

GERMAN-CANADIAN CENTRE FOR INNOVATION AND RESEARCH

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COMPANY PROFILES

Matchmaking Trip | November 2017 | GERMANY & FRANCE

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CLEAN ENERGY & GREEN BUILDING

HCT Sustainables

Company representative: Edward Hole and Scott Arakawa

Technology: Waste water treatment, Waste-to-Clean Energy, Treatment of Organic/Food Waste and Production of Biogas/Clean Energy, Geothermal Energy

Website: www.hct-sustainables.com



HCT
SUSTAINABLES

ONLY GERMANY

COMPANY

HCT Sustainables is an environmental technology company. We have in depth experience in project planning, technology development and transfer, and operations of global waste-to-clean energy, and waste water facilities. With this unique blend of experience, we deliver higher-quality, sustainable solutions while lowering risk and project costs.

Our primary mission is to identify leading sustainable environmental technologies worldwide and to form partnerships with these technology providers in order to offer customized solutions in Canada and internationally. We monitor award winning, emerging environmental technologies globally, and maintain strong relationships with start-ups, R&D organizations, established companies, academic institutions, and industry leaders in this field. This allows us to provide our customers with early access to proven environmental technologies and innovative solutions that are more cost effective than traditional options.

HCT Sustainables has recently entered into a partnership with the leading European Waste Water Treatment technology company and we are in the process of introducing an innovative onsite waste water treatment system to the Canadian market. HCT also has established relationships with top geothermal and solar energy providers.

TECHNOLOGY

We are developing customized innovative small sized waste water treatment systems for the Canadian and North American market. The system has no pumps or blowers in contact with the waste water. It fits in all types of waste water tanks and can be retrofit in existing systems to ensure that only treated water is exposed to the environment. Furthermore, we are developing a cell phone application to remotely control the system.

We deliver independent assessments that are customer-centric, not vendor specific. HCT Sustainables works closely with key technology providers worldwide in waste water treatment, waste recycling, and clean energy production.

MATCHMAKING OBJECTIVES

We are looking for German partners to utilize synergies of combining expertise and experience of HCT Sustainables and top, proven German companies' technologies in small waste water treatment, biological treatment of organic and food waste.

We are looking for leading German partners in new, innovative clean drinking water technologies for delivery remote areas such as First Nations reserves in Alberta. To date many technologies offered by engineering companies to First Nations have been traditional, larger scale facilities that are very expensive and not flexible enough for these groups specific needs. A new more innovative approach is needed to offer custom designs and modular or scalable facilities.

HCT is also seeking German partners with new technologies for the conversion of abandoned oil and gas wells in Alberta to the production of decentralized geothermal energy production. This has never been done before in Alberta and requires new, innovative technologies to accomplish this conversion to energy production, instead of simply shutting in old wells. Alberta currently has close to 78,000 abandoned or orphaned oil and gas wells.

HCT Sustainable is also looking for German partners in new, state-of-the-art, technologies for the treatment of organic waste and food waste in Alberta. These valuable waste streams are largely dumped in landfills that produce major greenhouse gas emissions over time instead of being converted to valuable energy and high quality compost. Other technologies on the market such as gasification are simply too expensive as far as capital and operating costs over time and new more economic technologies such as dry fermentation/biogas/in-vessel composting technologies are needed and must be adapted to cold weather conditions in Alberta. HCT sees a strong potential to introduce and adapt these innovative technologies in Alberta.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

We would like to meet with companies which offer innovative technologies for drinking water treatment and purifying, as this would complement our waste water treatment technologies and there could be synergies in having both technologies to offer. Furthermore, we are interested in renewable energy production and geothermal technologies. As mentioned above, we are also interested in new technologies for the treatment of organic and food waste.

CONTACTS TO BE INVITED

ATB Umwelttechnologien GmbH:

HCT has entered into a partnership with ATB Umwelttechnologien GmbH, but would like to meet with them again.

ATB Umwelttechnologien GmbH
Herr Markus Baumann (CEO)
Herr Markus Blome (General Manager)
Herr Thomas Deutzmann (Business Development Manager)
Herr Thomas Vogt (Engineer)
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Eggersmann Group:

The innovation of Eggersmann has resulted in waste management technologies with innovative plants for recycling and modern biogas plant designs using innovative methods of achieving their own development systems from Eggersmann are very efficient. Compact and modular construction solutions feature flexibility for new projects and for modernization and expansion of existing systems and adaptation to Alberta cold weather climate conditions. The natural fermentation-based recycling of organic waste provides us with a potentially inexhaustible source of energy. The fermentation of organic waste releases energy-rich methane gas, the high quality and economic efficiency of which makes it a viable alternative to fossil fuels. In addition to the recovery of biogas, Eggersmann recycling systems also provide nutrient-rich compost for use in the gardening and agricultural sectors.

Modular concepts, modern ways of optimising efficiency and flexible applications are all characteristic of the solutions supplied by Eggersmann. As mentioned above, this type of technology offers excellent potential in Alberta to eliminate landfilling of the waste stream resources of organic and food wastes. However, these technologies must be adapted to Alberta cold climate conditions which could affect the required plant designs. HCT is a specialist in waste-to-energy technologies and sees great potential to transfer, adapt, and modify the Eggersmann biogas plant designs for use in Alberta conditions.

Eggersmann Group
Carl-Zeiss-Straße 6-8
32549 Bad Oeynhausen
Germany

Tel: +49 (0) 5734 6690 - 0

[http://www.eggersmann-
recyclingtechnology.com/en/](http://www.eggersmann-recyclingtechnology.com/en/)

Honomobo

H O N O M O B O TM

Company representative: Daniel Engelman

Technology: Energy Efficient Modular Housing – Home Automation, Efficient Mechanical Systems, Design

Website: www.honomobo.com

COMPANY

Honomobo builds modern, beautiful, modular homes from shipping containers in our factory in Alberta, which can be shipped North America wide. We are a design driven firm which focuses on efficient, beautiful spaces, which do not compromise great design principles. Our strengths are in our design, brand, manufacturing, and marketing. Our homes are powered fully by electricity, we do not offer any gas options for the unit. Our areas of focus are on increasing the efficiency of our homes through the integration of solar technology, higher insulation, efficient mechanical systems, and the integration of technology to make our homes smarter, and more responsive to the inhabitants. Honomobo is open to technologies and designs outside of the shipping container as well. The dream is to be able to offer an off-grid package which would allow no compromise living without being dependent on the sewer/water and power systems from the grid.

TECHNOLOGY

Currently Honomobo is starting to integrate home automation systems which will make the home more responsive to inhabitants, and optimize the heating and cooling of the home for comfort and efficiency. In design phase is the further integration of solar panels into this system which will allow electrical supply vs demand to be both monitored and optimized for weather, site conditions, and comfort.

MATCHMAKING OBJECTIVES

We are looking for German/French companies who can assist us with integrating the full package of energy supply, home automation, and high-performance building mechanical and envelope into our modern design aesthetic. The intent would be to develop and build a prototype model of our homes which will bring together all facets described into one user friendly, extremely efficient, home that can be manufactured in Canada and delivered North America, or potentially, worldwide.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

We are seeking progressive companies in Germany/France who can assist in the integration of technologies in a way which will allow us to all integrate technology together into homes that will be built and sold in North America. Companies who can supply products or systems which can be integrated into our design and sold are of preference.

Specifically, we are looking for the following technologies:

- Solar panels and battery storage for those
- Hot water heating which runs efficiently off electricity only
- Mechanical systems which can handle heating and cooling, run efficiently, and work off of electricity only
- Home automation systems which can automate heating/cooling, battery usage, electrical usage, lighting, door locks, and sound

Nemalux Inc.

Company representative: Samuel Pogosian and Jode Himann

Technology: Design and Manufacturing of LED Lighting Systems

Website: www.nemalux.com



COMPANY

Nemalux was created by innovative thinking as we've anticipated the lighting paradigm shift of LEDs. We have developed a full line of LED products which continue to lead the industry with their technology and design. Nemalux offers energy efficient, robust, waterproof and hazardous location approved luminaires. These products are designed to provide lighting for areas where water, vibration, maintenance or temperature negatively affects conventional illumination. Nemalux is strategically positioned to provide integrated product solutions and services to customers worldwide. Main market segments are Industrial, Hazardous Location, Chemical, Oil & Gas, Mining, Military, Aerospace, Food Processing, Marine and Tunnels. With a stone in-house team of product designers, electrical and electronics engineers, physicists and programmers, the company has a proven record of supporting challenging projects in North America.

TECHNOLOGY

Nemalux has improved energy efficient, robust, waterproof and hazardous location approved luminaires. These products are designed to provide lighting for areas where water, vibration, maintenance or temperature negatively affects conventional illumination. We've combined the long-life and reliability advantages of Light Emitting Diodes (LEDs) with the brightness of conventional lighting. Nemalux fixtures were developed for lighting in industrial locations. Its brand was established to fill a market niche for low profile, hazardous location lighting where fluorescent and incandescent lights could not compete. Nemalux has built its name on durable, high quality and safe LED luminaires.

MATCHMAKING OBJECTIVES

Nemalux is strategically positioned to provide integrated product solutions and services to customers worldwide. We recognize that the world is changing and with change comes opportunity. We embrace the chance to be on the ground in emerging, profitable markets; the opportunity to work with indigenous and skilled workforce; the opportunity to better serve our global customers; and the opportunity to leverage the cost benefits of being both an efficient global supplier for our clients and working with a competitive supply base. We are seeking opportunities where long-term growth prospects are high in the most strategic areas to ensure that we remain close to our customers and competitive in the markets we serve. In case of WISKA the specific technologies that we would benefit from substantially are:

- o Thermally Conductive Plastic (material, performance, longevity and so on)
- o Manufacturing process for sealed enclosures (plastic casting process, pressure equalization vents, sealing membranes for junction boxes and so on).
- o Market intelligence and clear deliverables for a high intensity marine search lights that are suitable for vessel mounted applications and are based on LED technology.

Additional technologies can most certainly be identified during a more in-depth conversation with the WISKA team.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

European corporations that would be interested and capable of supporting the following initiatives:

1. Thermally conductive plastics for industrial applications
2. Development of advanced controls systems for luminaires in the heavy industrial sector
3. Development of IECEx (hazardous location) rated power supplies for use inside industrial luminaires
4. Development of new standards in temporary lighting applications (light towers)
5. Drone manufacturers
6. Field induced polymer electroluminescent technology

7. Electroluminescent paint
8. Sunlight harvesting/capture (via TIR)
9. Industrial sensors manufacturer and slowing light

CONTACTS TO BE INVITED

WISKA - Nemalux has made contact with a sales group based in Peru and has requested samples for evaluation.

Novhäus Inc.

Company representative: Aurelien Balondona

Technology: Clean Technologies for Building and residential

Website: www.novhaus.com



COMPANY

Mission

Responsibly delivering healthy, eco-friendly, and energy-efficient homes and buildings within our community.

Core Principles

By always adhering to the core principles below, we seek to WOW each person we interact with.

1. **Integrity:** We conduct ourselves with honesty and in adherence with moral and ethical principles.
2. **Innovation:** We relentlessly seek and deliver creative solutions and intelligent methods and technology.
3. **Accountability:** We hold ourselves accountable for living up to our commitments.
4. **Continuous Learning and Improvement:** We pursue excellence throughout our organization by consistently exchanging ideas and observations, investing in employee education and growth, and collaboratively seeking feedback from our clients and partners.
5. **Social Responsibility:** We believe in supporting our communities, our employees and their families, and the environment.

Novhäus is an innovative green builder offering bleeding and leading-edge solutions and inspirational ultramodern design. As a company rooted in smart engineering and lean manufacturing, Novhäus can deliver high performance, cost effective, low carbon buildings in a competitive time frame. Our shared vision for environmentally conscious building practices combined with a genuine willingness to engage the collaborative process makes Novhäus an excellent builder of choice.

