Innovate UK

Results of Competition: **First of a Kind Phase 2**
Competition Code: **1702_SBRI_FOAK_PH2**

Total available funding for Phase 2 is up to £18m from Innovate UK.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
iGeolise Ltd	iRoute: routing by public transport for commercial organisations	£298,300	£298,300

Project description - provided by applicants
The market for fleet management software is worth about $8bn a year (source: Berg Insight 2013); Vehicle Routing and Scheduling is an inherent part of such software, but is just for routing vehicles it is for road use only. There is no equivalent multi-modal routing software for commercial use. We propose to develop a fully multi-modal routing software for commercial use by extending the feature set within our existing TravelTime routing platform. The opportunity is significant. There were 310 billion road miles travelled in GB in 2014 (Source: Dept. for Transport) and 80 billion of these miles (25%) were for commercial purposes - HGVs, vans and cars being used for business. iGeolise believe that c.5% of the total road miles could be switched to public transport (around 16 billion road miles). Clearly 'switchable miles' are not HGV miles, nor vans delivering or picking up goods or carrying heavy / bulky equipment but it could be vans currently just carrying people to jobs, and cars conveying people to meetings where they are need little more than a laptop. For this to happen there are 3 pre-requisites;1)Adequate public transport alternatives for the required commercial journey (which is why our estimates above are only for urban areas, where good public transport is generally available);2)Continued development and imaginative deployment of the Internet of Things, and ICT (such as tablets and augmented reality to demonstrate products) so reducing the need to transport carrying bulky / heavy items;3)And commercial routing software that is truly multi-modal and real-time. iRoute can be that software. iGeolise have already built the TravelTime platform that makes maps and data searchable by traveltime. It includes all transport modes (road, buses, trains, walking, cycling, ferries, trams â€¦). The platform does 3 things. A) It can determine a travel time area from an origin (the area that can be reached within a given time using a given transport mode or modes. B) it ranks & sorts thousands of destinations by their travel time from an origin. C) it calculates the turn by turn, door to door route to each location, using all travel modes and returns the time, the true distance, and the travel cost to each. These 3 features are used by Zoopla, Countrywide and Foxtons (search for properties by their travel time from the office), and Jobsite (search for jobs within a commuting time), amongst many other clients. We propose developing iRoute by using our existing routing capability and adding the additional features required for commercial routing and scheduling. iRoute will be the equivalent of the best Vehicle Routing software but will include ALL transport modes. This will mean commercial organisations can route and schedule their staff using all transport modes and gain efficiencies by switching some of their road miles to public transport. In context HGVs drive nearly 16 billion miles a year - virtually the same as the van and car miles that could potentially be switched.

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CarTap Ltd	Car as a Delivery Service (CaaDS)	£456,090	£456,090
Project description - provided by applicants			
Car as a Delivery Service (CaaDS) is a reveloutionary technological urban solution to the last mile delivery problem. Building on a secure smartphone based vehicle access technology, the project aims to enable a new asynchronous delivery option to strengthen urban infrastructure. Apart from the cost benifits and emission reduction by eliminating redeliveries, this solution has the potential of offering a complete automated round the clock delivery systems, reduce demand on transport infrasturcture during peak times, increased usage of zero emission vans and drastic reductions in the CO2 footprint of logistics delivery.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Smart Component Technologies Ltd	Creating Smart, Resilient, Affordable & Reliable Infrastructures in Rail	£598,957	£598,957

