higher than 10cm, automatic obstacle avoiding distance not lower than 2m;  2. More than ten online monitoring data processing types are available （horizontal displacement, vertical displacement, 3D deformation, crack, soil pressure, seepage, water level, water pressure, temperature and humidity, inclination, flexibility, stress and vibration）. Display response time for daily operation not longer than 2s;  3. Display response time of complicated chart not longer than 10s, system peak response speed, simultaneous processing for ≥ 50 users;  4. Data received, arranged, saved, indexed and given early warning ≥50000 entries per second;  5. At system peak, data received, arranged, saved, indexed and given early warning ≥80000 entries per second. |
| 18 | Jiangsu Kaite Auto Parts Co., Ltd. | Research & development of digital process manufacturing technology for complex-structure automotive aluminum wheels with oversized and super-wide rims | 500 | China has become the largest manufacturer and exporter of automotive aluminum wheels in the world for twelve consecutive years, but the problem of “large scale and lack of power” is still significant, and the prevailing approaches for casting, mold and product design are still “empirical” and “trial and error”, which is substantially far behind the developed countries in intelligent manufacture. The traditional manufacture processes can hardly adapt the need for the large-diameter, wide-rim and deep-Lip aluminum wheels. Aiming at the aforesaid “cutthroat” technology, by carrying out the research of an advanced digital processes system for automotive forming, designing intelligent molds, researching intelligent heat treatment processes and equipments, and designing quick-processes and low-weight products, a systematic digital processes for the automotive aluminum wheels is formed, so that the aluminum wheels over 20 inches, especially over 26 inches, rim width over 7mm and Lip depth over 3mm at the international high-end market for large vehicles like off-road vehicle, recreational vehicle, wide pickup, light cargo or passenger-carrying vehicle are developed, and distinct progress of our automotive aluminum wheel industry in intelligent manufacture technology is made. | 1. Thermal forming process tracing, 20-32 inch casting defect lower than class 1, percent of pass exceeds 90%.  2. More than 50 intelligent molds are developed, the rate of first development success exceeds 90%, less than 2 mold trials, and rejected casting is reduced by 50%.  3. The hardness rises from 60-90 to 70-80; the energy for fusion casting and heat treatment is reduced by over 10%.  4. The lead time of new product is reduced from 15 days to 7 days, and the weight of the wheels of 20-32 inches is reduced by 1-3 kilos.  5. Ten series of new products are developed, whose performance is improved by over 20%, the tensile strength is larger than 320Mpa, the yield strength is larger than 250MPa, and the elongation is larger than 10%.  6. We applied for 8 patents, including 5 invention patents, and 3 utility model patents; more than 3 patents are granted. |
| 19 | Jiangsu Trautec Medical Technology Co., Ltd. | Recombinant collagen-based gel for repair of intrauterine adhesion | 200 | Intrauterine adhesion often occurs in the population subject to repeated intrauterine operations, especially the women over 35. The operation causes the damage of endometrium basal layer, endometrium repair impediment and proliferation of fibrous tissue, which finally leads to infertility. Clinically, hysteroscopic uterine exploratory operation is typically used to treat intrauterine adhesion, however, the operation would cause intrauterine mucosa damage and high rate of relapse. On the other hand, the intrauterine stent and cross-linked hyaluronic acid have problems like bad tolerability and short resistance time. Therefore, there is an urgent need of a biologically compatible intrauterine adhesion repair product of long resistance time and excellent repair effect. The collagen has natural repair and regeneration factor, which can play a role of lubrication, repair, regeneration and bleeding stop.  This company, as a leading company in the recombinant humanized collagen industry, has the raw materials of the recombinant humanized collagen and related collagen products with proprietary intelligent property. Hence, we have sufficient intention and motivation to develop a collagen-based intrauterine adhesion repair gel. | 1. The product should meet the requirement of injectability to facilitate doctor’s operation;  2. The product should be degradable and absorbable without need of a second operation to take it out;  3. The product should have a proper viscosity in the uterine environment to help divide the uterine structures, and the resistance time in the uterine cavity should be 7-28 days;  4. The product should have lower irritation, and the anti-adhesion effect should be equivalent to or better than its competitive products. |
| 20 | Jiangsu Yurui Pharmaceutical Technology Co., Ltd. | Development and industrialization of Pimavanserin tartrate for Parkinson's disease treatment | 250 | 1. Thepimavanserin tartrate is used for treatment of mental disorder （PDP） symptoms related to the Parkinson’s disease like hallucination and delusion. It was put on the market in U.S. in 2016, and the current global sales amount is 160 million dollars. No declaration is made in China.  2. Description of the research  The RLD company uses a comparatively expensive catalyst, Palladium and a highly toxic agent, Phosgene in its synthesis route. Therefore, there is an urgent need for developing a low-cost, eco-friendly and high-field industrialized route. The requirements are shown below:  1）Not use precious-metal catalyst （for example: palladium）;  2）Short route, reasonable reaction time and man hour;  3）Not use phosgene, a highly toxic agent, and not use any agent which can cause heavy pollution;  4）Incur lower cost than the reference listed compound patent;  5）Be able to be expanded into workshop and satisfy the industrialized production requirement;  6）Complete the research and preparation of all the process impurities, degradation impurities and genotoxic impurities;  7）Help to complete the medium-scale testing, production of validation lot, quality research and drug registration. | 1.Design a new synthesis route: not use any precious-metal, highly-toxic and highly-pollutant agent;  2. Comprehensive cost: not higher than the one of the patented route of the reference listed compound;  3. Form lab technical package: complete lab small-scale testing, impurities preparation and quality research;  4. Form workshop medium-scale testing report: complete technical transfer and complete workshop medium-scale testing that meets the requirements for drug registration;  5. Form workshop processes validation report: complete 3 validation lots that meets the requirements for drug registration;  6. Product quality: meet the requirements in ICH, and the registration requirements of Chinese pharmacopoeia and National Medical Products Administration;  7. Obtain patent right: grant at least 1 invention patent of pimavanserin synthesis processes |
