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With their Pathogen Detection Technology Canary®, PathSensors is Identifying the Presence of Bacteria, Viruses and Toxins in Three Market Segments: Security, Agriculture and Food Safety

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CEOCFO: Mr. Olsen, the first thing on the PathSensors site is, "Stay one step ahead with breakthrough pathogen detection." What have you created?
Mr. Olsen: PathSensors is a biotechnology company built on technology licensed from MIT Lincoln Laboratories, trade named Canary®. Our business is focused on identifying the presence of pathogens (bacteria, viruses and toxins) in three market segments: security (building protection and mail screening), agriculture and food safety.
Canary delivers test results in two minutes, which is unheard of for biological testing. Canary® offers industry leading capabilities in speed and sensitivity on a platform that does not require a highly skilled operator.

CEOCFO: *What is it about your technology that is different?*
Mr. Olsen: The technology is based on a genetically engineered biosensor that has two unique attributes. First we took genetic material which encodes for the protien that cause a jellyfish to glow blueish green at night in the ocean; This genetic material provides the biosensor the ability to signal, (think of turning on a light switch in a dark room). In the presence of a specific pathogen the Canary® biosensor glows, if the pathogen isn't present the biosensor stays dark.
The second attribute of the biosensor is making it specific for one pathogen of interest. To accomplish this we take the genetic material which encodes the specific antibodies, typically generated in mice, and transfer it into the biosensor. Now, the biosensor is specific for one pathogen (think of the reaction of a magnet to a piece of steel). Once the biosensor is in the presence of the bacteria, it is designed to detect, the biosensor glows. We have an instrument that monitors the light emission and reports to the user whether the pathogen under test is present or absent.

CEOCFO: *Would there be a series of biosensors for items that could have more than one bacteria? How does it work in the different arenas?*
Mr. Olsen: Canary® has a library of biosensors for a variety of pathogens identifying bioterror agents, agriculture and food pathogens. As an example, in food safety we have products that test for *salmonella*, *listeria*, *E.coli* and *campylobacter*. Most applications want to test for one unique pathogen, however, we have the ability to blend a variety of biosensors together which would then screen a sample for the presence of all the pathogens in the blend.

CEOCFO: *Why not look for everything?*
Mr. Olsen: As we discussed we make a biosensors against a variety of bacteria, virus or toxins. There are literally thousands of bacteria in the world, most are harmless to living things. If we had a biosensor that tested for everything (all

bacteria, viruses and toxins) every test would come back positive due to the ubiquitous nature of pathogens in the world. As we evolve the technology our library of pathogens continues to expand.

CEOCFO: ***Would you tell us about you work on biodefense?***
Mr. Olsen: We offer two product lines. One is an aerosol sampler and the second tests powder or liquid samples. The aerosol sampler, the BioFlash, is utilized to monitor air in a building or envelopes sent through the mail for biological agents. The BioFlash automatically collects an air sample and captures all the particles smaller that 15 microns into a filter cartridge. The cartridge is pre-loaded with CANARY biosensors which are designed to detect pathogenic substances such as Anthrax, Ricin, Botulinum toxin, Tularemia, Small Pox and the Plague. If the biosensor comes in contact with the agent it is designed to detect, the biosensor glows, our instrumentation measures the light emission and sounds an alert for the pathogen it has detected.
BioFlash runs the entire test cycle from sample collection to reporting results automatically with no human interaction. This automated capability allows a person to run very sophisticated pathogenic tests with little need for an understanding of the biological sciences. Test results take as little as two minutes which allows the release of a biological agent to be confined in a very small area.

