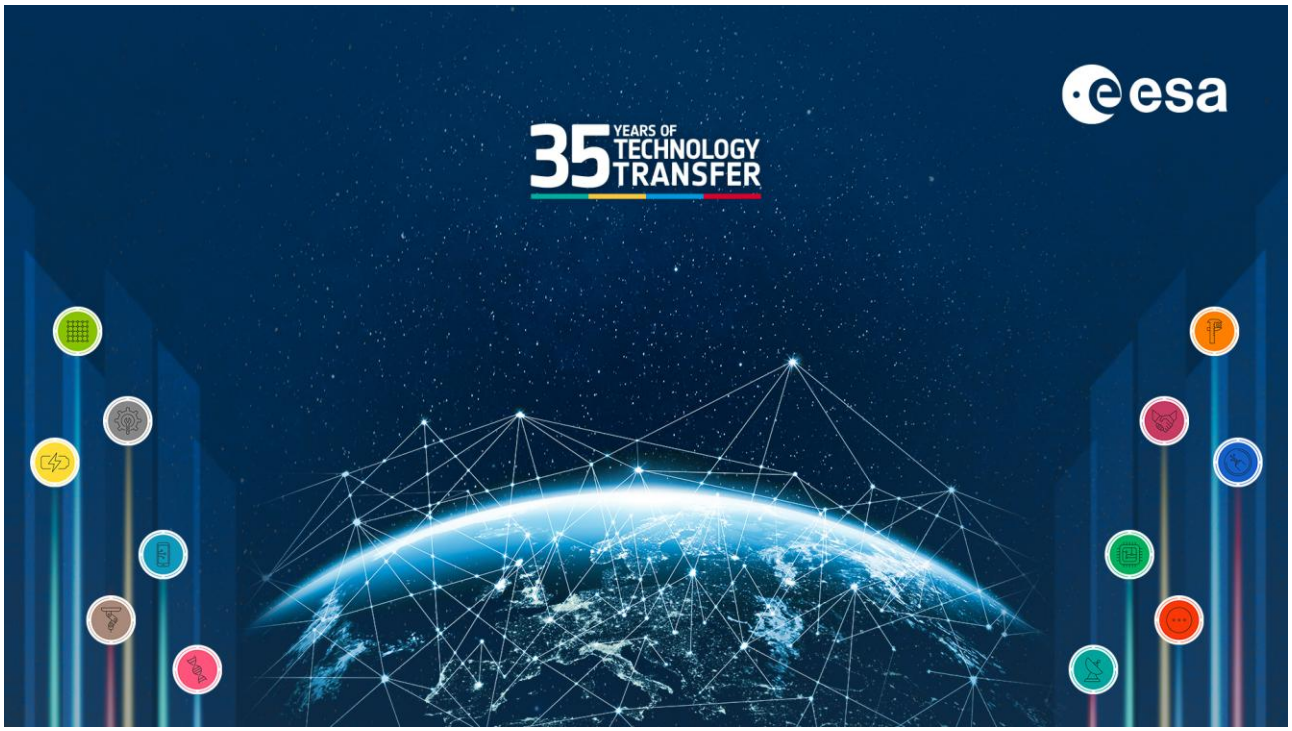
Technology NEEDS
OVERVIEW
Version 2025-1



Contact:

https://esa-technology-broker.arrib.es/

https://esa-technology-broker.arrib.es/contact.html

OVERVIEW

1. MATERIALS AND PROCESSES

High Technology for Automotive Sector [TN-ES-1001]

The company is seeking corrosion-resistant surface treatment and welding solutions for serial-produced automotive parts made of materials like steel, stainless steel, and aluminum. The company needs an efficient, cost-effective laser welding and surface treatment solution that provides long-lasting corrosion protection, meets automotive durability requirements, and is ready for implementation within a short timeframe.

UV-resistant elastic fiber [TN-BE-1002]

The company needs a more durable alternative to elastane, possibly enabled by advanced material synthesis and processing techniques. It is crucial that this alternative retains its elastic recovery properties, to an extent at least comparable to existing spandex products.

High-performance materials for marine battery modules [TN-BE-1003]

The company seeks high-performance materials to significantly reduce weight, replacing traditional aluminum and steel components. Ideal materials must possess comparable strength characteristics to ensure structural integrity. While also exhibiting exceptional fire and water resistance.

Advanced metal manufacturing technology [TN-BE-1005]

The company is looking for advanced metal manufacturing techniques to use in production machines for biomaterials. This technology should allow multiple materials to be bonded in small structures with engineered micro-channels. Allowing optimization of chemical robustness with thermal transfer and structural strength.

Sustainable Alternatives to Sulphur hexafluoride (SF6) [TN-BE-1006]

The company is seeking innovative solutions to replace SF6 gas with environmentally friendly alternatives, referred to as “Green Grid Gases”. These gases must maintain the same technical performance as SF6 while reducing environmental impact by 99%. They are focused on overcoming challenges in scaling production, infrastructure development, energy storage and safety to deploy alternatives across energy grids.

High-Temperature Superconductors (HTS) for Efficient Power Transmission and Grid Stability [TN-BE-1007]

The company is exploring the use of High-Temperature-Superconducting (HTS) materials for high-power transmission and energy storage systems. However, challenges including high component costs, expensive cooling requirements, material anisotropy, and mechanical durability must be addressed to fully leverage HTS technology in practical grid applications.

Adoption of Next-Generation Steel and Alloys with lower ductile-to-brittle transition temperature [TN-BE-1008]

The Company is seeking innovative solutions to support the adoption of next-generation steel and alloys, such as Green Steel and Advanced High Strength Steel (AHSS), for infrastructure projects. Challenges to overcome can be summarized into the topics of cost challenges, fabrication and brittleness at low temperatures.

Food Decontamination [TN-DE-1030]

The company's preservation technique is based on a natural drying process and requires a significant amount of gas and electricity. Implementing a technology that can improve operational efficiency, reduce environmental impact, and ultimately lead to cost savings will strengthen the value propositions for sustainable food. All technologies that can prolong shelf life, reduce energy consumption, and minimize microorganisms' contaminations in food are welcome.

Foam for sensor mat [TN-DE-1052]

This start-up developed an electronic sensor bed mat for outpatient and inpatient care. The sensor technology used is a fiber-optic sensor technology (FOS) embedded in a specific foam.
This mat is to be further developed to ensure that it can be used in pressure ulcers. In addition, the sensor technology already used in space travel is to be further refined and expanded so that pressure points and lying positions of patients can be measured and analyzed very precisely.
To this end, the company is looking for a partner with expertise in the field of foam (PU, latex, silicone foam, etc.).

Coating of photochromatic pigment particles [TN-DE-1055]

During powder bed-based 3D printing of plastics (PBF-LB/P), an inhomogeneous temperature distribution can develop within the powder bed, depending on the geometry and arrangement of the components. The resulting local temperature hotspots can cause powder particles to sinter together or melt. Therefore, the company is looking to add photochromatic pigment particles to the powder, which reversibly changes color with temperature. The local powder temperature is then to be monitored online using a camera system.

Simulation and Process Optimization [TN-DE-1058]

A leading German research institute seeks SMEs or universities to support the mixing, coating, drying, and calendaring processes. Partners will assist in scaling from lab to pilot scale through both practical implementation and process simulation. They will also contribute to modeling the electrode production process chain using AI, enabling detailed analysis and optimization of the entire production process.

Composite Materials for interior doors [TN-PL-1001]

We are seeking high-strength, lightweight composite materials such as carbon fibre-reinforced polymers (CFRP), aramid composites (e.g., Kevlar), and nanotube-enhanced materials. These materials will significantly

reduce the weight of products while improving durability, thermal insulation, and acoustic performance. The goal is to enhance product sustainability and meet modern standards for energy efficiency, reducing costs and environmental impact.

Composite Technologies in vehicle parts [TN-PL-1002]

The company is looking for advanced materials and composites to replace steel structures. The materials will be used as: structures, brackets, tanks, packaging for batteries for vehicles, elements of exhaust systems, vehicle frames.

Electrical assistance of exhaust systems [TN-PL-1004]

The technology needed is to accelerate the heating of a system and continuously provide it with heat. The technology can also support the evaporation of an aqueous solution of urea dosed into the system.

Emission control technique [TN-PL-1005]

The company is looking for alternative treatment and removal solutions for exhaust gas systems. The following substances are subject to carbon oxides, sulphur oxides, nitrogen oxides, hydrocarbons, soot, particulate matter, organic emissions, urea, and ammonia.

Hydrogen technologies [TN-PL-1006]

The company is looking for hydrogen technologies with a use case in the automotive industry, such as hydrogen cells, hydrogen production and storage technologies, hydrogen tanks, volume-efficient hydrogen transport.

Insulation technologies [TN-PL-1007]

The company is looking for insulation technologies with low thermal conductivity operating from 700°C to 1000°C. It must be resistant to mechanical damage and impervious to saturation with water, oils, and other substances.