| 21 | Changzhou Institute of Pharmaceutical Research Co., Ltd. | Development and application of composite BMP-2 bone repair material | 300 | How to reduce the dose of growth factor to improve the biological safety of protein therapy while ensuring the efficacy becomes a critical aspect in stent material study in bone tissue engineering.  Nowadays, BMP-2 products in China are mainly imported, and the price is quite high; the products independently developed in China require higher dose of BMP-2, which also has a potential hazard of the inherent biological safety. Therefore, there is an urgent need for a new-generation BMP-2 product of high biological safety, good efficacy and low treatment cost.  Some critical technical issues which should be solved in this project: 1. To develop a hydrophilized treatment method for the PLGA stent; 2. To research and develop a completely biologically-degradable zwitterionic hydrogel; 3. To ensure the material has better controlled-release effect and protein bioactive maintenance capability; 4. The degradation time of the composite bone repair material after it is implanted should not less than 3 months. | 1. The mass loss of the PLGA stent after hydrophilizedly modified, and the water contact angle shall not lower than 10°;  2. The molecular weight of the final degradation product of the completely biologically-degradable zwitterionic hydrogel shall be lower than 3000Da;  3. The composite bone repair material can efficiently release rhMBP-2, and the total release amount in three days shall not be higher than 20%;  4. The degradation time of the composite bone repair material after it is implanted should not less than 3 months. |
| 22 | Changzhou Qianhong Bio-pharma Co., Ltd. | Phase I Clinical Research of QHRD110, a State Class I New Drug | 200 | The malignant glioma is a severe and complicated disease, the tumor cell infiltrates into the normal brain cell, so it is quitely difficult to remove it by operation completely, and the ratio of postoperative replase is high. The existence of the blood-brain barrier limits the effect of chemotherapeutic drug on the tumor. Alkylating drugs like temozolomide are used for decades to go through the blood-brain barrier, reach the lesion, inhibit the growth of the tumor and extend survival time. However, drug resistance may occur very easily for the temozolomide, and once patient is resistant against it, no other drug is available for treatment. QHRD110 is a new small-molecule highly-selective CDK4/6 inhibitor and belongs to the new drug of class 1. The study shows that, the QHRD110 is able to go through the blood-brain barrier and act as an inhibitor against the growth of the malignant glioma cell. The QHRD110 is expected to become the first targeted drug for malignant glioma treatment in the world, thus the difficulty of the lack of available clinical drug for glioma treatment is solved.  Currently, non-clinical evaluation has completed for the QHRD110, and the approval for clinical trial is obtained. This study is intended to design an innovative multi-dimension clinical trial scheme that meets the features of the QHRD110 according to the clinical treatment program for the indication by holding the clinical R&D strategy and arrangements, and linking it to the non-clinical study, so that the phase 1 clinical study can be completed at high efficiency and low cost, the efficacy of the QHRD110 to the refractory malignant tumor like glioblastoma is demonstrated preliminarily and necessary support for the phase II clinical trial is provided. The proposed funding of this study is 15,000,000, and relevant items of the study will be completed together with other candidates. | 1. Obtain the ethics approval for clinical trial; design and complete the phase I clinical trial scheme;  2. Complete the phase Ia clinical trial, obtain the phase Ia clinical study report, and determine the recommended dose and maximum tolerable dose for human for the phase II trial;  3. Design and complete the phase Ib clinical trial, and obtain the phase Ib clinical study report;  4. Apply for 1 invention patent. |
| 23 | Changmao Biochemical Engineering Co., Ltd | Highly selective production of sweetener aspartame | 200 | Aspartame, with its chemical name of N-α-L-aspartyl-L-phenylalanine methyl, is a new synthetic peptide sweetening agent. Its sweetness is about 200 times higher than the cane sugar, and in the application, the desired sweetness can be obtained with only a few amount of Aspartame. In this way, calories can be significantly reduced, and there will be no tooth decay or higher level of blood sugar. Aspartame is identified as class GRAS （generally recognized as safe） by the U.N. Codex Committee on Food Additives. Currently, this sweetening agent has been approved for use in over 100 countries and regions, and is applied in over 6000 beverages, food, medical and other products.  The existing production process for Aspartame is mainly chemical synthesis. However, for the high proportion of β-isomer in the coupling reaction, and a large amount of high-ammonia and nitrogen organic waste water generated in the production, the traditional synthesis process needs to be improved urgently. This project adopts L-phenylalanine, L-aspartic acid/maleic anhydride as raw material, and introduces the highly-selective synthesis or biological fermentation/enzymatic conversion technology to carry out the production （the conversion concentration of the biological substrate is not lower than 100g/L）. | 1. The one-way consumption of the raw material, L-phenylalanine, is lower than 0.7;  2. The relative proportion of the isomers of the coupling （peptide linking） product is lower than 5%;  3. The product quality meets national standard;  4. Compared to the existing production processes, the cost of the final product is significantly reduced. |
| 24 | Changzhou Yuanzizai Technology Co., Ltd. | Research & development and industrialization of wearable flexible electrical stimulation sensor and wearable wireless control module | 300 | 1. Difficult to position the patch at the proper treatment location; 2. Allergic reaction of skin; 3. Hard to configure the effective treatment parameters  Description of the research:  1）Non-adhesive electrode design: The conductive material is arranged according to the different treatment locations by the design of a new conductive material, it combines with a wearable flexible fabric, and patient can directly wear the suitable flexible textile to effectively position the treatment electrode at the proper locations, and greatly simplify the positioning operation of the treatment electrode.  2）Wearable flexible carrier: A wearable textile flexible protector is developed against different orthopedic indications by using a skin-friendly textile material. A new flexible conductive material is integrated into the traditional fabric at the treatment location, moreover, TENS wireless stimulation control module can be incorporated, so that the design requirements for low weight, free of conductor are satisfied for the whole device.  