

Bringing to Market their Vigilus Mobile Camera System Robot that Can Take Verbal Commands and Patrol Eight-Hours in a Large Industrial Garage, GAMMA TWO, INC. will Change the Way the Security Industry Protects Assets in the Future

Technology
Artificial Intelligence Software
(Private)



Dr. Louise F. Gunderson
President and CEO

BIO:

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Louise has broad range of educational accomplishments, including a Ph.D. in Systems Engineering from the University of Virginia, an MS in Environmental Science and a BA in Biology from the University of Colorado at Denver; as well as a BA in Chemistry from the University of California at Berkeley.

Her areas of expertise include the automatic extraction of information from complex data streams, geospa-

tial analysis of satellite data, data mining, human preference forecasting, and predictive modeling of human behavior. She is the author of over 20 technical publications, including book chapters and archival journal articles. Along with James Gunderson, she has completed a technical book which was published by Springer-Verlag in late 2008.

Company Profile:

GAMMA TWO, INC., was incorporated in Colorado on June 23, 2003 as the continuation of Gunderson and Gunderson, Inc., a business formed in 1997. The corporation was organized to provide advanced artificial intelligence software to businesses in the financial and logistics sectors. In the process, there was continuing research into computational models of real world behavior, that resulted in a number of proprietary algorithms, which enable computers to recognize, and reason about the world in a manner based on biological principles.

Beginning in early 2006, the team at Gamma Two focused on designing, building, and testing a Cybernetic Brain for mobile robots. This work continued over the next three years, culminating in the Vigilus Mobile Camera System (MCS). This robot is a robotic security system designed to augment existing video surveillance. It is capable of performing independent patrols of a building while relaying video wirelessly to a Security Command Center. The robot can be directed to respond to incidents by radio, voice, or by command console. On patrol, it is designed for hands free operation, with continuous situation reports via the command con-

sole. Unlike industrial robots, which are unaware of their surroundings, the Vigilus MCS series robot acts in close concert with people, avoiding obstacles as it navigates autonomously in the warehouse, garage, or office that it is patrolling.

Interview conducted by:
Lynn Fosse, Senior Editor
CEOCFO Magazine

CEOCFO: Dr. Gunderson, what was your vision when you founded Gamma Two and where are you today?

Dr. Gunderson: Our vision is to build robots that people want to live with, are easy to live with, and that make their lives better. My husband and I started this company nine years ago. Five years ago, we were invited to write a book on robotics and as we were doing that, we built our first robot because we needed something to test with. What we realized then is that we had the beginnings of a robot that would really change how people interact with robots. It would make them easy to live with, easy to control and more to the point it will be fully and truly autonomous, which it is.

CEOCFO: You mentioned robots being easy to live with; what has been the challenge in the acceptance or creation of robots so that people will feel safe?

Dr. Gunderson: There are already robots that people are comfortable living with. The Roomba is a great example. iRobot has done a spectacular job of building a robot that is acceptable, but the problem is it is not intelligent enough to do a complex job. It does vacuuming well if you do

not mind periodically having to rescue it. It is a reactive system, which is not truly intelligent. We are looking at something that is smart enough to take commands and fill jobs that are too dull, dirty or dangerous for humans without a human having to operate the robot. Right now, there are four basic kinds of robots, one of which is factory floor automation. It is pre-programmed; humans do not get to be close to it. The second kind is tele-operated, where the human is providing the intelligence for the system, such as bomb disposable robots. A human has been involved to operate that object. The third is reactive, which is where the robot is minimally intelligent but it is in fact autonomous such as the iRobot's Roomba. We are putting intelligence into autonomy so that it is smart enough to be enjoyable, safe, and truly useful.

CEOCFO: How do you convince someone that robots are not just science fiction?

Dr. Gunderson: What I have right now in the lab is a robot that I can tell verbally or by a console to go places and it will make plans to go to that place. It will do that reliably time after time after time. It takes voice commands, console commands, and it does not require a human with a joystick. We have done eight-hour patrols

in our large industrial garage with the robot doing patrol after patrol after patrol, eight hours and five kilometers with no human touching the robot. It knew where it was, it knew it could relocate itself, and it did not get lost. The security industry has a huge problem. They cannot get enough people to do that level of patrol reliably. I can take my robot, put it into that warehouse garage, event center, and have it reliably do the patrol and report changes

CEOCFO: Gamma has done a great deal of testing but how do you account for unforeseen outcomes that could affect performance?

Dr. Gunderson: The correct answer is I cannot predict for an event that I

do not know, however, the answer that we have implemented is that the main way in which a robot is going to hurt something is that it is going to hit it. We have spent years making sure that the robot, when it approaches something, does not touch that thing. We have tested this hundreds of times. The first thing we did was make sure the robot knew where it was. The second thing we did was make sure, down in the bottom level of programming, that robot will not touch objects and we have done that for five years so I am not worried about putting the robot in new environments. Regarding people, engineers are nice to robots; we are in an arts district, so once a month we open

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up our doors to let art lovers in to play with the robots. I have thousands of hours of human robot interaction with no problems.

CEOCFO: What was the biggest challenge in putting it together? Is it just the right software program? What has been the stumbling block and what has Gamma Two figured out that others have not?

Dr. Gunderson: We took a very different approach to the design. We created a reasonably faithful copy of the brain of a living system because the question was not how do you reason, the problem was how do you move safely and efficiently through the world. This is something that every lizard knows how to do, they

are very good at it actually. The biggest, ugliest part was figuring out how to copy a brain such that it could do what every lizard knows how to do, then once we had something that was a reasonably faithful copy, we could start putting in other functions, how to take commands, how to work with people, all those kinds of issues. There is interesting work, on what is sometimes called the tacit dimension, which concerns all those things that happen below the linguistic level. We are really working on that.

CEOCFO: What is the competitive landscape?

Dr. Gunderson: In terms of security robots, Adapt Mobile Robotics has fielded one through Cyprus Security. Really though, for us the competition is Video Analytics in cameras. In terms of hardware, there is beautiful hardware coming out of Japan. There is also iRobot, which also does lovely hardware, primarily for the military, they do mostly tele-operations. In terms of autonomy, most of the truly autonomous robots are in university laboratories.

CEOCFO: You talked about next month's launching, what is happening?

Dr. Gunderson: ASIS is the largest physical security conference and tradeshow

in North America. We have a booth there, and we will be demonstrating the robots and soliciting channel partners to sell and install robots for their customers. We will be doing routine patrols in our booth for three days and I am really looking forward to it.

CEOCFO: Commercialization is a very different skill set than development. How is Gamma Two equipped to make that leap?

Dr. Gunderson: We are skilled engineers but we are reaching out into the larger community. We have been fortunate to find professionals to do what we cannot, such as industrial design. For manufacturing we will also contract with experts. We are also talking with people who are experts in chan-

nel partner agreements, so we will be using the skills of people outside this company to help us do that.

CEO CFO: What is the financial picture like to get Gamma Two moving and do you have the funding to get through the commercialization stage?

Dr. Gunderson: We do have enough to get us to product but right now, we are in negotiation with groups to provide more funding. We can get there with what we have, but we are talking to potential investors.

CEO CFO: Is the security industry, your target market, aware or will this be virtually brand-new for them?

Dr. Gunderson: We have been talking to people in the security industry for the last few years, we have been going to conferences and we have been using the feedback from those people to guide our development, to make sure not just that we can build the robots, but that we can build the right robots. The feedback we have gotten most often is "how soon can I get one?!" and suggestions for numerous applications beyond patrol and report security. That is what I am hearing, which it has been very encouraging to us and certainly helps us drive our development further.

CEO CFO: Is there anything you would have liked to do in the development or that you wish you could have done that you have not achieved yet?

Dr. Gunderson: We have been very careful in development to make sure that the development does not preclude future work. We are not just

putting together a robot that will do a security patrol. Our next step is a robot that is more interactive with humans, will be able to work in nursing homes and assisted living facilities. Our eventual goal is to build a robot that is capable of assisting people to age-in-place. I would not say that it is something that I have not been able to do, because I am going to do it.

CEO CFO: How will you be selling or leasing your product?

Dr. Gunderson: We are looking at going through channel partners to sell the robot. If somebody comes to us with a good leasing view, we are open to it. We are open to whatever the market needs. What the channel partners have told us is the sale of the robot with a maintenance agreement with the channel partner is preferable.

CEO CFO: What is needed in terms of upkeep for the robot?

Dr. Gunderson: We have robots that have been running for four years. At about six months, we expect you will have to change the battery, which is a lead acid marine battery, pretty standard off the shelf. I expect that the motors, the wheels and the gears will last at least three years.

CEO CFO: How do you feel about the current economic scenario? Does it help or hurt Gamma Two?

Dr. Gunderson: In the security industry, which is where we are starting, in the middle of the recession, they could not get enough people. There were jobs open in the depth of the recession. Because of the way we are pricing it, the ROI on a robot purchase

is approximately one year if you are comparing us against a (fully burdened) salary. So I do not know how much it influences us. There was such a need that I do not think we were massively impacted at this point. I think that as things get better, our business will get better.

CEO CFO: Are there any concerns regarding insurance companies recognizing adequate protection with robots?

Dr. Gunderson: One of the reasons that there is a need for round-the-clock physical security is insurance, which is a huge driver. We have some contacts in the insurance industry and we are just starting to work that out. That is going to have to play out.

CEO CFO: Why should people in the business and investment community pay attention to Gamma Two?

Dr. Gunderson: I am old enough to remember when the first PC came out and the Apple was made out of plywood. I think robotics is going to follow the same path that computers did. Instead of being a \$250,000 object sitting in the lab or garage, I think it is going to be \$40,000 object in your business, and then it is going to even more affordable object in your house. That is why they should pay attention. This is new, it is coming and it is going to be here in the next few years.

CEO CFO: Are you are actively looking for partners?

Dr. Gunderson: We are looking for channel partners and we are open to interesting offers.



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