"Canary® is a revolutionary technology offering cutting edge pathogen detection capabilities which make the world a safer place. We are protecting many organizations against a repeat of the consequences from the anthrax attacks that happened in September 2001 at the U.S. Captial. We're helping the food industry with tools that enable higher quality food that's safe from food borne pathogens like salmonella and listeria. The future is very exciting at PathSensors."- Theodore Olsen

CEOCFO: ***Is there much monitoring other than when something is suspected of being a problem? How likely is it that more organizations will take to monitoring, as you have something that is affordable?***
Mr. Olsen: Unlike a chemical release where people, who are exposed, start showing symptoms quite quickly, biological agents require incubation time in a human body. It can take as long as 5 – 7 days to show symptoms of a disease. Many times after the symptoms show it is too late to treat the disease. PathSensors technology allows the presence of pathogens to be identified in real time. Once a pathogen is detected medical counter measures can be deployed for those exposed which can minimize the effects of an infectous dose.
PathSensors technology has been deployed in a number of high profile locations. Organizations that are visible, or controversial or frequently in the news receive suspicious envelopes/packages addressed to celebrities on their payroll. There is no way to know if the contents of the package are a threat without examining the package. X-ray equipment is widely used looking for explosive devices. Unfortunately, X-rays cannot detect the presence of chemicals or biological agents. PathSensors mission is to make the world a safer place. We work closely with security professionals to supply technology that quickly, easily and sensitively detects and warns about the presence of pathogens (biological agents). PathSensors is growing quickly in the security field. We believe that growth is due to many organizations understanding that biological risks are real and the desire to protect their employees and prevent business interuptions due to the release of nefarious agents. CANARY technology is very cost effective and as the number of systems deployed grows the cost will continue to come down.

CEOCFO: ***Would you tell us about your ongoing partnership with the USDA regarding plant disease diagnostics?***
Mr. Olsen: A couple of years ago MIT Lincoln Laboratory, the USDA and PathSensors entered into a three party development agreement for Canary products. The initial work was on testing inbound plant material coming into the United States at ports of entry. One example is geraniums that are planted in this country, most of which arrive as clippings from overseas. The clippings are shipped and planted during the winter and grown in green houses. The fully grown plants show up at your local plant store in the spring. Geranium clippings many times are infected by an invasive plant disease called *Ralstonia*. There are rules and regulations preventing infected plant materials from entering the US. There is no way to know if a plant is infected by doing a visual inspection. Therefore, most plant material shipped from international locations is tested and cleared prior to entry to the US. Current test methods are slow and laborious. CANARY is revolutionizing the field of plant pathogen testing. We are also working on citrus and potato disease.

CEOCFO: ***You have so much opportunity, so many industries and subsets of industries. Where do you focus? How do you reach out?***
Mr. Olsen: We perform extensive market research. Our marketing team works hard to identify new opportunities for CANARY product lines. In addition, we are always looking for new customer problems to solve. Especially market segments where commercially available, state of the art pathogen detection products do not fully meet customer needs.

For example, new plant pathogens that are becoming issues in North America where sensitive easy to use detection systems are not yet available.

Our scientists work with subject matter experts in the field to identify unmet needs in markets that look attractive which are large enough to support the investment required to develop a CANARY product. We are always looking for new or underserved markets where our technology adds value solving customers' problems. We typicall look for a customer with the problem, make sure we have strong capability in the application, nurture small scale deployments and ramp up from there.

CEOCFO: ***Are you looking at the cannabis industry at all?***
Mr. Olsen: We are, yes! We believe it is going to be huge, due to the issues associated with indoor farming and the concerns associated with cannabis in edible products. Plant pathogens grow very quickly in the warm moist climate of a greenhouse. Plant diseases can hinder the growth of the plant and hurt the quality of the harvested product. Food borne pathogens grow rapidly in the incubator environment of a green house. Both food safety and plant pathogens are a concern in cannabis. The market is large and growing quickly. Most big companies do not want to work in this space until the legal issues associated with federal regulations are addressed. It is a very interesting dynamic. We have unique capabilities we bring to this market. It's early and we are trying to help the industry while remaining vigilant of rules and regulations.

CEOCFO: ***Why is PathSensors an important company?***
Mr. Olsen: Canary® is a revolutionary technology offering cutting edge pathogen detection capabilities which make the world a safer place. We are protecting many organizations against a repeat of the consequences from the anthrax attacks that happened in September 2001 at the U.S. Capitol. We're helping the food industry with tools that enable higher quality food that's safe from food borne pathogens like salmonella and listeria. The future is very exciting at PathSensors.