Project description - provided by applicants
Reliable rail networks are vital for the movement of people and goods across the UK accounting for 71 billion passenger miles and 18bn tonnes of freight. The rail infrastructure uses millions of threaded fasteners. Although a nut and bolt is simple component, it is often safety and performance critical i.e. should it fail, it would lead to catastrophic accidents or significant degradation of the infrastructure. As a consequence, the inspection and maintenance of such safety and performance critical fasteners represents a sizable cost to infrastructure owners as well as reducing capacity whilst maintenance is taking place. Failure can occur through incorrect installation, damage, wear or fatigue. Within the rail network there are around 26,000 switch machines (points) which enables trains to be guided from one track to another such as at a railway junction or a spur. Components of the switch machine include switch rails, stretcher bars & a switch drive motor. When there are two tracks crossing each other, there is a single cast X-shape rail known as the crossing. Collectively abbreviated to S&C's, they are complicated assets subject to extreme loading both vertical and horizontal. Furthermore, they are exposed to a wide range of weather conditions. All of which results in S&C's being the most costly and safety critical asset category in the rail infrastructure. In conjunction with Network Rail and London Underground, Smart Component Technologies (SCT) has developed the "Smart Washer" to measure the clamp force of fasteners during installation & maintenance. This reduces time, cost and error. In addition, the smart washer provides a 24/7 remote monitoring mode with a flexible system of alerts allowing for preventative maintenance and increasing the reliability of the network. The smart washer does a lot more as it also contains other sensors, in particular a 3-axis accelerometer. This allows for the operation and mechanical condition of the entire S&C to be remotely monitored as well as any deterioration of the track bed. SCT completes the end-to-end solution with the provision of wireless comms, data management & analytics, user interfaces and software services. Such a solution is the aim of smart component technology and at the heart of intelligent asset & infrastructure management. Although all this world-leading technology is ready for lift-off, it has not yet been deployed in a real-life environment that proves a compelling value proposition and validates a scalable and repeat business model. The purpose of the project is do exactly that. Working with Network Rail, London Underground and a number of Tier 1 partners, SCT aims to deploy and test every aspect of the smart washer technology over a 12 month period. With the technology validated and a strategic partnership in place, SCT will be able to roll-out, at speed, across the UK and develop the global market for its technology. Smart component technology is a broad platform technology and directly applicable in all major infrastructures, for example energy systems, nuclear, offshore wind. The full range of smart component categories and infrastructure sectors will also be very actively developed over the next 3 years.

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Grid Smarter Cities Ltd	Kerb - Intelligent Kerbside Management	£1,102,146	£1,102,146

Project description - provided by applicants
KERB Virtual Parking System (VPS) Is a Real Time Dynamic, Intelligent Kerbside Management Solution for Cities: The solution addresses the First of a Kind Challenge with an innovative, patent protected, ready for market solution with global potential that can deliver, rapidly, at least cost and effort - additional capacity - adaptability - resilience - integration of / into other technologies. Grid Smarter Cities Limited (Grid) has developed a novel web-based scalable application which allows commercial vehicle operators to opt to pay and park/load unload on previously unavailable kerb space in high density, urban traffic areas. Operators will use the application to reserve a defined location on restricted kerbspace during an available time slot for a fixed fee. This pre-booked space becomes a 'Virtual Loading Bay' (VLB) or Virtual Parking Bay (VPB) allowing drivers to load and unload in close proximity to their delivery point without causing congestion and without the risk of receiving a Penalty Charge Notice (PCN) and saving time and fuel. Local Authorities (LAs) will determine the fee and the locations to be exempted. This can be time and vehicle specific to give preference to certain vehicles (e.g. zero / low carbon vehicles) and to 'nudge' behaviour into off-peak times.Using Kerb VPS helps councils to address air quality issues in general and also in specific areas by managing kerbspace at a micro level and behavioural change through incentivisation and intelligent kerbside management managing traffic flows. Kerb VPS contributes to macro reductions when applied across the borough area by reducing congestion and driver stress on roads. Kerb VPS will reduce the cost associated with administering PCNs creating cost certainties (for fleet operators and councils alike) as well as well as efficiency savings from optimised deliveries.Other benefits include: - efficient planning multiple drop-offs,reducing CO2 emissions. - Encourages take-up of electric vehicles (EVs) by the delivery industry, by providing bookable EV bays incentivised by 'at location' rapid chargers. - Utilises kerb space on routes that traditionally prohibit loading and unloading allowing deliveries at previously difficult to reach locations. - Saves money by reducing the time and mileage spent searching for available kerb space. - Reducing PM, NO and CO2 emissions in keeping with 'Corporate Social Responsibilityâ€and international air quality standards. - Sending 'real time' updates to Civil Enforcement Officers (CEOs) reducing the issuing of PCNs. There is overwhelming support for such a solution with significant environmental (included in Air Quality Action Plans provided by DEFRA and London Councils) and economic benefits for commercial vehicle operators and LAs in the adoption of the solution in comparison with the existing regime of PCNs for illegal parking which is currently â€˜stick with no carrot.â€™ It also provides a positive user-led revenue stream for the city, and helps freight and logistics operators avoid PCNs by offering them bookable spaces, where they need to deliver at times that least impact on the road network creating efficiency savings for all parties and a national booking portal for operators and councils. The solution is replicable and repeatable for London boroughs and provincial cities who will be able to opt-in with as many or as few VPBs / VLBs as they wish. Additionally the platform can be used for other vehicle types as well as freight vehicles such as EV's (including taxis), coaches, vehicles for disabled drivers and skips.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
ITM Power (Trading) Ltd	MEGASTACK – creating affordable transport fuel from renewable electricity	£3,497,768	£3,497,768