Technology for producing scintillation material [TN-PL-1008]

We are seeking technology for producing scintillation material, specifically plastic scintillators, which can be applied in muon tomography. The use of this technology in archaeology will enable non-invasive exploration of underground structures. It is essential that these materials meet specific requirements regarding sensitivity to alpha and beta radiation, response time, cost, and resistance to radiation damage

(Inflatable) Textiles for the envelope [TN-AT-1027]

We are seeking advanced textile or film materials suitable for airship envelopes, ballonets, or gas cells across various airship types (rigid, semi-rigid, non-rigid). The materials must maintain gas-tightness at slightly elevated pressures (1–3 bar), exhibit high form stability, and withstand continuous temperatures of 473–573 K. Additional requirements include UV and weather resistance, low weight, mechanical strength, and resistance to environmental stressors such as moisture, salt, and chemicals. Drop-stitch fabric is one potential solution, offering both shape stability and reduced lifting gas leakage, but we are open to alternative material concepts tailored to different structural designs.

(Materials for) structural components [TN-AT-1028]

We are looking for ultra-lightweight, high-strength materials and structural concepts suitable for airship frameworks and large-span hangars. Materials must withstand continuous temperatures of 473–573 K, while offering excellent mechanical performance. In addition to traditional options like aluminum, titanium alloys, and fiber-reinforced composites, we are especially interested in innovative alternatives such as compressed wood, which combines high strength with low weight and sustainability. Structural design approaches such as trusses, lattice frameworks, tensegrity systems, and optimized node geometries are also of interest to maximize strength-to-weight ratio. These solutions should be applicable to both airborne structures and large-scale ground infrastructure.

Advanced Fluid Purification for ballast water [TN-AT-1031]

We are seeking lightweight, energy-efficient fluid filtration technologies for airships operating in remote environments. The system must purify water collected from natural sources (e.g., seas, rivers, lakes) to prevent ecological cross-contamination when used as ballast and later released. It should effectively remove microorganisms and other contaminants, operate reliably with minimal maintenance, and feature automated processes for seamless integration into airship operations. The solution must balance performance with low weight and energy consumption to support sustainable and autonomous long-range missions.

Helium/hydrogen purification/cleaning [TN-AT-1036]

We are looking for advanced gas purification technologies to maintain the quality and reusability of lifting and fuel gases—primarily helium and hydrogen—used onboard airships. These systems must effectively separate and purify gases to prevent cross-contamination over time, ensuring optimal performance and safety. Solutions should be compact, lightweight, energy-efficient, and suitable for continuous operation in remote and mobile environments. The goal is to minimize helium losses and support sustainable hydrogen fuel use by enabling onboard gas recovery and reuse.

Vacuum Insulation [TN-AT-1042]

We are seeking ultra-lightweight core materials or separators for vacuum insulation panels (VIPs) used in airship thermal management systems. The materials must exhibit low thermal conductivity, maintain structural integrity under vacuum, and withstand continuous temperatures of 473–573 K. While aramid honeycomb (approx. 24 kg/m³) is a promising candidate, we are especially interested in alternatives with even lower density and comparable or superior thermal insulation performance. The solution should enable highly efficient, lightweight insulation suited for high-altitude, high-temperature environments.

2. AUTOMATION AND ROBOTICS

Robotics for automation [TN-PL-1009]

We seek advanced robotic solutions, including AGVs, AMRs, and cobots, to automate material handling, assembly, and quality control in the production. The goal is to enhance overall production by integrating robots capable of working alongside humans and optimizing logistics while maintaining high safety and quality standards.

Efficient heating technologies, evaporators, heat recycling [TN-PL-1010]

The company is looking for technologies suitable for heat recovery, Adblue evaporation or the reheating of exhaust gas treatment systems.

Automation of processes [TN-PL-1011]

The request seeks innovative solutions for automating tool steel regeneration using robotics, machine learning, and additive manufacturing. The goal is to integrate heat recovery systems to capture and reuse waste heat, optimizing energy efficiency. The technology should enable precise control, real-time monitoring, and energy optimization, aligning with sustainable industrial practices

Large format 3D printing [TN-AT-1030]

We are seeking advanced manufacturing solutions—particularly large-format 3D printing—suitable for producing thermally resilient airship framework components designed via generative design and topology optimization. The components must withstand continuous temperatures of 473–573 K. Both direct 3D printing of structural parts and indirect approaches (e.g., printing molds for casting) are under consideration. We are especially interested in scalable, high-temperature-capable additive manufacturing processes that align with lightweight, structurally optimized designs.