Our key strengths:

- We have an amazing team. Our comprehensive team has experience executing high performance projects. They are leaders in green building with proven track records and well-established working relationships. Collectively, we are a wealth of knowledge and a visionary force.
- Our comprehensive understanding of the Energy-Efficiency Initiative and Carbon reduction, as well as the implications of sustainable building in our own communities makes us a committed contender. We are developing excellent relationships with Planning and Development, City Counsellors, Community Leagues, and Local Businesses. We are invested in Edmonton and excited about bringing our unique construction technology to our neighborhoods, while supporting local products and service providers.
- We love to collaborate. Novhäus embraces partnership roles with architects, engineers, designers, and subtrades and most importantly, clients. We have an established mindset that invites rapid growth and critical thinking.
- We can bring your dream to life. Novhäus has the technology, passion, capacity, vision, and heart to build your home. We are committed to our customer's plan.

Novhäus bridges the gap between affordability and environmentally conscious.

TECHNOLOGY

1. Novhäus has developed an unique and innovative way of building cost-effective high-performant buildings using shipping containers. We passed the technology demonstration stage and now we have two (2) homes built, four (4) homes in construction this year 2017 and a multifamily high performant apartment (23 units) building in the works here in Edmonton we are improving our technologies to meet the Passivhaus requirements while staying cost-effective. Patents are in process
2. Novhäus is also developing a Structural Insulated Panel with Curved Solar PV for Flat Roof. We are in proof of concept stage. Patents are in process
3. Novhäus Inc. and Bäune Ecosystem Inc. are developing the first self-sufficient EV Fast DC Chargers Stations coupled with a kiosk or shop all within/inside Shipping Containers with Solar PV Panels on the folding/retractable roof. The structure will be able to be moved or placed anywhere on hearth. Patents are in process

MATCHMAKING OBJECTIVES

Novhäus believes that partnership is the best way to disrupt innovation and deliver a fast and cost-effective solution to our communities and foster economic growth for each partner. With experience working in Europe, Novhäus' Management found that German and French companies have a lot to offer technologically and economically and partnering with them to bridge the gap between their technologies and our technologies is a win-win opportunity and will help to disrupt the standard technology development process to cost-effectively release our products into market locally and globally.

Novhäus is planning to apply as permitted for both the Alberta-Germany Collaboration Funds and the Alberta-France Collaboration Fund for the three projects mentioned above in section Innovation/Technology. To protect our Intellectual Property, the information shared above are sufficient.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

For potential partners, details about our requirements are in order of preference:

1. Sustainability, Green technology: Smart buildings Industry (Energy efficiency, Material efficiency, Waste management and recycling, Sustainable water management, etc.)
2. Renewable energy: Environmentally friendly power generation, storage and distribution (Photovoltaics, Solar thermal energy, Wind power (onshore), Mechanical storage of energy, Efficient grids, etc).
3. Smart technology: Machine Learning, Artificial Intelligence, Virtual Reality, Augmented Reality and Mixed Reality.

Susteen Technologies Canada Ltd.

Company representative: Bruce Hillen

Technology: Clean Technology: Waste to Resource Processing Technology

Website: www.susteen.ca



COMPANY

Susteen Technologies designs and offers innovative technology for the efficient conversion of carbon-based wastes into sustainable resources and energy. The company is a spin-off of Fraunhofer Gesellschaft e.V. – Europe's leading applied research institution. The company is headquartered in Sulzbach-Rosenberg (Bavaria, Germany) with subsidiaries in Canada and the UK.

Susteen's main technology platform is the "Thermo-Catalytic Reforming TCR®" process originally developed by Fraunhofer. TCR® efficiently converts a wide range of organic waste feedstock into coal, gas and oil with unprecedented quality through a robust plant design. The products are suitable for many downstream applications including combined power & heat generation on efficient combustion engines, road & aviation fuel refining, clean hydrogen production, base chemicals applications as well as technical & agricultural applications for biochar. The

company is currently demonstrating the core technology at industrial scale and works with international partners on the development and demonstration of various downstream applications.

TECHNOLOGY

Susteen Technologies turns organic wastes into sustainable resources.

Susteen Technologies is a spin-off company from Europe's leading applied research institution Fraunhofer. We focus on commercializing the innovative TCR® technology developed by Fraunhofer.

Since early 2015 we are successfully testing a pilot plant with a daily capacity of approx. 750 kg of manure, digestate or sewage sludge together with the Fraunhofer research institute UMSICHT. On this basis, we have now developed a containerized prototype plant for small scale demonstration projects.

In parallel we are working on the construction of a fully containerized commercial scale demonstration plant with a daily capacity of approx. 7 t of sewage sludge starting commissioning and testing very soon. Expected first run September 2017.

Susteen Technologies' teams are based in Calgary, Canada, and Sulzbach-Rosenberg in Bavaria, Germany. We collaborate with an international network of academic and industrial institutions incl. University of Alberta and Innotech Alberta here in Canada. With our technology platform we convert a wide range of carbon-based wastes into sustainable gas, oil and char.

Due to the high quality of these resources target drop-in solutions for agricultural, municipal and industrial value chains including alternatives for many fossil downstream applications. More than 50 types of waste feedstock have been tested with our technology – the Thermo Catalytic Reforming – short TCR. This includes many agricultural and forestry byproducts such as animal manure, harvest residue incl. straw and forestry residue.

Our initial focus is on municipal wastes including sewage sludge and organic waste fractions. Even plastic wastes can be processed. Processing industrial effluents is another attractive field of application including byproducts from food and animal processing, fermentation residue from biogas and ethanol plants, paper recycling residue and specialized solutions for manufacturing companies using carbon-based composite materials.

All these types of feedstock are converted into high quality gas, oil and char suitable for many downstream applications such as power, heat and cooling generation on combustion engines from gas, oil and char. Moreover our crude oil can be refined into norm-compliant Diesel and Gasoline fuels. We can produce hydrogen from our syngas or use it in synthesis processes. Depending on the particular feedstock biochar is interesting for soil conditioning, animal farming, metal smelting and technical filter applications.

How does the TCR® function?

A feedstock is processed in an auger reactor without air. By slowly heating it up we crack biomass molecules and while other pyrolysis and gasification technologies are hampered by producing tars in this process our breakthrough catalytic function avoids this problem at the root. This creates the foundation of industrial robustness and high product quality. In a second stage called post-reformer we further upgrade the products through a combination of steam reforming and catalytic cracking. Due to the robust process design we can process a wide range of feedstock even mixed and in seasonal variety. Variable water content and plastics content do not cause a problem either.

As a result, all products are unique in quality. The oil is high in heating value and low in acidity. It is the only thermal conversion oil directly suitable for combustion engines and standard refining processes producing norm-compliant fuels. The oil also contains high fractions of aromatics and naphthenes for chemical industry. Our syngas contains up to 50% in hydrogen interesting for hydrogen separation and synthesis processes. From low ash feedstock our char reaches highest coal grades. It is very low in organic toxicity and hence safe for agricultural applications. The use in enclosed animal farming, for instance, can reduce antibiotics demand massively.

One of the most exciting results of our work is demonstrating the refining of TCR crude oil. With a crude quality better than fossil crude oil the same refining processes can be used to produce Diesel, Gasoline and other fuel fractions. This Diesel fraction from Sewage Sludge for instance meets all parameters of the European Diesel norm. Susteen Technologies GmbH is also involved with the (To Syn Fuel) project based out of Rotterdam harbour to integrate upgrading technologies and to scale up our technology to a full commercial level.

In addition, Susteen Technologies UK is collaborating with the University of Birmingham and the Tyseley Energy Park through the Energy Research Accelerator on a Horizon 2020 project.

Please see below links for further information regarding level of technical development:

<https://youtu.be/AUZSr7Uha20> → This is a video of a research platform in Birmingham.

<http://biomassmagazine.com/articles/14377/to-syn-fuel-turns-sewage-sludge-into-fuels-and-hydrogen> → Biomass magazine

<http://www.cirsa.unibo.it/en/research/environmental-management-research-group-emrg/h2020-projects> → Rotterdam project

https://oppex.com/notice/SELL2WALES_dc174b70e957d921a0c721870772eb01 → Birmingham project

MATCHMAKING OBJECTIVES

As Susteen Technologies Canada is in its early stages as a developing company in Canada, we rely on the capacities and relationships with our European partners, Specifically Susteen Technologies GmbH Germany, and Susteen Technologies Ltd. UK. We also have a strong relationship with Fraunhofer UMSICHT as a research contact. Because of these close relationships we face challenges qualifying whilst trying to take advantage of the funding opportunities that the GCCIR has to offer. For these reasons, and others, Susteen would like to develop additional international relationships with other SME's for potential collaboration in order to access those funds.

Further objectives that we would like to achieve are to examine other technologies that could be integrated into our models, and also to investigate potential markets for TCR® derived products that could enter the French or German markets from Canada.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

Susteen Technologies is looking for potential collaboration partners in the field of Bio-Char, Advanced Bio Fuels, Waste Recovery Management, Process Equipment, Green chemicals, and other clean technologies.

We are also interested to investigate how Susteen Technologies Canada could assist European companies trying to enter Canadian markets for their product development.

CONTACTS TO BE INVITED

Susteen Technologies GmbH Established

Fraunhofer UMSICHT Established

Engie Services Established by Susteen GmbH (first meeting for Susteen Canada)

Rittmo in Alsace, close to Karlsruhe – Biochar first meeting

Sea Marconi in Loraine- pyrolysis, Established by Fraunhofer UMSICHT (first meeting for Susteen Canada)

Cea Grenoble, a nuclear research Center today playing in bioenergy. Never met

RESSOURCE / EXTRACTION TECHNOLOGY

Evolution Engineering

Company representative: Aaron Logan

Technology: Oil & Gas – advanced telemetry and clean technology

Website: www.evolutioneng.com



ONLY GERMANY

COMPANY

In 2011, Evolution Engineering™ (EVO™) was founded by a group of like-minded professionals with a history of developing and commercializing cutting-edge telemetry technology for the downhole market. EVO's founders had long been perplexed by the fact that the oil and gas (O&G) industry, easily the largest industry on earth, had been characterized by stagnancy in technological innovation in one fundamental area of its operation: data transmission. As in any other major industry, fast and reliable data has always been a driver for success, yet in this core capability, the oil and gas industry had been eclipsed by other industries like telecom and transportation. We felt it was time for an evolutionary change. With that foundation, Evolution Engineering started with the aim to be known as one of the most advanced, innovative, and rapid response engineering teams dedicated to building better telemetry and communication systems for the drilling industry. We adopted the mantra "Breaking Through Boundaries™" which is what our first technology release has accomplished.