Project description - provided by applicants
Megastack creating affordable transport fuel from renewable electricity This project involves the first customer facing implementation of a large 3MW water electrolyser with the potential to convert electricity to hydrogen at a price which is affordable for its use in the transport sector. This is a breakthrough compared to previous electrolyser projects in which the effective cost of hydrogen has been two to three times the equivalent price of petrol or diesel transportation. This breakthrough will enable the beginning of sales of the inter-connecting systems which will be deployed here on a commercial basis to markets for hydrogen transport which are emerging in the UK, Europe and worldwide. This has been achieved thanks to two UK-specific innovations which will be tested in this project: 1. Novel technology which has been developed by ITM Power specifically for highly responsive Megawatt scale electrolysers. These systems will bring the capital and maintenance costs of electrolysis down to the point where they contribute a manageable fraction of the cost of hydrogen production for transport applications, without compromising the system efficiency. The systems have been validated at a proof of concept scale, but this will be the first time that this technology has been deployed in a customer facing application. 2. The system will be deployed at a scale (3MW) which allows interaction with National Grid's electricity balancing markets. The electrolyser is highly responsive (sub-second) and hence can participate in all of National Grid's balancing markets. This project will test the participation of an electrolyser in these markets for the first time in the UK. This will prove that the electrolyser can provide valuable services to help manage a grid which must absorb large quantities of intermittent renewables. Providing these services secures a revenue stream for the plant operator which helps make the price of hydrogen production affordable for transport markets. In this way the project will demonstrate the interlinking of the electricity generation/distribution sectors with the energy demands of the transport sector in an economically and practically feasible fashion. In so doing, the project will demonstrate a key component of the inter-linked energy system of the future (namely the generation of hydrogen from electricity as a tool to balance grids which have a surplus of renewable electricity). The opportunity for this first of a kind installation arises because hydrogen fuelled vehicles are becoming increasingly commercially competitive. The hydrogen produced in this project will be compressed, stored and then used to fuel a fleet of at least 20 hydrogen buses. The buses will be procured as part of a major European hydrogen bus deployment project, which is supported by project partners Birmingham City Council and National Express. This guarantees a customer for the hydrogen produced and leads to a demand which is of a sufficient scale to justify the installation.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Citi Logik Ltd	Developing a real-time mobile network data platform for connected transport.	£1,173,700	£1,173,700