3）Intelligent control module: a portable miniature TENS stimulation control host module is developed, and by connecting the intelligent control module with the general mobile device, operation process for remote interconnection can be configured. | 1. Develop a non-adhesive electrode material: develop a new non-adhesive electrode material which can integrate with textile, and conduct electrical stimulation to the treatment location by connecting with electrical stimulation module.  2. Develop a wearable flexible treatment carrier: enable quick wearing at different locations like elbow joint, wrist joint, knee joint and ankle joint, and flexible electrode material and electrical stimulation module can be incorporated into it.  3. Develop a portable miniature TENS stimulation control host module: exercise feedback can be recorded and treatment prescription can be placed by mobile device remotely.  4. Avoid local irritation, suitable for most people.  5. Weight lower than 300g, 1 charging for 6-8 treatments. |
| 25 | Changzhou KingyuKinder Electronic Technology Co., Ltd. | Polymer multiple ligating clips and clip appliers | 300 | The polymer multiple ligating clips and clip appliers are the products of cutting-edge technology which both China and other countries show great concern. The existing products on the market are still in the concept or validation stage, and far from meeting the basic requirements of safety and reliability. The problems are largely concentrated in drop and seizure caused by plastic deformation at the root of the ligating clip during repeated clip applications of the traditional polymer ligating clip, which finally affects the sugical efficiency and experience of the clinical physicians. The proposed offer of this company is 3,000,000 to seek a solution of the following critical technologies:  I. A ligating clip of a brand-new structure or a polymer ligating clip of a brand-new material formulas  The ligating clip adopts injection molding, either of the following two solutions is acceptable:  1）With regard to the solution for a brand-new material formulas, the ligating clip shall, keep semi-closed state by external force for 30 minutes for three consecutive times, and after the external force is cancelled each time, it shall rebound to the position at over 95% of the original opening angle; 2）With regard to the solution for a brand-new structure, allow three consecutive clippings, the progressive decrease in strength of the ligating clip after each clipping shall not exceed 5%.  II. A gun-type multiple clip applier of a brand-new structure  1）The one-time clipping number is required to be not less than 20, and the operation is required to be similar as the existing single clip applier. Either of the following two structures is acceptable: 1）An interchangeable clip structure is available; 2）The front section which is inserted to human body is disposable to facilitate disassembly. | 1. For each supporting multiple clip applier, no drop or seizure after over 20 consecutive applications;  2. The diameter of the section of the gun-type multiple clip applier which is inserted to human body is not larger than 10mm;  3. Tightening force after the ligating clip is closed ≥1.5Bar  4. No detachment, breakage or otherwise at the lock catch upon expiry of 48 hours of 50KPa pressure in tube |
| 26 | Eaglescope Medical Technology Co., Ltd. | Key technology of 8K laparoscope optical imaging and intelligent manufacturing | 270 | There is no mature 8K laparoscopic optical and imaging system on the international market, the mainstream products on the international market are 4K UHD products, hereinto, the UHD market is mainly monopolized by Olympus, Phentax, Karl Storz, Stryker and other international brands, but 4K UHD picture quality cannot meet the demand of the physicians at the intelligent, high-precision and high-difficulty operation circumstances, in particular, physicians need the laparoscopic optical and imaging equipments with higher solution to identify some local fine lesions and vessels. We, based on the experience over years in the field of laparoscopic surgery, are expected to realize the R&D and industrialization of the 8K UHD laparoscopic technology.  Description of the research:  （1）Design and technical research of lighting optical circuits  （2）Processing, installation and debugging of imaging optical circuits  （3）Development of dedicated testing device | 1. Field of view >80°  2. Visual directions angle 30°, allowance ±2°.  3. Relative distortion per unit <15%.  4. When transmitting function 8K picture: MTF at the central field of view reaches 0.4@150lp/mm: MTF at the peripheral field of view reaches over 0.3@150lp/mm.  5. Lighting uniformity>90%. |
| 27 | Jiangsu TargetpharmaLaboratories （Jiangsu） Co., Ltd. | Development of oncolytic bacteria （e.g., attenuated Salmonella） with high targeting ability, low toxicity and high antineoplastic activity | 220 | Live bacteria can be used as a new drug carrier to realize tumor targeted dosage and controlled drug release. Represented by VNP20009, over ten clinical trials and studies have begun against the Salmonellaoncolytic bacteria, but most of them stopped with phase I trial, and few entered phase II trial, therefore, it is hard to deepen late-stage clinical study. That’s because the safety of the VNP20009 still needs to be improved, its tier in the solid tumor is insufficient, and the anti-tumor efficacy is not ideal. Therefore, it is the bottleneck of this field to further design, modify and screen for an oncolytic bacteria with better performance.  The purpose of this study is to: further improve the tumor targeting of the bacterial strain; reduce the toxicity and improve the safety of the bacterial strain; to improve the anti-tumor activity of the bacterial strain; while not reduce the growth performance of the cultivation of the bacterial strain, and not reduce the plasmid stability of the bacterial strain by designing, modifying and screening for an oncolytic bacteria with better performance, so that an oncolytic bacteria of high tumor targeting, high safety, high anti-tumor activity with new drug development prospect is obtained. | 1. The tumor targeting performance of the bacterial strain （tumor structure cell tier / liver or spleen bacteria tier） is equal to or higher than that of the VNP20009 strain;  2. The toxicity of the bacterial strain （including LD50 index） is equal to or better than that of the VNP20009 strain （intravenous administration: about 4.9×106）  3. The anti-tumor activity of the bacterial strain is significantly better than the VNP20009 strain （more than two tumor models）;  4. The growth performance of the bacterial strain is not lower than that of the VNP20009 strain （environment with oxygen and lacking oxygen）;  5. The plasmid stability of the bacterial strain is not lower than that of the VNP20009 strain （plasmid passage and growth stability） |