Our focus at Evolution Engineering is to develop in house, from the ground up, next generation communication and sensor technology. We then deploy this innovative technology to the proper client base, resulting in positive and effective impacts on their businesses. Founded in August of 2011, our company has helped our clients rapidly gain market share by introducing revolutionary technology and novel processes into their workflow. Currently, Evolution holds 83 unique patents filed, each of which cover national entry in Canada, USA, Eurasia, the European Union, Iran, UAE, Saudi Arabia, Australia, Mexico, and China. We have an additional 36 drafted patents currently under review by the engineering team and are constantly striving to generate intellectual property central to Alberta. We have in house dedicated Intellectual Property resources supported by IP management software tailored to our business; we like to believe that we are a market leading small company, with big company IP generation. We place a huge value on promoting creativity in our entrepreneurial environment, as it is the key to driving innovation. Pushing boundaries, and staying on top of industry movements, helps identify and manage risks associated with development and commercialization of our technologies

We have grown in size to meet the ever-increasing demand for technology, as well as the need in the industry for reliability, low cost service, and exceptional quality. We strive to partner with like-minded companies in our application of technology while accommodating industry needs. Here are a few key points about our company:

- Private company; started in 2011
- Evolution has over 80 employees in R&D, Manufacturing, and Operations
- Evolution has three North American offices:
 - o Calgary, AB, Canada
 - o Conroe, TX, USA
 - o Midland, TX, USA
- 220 issued and pending patents
- \$25+ million spent on product development and IP
- Principals and founders have been involved in 6 major MWD development programs over the last 35 years
- Profitable for the last three years despite severe industry downturn
- EVO ONE holds an estimated 13+% market share in the Permian

- 117 EVO ONE systems built and sold to date; backlog of 20 systems including rental demand

INNOVATION/TECHNOLOGY

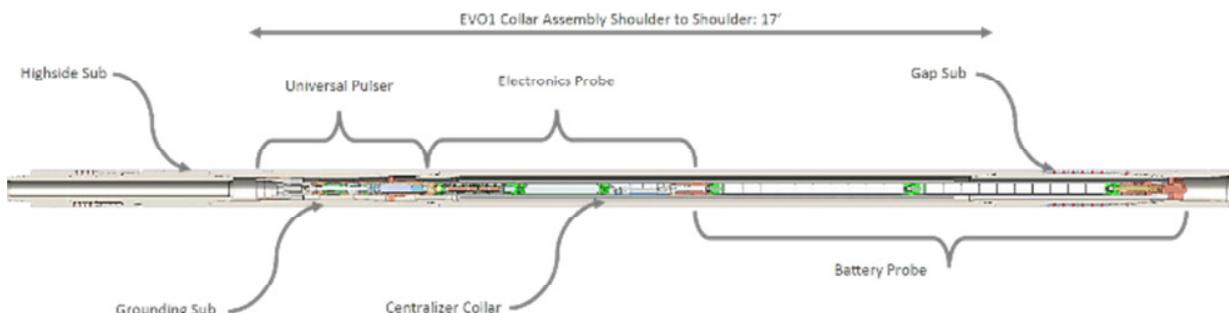
The industry outlook can be broken down as follows:

- Yesterday
 - o Market dominated by positive pulse “tensor” or “GE” style tools, poppet orifice, slow data rate, non-adaptable to changing drilling conditions, downward curve on reliability
- Now
 - o Producers are being challenged to find cost reductions from efficiencies and reduced downtime associated with unreliable drilling services such as MWD, and look for more reliable EM or other telemetry options
- Tomorrow
 - o Looking to enhance the drilling services by making use of automated and/or integrated services from surface to downhole, especially interested in higher data rates

Evolution Engineering has been working with Inpetro Energy (a technology partner) to develop a next generation Measurement While Drilling (MWD) tool for use in land based oil and gas (O&G) exploration. This technology is currently commercially available exclusively through Inpetro’s operational division distribution arm, and has quickly gained acceptance with some of the largest O&G operators across North America. Evolution Engineering believes, that to develop a groundbreaking technology portfolio, you have to focus on the technology development itself – entirely. As such, Evolution has partnered with key manufacturing and distribution teams to deploy our ground-breaking products to the world.

EVO ONE has broken several boundaries but at the heart of the development was creating a next generation industry leading MWD technology focused on high Reliability. To change the industries current MWD market, we had to rely on Innovations that are both Simple and Efficient in design, assembly, use, and service. The industry is very much restricted to legacy constrained technology, or the “wet noodle” syndrome that all current MWD probes seem to suffer from. When a company can start fresh, and is free of limitations in design – great leaps can be made as focus can be placed on how to address the issues from the ground up, rather than how to address the issues within the confinements of legacy based technology. With the mindset of “nothing is untouchable”, we opened Pandora’s box and made sweeping evolutionary changes. Drawing on the teams extensive industry experience, known Service Quality and Reliability issues were identified; where leading offensive failures – including those that we experienced repeatedly in our past, were designed out of the system. We also identified and addressed the human factor related issues that arise with complex designs and products that do not take the end users’ needs into consideration. As such, our first product offering, EVO ONE: Unified Telemetry, was born.

Operation of an MWD tool requires adaptation to multiple environments and changing drilling conditions. To do so, EVO ONE is fully automated to make real-time smart decisions both downhole and through a closed loop uphole/downhole EM communication with the surface system. Decisions are made in real-time based on changing drilling conditions so as to maximize signal to surface while maintaining data rates and decreasing battery consumption, or by altering data rates to ensure signal is maintained – with two fully configurable telemetries downhole EVO ONE has the ability to adapt, and the smarts downhole and uphole to know when and why.



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MATCHMAKING OBJECTIVES

There has been some shortcoming in technologies for our projects that I would want to figure out a path of development for. I noticed that there is an incredibly novel solution that Laser Zentrum Hannover has – and I think this is a perfect area of development for Evolution to apply for a Matchmaking Trip. Conventional strain gauges use glue to bond to the metal, and those fall off downhole – which eventually leads to a failure and a substantial amount of wasted time/resources. Strain measurements downhole allow for determination of bending stress, weight transfer to the drill bit, and pressure measurements. These are all critical measurements that need to be understood at multiple points of the drill string – and currently are not feasible with conventional glued on strain gauge style technology. LZH has a method of laser etching a strain gauge onto the metal substrate – this would solve a large many problems for Evolution:

<http://www.lzh.de/en/departments/productionandsystemtechnology/lasermicromachining/straingauges>

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

We are looking at a partner that is quick to market with a reliable, and well executed design. The partner must be skilled in on body oxide film strain gauge design, preferably experienced in ultrashort laser pulse thin film strain gauge design, and development of robust products capable of high temperature. The partner must be capable of either manufacturing the product, or in outsourcing the product intellectual property for purchase or license by evolution.

CONTACTS TO BE INVITED

<http://www.lzh.de/en/departments/productionandsystemtechnology/lasermicromachining/straingauges>

MWDPlanet and Lumen Corporation

Company representative: Mariya Kucherenko

Technology: Field of Science/Technology –
Remote Sensing

Website: www.mwdplanet.ca



MWDPLANET TELEMETRY

ONLY GERMANY

COMPANY

MWDPlanet and Lumen Corporation develops, manufactures, customizing and assembles Measuring While Drilling (MWD) tools for horizontal and directional drilling in the oil and gas industry. We have been growing steadily since our inception in 2013. Large capital projects in 2013/2014/2015 have generated the cash flow necessary to support our current focus on R&D, technological innovation, and expansion to new international markets.

The keys to success in our industry are:

- Innovation and responsiveness to the market's demands;
- Ability to rapidly develop and launch new technologies;
- Flexibility to fully integrate the client's specifications into customized directional drilling kits; and
- Ability to offer continuous services for equipment, both in-house and at customer sites.

We currently exhibit all of these keys to success. As an SME consisting of a team of technically skilled innovators, we are committed to developing new, innovative and competitive technologies, as well as continuing to offer our world-class kit customization and consulting services.

Our Research and Development Team is focused on the developing and supporting the following projects:

Hybrid E/M/Mud-Pulse Telemetry;
Remote and local Surface Real - Real Time Logging systems and Depth-Tracking systems for locations without an EDR;
Later-Log Directional Resistivity;
Wave-Propagation Multi Space and Multi Frequencies Resistivity Downhole data loggers;
Neutron Density Tool with MWD integration and real time logging;
Development of a Rotary Steerable System

While downtime in Oil-field Industries pushes Canadian companies to shutdown their Highly Technological businesses or, at least, move them out of the country – Our Company works on how to keep technology and educated people in Canada. We know market inside of our country and overseas. We know the market inside of our country and overseas. We know how to grow business in Canada and maintain an overseas client-base at the same time.

The growing aggressiveness on cutting drilling cost of oil companies all around the world creates new market for more advanced and cost efficient drilling tools. Yesterday's very strict and conservative oil companies want to drill with new equipment already today. This creates new possibilities for Alberta – to not lose technology, to use existing resources and integrate Alberta's companies into the international global market. MWDPlanet's project focuses on the new market and solves quite a few technological challenges for the Oil and Gas industry. Currently in the process of 4 patent applications .

INNOVATION/TECHNOLOGY

We are proposing to build a down-hole directional orientation module (sensor pack) to measure bore-hole orientation for MWD or any Directional Drilling applications.

A novel sensor pack design consists of a newly developed rock-solid magnetometer and three accelerometers, for azimuth and inclination measurements respectively. At this time we have developed and tested an in-house triple-axis magnetometer prototype. We have also sourced a third-party MEMS-based accelerometer. The next step is to combine these components into a three-dimensional, compact sensor pack.

As the main part of the project development we will create a calibration tool, which is an additional commercial component that customers will use to calibrate the sensor on-site. The complete sensor pack with calibration station will then be pushed to commercialization.

Sensor pack's new internal mathematics will eliminate industry's old problems of slow and not always repeatable measurements, while at the same time the newest integration section of the Sensor Pack will still keep the possibility to communicate with old MWD-systems.

Our primary innovation is combining the MEMS accelerometer technology with our in-house flux-gate magnetometer design. The combination of these technologies permits the following innovations, compared to directional modules currently available on the market:

We can rate our combined sensor pack to a lower overall power consumption;
Our sensor pack will be smaller (more compact);
Due to the higher shock and vibration ratings of the MEMS based accelerometers, our sensor pack will be more reliable;
Because we are using in-house components for the magnetometer, the overall cost of materials will be lower.
Resulted design will communicate with all existing MWD protocols on the market.

By offering Calibration System together with Sensor Pack - We will resolve all Directional Service company's problems that operate within harsh logistical parameters by providing them with a way to perform simple quality control of measured trajectory and/or possible repair and recalibration even in remote exploration areas.

Since our product in its infancy stage has a strong interest of our current clients, we plan to focus on keeping them consistently updated on the progress of the project with direct outreach, print and video marketing materials. Patenting, Successful field tests and Certifications will be the main selling points of our product. When it comes to innovative technology that is a part of a multi-million dollar operation, data and statistics are necessary to assure our clients in the success of the development. Thus we will need multiple field-test with carefully catalogued results. The data will be posted with the printed and video marketing material. Clients will be also invited to be present and participate at the actual field-tests, so that we can directly demonstrate the efficacy of our product.

We have a confirmed site for the Official Independent Field Test at Catoosa Test Facility, OK, USA. The findings and data from this test will be published as a part of the marketing materials.

We have been involved with the independent Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA).

MATCHMAKING OBJECTIVES

Technical R&D expertise, value-added reseller, system integration, early adopter, investor.

Technology Adaptation of a proven innovative product to meet new requirements such as country -specific regulations and standards in the market being entered,

Technology Validation of functionality, performance, quality and usability with early adopter customers in Europe and Asia market being entered. validation of product value proposition (test, procedure/tools development, test results analysis and reporting).

Through GCCIR's Alberta-Germany coordination fund, we would like to arrange a joint project with a German partner to develop the sensor package. We like the German partner to develop any of the following:

High Temperature MEMS Accelerometers

High Temperature MEMS Magnetometers

A 3-axis sensor assembly (with precise mechanical assembly) that utilizes 3-sensor MEMS accelerometers, magnetometers, and possibly gyroscopes

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

Ideally, this partner would be able to develop all the three components, and deliver a high temperature MEMS 3-axis sensor assembly. MWDPlanet would complete the sensor package which would include this 3-axis sensor assembly, power supply, processor, and enclosure. Additionally, MWDPlanet would complete the calibrating procedures and create the error modelling firmware and research needed. Ideally, the IP plan would grant us the exclusive right to utilize the sensor assembly in a downhole environment (and perhaps other oil and gas applications in general). The partner would retain the right to commercialize the sensor assembly for other applications.

CONTACTS TO BE INVITED

Dr.-Ing. Horst Kreuter
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Web: www.Hahn-Schickard.com

zEroCor Tubulars Inc.