Project description - provided by applicants
Citi Logik, an SME that analyzes aggregated and anonymised journey paths from the existing mobile phone network, is proposing to develop a repeatable virtual technology platform linked to an advanced telecom 3G/4G/5G sensor network. It will do this with the support of Vodafone Enterprise UK. This platform will be capable of analysing movement by vehicle, on foot or by train in real time and will help us understand peak demand, network capacity and operational efficiency through a detailed analysis of flow and mode, across the UK. The context for this project has recently been reported in the Policy Exchange insight on 'Smart Devolution', which in turn draws learnings from current best practice in New York City. These reports highlight that most cities have vast quantities of data that if accessed and used effectively could help improve public services, optimise transport routes and even prevent cycling accidents. The most significant point is that the mobile phone network is the best public asset, as yet never deployed comprehensively as a system, to analyse traffic movement in real time. The proposed service is a real time extraction of fully anonymised data from the Vodafone Network in compliance with UK Information Commisioner Officer Guidelines and EU Privacy Laws. It creates a structured and secure database environment which is then interrrogated to understand actual journey times, road capacity constraints, and journey time reliability. The capabilty was demonstrated in 2012 for improving network capacity and resilience in a very successful experiment as part of the Transport for London Co-operative Systems trials. As part of this trial Citi Logik demonstrated real time capabilities of data sets to predict journey time reliability. Citi Logik also has an emerging programme of work with UK Local Authorities, UK core cities and UK airports to use the proposed capabilities to replace traditional roadside survey techniques. We have already held discussions with a number of potential customers, including Transport for Greater Manchester and the Welsh Government, regarding the potential deployment of a real time service from April 2017. This proposal is offered by an SME (Citi Logik Ltd), based in Tech City, working in close co-operation with a UK Mobile Operator (Vodafone) for the purposes of creating public good from the mobile network. Significant communciation efforts have been completed to share and communicate these ideas with UK Privacy Groups and Vodafone UK Customers.

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Zeetta Networks Ltd	NetOS® : Dynamic & Intelligent Orchestration of Networks	£1,834,694	£1,834,694

Project description - provided by applicants
Title: NetOS®: Dynamic & Intelligent Orchestration of Infrastructure Networks Zeetta Networks offers Open Networking solutions based on a proprietary network operating system, NetOS® that provides a single, converged and secure platform for monitoring, managing and automating the operations of heterogeneous networks. NetOS® uniquely manages simultaneous data flows between different types of connected devices and sub-systems including Wireless, Optical, Ethernet and Internet-of-Things (IoT) devices. This integrated and scalable approach, able to handle from a few kilobits of data per second generated by an Internet-of-Things (IoT) network up to Petabits of data per second managed by an optical switch, significantly increases network performance and efficiency. NetOS® is being developed to tackle city-scale integration of Energy, Transport and Information & Communications Technology (ICT) infrastructure. It uses intelligent software and virtualization to replace expensive hardware networking equipment and human intervention for provisioning and management of network resources, enabling greater efficiency, capacity, security and resilience across the network. Zeetta Networks will deploy NetOS® in a first of a kind deployment at Ashton Gate Stadium in Bristol, to provide a large scale demonstration of the capabilities and commercial potential of the innovative NetOS® technology. Zeetta will develop key network applications running on top of NetOS® which satisfy the expressed needs of the stadium's operations teams, members of the public (visitors and fans) and security and emergency services. These network applications will allow operations staff to monitor and dynamically reconfigure network resources (e.g. bandwidth quotas) across the different network subsystems, in real time, with minimal effort and no service downtime, thereby reducing the cost of operating and maintaining the network of service delivery sub-systems in Ashton Gate stadium. This deployment serves as an example of managing complex civil infrastructure (such as a 30,000 seat stadium) in a dynamic and future-proof way using cutting-edge networking technology to: (i) Optimise network capacity in a safe & secure way, (ii) improve resilience of the infrastructure by intelligent use of network and services, (iii) support the reconfiguration of resources to meet anticipated needs and (iv) adapt to rapidly changing demands in an urban environment.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Vivacity Labs Ltd	City Wide Smart Transport Sensor System	£1,989,577	£1,989,577
Project description - provided by applicants			
Our project will transform Milton Keynes into the world's first fully smart city by gathering and distributing real-time data about the 'busy-ness' of the city, including availability of public transport, roads, cyclist parking, mixed-mode pedestrian and cycling areas, car parking and retail areas, with a particular focus on interchanges. This live data will be shared with citizens & businesses through an intuitive app to enable more effective use of infrastructure - increasing availability without building new capacity. We will build on the work of the MK:Smart project, rolling out networks of sensors prototyped through that project and combining these with the front-end interfaces developed for Milton Keynes. This will deliver the first real-time, city-wide data feed on the end-to-end transport network.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Lynkeos Technology Ltd	Deployment of a Muon Tomography System for Nuclear Waste Characterisation	£1,539,397	£1,539,397