3. MECHANICAL COMPONENTS AND SYSTEMS

Motion Control Mechanism [TN-AT-1022]

The following challenge is posed by the guidance of an elliptical track projected onto a spherical surface. A prototype has already been developed for this purpose, but it still needs to be improved to ensure smoother movement. The challenge is to build a frictionless, smooth-running guide for elliptical motion.

Cool Gas Generator [TN-BE-1001]

There is a need for a cool gas generator with the maximum measurements of 80mm x 40mm x 40mm to cool down the electronics. The gas should preferably be C02 but can also be N2 if there are no other alternatives.

Personal thermal comfort systems [TN-BE-1004]

The company is looking for technologies that can help cool individuals, by either cooling the body, accelerating body cooling, cooling specific body areas or creating a perception of cooling. These technologies may be coming from astronaut spacesuit systems, including fabrics and active components, or spacecrafts/ rovers thermal management systems.

Additive manufacturing of a combined turbine and compressor rotor with internal channels [TN-DE-1036]

The company provides an innovative advancement of turbofan technology, which is suitable for any kind of unmanned aircraft or small business jets, for which small and efficient engines are required at low costs. We are looking for an additive manufacturing of the rotor of the engine, due to its complex geometry, as it combines multiple functions.

High-tech systems to develop 3D measurement machines [TN-DE-1054]

A German SME specialized in designing, developing and manufacturing precision optical fiber measurement systems, is seeking a partner with mechanical engineering expertise in the field of high-tech systems in order to develop their own 3D measurement machine, that combines several high precision axes to a unique kinematic set-up.

Cryogenic Tank [TN-AT-1032]

We are seeking ultra-lightweight, highly insulated cryogenic storage solutions for liquid hydrogen to enable multi-day airship missions. The tanks must maintain hydrogen in its liquid state efficiently, minimizing boiloff while withstanding the rigors of airborne operation. Ideally, boiloff rates should align with the airship's continuous fuel consumption. The solution should combine minimal weight with maximum insulation performance to support sustainable, high-endurance hydrogen-powered flight.

Heat Exchanger [TN-AT-1035]

We are looking for ultra-lightweight, high-efficiency heat exchangers and condensers to support the thermal management system of a hydrogen-powered airship. The system must enable waste heat recovery from fuel cells or combustion engines and maximize water vapor condensation for ballast. Key requirements include a gas-to-gas heat exchanger to manage lifting gas temperature (heating and cooling) and a steam/water-to-gas exchanger for condensing water using ambient air. While the components can be large in form, achieving exceptional gravimetric efficiency is critical to ensure optimal performance without adding excess weight.

Hydrogen energy converter [TN-AT-1038]

We are seeking lightweight, high-efficiency hydrogen energy converters for airship propulsion and onboard power systems. Suitable technologies include high-temperature fuel cells, internal combustion engines, or gas turbines. The converter must maximize gravimetric energy density while enabling both electrical energy generation and effective waste heat utilization. High-temperature fuel cells are of particular interest due to their dual energy output and compatibility with integrated thermal management and ballast systems.

Propeller [TN-AT-1039]

We are seeking advanced, energy-efficient, and low-noise propulsion solutions for airships operating at low cruising speeds. While conventional propellers are viable, we are especially interested in innovative configurations such as contra-rotating, ducted, variable-pitch, and asymmetrical propellers to enhance thrust efficiency and minimize noise emissions. Electric propulsion systems with distributed propeller layouts are also of interest for improved maneuverability, redundancy, and system integration. All solutions should prioritize aerodynamic performance, quiet operation, and lightweight design.

Empennage & Control Surfaces [TN-AT-1033]

We are seeking innovative empennage and control surface solutions to ensure optimal stability and maneuverability for large airships. While proven configurations like X-tail or triple-fin designs are favored for their aerodynamic reliability, alternative layouts such as inverted V-tails may offer specific benefits. In all cases, large control surfaces are essential. Adaptive compliant (morphing) surfaces are of particular interest as a potential replacement for traditional hinged rudders, offering reduced drag, lower mechanical complexity, and improved responsiveness. Solutions should prioritize aerodynamic efficiency, structural integrity, and weight optimization.

4. ELECTRONICS AND OPTO-ELECTRONICS

Camera system to observe melting process in brazing high temperature, high vacuum conditions [TN-DE-1037]

Brazing furnaces are a black box as visualizing the melting and flowing processes of the brazing material is currently impossible due to the harsh conditions. A camera system would give the possibility to see any flowing problems during the process, so that the process parameters could be adjusted and the brazing quality improved.
Expertise needed: Solutions for thermal shielding; data transfer; high quality pictures in infrared environment; kinetic solutions for camera positioning

Electronics for Superconducting Coils [TN-DE-1047]

The company has invented and developed propulsion technology that is maintenance-free, does not require any mechanically moving parts, and is completely environmentally friendly. It is based on magnetic physics, that generates thrust and controls forces to move objects in any medium
The proposed project is the designing and producing of a professional customized high-current driver module utilizing internal and external services. They are looking for support in developing, designing, and producing an electronic circuit that can switch high currents. The functions of the desired high current driver module will be managed and controlled by a digital processor that already exists.

Solar Panels [TN-AT-1040]

We are seeking ultra-lightweight and/or high-efficiency solar panel technologies suitable for integration on the large surface area of an airship. Both rigid and flexible panels are of interest, with a strong focus on maximizing gravimetric energy density. The goal is to significantly reduce or fully suspend fuel consumption during daylight hours by leveraging solar energy. Solutions must adapt to the airship's curvature and structural constraints while delivering reliable performance under varying light conditions to support hybrid solar-hydrogen propulsion.

5. DIGITALISATION, COMPUTER HARDWARE AND SOFTWARE

Cybertechnologies for improvement of production processes [TN-PL-1003]

The company is looking for technologies to improve production and manufacturing productivity as well as supporting processes such as logistics, purchasing, sales, research and development.

Gas, Thermodynamics & Fluid Dynamics Simulation Software [TN-AT-1034]

We are seeking advanced simulation tools capable of modeling complex thermodynamic, fluid dynamic, and gas behavior processes for airship design and optimization. These tools are essential for developing and refining the Buoyancy Compensation System, requiring precise simulation of gas expansion/compression, heat transfer, and ballast interactions. The software should support aerodynamic analysis, energy efficiency optimization, and performance prediction under varying environmental conditions to ensure stable, efficient, and reliable airship operation.

Topology optimization / Generative design Software [TN-AT-1041]

We are seeking advanced topology optimization and generative design software to support the development of an ultra-lightweight structural framework for a large airship. The goal is to iteratively minimize weight by simulating the airship as a solid volume under defined forces, then optimizing structural components accordingly. The software must enable integration of key elements—such as fuel tanks, ballast systems, and cargo handling equipment—into the load-bearing structure to maximize efficiency and reduce redundant mass. High-performance tools that can handle large-scale, complex geometries are essential.

6. COMMUNICATION AND INFORMATION

Sat communication [TN-DE-1048]

There is a new emergency management law. It states that companies must have an emergency plan in place in the event of a cyberattack. For security and insurance reasons, a self-sufficient system must function independently of the normal company infrastructure.
The network partner has a solution based on this problem and is searching for specialists in satellite communication and development of hardware and software for connections to IoT interfaces. It is self-contained and runs plug-and-play on a separate server for each company and can therefore supply all relevant users of a company in an emergency if the entire system is down.

Quantum encryption technology [TN-DE-1057]

The company has developed a mobile messenger that enables all team members to communicate securely in a completely encrypted and closed system. For this, they are looking for a quantum encryption technology for secure data transmission.

(Remote) control technology/data processing/sensor technology *(also partly fits in sensors)* [TN-AT-1029]

We are seeking advanced remote and autonomous control technologies to enable unmanned, long-distance airship operations. The system must support stable, precise flight control—including autonomous docking, refueling, and ballast handling—even in complex or low-visibility environments. A sophisticated sensor suite (LiDAR, radar, infrared, computer vision) is required for real-time situational awareness. Additionally, the system must include high-performance onboard data processing for real-time decision-making, efficient data transmission, and robust cybersecurity. Redundancy and communication reliability are critical to support remote oversight of multiple airships simultaneously.

7. SENSORS AND MEASURING TECHNIQUES

High-Precision Thermal Conductivity Testing [TN-AT-1037]

We are seeking advanced thermal conductivity testing solutions—either as a service or through access to testing equipment—for evaluating lightweight and composite materials used in airship construction. The solution must support accurate measurements across a temperature range of approximately 223 K to 573 K and accommodate a variety of material types and thicknesses (from thin films to multi-layered structures up to ~30 cm). Suitable for anisotropic materials, the system should support methods such as Laser Flash Analysis (LFA), Hot Plate, Transient Plane Source (TPS), or equivalent. Results will directly inform thermal management strategies and material selection.