Company representative: Greg Boser

Technology: Coatings, carbon capture, water treatment, construction materials

Website: www.zerocor.com



COMPANY

zEroCor, founded in 2007 by two Canadian oil patch veteran with over 60 years of combined experience in the oilfield business, has succeeded by promoting cost-effective solutions for our clients. zEroCor's commercial product line offers coated tubulars for down-hole production use in oil and gas wells for enhanced performance versus corrosion and wear.

In the last couple of years, we have branched into other segments of the oil & gas industry as well, and have developed a portfolio of unique technologies that are market ready for pipeline leak detection, diluting heavy oils, and for the economic treatment of frack, brackish and acid mine drainage water. The R&D effort has also expanded into clean technology where the spin-off company (Carbon Upcycling Technologies Inc.) is focused on sequestering CO2 emissions in solid carbon feedstock.

TECHNOLOGY

Oil & gas industry:

- Special coated tubulars:
 - zCor 100- is designed for service in corrosive environments, which can include wells that have chemicals such as H₂S (i.e. sour wells). zCor 100 can also be used in normal operations, where it is effective in prolonging the tubing life during the use of acidizing and other well stimulation operations. Additionally, CO₂ injection wells and disposal wells used to get rid of produced, non-oil liquids are also good target markets for this product. The product has also been used in conditions with high carbonic acid content, and has a successful track record over 5 years.
 - zEro 100- is used in areas where wear is an issue, such as pumping wells where corod continually wears a hole in the tubing ID. zEro 100 has been used extensively in Canada, particularly in the Bonnyville and Lloydminster areas with considerable success, where it has generally doubled the life of bare tubing. The product has been increasingly used by CNRL, Husky and other major oil & gas producers in Alberta and has a successful track record over 5 years.
 - High-temperature coatings- zEroCor has developed a new line of coatings with infused nanoparticles that can be applied to carbon steel and stainless steel substrates at low temperatures and provide high-temperature corrosion resistance. This new line of coatings is designed for high temperature corrosion resistance, up to 600 degrees Celsius, and can be applied using commercial spray application techniques. The coatings can be used for downhole tubing and tools protection, as well as on surface facilities. The coatings can be produced cost-effectively, and have been extensively tested for harsh environments, including acid-drop tests (<1 pH) & flame-burning tests, and can enhance the base materials via:
 - Increased corrosion resistance,
 - Increased wear resistance,
 - Increased or decreased thermal conductivity,
 - Higher lubricity.
- Diluent- zEroCor has developed a family of diluents that can be used to reduce the viscosity of heavy oil at low dosages. The family includes particular water-based blends for paraffin- and asphalt-based heavy oils that require a minimal water cut in the produced oil to be effective. The diluents have been tested with produced heavy oils in China as well as Canada and have shown a viscosity reduction of over 95% at concentrations of less than 0.5% by total mass of solution. The diluent is stable at temperatures higher than 150 degrees Celsius, and is produced with the light ends during distillation without any modifications to the refining process.

- Leak Detection- zEroCor has licensed a non-invasive, cost-effective pipeline damage and leak detection technology. The technology uses a pressure transient wave which is then analyzed to determine the wall thickness and wall integrity of the pipeline section under scrutiny. The ITA (Inverse Transient Analysis) method can be used to detect the presence of air pockets, wall loss on both the inner and the outer diameters of the pipe-line, as well as leak detection capabilities. The technology has not yet been tested on live oil & gas pipelines.
- Water Tracers- Zerocor has developed a line of non-toxic tracers that have shown excellent dispersion in water streams and stability at elevated temperatures as high as 80 degrees Celsius. Additionally, the tracers have shown high resiliency in saline environment with 4% salinity.
- zEroCor is also developing a couple of water treatment technologies for low-cost water treatment through Forward Osmosis, nanoparticle-based tracers for tracking fluid flow in formation, and mobile steam generation for secondary recovery through steam, and enhanced oil recovery (EOR) processes. ZEroCor is also involved in the development of a RFID tagging technology to track drill pipe usage, energy harvesting sensors for use in oil & gas facilities, and nano-fiber based sensors for precise tracking of pH, oil/water cut, and gas concentrations.

Industrial, Automotive, & Manufacturing industry:

- High-temperature coatings- zEroCor has developed a new line of coatings with infused nanoparticles that can be applied to metallic substrates at low temperatures and provide high-temperature performance. This new line of coatings are designed for high temperature corrosion resistance, up to 1200 degrees Celsius, and can be applied using commercial spray application techniques. The coatings can be used in industrial settings, at manufacturing facilities, and in marine-associated construction as well. The coatings can be produced cost-effectively, and have been extensively tested for harsh environments, including acid-drop tests (<1 pH) & flame-burning tests, and can enhance the base materials via:
 - Increased corrosion resistance,
 - Increased wear resistance,
 - Increased or decreased thermal conductivity,
 - Excellent bond strength & adhesion to variety of substrates,
 - Higher lubricity.

MATCHMAKING OBJECTIVES

In this section, please explain why you are looking for a German partner company and what benefits a collaboration could offer your company/technology development process. If you are planning to apply for the Alberta-Germany Collaboration Fund and/or if you already have a developed project idea, please also include a description here.

zEroCor's R&D branch has created technology development roadmaps for the concrete, asphalt, coatings, and plastics industry in the last 2 years and is currently working with a host of materials including carbon and ceramic-based nanoparticles to create market-specific solutions. Additionally, zEroCor is also working in water treatment, chemical fiber, and energy harvesting technologies. In particular, Zerocor has begun collaborations with groups working on eutectic freeze crystallization for pure salt harvesting, composite graphene membranes for solute and bacterial removal. Zerocor has also been working on nanofiber sensors for detection of trace contaminants (i.e. H₂S, CO₂, etc.). Energy harvesting technologies include methods of harvesting low-grade heat as well as radio-waves in urban areas for powering small devices such as cellphones, etc. Some of the work done on these segments requires external expertise, and we have been in touch with a couple of German entities already on this front, and are interested to explore the possibility of collaboration with other German parties further. Zerocor has also developed low carbon footprint additives designed for use in the concrete and asphalt industries that it would like to explore with potential German partners.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

zEroCor would be strongly interested in a German partner who has a new technology, process, or innovation at a technology readiness level (TRL) of between 3 and 9. With early stage technologies, we would be interested in working with the German partner to create a technology development program that can leverage the HR and financial resources available in Canada while with more developed technology providers, we would be very

interested in providing the partner with a commercialization partner for the Western Canadian market, particularly for the oil & gas industry. In particular, Zerocor is interested in coatings, advanced materials, novel, cost-effective water treatment technologies, and other propositions (including software, IoT) for use in the upstream oil & gas sector in the US and Canada where the company is active. Zerocor is also interested in German partners looking to invest in clean technology and in advanced materials or are looking for companies that can help them develop solutions for their identified issues and challenges.

Benefits for Potential German Partner(s):

zEroCor has an extensive network of clients and research partners within Canada that can be utilized and leveraged for commercializing new technologies, as well as incubating the development process of new innovations. zEroCor has been an active service provider in the upstream Canadian oilsands market for over 7 years and has the sales and market experience of two founders with a combined experience of over 60 years in the local market.

Additionally, zEroCor has an extensively successful track record with federal and provincial R&D incubators and funding organizations in Canada, and has received funding from CCEMC, AITF, NRC-IRAP, and NSERC. This has been used to fund collaboration with various research groups and private companies throughout Canada, including universities such as University of Toronto, Carleton University, UBC, University of Calgary, NAIT, University of Alberta, and others. These resources and the local knowledge of Canadian academia and the energy industry can be an important resource that zEroCor would be willing to leverage with a German partner, when a mutually beneficial relationship can be found.

CONTACTS TO BE INVITED

Ulf Leonhard, Leonhard Ventures (<http://www.leoven.com/>)

Elise (<http://elise.de/en/>)

Weimar Institute

Fraunhofer Institute on polymer composites and advanced materials

HEALTH TECHNOLOGY

Nomadogen Biotechnologies Inc.

Company representative: Zak Stinson and Aubrey Demchuk

Technology: Health

Website: www.nomadogen.com



COMPANY

Nomadogen Biotechnologies Inc. is a medical biotechnology company (incorporated in Alberta in 2015) founded by four graduate student members of the award-winning University of Lethbridge's 2014 International Genetically Engineered Machine (iGEM) team. Three of the original founders (Scott Wong, Zak Stinson, and Aubrey Demchuk) currently constitute the Board of Directors and each holds an equal share (30%) of the company (with the remaining 10% allotted to the fourth founder: Evan Caton). Together, the Directors of Nomadogen have a combined expertise in molecular and synthetic biology, mammalian cell culture, biochemistry, and behavioural and molecular neuroscience. Nomadogen has also developed strong, reciprocal relationships with notable scientific advisors from the University of Lethbridge (including Dr. Bruce McNaughton, Dr. Aaron Gruber, and Dr. Hans-Joachim Wieden) to assist in preclinical development. This partnership not only offers valuable expertise in neuroscience and biochemistry, but also eliminates the overhead costs associated with validating the technology, facility use, liability insurance, and equipment acquisition.

There is a massive, unmet market need for therapies that facilitate neural regeneration and functional recovery after stroke, traumatic brain injury (TBI) or neurodegenerative disease onset. Nomadogen's foundational technology, "Nomadocytes", (described below) directly addresses this need, can be adapted to treat a wide range of injuries and diseases, and offers distinct advantages over conventional drugs and analogous cell therapies. Specifically, our competitive advantage is that this technology is designed to be non-immunogenic and non-invasive (no neurosurgery required), reduce inhibitory scar tissue and replace lost neurons, and is anticipated to have a broader time window for treatment than current methods of surgical intervention, clot degradation (in the case of stroke), or preventative drug treatments.

Nomadogen's intellectual property is unencumbered and patent applications have been filed and published in both the USA (US20170073382) and Canada (CA2903933).

TECHNOLOGY

Nomadogen's product is a patented process to generate "Nomadocytes": a patient-derived cell line that can be used to non-invasively deliver therapeutic signals to brain cells specifically affected by stroke, traumatic brain injury and neurodegenerative disease. These signals reprogram neural scar tissue that prevents natural regeneration and rehabilitation into functional neurons, which are predicted to restore lost functionality and facilitate recovery.

Specifically, Nomadocytes are a genetically modified type of microglia. Microglia, the mobile immune cells of the brain, have three characteristics that make them excellent candidates for delivery of therapies targeting neural injuries and scar tissue: (1) they have been shown to migrate across the blood-brain barrier and travel specifically to sites of neuron death when injected intravenously; (2) they produce nanoparticles called exosomes, which have been previously demonstrated to have significant potential in trafficking brain disease therapies; and (3) microglia can be derived from patient bone marrow cells. The therapeutic process itself involves the introduction of a novel exosomal protein to microglia that enhances both the targeting of therapeutic DNA to exosomes (a process that would also have widespread scientific applications) and the uptake of these exosomes by specific cells in the central nervous system. The therapeutic DNA, a cellular reprogramming gene called NeuroD1, has been previously

shown to reprogram specific scar tissue cells (known as reactive astrocytes) into neurons, which are predicted to integrate into existing neural networks, restore lost functionality and facilitate recovery. Additionally, Nomadocytes are a platform technology that can easily be adapted to target neurodegenerative diseases such as Parkinson's or Alzheimer's disease simply by replacing NeuroD1 with therapeutic DNA relevant to treatment of those diseases.

Nomadogen is currently in the preclinical "proof of concept" stage of developing the Nomadocyte technology.

MATCHMAKING OBJECTIVES

Nomadogen is seeking complementary biotechnology development opportunities, technical product evaluation, market assessments, and assistance with international IP and market strategy. More specifically, Nomadogen is interested in accelerating preclinical validation by outsourcing "proof of concept" experiments (including replication of completed experiments) such as exosome isolation, qPCR of therapeutic DNA extracted from modified versus unmodified exosome samples, fusion protein toxicity analysis, demonstration of DNA transfer between cell types (in both cell culture and animal models), application of transfected cell cultures and exosomes to animal models, quantification of stroke and TBI recovery in animal models, and replication of completed experiments using Good Laboratory Practices (GLP).

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

Nomadogen is seeking partners with expertise specifically in the areas of healthcare, preclinical/clinical trials, cell therapy, and/or gene therapy (especially those with technical expertise in exosome isolation, qPCR, mammalian cell culture, protein analysis, and stroke or TBI models). GLP laboratories are especially desirable during preclinical evaluation of the Nomadocyte technology.

CONTACTS TO BE INVITED

We do not currently have a relationship with any European companies. Of the current partner companies involved with the Matchmaking Trip, Nomadogen has identified Steinbeis-Europa-Zentrum and Baden-Wuerttemberg International in Germany as well as Erdyn in France as potential partners to achieve these goals due to their involvement with projects in both healthcare and science. Other companies that may be invited to the symposia that have complementary research interests or that offer services relevant to this project include NEUROFIT (Illkirch, France), Celectis (Paris, France), Vectalys (Toulouse, France), CellForCure (Paris, France), Cato Research (Cologne, Germany), Apceh (Munich, Germany), and uniQure (Heidelberg, Germany), to name a few examples.

Physio4D

Company representative: Javad Sadeghi and Ella Moghaddam

Technology: Health

Website: www.physio4d.com



COMPANY

Physio4D™ was founded in July 2015 by two research scientists from the University of Calgary with the vision of building new technologies utilizing the motion capture technique. It provides an interactive motion-tracking technology to enable clinicians to objectively assess the joint mobility of the patients and save time. Physio4D™'s mission is to automate the whole process of objective examination, exercise instruction and compliance tracking in an accurate, data-driven and engaging way. This allows physiotherapists who are always pressed by time, manage their time of patient care more efficiently. It also offers patients an optimized, expressive, and self-managed experience through a set of custom exercises and suggestive feedback. What differentiates Physio4D™ from the rest of the competition is provision of the active visual feedback across all platforms including mobile devices. Also,

by employing machine learning in the treatment plan, Physio4D™'s intelligent exercise prescription system can personalize prescriptions of the custom exercise recipes for any type of injury.

Physio4D™ is expert in using computer vision, machine intelligence, and visual analytics to facilitate assessment, instruction, and monitoring of the patients. Physio4D™ has two PhDs and a MSc in its core team who are focused primarily on technology innovation. This enabled Physio4D™ to be shortlisted as a finalist (2017) and semi-finalist (2016) for DynaLIFE Dx stream of Tech VenturePrize and receive Screener's Award of Merit (2015). In 2016, Physio4D™ was one of the top 3 teams to represent Canada in the second Global Healthcare Innovation Academy. Also in summer 2016, Physio4D™ was selected out of 983 start-ups to participate in the Plug & Play Accelerator's summer start-up camp in Silicon Valley. This program helped crystallizing Physio4D™'s business plan, building a scalable business model and presenting a refined pitch to more than 30 VCs in the Bay Area. More recently, Physio4D™ was shortlisted as one of the top 3 teams to participate in the first cohort of the TELUS Technology Accelerator in Calgary. This program helped Physio4D™ to finish development of the first version of its motion-tracking technology and start piloting it in a chain of 8 physiotherapy clinics in Calgary.

TECHNOLOGY

Motion capture technique has proven to be advantageous in the area of physical therapy because it has shown a higher accuracy in the diagnosis of musculoskeletal disorders. Tracking patients' activities using motion capture helps to diagnose and visualize limitations in the human body. However, motion capture is currently not affordable nor sufficiently mobile to be used by physiotherapy clinics. Physio4D™ provides a mobile yet accurate motion tracking technique and makes it affordable to the situations that a motion capture setup is not available. It offers clinicians a digital onboarding process, a vision-based upfront assessment tool, an intelligent exercise recommendation portal and an interactive compliance tracking app to automate their whole process of objective examination, exercise instruction and compliance tracking in an accurate, data-driven and engaging way. Physio4D™ starts saving time from the moment a patient walks into the clinic through a digital onboarding process that helps clinicians complete their charting and daily notes while interacting with the patients. As part of this process, a depth camera is used to track the range of motion (ROM) of the patients and provide reliable assessments of the patient progression. In addition, Physio4D™ provides a repository of 3D exercises to clinicians to browse and prescribe to their patients. By employing a machine learning algorithm, after enough training, the process of exercise recommendation becomes intelligent that improves efficiency of the outcomes. Physio4D™ also provides visual suggestive feedback to the patients while performing their exercises in front of the depth camera. The analytical data logged from the patients during their exercise sessions will be accessible by physical therapists in different visual formats to track their patients' progress. This allows physiotherapists to develop an evidence-based practice for assessment of the success of their treatment.

Our motion-tracking solution is currently under pilot in a chain of 8 physical therapy clinics. We have recently converted one of them to our first paying customer and are working to convert the rest. The current pilots of Physio4D™ have raised significant interest from the physiotherapists as a viable plan to improve their outcomes. Our plan is to report these outcomes in health-related websites, magazines, and journals. This enables us to gain a lot of credibility in the eyes of the large national clinics as a reliable solution and facilitates onboarding these large chains in the near future.

MATCHMAKING OBJECTIVES

Since Physio4D™'s motion-tracking product is commercial ready; we are looking forward to partner with large physiotherapy and sport medicine chains to start gathering training samples for our machine learning algorithms. Currently, there is no solution in the market that employs machine learning and visual analytics to personalize prescriptions of custom physiotherapy exercises. The main reason for this gap is the need to gather a lot of test samples from patient sessions to train an intelligent algorithm. Finding potential partners in Germany and France that can enable us to collect enough data points from their patients, helps to extrapolate the training samples of our machine learning algorithms across different injury categories in Europe. After enough training in the intended clinical setting, the process of exercise recommendation becomes intelligent which improves efficiency of the potential partner's outcomes.

We plan to run a study on the outcomes of using Physio4D™ inside potential partner's clinical setting. This study will help us identify the feasibility of tracking, recording, exercise prescription, time-to-assess, ease of assessment,

and effectiveness of our workflow in Germany and France. This study also evaluates effectiveness of using Physio4D™ in the decision making process of the clinicians. We also plan to start collaboration with large insurance companies in Europe on development of different activity assessment tests to provide predictive analytics for estimating realistic long-term care plans. The successful completion of this step will help adjusters with their discharge management and enables them to close the files faster while saving a lot of healthcare costs.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

The ideal German / French partner company we are looking for falls under one of these categories:

- 1) **Large chain of physical therapy, chiropractic, occupational therapy or sports medicine:**
This partner will provide us an ideal testbed to mature our technology and provide a unique and personalized value to clinicians and patients. We are looking to find these networks of rehab clinics through the contacts at national associations of physiotherapy and their federal state associations e.g. federal association in the state of North Rhine Westphalia.
- 2) **Large insurance company:**
This partner would enable us to incorporate our objective measures into an independent method of assessment acceptable by major insurance bodies.
- 3) **A leading research and development organization:**
This partner could help us run a clinical study of our technology to get clinical approval on efficacy of our solution. We may also find a co-development partner to work together on an area of mutual interest e.g. Exergames.

CONTACTS TO BE INVITED

1) Large Physio Chains:

Germany:

- To find the best testbeds, we are planning to meet with the German National Association for Physiotherapy (<https://www.physio-deutschland.de/fachkreise.html>) and their regional associations in Bavaria, North Rhine Westphalia and Saxony, which are the three federal states we will visit.
<https://nrw.physio-deutschland.de/landesverband-nrw.html>
<https://bay.physio-deutschland.de/landesverband-bayern.html>
<https://sac.physio-deutschland.de/landesverband-sachsen.html>
- EIT Health (<https://www.eithealth.eu/>) is a consortium of more than 50 core partners and 90 associate partners from leading businesses, research centres and universities from across 14 EU countries. We plan to meet with them in Munich.
- Also, these are two rehabilitation centers in Germany that we can visit (<https://www.health-tourism.com/rehabilitation/germany/>).

France:

- To find the best testbeds in France, we are going to contact the World Confederation for Physical Therapy (<http://www.wcpt.org/>) and European Platform for Rehabilitation (<http://www.epr.eu/>).
- We are also looking forward to contact EIT Health (<https://eit.europa.eu/eit-community/eit-health>) in their Paris location.
- We may find a right fit in the private nursing homes and senior care facilities. For example, KORIAN, is one of Europe's leading groups (<http://www.korian.com/en/>) in the area of aging research.
- Also, these are two rehabilitation centres in France that we can visit (<https://www.health-tourism.com/rehabilitation/france/>).

2) Large Insurance Companies:

Germany:

- Allianz (<https://www.allianz.com/en/>) is an international insurer with headquarters in Munich that we would definitely like to meet.
- German Social Accident Insurance DGUV (<http://www.dguv.de/en/index.jsp>) is another insurance organization we want to meet.

- We would also like to visit their Allianz X Insurance Tech Accelerator in Munich (<https://www.allianzx.com/>) as well as W1 accelerator (<http://werk1.com/fwd/>).

France:

- Allianz (<https://www.allianz.com/en/>) has also a branch in Paris that we plan to visit.
- This is a list of top insurance companies in France to connect with (<http://insurance-companies.co/insurance-companies-in-france/>).
- It would be great if we can arrange a meeting with the person in the Embassy who runs the Canada France Health Tech Accelerator in Paris (<http://www.gccir.ca/portfolio-items/canadian-technology-accelerator-mentorship-in-france-3/>)

3) Leading R&D Organizations:

Germany:

- We would like to meet with CIBEK technology + trading GmbH as well as researchers from Fraunhofer Institute for Experimental Software Engineering IESE in Kaiserslautern, regarding the communication tool they have developed for seniors and nurses, called SUSI TD, that ensures social integration and fall prevention for seniors (<https://www.fraunhofer.de/en/about-fraunhofer/excellence-in-research/fraunhofer-awards/human-centered-technology.html>).
- It would also be great to meet with the teams at Fraunhofer Ambient Assistant Living Alliance AAL (<https://www.aal.fraunhofer.de/en/geschaeftsfelder.html>) about their personal health projects.
- We are interested to arrange meetings with Fraunhofer Institute of Digital Media IDMT (<https://www.idmt.fraunhofer.de/en.html>) and Fraunhofer Institute for Computer Graphics Research IGD (<https://www.igd.fraunhofer.de/en>) to discuss possible collaborations on Exergames.
- We would also like to meet with the researchers at Fraunhofer Institute for Software and Systems Engineering (ISST) (<https://www.isst.fraunhofer.de/en.html>) and Fraunhofer Institute for Computer Architecture and Software Engineering (FIRST).
- Siemens Healthcare (<https://www.healthcare.siemens.ca/>) and MERCK KGaA (<https://www.emdgroup.com/en/research/our-approach-to-research-and-development/healthcare.html>) are other institutes we would like to talk to.
- Maybe we can explore tracking rehabilitation of the stroke patients using our technology with scientist at Max Plank Institute for Software Systems (https://www.mpg.de/915977/softwaressysteme_kaiserslautern).

France:

- There is a software company in Paris called Shift Technology Solution (<http://www.shift-technology.com/>) that leverages machine learning to save money for claim handlers in the insurance industry. We are interested to explore possibility of collaborating with them.
- We would like to visit INRIA (<https://www.inria.fr/en/>), to explore their leading edge innovations in the field of digital health.
- We would also like to meet with The French National Center for Scientific Research CNRS (<http://www.cnrs.fr/index.php>), the largest governmental research organisation in France to discuss about their priority area of health engineering and bioengineering.

