DESTINATION STARTUP

LumenAstra

One-Sentence Summary of What You Do: LumenAstra is commercializing a wearable, non-invasive core body temperature sensor with more than a dozen clinical, consumer, military and athletic applications.

Affiliated Institution: University of Colorado Boulder

Have you formed a company yet? Yes

Funding/Financing: Grant Funding, Angel Funding (including Self or Friends/Family)

Please describe your company and the problem you are trying to solve: Currently, the only way to directly measure true internal body temperatures (e.g. core temp, brain, tissue, organ or tumor temperatures) are highly invasive and inaccurate. Alternate technologies include catheters, sensor tipped needles, swallowable thermometer capsules, or multi-million dollar MRI scanners. Our small, silver-dollar sized, noninvasive, wearable sensor can directly measure targeted internal tissue temperatures. It has compelling clinical applications such as monitoring brain temperature in the critical hours after stroke or brain injury to avoid permanent brain damage after the original injury; early warning of heat stress in soldiers, first responders and athletes; tight temperature control during tumor heat therapy to reduce chemo or radiation dosage while increasing cancer outcomes by 20-40%.

LumenAstra has attracted the attention of a leading consumer home thermometry brand that has been searching for a non-invasive true core temperature sensor to replace infrared forehead/ear scanners that have shown to be influenced by the outside environment creating many false positives for COVID and general health scanning.

The technology and IP was invented and demonstrated by the CU-Boulder EE Department and has been issued as a strong patent with 20-plus claims protecting key methods for low-level signal detection, active and passive noise mitigation, and high resolution spatial targeting. LumenAstra has signed an exclusive option to license this patent for all-fields converting to a full license by November.

We are still very early stage and pre-product. However we have attracted the attention of multiple possible integration and distribution partners in both the clinical and consumer medical device domain.

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What is/was your go-to-market strategy? After over 80 customer discovery interviews, we have identified over 20 clinical, professional, and consumer applications for this novel, wearable deep tissue temperature sensor. A top-down analysis illustrates the multiapplication potential for this device:

- Beachhead: Clinical Aortal Repair Surgery: 15K procedures/yr in US: $11-15M
- Post Brain injury temp monitoring: 3.3M hospitalizations/yr in US: $430-660M available
- Solid Tumor Hyperthermia therapy: 1.8M new cases/yr in US: $2.9B available
- Consumer home thermometry: $506M US/Yr, dominated by 4 major brands, high growth from covid screening

We have prioritized the 20+ application segments into a sequence that builds upon each segment success. Our first target application is a wearable sensor for directly monitoring brain temperature during aortal repair requiring circulatory arrest surgery. There are 15,000 such procedures per year in the US. We replace the EEG and technician (a $2000 hospital charge) with a very high margin sensor with an opportunity of $11-15M per year. We are partnering with a cardio-thoracic surgery team performing 250 procedures/yr for patient data gathering in the next few months. After demonstrating direct brain temperature monitoring, we will move to much larger markets in hospitals and ICUs for early warning of elevated brain temperature after cardiac arrest, stroke and traumatic brain injury partnering with major patient monitoring device providers. After clinical applications, we will work with a major consumer brand to enter the home thermometry market for general health screening and conditions related to circadian rhythm (e.g. fertility windows, sleep apnea, diabetes, etc)

How will/do you generate revenue? We are designing a core temperature sensor component that can be built into stand-alone wearable or handheld devices; or integrated with other sensors (e.g. heart rate, blood pressure, respiration rate, motion/gate) into a wearable sensor pack for health or safety monitoring/warning, For clinical applications, we anticipate working with existing patient monitoring solution providers such as Medtronic, Philips, Masimo, GE, etc. Clinical applications are very high margin for us. We can build a sensor for $25-75 that can be sold for $250-$1000 depending on the application. In this price range most hospitals/clinics/ICUs consider such a wearable device as “throw away” creating a continuous purchase model. For consumer applications, we would only enter this market in collaboration with an existing major consumer brand (of which we are in early discussions). This market is a very high volume, low margin opportunity requiring us to optimize our manufacturing costs towards a $3-5/unit basis. Our strategy is to leverage the high margin clinical markets to optimize our designs and robustness, then squeeze out the costs for the high volume consumer opportunities. We see a path to having device differentiation to allow higher priced, high margin clinical applications with a recurring purchase/revenue modal for hospitals, ICUs and clinics. Followed with consumer applications for reusable hand-held devices and wearable recurring purchase applications (e.g. fertility and circadian rhythm applications).

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How will this showcase benefit your company or technology? We are still a very early stage pre-product, pre-revenue company. Our funding strategy has been to:
1) Raise funds for the CU-Boulder RF Lab which we are closely collaborating with. Dr. Popovic, director of the RF Lab for 3 decades, along with letters of support from LumenAstra has secured over $700K of grant funding in the last 12 months.
2) Shift to raising funds for LumenAstra to complete the commercialization and land the first beachhead application. Together with the CU RF Lab, we were co-awarded the $125K grand prize in the 2020 Lab Venture Challenge pitch competition, raised $50K cash in founder equity, and recently awarded a $256K NSF SBIR Phase I grant. Together, the lab and LumenAstra has raised over $1M in the last 12 months.

Together, we are 4 for 5 in grant awards which demonstrates a strong interest in potential customers, partners and highly competitive federal grants (the NSF SBIR granted awards to less than 15% of the record number of applicants that had this year). Destination Startup gives us an excellent platform to showcase the traction we are achieving with competitive funding entities and potential partners and customers. This is the perfect time and opportunity to introduce our opportunity to a broader investment and partner community. LumenAstra is currently looking for a $1M raise during the next 9 months that will carry us through initial prototypes and patient data collection for our beachhead market and initial distribution partnerships.

Who are the members of your team, and why is this the right team to get the job done? LumenAstra has a strong management team including:

- CEO: Jim Pollock, an MIT alum starting his career at Hewlett-Packard and since involved with 8 early stage and startup companies with 5 exits. He has extensive experience in bringing new category products to market.
- CTO: Dr. Zoya Popovic, Distinguished Professor at the University of Colorado and a Caltech PhD is the inventor, of the technology while also directing the CU Radio Frequency (RF) Lab graduating 66 PhD students in 3 decades. Her RF Lab is world renowned with doctoral placements at most major aerospace, communication companies and research universities.
- VP of Product Development: Walter Wong was the Director of Engineering for Seagate for 20 years and a member of the Seagate Patent Hall of Fame having been named on 25 patents. Walter has also spent 10 years consulting in advanced medical device design. Walter brings tremendous experience at mass-scale manufacturing.
- Dr. John Mehall is a strategic medical advisor and is CEO of a team of cardio-thoracic surgeons leading our entry into our first clinical vertical of aortic dissection repair surgery.
- Lou Faust is a LumenAstra outside board director and brings vast financial and operations leadership with 10 years as Director of Global Operations of Solomon Brothers and multiple CEO roles in startups and turn-arounds.