8. LIFE SCIENCES, PHARMACY AND MEDICINE

High Technology for Large Greenhouse [TN-ES-1002]

The greenhouse infrastructure owner needs a compact and efficient CO_2 generation system to enhance plant growth by increasing CO_2 levels. The required technology is a small, high-performance CO_2 generation system that optimizes space while effectively increasing CO_2 levels in the greenhouse to support plant health and growth.

Large Water Volume Water Treatment [TN-ES-1003]

A football team is searching for an efficient, large-scale water recycling system that can treat toilet water, support irrigation needs and integrate seamlessly with the stadium's drainage network. while aligning with the stadium's structural and operational limitations.

Foot rot treatment [TN-DE-1044]

The company developed a promising technology that could be considered for the treatment of foot rot on animals, by using cold plasma.
Collaboration between veterinarians, research institutions, and companies specializing in the development of animal health products would be crucial for further development and implementation of such technologies for combating this problem.

Lab Space for expansion in bacteriophage-based antibiotics [TN-DE-1049]

This start-up is focused on the necessity for a new generation of targeted antibacterial solutions, which are becoming more and more crucial. The startup was established by a team of experts in molecular biology, bioinformatics, business management, and machine learning. This interdisciplinary team, with the need for a specified lab, combines extensive experience and specialized skills to pioneer innovative solutions.
The specified lab space will not only accommodate the startup's current needs but should preferably also allow for scalability and flexibility to adapt to evolving research directions and market demands. The startup goal is to establish a long-term facility that supports both their immediate research and development needs and their strategic vision for future growth and collaboration.

Advancing Additive Manufacturing with Proven Standard and Optimized Designs for safer medical implants [TN-ES-1006]

The product will be medical implants (most of these needs are coming from oncology). Today these parts are not structurally optimized, it could be scaled for the size of the patient but not optimized. Due to the lack of quality of specific standards for this process in the medical industry, failure of the parts is quite common. Powder control, machine parameters linked to mechanical properties, final porosity inspection and surface inspection (ti alfa, for example) are important parameters to be set up and control. The point is to increase the technology maturity level to TRL8, achieving a specific use case following the standards as a demonstrator of the work.

9. PRECISION MECHANICS AND OPTICS

Currently no needs available.

10.ENERGY

Membrane for saltwater osmosis [TN-DE-1046]

The company uses Saltwater Osmosis Membranes for electrical power generation and storage by forward and reverse osmosis and aims to incorporate in use membranes developed by space agencies such as ESA for more efficient, environmentally friendly and better performances.
To support the development, the company is in search for a Membrane supplier with an expertise in Power generation, power storage, osmotic pressure.

Ultra High-power and lightweight battery pack for small aircraft [TN-DE-1050]

A German mechanical engineering firm has, in cooperation with its partners, developed an electric vertical takeoff and landing (eVTOL) passenger aircraft for urban air mobility (UAM) and now seeks to optimize the aircraft's powertrain by integrating lightweight battery packs with a better energy performance.
The company seeks technical cooperation agreements or commercial agreements with technical assistance. Possible partners are developers and manufacturers of battery packs. Task to be performed by the desired partner is the identification of suitable battery cells and their assembly.

Energy efficiency solutions for buildings and sustainable building materials [TN-DE-1051]

This German architectural company is an expert in methodical building design. They plan and construct sustainable high-performance buildings for the office, industrial and healthcare sectors. They think sustainably into the future, which is underlined by several energy-efficient buildings and certified passive houses. They are always on the lookout for the latest solutions and would be interested to discuss new technologies for energy efficiency in non-residential buildings and learn about new materials for construction.
They are open to different types of co-operation.

Direct conversion of heat into electricity [TN-DE-1056]

A German physician and inventor having a track record of surface modification, i.e. boundary layer engineering, has developed a solid-state device for the conversion of heat into electricity. The innovator is looking for scientific as well as industrial partners to exploit the entire potential of this new kind of energy converter. Partners should be established in the electronics industry, shall have R&D capacity to finetune materials for low and high temperature applications with the goal to produce and bring the devices worldwide to the market.

Electric vehicles batteries [TN-PL-1012]

The company is looking for battery and cell technology for electric vehicles, which is competitive to current solutions and assistive technologies.

11.SERVICES

Currently no needs available.

12.OTHER TECHNOLOGIES

Currently no needs available.