Remarks: the Chinese version shall prevail in case of inconsistency between Chinese and English descriptions.

Attachment 2

Form for Domestic Bidders and Proposed Solutions

（Year 2022）

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Company Name  （Seal） |  | | Unified Social Credit Code |  |
| Address |  | | Post Code |  |
| Company Type | 🞎College/University🞎Research Institute🞎Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | |
| Legal Representative | Name |  | Tel |  |
| Contact | Name |  | Position |  |
| Mobile |  | Email |  |
| Bidding for （the project on the list） |  | | | |
| Basic information and R&D capacity | （Including number of R&D personnel, intellectual property rights, scientific research platform, etc.） | | | |
| Solutions | （For technical demands and key technical indicators, additional pages can be attached） | | | |

Attachment 3

Form for Overseas/Hong Kong/Macao/Taiwan Bidders and Proposed Solutions

（Year 2022）

|  |  |  |  |
| --- | --- | --- | --- |
| Company Name |  | Nationality |  |
| Address |  | Contact |  |
| Tel |  | Email |  |
| Bidding for （the project on the list） |  | | |
| Basic information and R&D capacity |  | | |
| Solutions | （Fortechnical demands and key technical indicators, additional pages can be attached） | | |
| Other matters needing clarification |  | | |

Legal representative or authorized agent（signature）:

Company Name （seal）:

Date: