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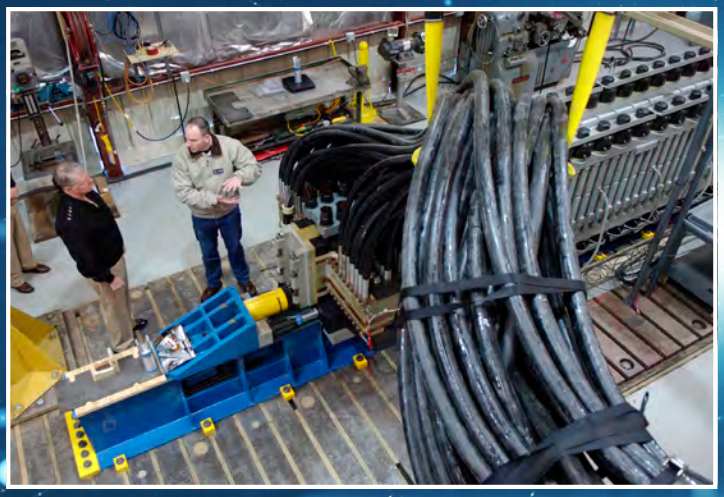
BREAKING THROUGH WITH YOUR BREAKTHROUGH

How Science-Based Communication Can Promote Trust to Accelerate Innovation and Technological Advantage



FOREWORD

Communication plays a vital role in advancing defense science and technology (S&T) innovation. Conveying the warfighting value of research builds the advocacy essential for new ideas. Chief of Naval Operations, Admiral John Richardson released our Navy's "Design for Maintaining Maritime Superiority," emphasizing high-velocity learning to increase the pace of innovation—and learning is first a function of effective communication. Lasting technological advantage demands that we continuously shrink the cycle of development and diffusion: a goal central to maintaining our maritime superiority. This requires understanding communication's role in gaining informed support from stakeholders. Not surprisingly, the communication strategy at the Office of Naval Research (ONR) is science-based and supports the objectives of the Naval S&T Strategy. ONR's credibility is built upon trust. Communicating naval S&T, therefore, rather than hype or spin, is about our responsibility to convey truth and reality for informed decision-making. Lessons learned detailed here are as much about good leadership as they are skills for defense innovators.

-- RADM Mat Winter, USN, Chief of Naval Research (CNR)

Premise: Innovation places stress on the status quo. Conventional wisdom overlooks adverse effects of stress on communication. Innovators can leverage science-based communication principles to help gain informed support.*

Naval technology today can trace its origins to ONR-sponsored research, but in order for breakthroughs to reach the Fleet, ONR has a responsibility to communicate warfighting value and foster informed support for implementation. We'd like to share some insights from decades of innovation and offer seven communication practices to help you as an innovator and leader.

Threats are proliferating, adversaries are closing the gap and the pace of innovation, once set by the Department of Defense (DoD), are exposing the consequences of our bureaucracy's declining ability to keep up. While innovation of all types is needed, the kind that enables us to win wars is technology-based. The Department of the Navy (DoN) has a solid record of leveraging technology for decisive capability advantage, but often it is a stressful journey, occasionally calling for extraordinary intervention. We also contend with that most inelastic of naval cultural traits—tradition—sometimes requiring heroic effort and personal sacrifice from innovators to overcome.

Consider the case of LT William Sims. In 1900, Sims introduced continuous-aim firing for naval guns using gears and telescopic sights to compensate for a ship's roll, increasing accuracy by 3000%. Nevertheless, his reports were systematically ignored or rejected by the Navy's Bureau of Ordnance—citing the technology as "unnecessarily disruptive to the social order of a ship." Exasperated, Sims wrote to President Roosevelt, who in 1902 intervened to circumvent the Navy bureaucracy, appointing Sims Inspector of Target Practice where he commissioned and tested new gunnery to instill continuous-aim technology. He persevered, retired at the rank of Admiral and was credited as the "the man who taught us how to shoot" (Morison, 1950). Some may recognize this case study and be struck by the parallels facing modern defense innovators.

From a communication perspective, LT Sims assumed too much: that facts speak for themselves; that he was an effective messenger; and that data-laden technical reports would counter intractable perception-based resistance. Sims underestimated the stress his innovation placed on the status quo, and how that impacts gaining informed support.

Today, we do not lack smart people, talent or good ideas. The problem remains at the point of implementation; where after the initial exuberance of discovery and early support, the reality of overcoming resistance from "late adopters and laggards" (Rogers, 2003) combined with scaling the bulkheads of bureaucracy, sets in. Science-based communication can help defense innovators break through with options well short of letters to the President.

Stress Impacts Communication

Innovation is the adoption of a new invention, practice or idea (Denning, 2010). Therefore, increasing the success rate requires deeper understanding of how to gain informed support. This seems straight forward, but the complexities of communicating innovation, and the changes invoked, are often oversimplified.

Recall moments when you were involved in a crisis, had to deliver bad news or persuade others on some controversial point. The message, messenger and method all take on crucial significance in such circumstances. Effective communication in stressful situations draws upon an understanding of science-based principles that apply to the diffusion of innovation. See sidebar 1.

One point of reference for high stress we vividly remember is September 11th 2001. Enormous uncertainty prevailed as the day unfolded. Horrific images are still etched in our minds. We were fearful, angry and grieving.

Shortly after the second tower fell, New York City mayor Giuliani held a news conference to speak to the nation. The first question he received was anticipated: "how many are dead?" His response was powerful: "Ultimately, the number is more than we can bear..." He continued to express compassion, conviction and optimism throughout the aftermath. How different would his effectiveness have been had he responded only with casualty statistics or succumbed to the emotion of the moment?

Would it surprise you to know his comments were developed five years earlier in his crisis preparedness planning, following a proven risk communication model?

Giuliani developed this plan with support from the Center for Risk Communication, a research organization addressing how people process information differently in high-stress situations. While 9-11 is the extreme, the principles apply equally to everyday work- and home-life circumstances. In naval innovation, risk communication leads us to think beyond the factual merits of new technologies to consider stakeholders' concerns, needs and perceptions.

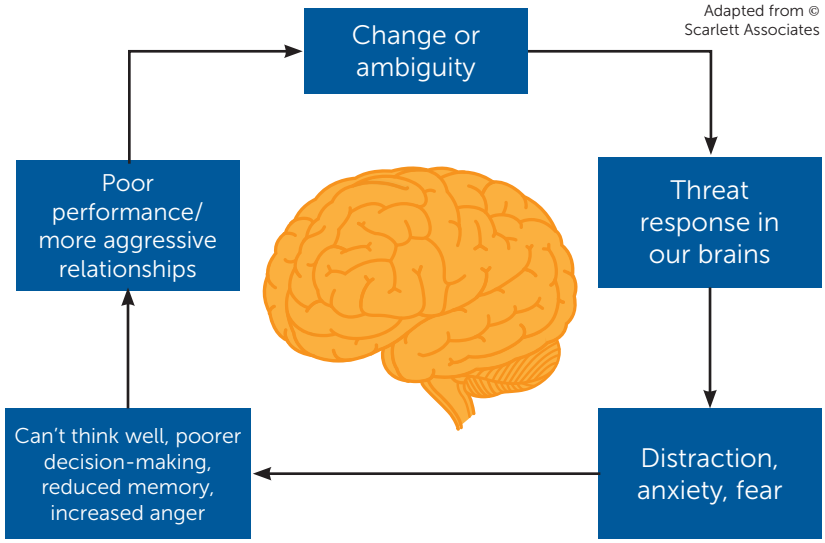
Naval scientific research is the responsibility of ONR. Its mission is to ensure technological warfighting advantage for the Navy and Marine Corps, and is where DoN's technology innovation begins. ONR's job is to discover, develop and deliver decisive capabilities—and when necessary, challenge the status quo. This often requires top cover, as LT Sims discovered, and is why ONR is among the few agencies in DoN established by Congress (Public Law 588 of 1946, signed by President Truman).

Investments made decades ago yielded discoveries in material science, pulse power and

COMMUNICATING INNOVATION

Sidebar 1: Study of innovation diffusion reveals success hinges greatly on stakeholder understanding of the advantages and disadvantages. Further, subjective evaluation by near peers who have adopted the innovation is a stronger influence than expert opinion (Rogers, 2003). In Rogers' five steps of innovation acceptance (knowledge, persuasion, decision, implementation, and confirmation), communication plays a critical role; evolving from awareness activities to interpersonal interaction to address concerns and misperceptions.

Innovation can be threatening and a source of stress. Communication principles focused on overcoming the effects of stress are central to effective strategies for innovation diffusion. Derived from decades of behavioral-science research in communicating risk, these findings are summarized by the National Research Council, "Improving Risk Communication" (National Academies Press, 1989).



Principles discussed in this article are further validated by recent neuroscience research on the effects of perceived threats on the brain (Brock, 2008) including: reduced attention span under stress, the dominance of negative information, the power of trust, and the importance of benefit and control—factors to account for in successful innovation strategies.

advanced electronics have led to today's technologies such as: electromagnetic railguns, laser canons and autonomous systems with true swarming capability.

In each of these examples, communication played an important role in gaining informed support for advancing these new technologies. We discuss each case to illustrate key communication principles *(italicized)*, six strategic communication factors and these seven conventional-wisdom traps:

- Just get the word out
- You can't over communicate
- Decide, announce, defend
- Facts speak for themselves
- Silence is golden
- Perception equals reality
- Experts make the best messengers

For railgun, lasers and autonomous swarm, the most common conventional-wisdom trap avoided was "get the word out." How often has a blast email resulted in successful change? Too often we confuse disseminating information with effective communication.

After the "word is out" it is tempting to check-off communication as completed. In fact, *all information must pass through complex filters before it registers* with meaning for a receiver. These filters transform (limit and distort) information, especially under stress, so what the receiver hears may bear little resemblance to what the sender intended. These filters include:

- Ability to focus on the information
- Trust and credibility of the source
- Alignment of words with actions

The proper metric for communication is not what we say, but what others hear and do in response. This underscores the dual role of communication in technology adoption: First, having effective strategies to inform critical decisions. And, second, understanding stakeholders' points-of-view to anticipate potential resistance and advise decision makers on options for gaining informed support (chart 1).

Chart 1: High-stress communication principles are required for the upper-right quadrant, and can be effective in all four. However, only low-stress communication skills work in the lower-left, otherwise conventional-wisdom traps await where resistance exists.

Electromagnetic Railgun:
Overcoming Resistance

Railgun is a revolutionary advancement in naval gun technology. Developmental success has enabled rapid progress toward land-based and at-sea demonstrations. Railguns provide affordable solutions to costly challenges.

What began as an ONR-funded lab project is now a technology for America's future fleet. Railgun uses electricity instead of gunpowder to fire hypervelocity projectiles at speeds up to mach 7, ten times farther than current naval guns and with greater accuracy. Railgun is safer to operate aboard ships and effective against multiple threats.

Like LT Sims with continuous-aim gun technology, railgun is disruptive to adversaries, and in a different way to those internally vested in the status quo. Dr. Elizabeth D'Andrea was the ONR railgun program officer in 2007. She understood the advocacy challenges for railgun, and it became apparent that most were based on misperceptions, uninformed opinions or lack of awareness.

"Railgun was not being taken seriously by naval leaders," said Dr. D'Andrea, "the lab team was making breakthroughs almost every day, but they did not know how to translate 'tech-talk' into 'fleet-speak' that naval officers understand." Additionally, some pockets of deeper resistance saw railgun as a threat to the existing political/social order of naval gun and missile technology.

Dr. D'Andrea understood the stress of time constraints, limited resources and competing priorities on leaders whose support was critical. With then-CNR RADM William Landay, it was determined direct engagement with stakeholders at a demonstration was the best course. Invited were key decision-makers, including then-CNO Admiral Gary Roughhead and others who could speak to the technological merits with higher credibility than could ONR alone. Landay and D'Andrea also knew they needed support beyond DoN and included news media. It was positioned as a "World-Record" event demonstrating a 10 mega-joule shot—then the world's most powerful railgun.

With so much on the line, spokespersons were prepared to deliver comprehensive structured messaging telling the compelling story accurately. At Naval Surface Warfare Center (NSWC) Dalhgren on 31 January 2008, Dr. D'Andrea, her Chief Engineer Charles Garnett and RADM Landay achieved success with an event that became known as the railgun "shot heard round the world."

"This was a turning point for railgun. It earned CNO as a champion who understood its warfighting value. Going forward,

Railgun 10 Megajoule shot in 2008

CRITICAL CRITERIA FOR EFFECTIVE MESSAGES

	How?	Why?
Concise	Limit **number/length of messages** • No more than three key message elements at a time • Elements should be 7-12 words each	Mental noise and stress **reduce** the **ability to process information**
Clear	Use **simple language** • 6th-8th grade reading level on average • Use simple construction • Avoid jargon	People under stress **understand information at four grades below** their education level
Brief	Recognize **time limitations** • Briefings: 15 minutes • Answers to questions: 2 minutes • Sound bites: 9 seconds	When stressed, a person's **attention span starts to steadily diminish** after 10 minutes and is completely gone after 15-20 minutes total
Positive	**Avoid negative language** • Avoid the words "no", "not", "never", "nothing", "none" • Address questions by asserting "what is", rather than refuting what "is not"	It takes **three positives** just **to balance** the effects of **one negative**

Source: Center for Risk Communication

Chart 2: Messaging addresses sources of resistance. Understanding the intensity and depth of resistance is important. Resistance can be rooted in *opinions, beliefs* or *values.* Over time, ideas (even wrong ones) that begin as opinions transform into beliefs unless effectively countered—credibly and quickly. *This can occur as quickly as 48 hours.* Opinions are significantly different from beliefs. Opinions range from favorable to unfavorable and are subject to substantial shifts (e.g. political polling results). In contrast, beliefs polarize between true and false with little gray area, and are resistant to change. *Once an opinion becomes a belief, people reject new information challenging their beliefs.* Values go even deeper, to our sense of *good* and *evil.* Changing values, if possible at all, can take a lifetime (changing a religious or political ideology), and may be beyond what communication alone can resolve.

communication became a major part of my job as visibility increased. We focused on gaining key stakeholders' trust and were very honest about our successes, failures and challenges. Consistent messaging, backed-up by results was the key," said D'Andrea.

National media coverage helped foster interest outside DoD and captured the public's imagination. Clips of railgun tests earned millions of views on ONR's YouTube channel. Railguns found their way into video games, science classes and even Hollywood (a Navy ship armed with railguns saved the planet from the Decepticons in the Transformers sequel).

Support continues and railgun is on track to become an official program of record.

Conventional-Wisdom Traps Avoided:
- You can't over communicate
- Decide, announce, defend

Communication opportunities must be established between parties for innovation diffusion to occur (Rogers, 2003). The goal for railgun was to communicate for effect. Where mass awareness is the objective in marketing, here, building relationships with decision makers was key to success.

People are bombarded everyday with more information than they can process. Railgun needed to cut through distractions to become the signal in the noise. This meant concise, clear, brief and accurate messaging on an interpersonal level for mitigating resistance, fostering trust and building a support network (old-fashioned, face-to-face conversation).

Innovators must see themselves as change leaders and understand their responsibility for communicating. Dr. D'Andrea made the railgun program very transparent to Navy leadership. Unfortunately, *an often-observed pattern in organizational communication is the D.A.D. model (Decide, Announce, Defend).* Executives huddle behind closed doors to make an important decision. Especially when the decision has negative impact on the workforce, as the *decision* is *announced*, leaders find themselves immediately on the *defensive,* scrambling to explain their decision to now angry and distrustful personnel.

Trust is based in perception and is essential for informed support. Valuing people means more than just informing them; it means involving and engaging them. The credibility lost from D.A.D. is far less about the decision itself than how it was reached. *People expect a voice in decisions that affect them.* When that voice is denied, resistance (sometimes outrage) is predictable.

No matter how compelling a new technology may be, innovators must consider its potential negative impacts (real and perceived). Good communication strategies account for stakeholders' needs, expectations and potential resistance.

Laser Weapon System (LaWS): Addressing Barriers

High energy laser weapons represent game-changing technologies. ONR is a leader in fielding directed-energy technology, and laser systems complement existing naval weapons.*

Lasers enable the Navy to fight at the speed of light. In 2014, the first operational laser canon was installed aboard the USS Ponce and deployed to the Persian Gulf. Testing proved lasers could work in the harsh maritime environment. Providing new levels of precision and speed for naval warfighters, they also increase safety because, like railguns, they use electricity rather than explosive propellant or warheads, eliminating ammunition magazines. LaWS is tunable, giving commanders the option to fire a warning flash before a lethal beam. Current power levels are effective against small boats, planes and UAVs. They also cost less to build, install and fire—less than $1 per shot—compared to traditional weapons, such as multimillion-dollar missiles.

So why has it taken so long to get lasers aboard ships? After all, we started laser development in the 1980's under the Reagan administration's Strategic Defense Initiative, or "Star Wars." The technical hurdles are significant. Weapons-strength lasers require large amounts of energy, both for the beam and the apparatus itself. Early lasers suffered from system weight, low efficiency and materials deficiencies. Focusing and targeting the beam aboard a moving ship in a maritime environment is also a difficult computing and engineering challenge. Given these issues, one can understand the skepticism.

Enter Peter Morrison, ONR program officer for LaWS. Morrison and his team approached the problem using a combination of commercial lasers normally used for manufacturing. They modified components and designed the system to achieve the necessary performance for a warship. In 2013, they were ready to test fire against a drone aboard the USS Dewey. Within seconds of firing, the drone burst into flame and crashed into the ocean.

The test was successful, but few knew about it. What did this mean for the Navy, the program and the future of directed energy? Morrison had historical data from the project, test results and high-resolution video. Would these facts speak for themselves?

"True innovation should expect skepticism," said Morrison, "and skepticism plays an important role in science, but it means one must communicate meaningful facts to stakeholders. This can turn potential skeptics into educated advocates." To leave the narrative interpretation to those feeling threatened by its success could provoke greater resistance. