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Executive Speech Reprint

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Remarks prepared for delivery:

Launch of Science, Technology, Engineering and Mathematics (STEM) Education Model

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Thanks, Brian (Fitzgerald) … Congressman Gordon … welcome all. Thank you for your interest — and your support — of BHEF (Business-Higher Education Forum) and our focus on STEM education.

It's a distinct pleasure to be here today to introduce our new STEM Education Model. Before we begin our demonstration, I wanted to share with you how this model got started — how we ended up where we are today.

Three years ago, as co-chair of the BHEF STEM Working Group, I asked a question: How can we determine which great ideas are most likely to be effective in increasing the number of STEM graduates on a national level?

Hundreds of good ideas have been previously generated on this topic. Many have been tried at the local level and have shown promise, but none made it to a national level program. It was never a lack of ideas that prevented a solution — the issue when it comes to our national education system has always been scale and complexity. Our system simply cannot support a "one size fits all" solution.

So the question became this: How do we place a *priority* on the good ideas generated? Which ones can be successfully scaled to a national level and applied economically? What do we do first?

To answer these questions, we decided to use the same methods that have been applied to large, complex engineering systems. I asked our systems engineers to take up this challenge as part of their systems engineer education program at Raytheon — to look at our U.S. educational system using methods we apply every day in our most complex system development programs — the methods of systems engineering, modeling and simulation.

Research shows that the human mind can handle and integrate only a few variables at the same time. Modeling and Sim is used to break this barrier — and to accomplish a task much faster than what is possible in real time. These tools help us determine which system designs will work and be cost effective — and which should be abandoned because they have limited capabilities or high cost or, worse, just won't work over time.

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I asked Brian Wells, Raytheon's Chief Systems Engineer in our corporate engineering organization, to see if we could apply these system tools to one of the most complex systems we've seen — that is, STEM education at a national level.

We decided to frame this issue as a challenge to Raytheon's Systems Engineering Technical Development Program. This long-established program was created to support the training and development of our newest systems engineers. We gave them the STEM education modeling tool challenge as part of their class training project.

After three years, two classes, and more than 12,000 hours of effort by our systems engineers, Raytheon is pleased today to demonstrate a model that represents the U.S education system.

It is a model that examines student capabilities and interest in STEM — as students move from grade school, through high school, college and into the workforce.

- It allows us to see how policy changes and new programs affect student interest, capability and ultimately the number of students graduating with STEM degrees;
- It enables us to look years ahead in just seconds, to simulate and test ideas before we try them on our most valuable asset for the future — the young people of America;
- And it helps us to prioritize, as I mentioned before — to ask: Which of many innovative educational programs and policies are most likely to be effective at the national level?

In consultation with BHEF, we used educational research and national data to build the model. We've created a tool that uses complex algorithms, a series of dynamic hypotheses and more than 200 unique variables — to simulate and assess the impact of various STEM education proposals on the number of STEM graduates. The tool can review and assess different scenarios over a period of time — to see what would happen not just in the short-term, but longer-term as well.

Now that we have the tool, we need to turn our attention to its use — to ensure that those who are working so hard to improve our system have access to the information and tools that could support their efforts.

To this end, Raytheon is pleased to join with BHEF today to introduce the STEM Research and Modeling Network. SRMN is an open innovation network. It is dedicated to fostering the development and use of predictive modeling tools in education research and policy.

I am also pleased to announce today that Raytheon is gifting the STEM Education Model to the Business-Higher Education Forum. And BHEF will, in turn, make it available for open source use by researchers, policymakers and educators through the STEM Research and Modeling Network.

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We all know our nation and our world are facing challenges right now. But we also know this: One of our greatest strengths as a country is our ability to innovate.

Eighty million Americans will become eligible for Social Security retirement benefits over the next two decades, according to the Social Security Administration. That's more than 10,000 a day, seven every minute. Given this historic transition, the Business-Higher Education Forum has set a goal of doubling the number of American students earning STEM degrees.

It is our great hope and belief that the U.S. STEM Education Model, combined with the STEM Research and Modeling Network, will help our country achieve this goal.

We invite researchers, educators and policymakers to join the network to use, and advance, this STEM education modeling tool. Let's work together to help secure the STEM talent pipeline for the future.

I want to commend the leadership and partnership shown by those mentioned earlier. I also want to note that this model has been improved upon thanks to collaboration with The Ohio State University, ACT, the Bill & Melinda Gates Foundation, the California Council on Science and Technology, and other organizations. We thank you.

In addition, I want to thank Raytheon's Brian Wells for his tremendous leadership with respect to the work done by our Systems Engineering Technical Development Program class. My special thanks as well to Alex Sanchez, who is a system dynamics modeling expert at Raytheon. Alex will demonstrate the model for you today.

And last but not least, let me say that for a technology company like Raytheon, this has been a tremendous opportunity to apply the engineering mindset to matters close to the heart — that is: to help secure the future of innovation in our country and of the next generation of Americans.

Thank you. ■