Rehabtronics Inc.

Company representative: Peter Urban and Rahul Samant

Technology: Medical Devices with a focus on rehabilitation of neural injuries, sports therapy and performance technology

Website: www.rehabtronics.com



COMPANY

At Rehabtronics, we make technology to help people recover from neurological injuries like stroke and spinal cord injury. Our current products include the ReJoyce and ReTouch workstations for upper extremity rehabilitation, and the ReGrasp nerve stimulator for hand movement. Our products are sold worldwide and we are currently undertaking significant efforts to develop a new range of technology products in *the areas of sports injury recovery and performance management* that will significantly expand our market scope and reach.

TECHNOLOGY

Currently we are developing technologies in the following five areas, all with the goal of improving peoples lives either through providing technologies and products that enable recovery from (neurological) injuries or by enhancing physical abilities and performance (regular people and athletes):

FES: Functional Electrical Stimulation solutions with a focus on rehabilitation from neurological injuries such as stroke or spinal injuries.

Possible partner in this area (based on preliminary research): Hasomed, Otto Bock...

ES: Electrical Stimulation, focused on developing solutions for sports medicine and athletics. For instance, a consumer-grade stimulator can increase the effectiveness of people's (athletes) exercise regime. We are working on ES technology that aids in the healing process for instance in sports injuries and can help manage acute or chronic pain.

Possible partner in this area (based on preliminary research): Hasomed, Rehasim, Otto Bock...

EMG: Electromyography (a diagnostic procedure to assess the health of muscles and the nerve cells that control them (motor neurons). Motor neurons transmit electrical signals that cause muscles to contract...)

In this area, we are looking for partners for the development and/or supply of: Motion analysis and muscle activity sensors, electrodes, signal amplification, filtering, signal / noise management, low power wireless communication, signal processing, and signal analysis.

Possible partner in this area (based on preliminary research): Neurowerk, Hasomed, Rehasim, Otto Bock...

Cloud (Big Data) Management Platform Development. In this area, we are looking for experienced partners in the areas of developing IOT (internet of things) systems and data management solutions. Important topics are real-time online data communication, big data storage solutions (i.e. no-SQL databases etc.)

Possible partner in this area (based on preliminary research): idicos GmbH...

Artificial Intelligence and Machine Learning. We are currently exploring opportunities to develop solutions that utilize AI and Machine Learning to develop advanced solutions in the areas listed above.

MATCHMAKING OBJECTIVES

Our objectives are to identify and engage with partners in Germany and/or France that are a 'natural' fit for the kind of R&D projects that we are engaged in. Ideally these partners bring either expertise and experience or capacity to a joint development project that we currently have either no or only limited access to. Germany, France and Europe are key markets for Rehabtronics. Therefore, a collaboration in product development with a local company could be very beneficial. Our goal is to engage with one or multiple partners in a joint innovation product development that benefits everybody that is participating and contributing to the project.

Rehabtronics will bring a couple of specific product ideas to the table in the areas of EMG-based physical performance management solutions and we are planning to apply for funding from the Alberta-Germany Collaboration Fund.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

Rehabtronics is currently working on product concepts that integrate Artificial Intelligence and Machine Learning with EMG data and analysis with the goal of developing highly efficient performance management technology for various sports industries. Rehabtronics has access to proprietary intellectual property and technology solution in the areas of real-time data analysis and AI-based solutions for physical performance monitoring and management. For this project, we are looking for partners that can complement and enhance our abilities and (parts of the) solutions in the areas of EMG measurement, data filtering and communication and in miniaturization of the physical / wearable part of the system.

Expertise that we are looking for include:

- High level of expertise in their respective fields (see under “Innovation and Technology” above)
- Motivated and capable to invest in joint technology venture projects with a 2-3 year development roadmap.
- Willing to work and collaborate with agile development methodologies including the ability to quickly adapt to changing market conditions.
- Otherwise please see above under ‘Matchmaking Objectives’

CONTACTS TO BE INVITED

Definitive: Idicos GmbH

Based on preliminary online research: Neurowerk, Hasomed, Rehasim, Otto Bock

As our internal research progresses, we will be able to list further potential candidates.

Note by Peter Urban (2016 participant in the matchmaking trip):

On last year’s matchmaking trip at the Stuttgart meeting, I met an electronics engineering company from the Bodensee area that is focused on low power radio data communication. This company would be a potential partner for Rehabtronics as well.

eb-i Eberhard Baur - Informatik
Contact: Eberhard Baur
Email: baur@eb-i.de
Phone: +49 (0) 7732 9459330
Web: www.eb-i.de

Schuetzenstrasse 24
78315 Radolfzell
Germany

Salu Design Group / Health Gauge

Company representative: Randy Duguay

Technology: Artificial Intelligence platform solution IoT / wearable tech solution / health-tech

Website: www.salu.ca and new website (currently in development): www.healthgauge.ca/dev



ONLY GERMANY

COMPANY

Salu / Health Gauge is an innovative Alberta-based company in the early stages of growth and developing unique products and skills in the areas of artificial intelligence, machine learning, IoT and neural network solutions that better correlate ongoing synchronous and asynchronous personal health biometrics to personal behaviours and lifestyle choices. Our company is focused on building world-class competencies in the areas of applied machine intelligence to IoT and personal health biometrics, whereby individuals can become more engaged and aware of their ongoing personal health status, and to provide for more informed conversations with health care providers in regular care programs, in both preventative and recovery health plans. Through our close relationship with Alberta based research and development organizations such as the University of Alberta, and Alberta Health Services, and other strong partners – our company is pursuing international developments and validation projects in Canada, the United States, and Asia currently. Our company mission is to address the growing areas of precision health and medicine developments. We see this market area as having expansive and important growth potential. Our team has special skills in the areas of health IoT hardware and software solutions development. Our competencies include leading and developing these solutions using the latest generation of micro-electronics, sensors, and materials; in digital processing and refinement of pulsewave, photoplethysmography (PPG) and electrocardiography (ECG) signals; and in the application of artificial intelligence, machine intelligence, and neural network solutions to further refine data for downstream use in predictive analytics and virtual assistant solutions.

TECHNOLOGY

Salu has created a highly accurate non-invasive health & wellness AI-based monitoring platform solution that includes:

- Wireless wearable heart health & Blood Pressure monitoring device that can be paired with a smartwatch (band) or carried in a pocket (card form);
- Advanced AI platform that provides for enhanced signal processing, neural network & machine learning software to increase data accuracy,
- Biometric tagging for improved predictive analytics
- Secured cloud-based online interface that provides for individualized reports and feedback.
- Virtualized assistant that can provide personal health coaching feedback to active monitoring with care providers
- Syncs data with other health data solutions such as glucometers, weight scales, and activity & fitness monitors
- Neural network application provides for ongoing training of individual and population-based algorithms
- Enables secure sharing of health data with health care providers, caregivers and loved ones

MATCHMAKING OBJECTIVES

Our solution outline and objectives are to grow into international markets where there are like interests and where we can create synergistic opportunities. Germany offers the potential to be an ideal location to do collaborative developments in progressing our AI / MI and IoT platform initiatives. Ideally, we are looking for partners with expertise in the following areas:

- Artificial Intelligence / Machine Intelligence: developing areas of research in the areas of digital pulse, ECG, O2 and the use of neural networks / training using large data sets across large groups of demographics. These fields of research & innovation can encompass both human and bovine data sets and related algorithms; and the use and application of machine learning computing techniques and in the use of predictive analytics, psychometrics (behavioural), and virtual assistant solutions.
- Advanced materials or techniques for electrically conductive anodes for skin contact(s)
- Advanced design methods & materials for creating specialized forms (molds & manufacturing) for wearable solution(s) such as a smart-band solution

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

We would be interested in working with companies who have expertise or interests in specialized areas of manufacturing (IoT), software solutions, AI / MI solutions development, and who may be interested in doing joint developments.

What we are looking for in a German/French partner are companies who have an interest in doing collaborative design and development in advanced techniques in PPG & ECG data capture, related algorithms, machine learning processing and analysis / and advancing the hardware, sensors, design, and AI/MI (artificial / machine intelligence) software solutions. These could include organizations with an interest or expertise as well in psychometrics analytics and methods or software assets in virtual assistant, especially as it may pertain to relating biometrics to health & lifestyle behaviours (diet, exercise, sleep, stress; or areas such as alcohol, medications, smoking or other external factors).

In the software development space, we would need to do some work on localization of our applications which includes how to work with an organization that has skills in software (including some skillsets in AI, machine learning software, and competencies and focus in the areas we are developing) would be of interest to us, as we could develop projects of mutual interest in these new areas of software development.

CONTACTS TO BE INVITED

SAP Health (existing relationship / exploratory development discussions), BOSCH (phone meeting only), Siemens (no contact currently)

Further companies of interest:

- Organizations that have interests in market development in new areas of health-tech (IoT, AI, ML software dev) are of interest
- Organizations that have a vision for working in the area of applied AI using advanced sensors technologies are of interest (i.e. BOSCH, OSRAM)
- Organizations that may be able to aid in framing a localized project for validation / testing work, and R&D input. Examples like what an AHS (Alberta Health Services – Innovation group) could provide.

MICROTECHNOLOGY

AdvEn Industries, Inc.

Company representative: Kyle Wang

Technology: Clean Tech and Electrochemical Materials

Website: www.adven-industries.com (NOTE: our Board has specifically instructed our management not to disclose any specific technical and product information on our website. To the contrary, we use our website to detract readers from knowing what we really do for IP protection and competitive purposes. At this stage, we do NOT need publicity via publicly available media platform like website. We do marketing via highly selective means to reach highly selective audiences.)



COMPANY

We are an electrochemical material innovator and producer. Our proprietary materials and proprietary process of making electrodes for energy storage device, especially super capacitor and batteries are our current and future core strengths that we can offer potential industrial collaborators and research partners. We focus initially on supplying **super capacitor grade activated carbon materials and improving or upgrading electrode making techniques used in super capacitors and lithium batteries**. We have a robust R&D lab and a pilot plant and extensive material engineering and product development experience, covering chemical, material, mechanical, and operational expertise. The company was founded in October 2011, and is a 100% shareholder owned private enterprise.

TECHNOLOGY

AdvEn develops and produces activated carbon materials used in super capacitors and advanced lithium sulfur batteries. Super capacitor and battery builders are our near term users and research collaborators. Our ASAC (AdvEn Synthesized Activated Carbon) and ESAC (Electrode Super Adhesive Coating) technologies are our two initial proprietary technologies coming out of our lab since early 2016. ASAC has superior performance and lower cost when used in super capacitors and lithium sulfur battery systems in contrast to the materials made by world's leading suppliers in Japan. ASAC is at the end of its prototyping stage. We are now able to make sample products from our pilot plant and have sold them to national labs in the US, Li Tec Battery GmbH (100% Daimler company) and few other buyers in limited quantities since 2016. We are moving ASAC into pre-commercial demonstration phase starting 2018.

ESAC is at the prototyping stage with samples made to out-perform the world's leading electrodes. A superior performance to enhance energy and power density while staying at low production costs becomes evident from sample demos and data collections. We are also moving ESAC into the pre-commercial demonstration phase to produce larger quantities for sale to early adopters starting 2018.

MATCHMAKING OBJECTIVES

We are looking for German and French partners to:

- Help expedite our prototyping for ASAC and ESAC by testing our products in energy storage applications such as super capacitors and lithium sulfur batteries.
- Co-develop applications in energy storage space via joint R&D efforts, using ASAC and ESAC

A project to co-develop advanced super capacitor using our ASAC and ESAC would be ideal. The partner in this effort could be a super capacitor or super capacitor component manufacturer (e.g. Bolloré Group); it could also be the end user of super capacitor such as an electric bus/car company, renewable energy generation company (such as solar or wind) that needs to regulate and supply power to electric grid provided such end users are interested in advanced technologies in the upper stream of their ecosystem.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

We look for companies or national labs that have super capacitor and/or advanced battery (usually Lithium Sulfur system) R&D and prototyping capabilities; even better if they have manufacturing or fabrication capabilities for larger quantities of sample super capacitors or battery products to demo advanced and new material technologies.

CONTACTS TO BE INVITED

Bolloré Group in France would be a candidate for long term collaboration. We have not met them and don't have an existing relationship, but it's been on our potential partner list for a while. A similar group in Germany, not necessarily has to be F500 like Bolloré, will be most welcome.

Fourien Inc.

Company representative: Faheem Khan

Technology: Microchip manufacturing for life sciences

Website: www.fourien.com



ONLY GERMANY

COMPANY

Fourien is an Edmonton based high tech start-up, mainly focusing microchip manufacturing for various applications in life sciences. The company has a long history of research behind its novel technology which is being commercialized for applications in life sciences.

TECHNOLOGY

At Fourien, we have developed a microchip which can characterize an expensive bio sample (protein, DNA, polymers, etc) by consuming 100 times lower quantity than the conventional technologies. The microchip can replace functionality of four standard medical analytical instruments and simultaneously measures density, viscosity, chemical composition and thermal properties of sample with a quantity from nano to pico grams. By employing the similar machinery and protocols, which Intel uses to manufacture its microprocessors, our microchips are manufactured at mass scale which help us keeping the costs per chip to just few dollars. After a long research term of eight years, we have successfully tested multiple applications of our chips. Currently, we have a lab scale prototype which contains all essential modules, required for basic functionality of the technology. The microchips have been demonstrated multiple times and experimental results were published in multiple scientific research journals. More details on research publications are available on www.fourien.com. We also have two pending patents.

MATCHMAKING OBJECTIVES

We have mainly two objectives of matchmaking:

1. In order to get data from our microchips, we have to develop compatible instruments. We already have developed a prototype but at this stage it is quite expensive. This mainly because we used some highly expensive OEM infrared (IR) laser modules. Technically these modules are called Quantum Cascade Lasers. At the moment, a typical module costs up to \$50,000 CAD. In order to bring down the overall cost of our product, it is important for us to have low cost infrared lasers. Both, France and Germany have got some manufacturers who are developing low cost infrared sources. We would like to visit their facilities, show our microchips and determine, if they have a potential to develop custom IR sources. We believe, at least one of these manufacturers would be able to collaborate with us and help us develop an affordable instrument for our microchips.
2. While we are working in developing a low-cost instrument for our microchips, we are also exploring different applications of our technology. Germany and France have multiple start-ups that can buy our microchips as OEM parts and incorporate in their products. Therefore, through this opportunity of

matchmaking, we would like to establish collaborations with some relevant companies who may be interested in developing their products using our microchips.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

Fourien Inc. has developed a MEMS chip which can perform spectroscopy of small volumes of chemicals. Our product is mainly targeted for pharmaceuticals and diagnostic industry. In order to do spectroscopy, we need a tunable light source generally in UV, visible and mid-infrared region. Currently, we use quantum cascade lasers (QCLs) but they are very expensive.

We are looking for partners who can help us develop an OEM tunable light source. Therefore, we are looking for partners with expertise in the following areas:

1. Photonics
2. Optics
3. Electronics
4. Microfluidics
5. Infrared/UV/Visible Spectroscopy

CONTACTS TO BE INVITED

Below are some of the suggested companies which we would like to talk to:

- Nanoplus (Dr. Lars Hildebrandt- lars.hildebrandt@nanoplus.com)
- Xiton Photonics GmbH (Dr. Jürgen Bartschke- jbarschke@xiton-photonics.com)
- Toptica Photonics (www.toptica.com)
- MIRSense (www.mirsense.com)
- Neaspecs (www.neaspec.com)
- ATR Elements (www.atr-elements.com)
- Elveflow (www.elveflow.com)
- Zellmechanik (www.zellmechanik.com)

NORCADA

Company representative: Hooman Hosseinkhannazar

Technology: (1) MEMS and Nanotechnology; (2) Mid-IR laser technology

Website: www.norcada.com



COMPANY

Norcada is a MEMS and photonic product company specialized in the development and manufacturing of MEMS devices and mid-IR DFB lasers for a wide range of industrial and scientific applications. Founded in 2002, Norcada has access to a state-of-the-art MEMS and photonics fabrication facility in Edmonton, Alberta, home to a major nanotechnology cluster in Canada.

Norcada MEMS products include thin film devices, MEMS heating chips and liquid cells for electron and X-ray microscopy, silicon nitride X-ray windows, X-ray tomography chips, silicon nitride holey membranes for TEM and X-ray analyses, and nanopore devices for bioanalysis.

Norcada also develops and manufactures single mode semiconductor distributed feedback (DFB) lasers in the 1.3 - 3.6µm wavelength range for industrial gas sensing, environmental monitoring, and TDLAS applications.

TECHNOLOGY

Norcada's product focus involves the following two main technology areas:

(1) MEMS and Nanotechnology: Our MEMS and nanotechnology product focus involves the development and manufacturing of ultrathin membrane products for electron and X-ray microscopy applications. There are three key application areas we are seeking collaborations for:

MEMS chips and specialty holders for in-situ TEM and X-Ray Microscopy applications - the MEMS chips we have developed include heating chips, liquid cells, and e-biasing chips. All products can be configured for electron microscopy as well as X-Ray microscopy. The specialty holders can enable the customers to use Norcada MEMS chips for in-situ X-ray microscopy applications.

Ultra-thin X-ray windows - the ultra-thin X-ray windows have high transmission rates for X-rays (and electron beams), and are yet capable of holding at least one bar pressure differential. These thin membrane products are well suited as vacuum windows for electron and X-ray sources and detectors.

Nanopore technology for DNA sequencing – Norcada has developed a wafer-scale nanopore fabrication technology using our ultra-thin membrane platform. We are currently able to produce nanopores down to 50nm on wafer scale using standard nanofabrication technology, and nanopores as small as 10nm using ion milling methods. Our nanopore devices are basic enabling building blocks for a wide range of bio-analysis and DNA sequencing applications.

(2) Semiconductor infrared laser technology – Norcada's mid-IR laser technology allows the fabrication of semiconductor DFB lasers with single mode operation with narrow linewidth and wavelength tunability. Our technology can cover the 1300-3600nm wavelength region. These wavelengths and performance characteristics make Norcada lasers well suited for laser spectroscopy and trace-level gas sensing applications (TDLAS).

MATCHMAKING OBJECTIVES

Our main objective is to find compatible collaborators in France and Germany to develop new products and applications for Norcada's MEMS and nanotechnology product platform technologies, or potential customers for our semiconductor infrared laser technology.

Specifically, we are looking for early adaptors for our MEMS chips for in-situ microscopy, ultra-thin windows for electron beam and X-ray, or nanopore devices for bio-analysis and DNA sequencing.

For our semiconductor infrared laser technology, we are looking for potential partners who have needs of lasers for gas sensing and spectroscopy applications, the collaboration may entail development of custom wavelengths, or special packaging platform to best suite their specific applications.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

(1) For MEMS and nanotechnology: we are looking for both research institutes and companies that have a need to develop the following products and/or applications:

Heating chips and liquid cells for scanning/transmission electron microscopy, or X-ray microscopy

Companies that develop x-ray detectors and need ultrathin X-ray vacuum windows

Companies that are developing nanopore based next generation genetic (DNA, RNA, Protein) sequencing technologies

(2) For semiconductor infrared laser technology: we are looking for companies that are developing Tunable Diode Laser Absorption Spectroscopy (TDLAS) based instruments for gas sensing applications.

INFORMATION TECHNOLOGY

Routeique Inc.

Company representative: Mike Allan and Scott Birkby

Technology: Information Technology

Website: www.routeique.com



COMPANY

Routeique is a cloud-based logistics and delivery management platform, consisting of web-based administrative platform, a tablet-based application for field staff such as drivers and sales reps and a self-service web/mobile customer order portal for customers. In recent months, Routeique has also branched into the development of proprietary IOT hardware devices such as our 'vehicle brain' – a touchscreen computer that manages every aspect of a commercial delivery fleet in the field, from multi-zone temperature sensors to door contacts, to engine monitoring and GPS tracking.

TECHNOLOGY

Our software platform is fully developed and commercialized, but development continues on additional features – particularly in the areas of warehouse management functionality, pick/receive by voice, augmented reality picking, beaconing and indoor location services and machine learning.

MATCHMAKING OBJECTIVES

Routeique is currently looking for partners in Germany and France to help with cooperative R&D and product development in the key areas such as IoT, sensor technology, wireless (cellular) communications, route optimization, voice recognition, natural language processing, machine learning and geomatics. We are most interested in companies that have similar or complementary needs in terms of technology development and/or complementary skills to those of our team. While our team is very strong in terms of software development, we are much weaker in the area of hardware development and would therefore look to find partners who are more capable in this area.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

Routeique is interested in partnering with companies that have hardware engineering capabilities, fabrication, product design and testing capabilities. We are also interested in companies with experience in sectors such as Logistics and Supply Chain, Industry 4.0, transportation, warehouse management technology and even retail technologies.

Routeique is looking for partners with technical expertise in areas such as machine learning, geospatial/geomatics fields, sensor technology, wireless/cellular technology and IOT applications. Companies with complementary technologies or expertise who wish to collaborate or assist with our development. We are also interested in partners who are pushing innovation and R&D in their own environments and have a collaborative process, open to working with outside partners.

CONTACTS TO BE INVITED

We have already had brief meetings with the Fraunhofer Institute in Nuremberg, NFFX in Nuremberg and TechSpace in Regensburg about getting established in the German market and building relationships with potential partners.

Our primary goal for the trip would be to meet prospective partners with hardware development experience in the areas listed above, with particular emphasis on Logistics and Supply Chain technologies and/or Industry 4.0 initiatives. We would be excited to work with smaller companies similar in size and nature to Routeique, but we would also be happy to consider working with larger plays who wish to partner with young, innovative start-ups in the space.

SPLICE Software

Company representative: Tara Kelly and Karolina Congdon

Technology: Internet of Things, Digital Radio, Advertising

Website: www.splicesoftware.com



COMPANY

SPLICE's Data-Driven Dialogs® use real-time data and Artificial Intelligence, in concert with live-recorded talent, to deliver timely Voice-, and Home-Assistant based messaging. SPLICE's Dialog Builder™ uses pre-recorded, linguistically-optimized message segments that are spliced together for the most human sounding, customized, messaging tailored to your company's brand. The same messaging can be deployed via phone or AI-assistant devices like Echo and Google Home. SPLICE delivers notification to our client's customers during critical moments in the customer journey, enabling proactive communications to drive fact-based decisioning which improves the overall customer experience (CX) for insurers, bankers, and retailers. It's just part of how SPLICE combines art & science to help companies connect with their clients in new ways.

Our Three Promises: When you work with SPLICE, your solution is made up of these three factors.

- **The Dialog Suite™:** Secure access to SPLICE's award-winning Dialog Suite™ coupled with training ensures success. This client portal offers unique, helpful features and reports to optimize customer communications with our best-in-class software.
- **Personalized Messages:** SPLICE's data-driven human voice & SMS text messages give companies the opportunity to reach more customers, proactively providing important information, encouraging interaction, and enhancing brand connection.
- **Dedicated Account Manager:** SPLICE Account Managers are trusted advisors who analyze client results & monitor messages to recommend the most effective communication channels and customized messages for continuous improvement and ROI.

TECHNOLOGY

SPLICE's patented Dialog Suite™ is a unique client portal which includes helpful features designed to optimize customer communications with best-in-class software. There are currently 4 components of the Dialog Suite™ including the Dialog Controller™, Dialog Builder™, Dialog Director™ and the Dialog Dashboard™. The Dialog Suite™ has been fully developed and we currently have dozens of companies using this technology to improve their customer experience initiatives, however, technology updates and new development are always occurring in order to optimize our solutions and integrate with new technologies.

The SPLICE Dialog Controller™'s dashboard captures and stores customer preference data through voice messages, SMS text messages, on-site customer interaction kiosks, or your database. SPLICE clients can quickly and easily import and export this customer information through our secure portal interface or through our API - the data bridge for faster and better results.

The SPLICE Dialog Builder™ is our audio creation wizard, which features SPLICE-trained professional voice talents who record linguistically-optimized message segments that are spliced together for the most human sounding, customized, messaging tailored to your company's brand. When used in conjunction with a company's appropriate information, and customer data-points, SPLICE can produce a truly data-driven and results oriented messages. The SPLICE Dialog Director™ provides everything necessary for initiating a message campaign and tracking progress for continuous improvement. The Dialog Director puts clients in the driver's seat by enabling approval of every detail before launch, including important reference materials like message scripts, contact lists and audio samples. The metrics available within the Dialog Director include the number of messages sent, received, and listenership to gauge ROI and insight. The listenership metric demonstrates campaign success and potential areas for improvement by showing how long customers stayed on the line.

The SPLICE Dialog Dashboard™ is the user-intuitive analytics center, which allows clients to dive through the details in a guided and straightforward presentation that inspires continuous improvement from response patterns of past campaigns compared against other data.

Built on existing APIs for simple deployment, these applications allow insurance, retail and finance companies to engage in automated communication with customers. Our clients' brands are literally invited into their customers' homes.

SPLICE Alexa skills are a new solution feature and are currently in beta and have not yet been piloted on a live client. For example, through secure API connections that already exist, a furniture company that uses SPLICE can send an automated voice response via Alexa Skills to a customer who asks a question such as, "When will my new sofa be delivered?" Insurers can use the platform to respond to queries about an insurance claim, for example, checking the rental car coverage while a customer's car is being repaired. A bank can use Alexa Skills to provide updates on mortgage applications or to respond to a customer's request to change an appointment time.

MATCHMAKING OBJECTIVES

A collaboration with a German or French partner would provide SPLICE with the local expertise needed to not only research market interest in any of these opportunities, but the European market has always been on top of any technological innovations.

With the shift towards an all-mobile generation that expect Data-Driven Dialogs™, SPLICE is looking to expand operations into the European market. We are looking for a partner that has experience with the development of applications/skills for home assistants, a partner that is currently in the market of developing digital radio ads or a partner that is in the market of developing personalized videos. We have had great interest in moving towards home assisted devices in the US and Canada and we would like to be able to expand into the EU market. Data-driven dialogs with AI assistants will drive product and service discovery at the rate that online and mobile text searches currently do. The next frontier beyond speech may be video responses that will incorporate speech recognition and data-driven dialogs. We would like to be at the forefront of creating the best, personalized videos within a variety of industries.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

Companies with experience in:

- the development of applications/skills for home assistants
- developing digital radio ads
- developing personalized videos

We would like partner companies to be able to provide experience in customer communication and interaction within the European market so that SPLICE is able to improve/upgrade our solutions so that they are optimized for this new market.

Digital Ads:

- Companies similar to: Rubicon Project, AppNexus, The Trade Desk

Home Assistant App/Skills Development

- Witlingo

We are interested in meeting with video companies that do personalized videos like this:

<http://www.pitneybowes.com/us/customer-engagement-marketing/personalized-media/engageone-video-personalized-video.html>

CONTACTS TO BE INVITED

AppNexus

- Would be meeting for the first time
- <https://www.appnexus.com>

- Office in: Grosse Elbstrasse 43, 22767 Hamburg, Germany

The Trade Desk

- Would be meeting for the first time
- <https://www.thetradedesk.com>
- Office in: Domstraße 10, 20095 Hamburg, Germany
- +49 40 767 948611

Pegasystems Inc.

- Would be meeting for the first time with contacts in Germany Office
- www.pega.com
- Office in Germany: München, Lehel Carré, Sternstr. 5, 80538 München, Deutschland

Ventus Geospatial Inc.

Company representative: Steve Myshak and Owen Brown

Technology: Unmanned Systems, GIS, Robotics, Geomatics

Website: www.ventusgeo.com



COMPANY

Ventus Geospatial is a Canadian innovation leader in the field of spatial data acquisition, assessment & analysis (SDA3). Based in Alberta, Ventus specializes in the integration of advanced data acquisition technologies with high performance GIS analysis and visualization tools to produce rich client specific geospatial data sets, high quality imagery, terrain feature models and geo-referenced asset inspection and facilities management information. Ventus Geospatial has been recognized as a leading technical and business innovator in the SDA3 space; as winner of the Lethbridge Business of the Year Award in 2014, the Canadian Advanced Technology Alliance (CATA) Innovation Award in 2015, one of Alberta Ventures 20 Most Innovative Companies in 2015, and the ATB Innovations Award winner in 2017. We bring that spirit of innovation to bear in assessing our client's spatial data management needs and challenges, acquiring the data sets our clients require, using the most authoritative sources and effective technologies available, and amalgamating / analysing the data to produce the rich information content required to support our client's business and operational objectives, in a structure and format that provides insight and is readily accessible and comprehensible.

TECHNOLOGY

Ventus has pioneered the integration of high performance Unmanned Aerial Systems (UAS) with advanced remote sensing equipment to enable highly effective inspection, monitoring, survey and mapping alternatives for a diversity of applications and clients. Two significant outcomes of this effort are:

1. Ventus has applied to patent a unique UAS based gas detection system which provides a highly effective capability for pipeline leak detection and the monitoring of releases by petrochemical facilities.
2. Ventus is the first Canadian firm to implement a beyond line of sight UAS flight systems capability, and the first to apply to Transport Canada for a beyond line of sight operations license. Field trials were successfully completed in March 2017, and TC approval and licensing is expected by the fall of 2018.

We are currently in the technology demonstration and commercialization of our future products.

MATCHMAKING OBJECTIVES

Ventus is currently looking to apply to the Alberta-Germany collaboration fund. We are seeking a partner to do beyond visual line of sight trials using cellular or satellite telecommunication. We are also open to collaboration on other ideas we may be a fit for.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

Knowledge and expertise in one or more of the following areas would be preferable: telecommunication, unmanned systems, programming, and aerospace.

VEERUM

Company representative: Amit Varma and Ben Reed

Technology: Industrial Internet of Things, Artificial Intelligence

Website: www.veerum.com



COMPANY

VEERUM is on a mission to eradicate rework and improve construction productivity to help our world meet rising energy infrastructure demands. Currently 90% of projects go over budget with mega projects averaging cost overruns of 80% and 20-month schedule slips. This is primarily caused by poor transfer of information, causing mismatches between project plans and project reality, leading to expensive unsafe rework on site.

VEERUM uses a wide variety of sensors and scanning technologies to create a precise Digital Twin of a capital project. Our Artificial Intelligence engine, the Model of Truth, matches the Digital Twin directly to the project plans, designs and schedules to pro-actively identify and resolve issues before construction is impacted. Our core strength and focus is on consolidating multiple data sets to create a precise digital twin and integrating products from third parties to build robust IoT Networks that can generate the data require for our analytics to provide insight to project team.

TECHNOLOGY

VEERUM has developed a Digital Twin Technology to optimize each phase of the capital project lifecycle:

- Bid: Provide each contracting party with a digital twin during the RFP process. This allows contractors to reduce their assumptions and contingencies, thus lowering to cost of bids and enabling fixed-priced bidding.
- Design: Allowing design engineers to design within reality. We bring the construction site to the office and can perform quality assurance on engineering design to ensure the CAD model is designed to the right specifications
- Fabrication: We scan module, to ensure parts are per design. We also virtually match the module to the construction site, to ensure everything will fit before the module is shipped.
- Logistics: We track all necessary assets, tools and equipment to ensure they are in the right place at the right time.
- Construction: We monitor progress and allow project managers to remotely visualize activities, ensuring their project remains on budget and on schedule.

The Digital Twin is currently in its demonstration phase with large clients: Suncor, Cenovus, GE Hydro.

We also have parallel R&D projects that are currently under prototype development. This includes:

- Robotics to automate the capture of data, we are working with Clearpath to develop this solution. We are open to engaging other partners from Germany and/or France who may be able to help us accelerate commercialization.
- VR/AR as a user interface, we use it as another way to interact with the Digital Twin. VR development is well underway to enable VR engineering model reviews and we have existing paying customers. We are looking for partners to help us develop an AR solution.

- Connectivity in a box to enable rapidly deployable and scalable telecommunication infrastructure that can support our sensor networks on remote sites. We would like to find a project partner who can help commercialize this solution and deploy this solution for us.
- Sensor implementation for asset tracking and management. Currently we are deploying sensors to track high value assets. We see opportunities in using advanced sensor technologies to optimize the capital project lifecycle.

MATCHMAKING OBJECTIVES

The European market is very advanced in the use and adoption of cutting-edge technologies to improve productivity across all industries. Germany's position as a world leader in industrial automation, provides many opportunities for VEERUM repurpose these. France on the other hand is the world leader in Nuclear energy. Due to the extremely high risk of these capital projects, VEERUM's solution has the potential to bring tremendous value. The goal is to apply for either the Alberta-Germany or Alberta-France fund. VEERUM is a leader in integrating multiple third party solutions to create an end-to-end solution that can support the digital transformation of large complex projects. Any company with a technology that can be applied toward our R&D projects and to reach our goals can bring value. We have an existing relationship with McKinsey&Co. in Germany, and will be presenting at their event on Digitalization of Construction and Infrastructure in Frankfurt on November 21st. We also have relationships with Alstom/GE in France as we work out of their Customer Innovation Center in Calgary and have connections with Engie.

PREFERENCES/REQUIREMENTS FOR POTENTIAL PARTNER(S)

The German/French partner should already be gaining significant traction in its respective market and have existing projects with large industrial companies (Siemens, E.ON, Engie, Alstom/GE, Areva). They should be developing or implementing complimentary cutting edge technologies in the fields of Augmented Reality (AR), outdoor industrial robotics, IoT networks or remote telecommunications. We are also interested in any other company developing technologies to optimize construction projects.

CONTACTS TO BE INVITED

France:

- Sigfox (IoT, we use their technology and are in contact with Chris Garyet – Sales and Adam Harlor – Support)
- Laster Technologies (We've previously discussed a joint project with Jorge Pires - Director Commercial, they also work with Alstom)
- FinalCAD, they are developing mobile apps with predictive analytics to optimize capital projects. Lots of room for collaboration.
- Connit, they are experts in deploying IoT networks and working with LoRA and Sigfox.
- Cosmo Tech, they are leaders in simulation analytics and share our vision in bringing clarity to the most complex issues impacting industries.
- Intesens, they do remote asset monitoring (sensor company)
- We also have contacts at Alstom/GE and Engie in France. We are highly interested in any complimentary companies that work with them.

Germany:

- Relayr, they do IoT network and leverage AI similarly to us. We can work to co-develop a new suite of analytics
- Xamla, they do intelligent industrial robotics with existing relationships with Siemens through Next47. They would like to work on tele operating a robot with VR. This is of high interest to us.
- Evertracker, they are developing AI algorithms to optimize logistics and asset management. We would like to integrate their algorithms into our solution
- Think Project! They provide a similar service to us in capital project optimization. We would like to work together to improve each other's solution.
- We have contacts with McKinsey in Germany that we will leverage and we are highly interested in start-ups working with Siemens, possibly through Next47.