Project description - provided by applicants
Muon Tomography is a new technology that is just now making the transition from academic research into commercialisation. Over the past decade, Muon Tomography has been one of the fastest-growing fields in applied particle and nuclear physics research with applications in diverse areas such as national security, volcanology and cultural preservation. This imaging technique uses naturally-occurring background radiation in the form of cosmic-ray muons, particles that are constantly showering the Earth's surface. It builds up a 3D image of shielded and/or large, dense structures that other, more conventional forms of imaging radiation (e.g. X-rays, gamma rays etc.) are not able to penetrate. Researchers at the University of Glasgow and UK National Nuclear Laboratory (NNL) have developed a novel Muon Tomography 3D imaging system to address an important and complex challenge in today's society. The challenge for the UK Nuclear Industry is to process and safely store current as well as legacy nuclear waste, some of which dates back several decades. In particular, the cost and safety of the long term storage of the UK Intermediate Level Waste (ILW) inventory is of crucial importance. One form of ILW are so-called '500 litre' drums that contain cladding material stripped from nuclear fuel rods that are encapsulated within grout-filled steel containers. There are currently more than 30,000 such barrels in long-term storage on the Sellafield site alone. Whether these contain fragments of uranium fuel is a key factor in deciding how these containers are stored. If there is an uncertainty about the content of a legacy container then it must be treated conservatively (i.e. to assume the worst case in terms of possible content). This would require storage space that would incur additional cost of the order of £100M-£200M for the UK Taxpayer in order to build such facilities. The 3D imaging system that has been developed is capable of identifying the presence (or alternatively confirming the absence) of fuel within these containers, thereby allowing the barrels to be more efficiently and cost-effectively stored and processed or by establishing the presence of fuel that can be retrieved and/or repackaged more safely at a much reduced cost. This could not otherwise be done without opening up each container to manually inspect the contents, which would be prohibitively expensive (of the order of £300M). The proposed project will be led by Lynkeos Technology Ltd., a Glasgow-based company founded in August 2016. It has been spun-out by the University of Glasgow after a successful multi-million-pound R&D programme funded by Sellafield Ltd. (on behalf on the Nuclear Decommsioning Authority) and in collaboration with NNL. Innovate UK funding from this competition would enable the first-of-a-kind deployment of this innovative solution within the UK Nuclear Industry. This contract will facilitate the commercialisation of this unique technology and advance the current TRL6 (lab-based demonstrator) system to TRL9 (active deployment) on a nuclear-licensed site in the UK (NNL Preston site). This system will then be ideally placed to characterise the contents of these ILW containers and to help mitigate the risks inherent with the long-term storage of such materials, and in the process will provide a significant saving to the UK Taxpayer.

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Zapinamo Ltd	Changing the Way We Charge Electric Vehicles	£3,127,711	£3,127,711
Project description - provided by applicants			
Awaiting Public Project Summary			

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Powervault Ltd	Second Life Batteries for domestic electricity storage (SLB)	£388,480	£388,480

Project description - provided by applicants
Powervault aims to be the UK's first specialist provider of cost-effective distributed electricity storage, lowering consumersâ€™ electricity bills, reducing peak demand and increasing the utilisation of onsite renewable energy. Since 2010 the UK has witnessed a solar revolution, with >820,000 households installing solar photovoltaics. However, due to the supply profile of solar generation (high during the day, low during the evening), and typical household demand (low during the day, high in the evenings), households are generally only able to access ~50% of the clean energy produced on site, and remain reliant on the grid at periods of peak demand (e.g. evenings). Installation of domestic storage typically doubles the amount solar generation used onsite, by charging during the day when solar is plentiful, and discharging during periods of peak demand, reducing customer electricity bills, and pressure on the grid during peak periods. The UK's electricity networks face considerable challenges from decarbonisation - with microgeneration, electric vehicle penetration and renewable heat stressing distribution networks which were not designed to take this load. New technologies such as energy storage and demand side response offer potential solutions through increased load flexibility, and increased system resilience. In 2016 the National Infrastructure Commission predicted these technologies, alongside interconnectors, could help instigate a 'smart power revolution' estimated to worth £8 billion in consumer savings annually by 2030. Domestic storage benefits households and the wider electricity system across all three pillars of the energy trilemma; facilitating greater use of local renewable energy, thereby supporting decarbonisation and security of supply objectives, and providing a cost-effective alternative to unnecessary additional generation and network reinforcements. However, in 2015 only ~1000 systems were installed in the UK, with high upfront cost cited as the main barrier. To address this bottleneck, Powervault has spent 3 years undertaking customer research and technical development devising a solution affordable enough to unlock mass market traction. Having successfully completed an Innovate UK Proof of Concept in April 2016, validating technical feasibility, Powervault believes its supply chain innovation, â€˜Second Life Batteriesâ€™ (â€œSLBâ€) can be a game changer for energy storage economics. To transform this lab-tested alpha device into an optimised and market ready proposition, Powervault now seeks to validate SLB in an end user environment, secure emerging areas of IP and complete technical development. SLB will benefit from the expertise of Powervault's management team and 4 yearsâ€™ market activity. To date, Powervault has received support and recognition from many organisations including: Innovate UK; RBS Innovation Gateway; NESTA; National Physical Laboratory and Climate-KIC. In 2014 Powervault set a cleantech crowdfunding record, securing investment in <8 hours on Crowdcube and in 2015 BusinessGreen awarded Powervault 'Innovator of the Year'.

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Zephir Ltd	WinTIL GO LIVE	£1,943,400	£1,943,400

Project description - provided by applicants
Wind Turbine Integrated Lidar GO LIVE; WinTIL GO LIVE™. With existing funding from Innovate UK under the WinTIL project, Zephir Ltd. has successfully designed a wind turbine hub-mounted wind speed sensor (ZPINNER) based on Continuous Wave (CW) lidar technology that can be used to reduce turbine loading, optimise turbine performance and increase energy generation. By doing so it reduces the cost of wind energy, reduces carbon emissions and increases the security of energy supply hence addressing the energy trilemma (www.worldenergy.org/work-programme/strategic-insight/assessment-of-energy-climate-change-policy/) and satisfies Innovate UK requirements in the Energy Catalyst funding competition. Over the last 10 years, Zephir Ltd. has become a leading global wind lidar innovator and manufacturer, exporting ~80% of all it produces to more than 50 countries worldwide. This step-change innovation, based on ZephIR's unique core CW lidar technology, aims to deploy the First of its Kind in a real-world, user-facing project offering several UK-based SMEs within the supply chain a significant route to market. The specific business opportunity is the mass adoption of the ZPINNER wind sensor on wind turbines. There are ~300,000 turbines operating globally as an existing addressable market for ZPINNER and in addition there are ~15,000-20,000 new turbines installed every year. While WinTIL has taken core research from fundamental scientific principles and produced a proof of concept demonstrator (TRL 7) which has proven the technology, it has not overcome all the barriers to entry to bridge the chasm from early innovators to early adopters and on to the mass majority in the product life cycle (TRL 8 & 9). There are three significant barriers to overcome to drive mass adoption and uptake of the ZPINNER that will be addressed by 'WinTIL â€“ GO LIVE': 1.) First Of A Kind Deployment (FOAK). While ZPINNER has been proven conceptually on an individual turbine, the value proposition is not evidenced to the level required by the market to perceive a low enough risk to adopt across an entire wind farm. The market is waiting for 'others' to adopt the technology before it commits. There is a need to accelerate a First Of A Kind deployment of the technology in a significant enough volume that produces the evidence and demonstrates the value proposition to secure volume sales. Funding this stage of New Product Introduction is currently the most significant barrier to market adoption. 2.) Design for Manufacture. The ZPINNER product design is suitable for small scale manufacture but would benefit from additional improvements to enable it to be manufactured in volume in a cost effective and efficient way to the repeatable high product quality demanded. 3.) UK Supply chain investment. Zephir Ltd. is currently organised to manufacture ~100 lidar units per year. Zephir Ltd. has initiated the build / investment in a larger facility to provide increased production capacity but requires assistance for tooling, calibration and test equipment within the ZPINNER manufacturing line. Investment in UK SME suppliers in our supply chain will give the support required for delivering against the significant opportunity that a FOAK deployment will unlock and the option to onshore currently offshored key ZPINNER components.

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