Testimony before the
Committee on Homeland Security and Governmental Affairs
United States Senate

on the subject of
"Transforming Government Through Innovative Tools and Technology"

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August 3, 2010

Mr. Chairman and Members of the Committee, thank you for this opportunity to testify before you today. My name is Riley Crane and I am currently the "Society in Science" postdoctoral fellow in the Human Dynamics group at the Media Lab at MIT. I received a Ph.D. in Physics from the University of California Los Angeles and I have spent the last several years applying ideas from physics to the collective behavior of social systems. My research focuses on how information spreads through online social networks and whether or not social systems obey quantitative mathematical rules. In December 2009, I led the team from MIT that won the DARPA Network Challenge using crowdsourcing, social networking and social media to mobilize thousands of individuals around the world in under 9 hours.

We are here today to discuss the subject of "transforming government through innovative tools and technology" and in particular how government can use leading-edge techniques and technologies to solve problems and cut out fraudulent waste and spending.

In this testimony I would like to discuss how new technologies are transforming our ability to solve incredibly difficult problems and to propose promising new directions that would help government reduce spending, increase transparency, and create a population that is more engaged in the civic process and more equipped to solve problems requiring collective action.

I'd like to illustrate some of the powerful new approaches to problem solving by sharing with you a story that I had the great fortune to be a part of. On December 5, 2009 DARPA --- the Defense Advanced Research Projects Agency --- unveiled 10 moored, red weather balloons at undisclosed locations around the continental US and offered $40,000 to the first person to correctly report all of the coordinates accurate to within one mile. DARPA is the agency credited with the creation of the Internet, and this challenge, considered impossible to solve by those within the intelligence community, was designed to celebrate the 40th anniversary of that achievement.

In the 40 years since the first four computers comprising the ARPANET were connected and exchanged a message heralding the age of information, our world has been transformed.

From these humble beginnings came the Internet which now links together all of the world's computers. This was followed 20 years later by the emergence of the World Wide Web linking together all of the world's publicly available information. In recent years we have witnessed the addition of a new social layer, driven by the convergence of networked, mobile and social technologies that are for the first time allowing us to bridge the gap between the online and real worlds and create virtual connections between people, places, and things.

While this new "social web" makes it easier to find restaurants and share photos, and there is a general sense that something transformative may be occurring, many wonder whether this new global infrastructure can be used to solve important challenges. Hence DARPA issued the challenge to test this question and to explore the role that crowdsourcing, social networking and social media play in timely communication, wide-area team building, and urgent mobilization required to solve broad scope, time critical problems.

In order to tackle this challenge our team built a platform that used incentives, referrals, and social media to construct a network of "human sensors" throughout the world. Our web based platform was designed track the chain of referrals as individuals signed up and spread the information through their social network in order to account for who was responsible for recruiting whom. In addition, we created an incentive system that divided the $40,000 equally over the 10 balloons thus allocating a prize of $4,000 for each balloon. The incentive system worked in the following way: If for example Mr. Chairman, you signed up and found a balloon we would pay you $2,000 and would give the remaining $2,000 to charity. However, if you signed up and recruited Senator McCain and he found a balloon, he would receive $2,000 for finding it, you would receive 1/2 of the remaining prize ($1,000) for referring him to us, and the leftover $1,000 would be donated to charity. This division of the award along the referral chain could be extended to any chain length. Furthermore, the structure of the incentive was such that its value could be transferred through the network undiminished, since it depended not on being first or having the largest number of referrals, as is the case with a typical pyramid scheme, but rather relied on rewarding individuals who made actual contributions for their role in connecting us to the individual with relevant information.

In total over 4,000 other teams competed, including universities, minor celebrities, community organizations with many tens of thousands of members, and even Google. Using our strategy the MIT Red Balloon Challenge Team found all 10 balloons in 8 hours and 52 minutes. One of the more interesting facts of the story is that I had only heard about the challenge four days before the competition began. In two days we built a platform and in just 36 hours recruited nearly 5,000 participants. According to the results of the official DARPA logs we located 4 balloons before any other team, and of the 10 individuals that were the first to report to us the correct locations, we had recruited half before the competition began, demonstrating the power of social media to rapidly spread information far and wide.

How did we win? What did we do differently from the other larger and more well organized teams? While other teams spent months preparing, organizing and designing systems to solve the problem, our approach, which was conceived of, built, and executed in 4 days relied on continuous feedback and evolved continuously throughout the challenge. Rather than coming up with the "best" solution, we built a platform that leveraged the problem solving capabilities of

the participants. Our platform encouraged individuals to innovate and to spread the message to their own audience in the most contextually relevant way --- regardless of whether their focus was science, charity, money or something else. Our system provided a solution that aligned the goals of each participant, acting in their own self interest, with the broader goals of our organization. We built the infrastructure that allowed others, even our competitors, to solve the problem for us.

While this example nicely encapsulates the disruptive innovation being driven by the democratization of technology and its convergence with social factors and economies of scale that are changing the way we communicate, collaborate, and coordinate, there are many other important examples that I would like to bring to your attention.

On his first day in office, President Obama ushered in a new era of Government by creating the "Open Government Initiative" providing a mandate for federal agencies to take specific steps to achieve milestones in "transparency, participation, and collaboration". This initiative has since been embraced by cities across the nation such as Boston, New York, San Francisco and Washington D.C. For example, efforts in Boston that resulted in the release of transportation data have already yielded enormous cost savings by providing entrepreneurs with data and APIs they need to solve problems themselves. These programs yield millions of dollars in savings to the taxpayers and are often achieved in weeks or months instead of years and decades.

In another example of how increased transparency can reduce fraudulent spending, "The Guardian", a British newspaper, created a crowdsourcing platform that digitized the expense reports for members of Parliament. This platform encouraged citizens to investigate and bring attention to charges that they believed required further investigation. As of last week, the program had resulted in the review of 221,384 pages of documents by 27,029 individuals and had brought to light many examples of extravagant spending.

Finally I'd like to bring to the attention of this committee incredible efforts made by the open source community in partnership with the U.S. Department of State during the recent devastating earthquake in Haiti. Volunteer organizations such as Ushahidi and Open Street Map mobilized in the immediate aftermath to establish communication networks and interactive crisis maps. Using these systems, victims on the ground could send out urgent requests for help that were translated, mapped, and then delivered to the search and rescue teams on the ground. One success story highlighted by Secretary Clinton emphasized the plight of a little girl who was "pulled from the rubble in Port-au-Prince. She's alive, she was reunited with her family, she will have the chance to grow up because these networks took a voice that was buried and spread it to the world."

What are the lessons from these examples? In each case organizations created a platform that enabled citizens, acting in their own self interest, to solve problems. While the Federal Government has already made great strides towards becoming more open, including great examples such as Data.gov, more effort should be made to open data, develop and support standards for data exchange, encourage the use and reuse of free and open software, and to continue the use of social media to increase dialogue and engage more directly with

constituents. Most importantly the Federal Government should adopt the philosophy of the "Governement 2.0" movement espoused by Tim O'Reilly and others and to start to think and behave more as a platform which incentivizes civic engagement, supports collective action, and enables and empowers citizens to solve the problems which do not require the Government to intervene.

If there is one message it is this: support open standards and data, and build infrastructure that empowers citizens to solve problems they care about.

I thank you for your time and attention and would be pleased to answer any questions you may have.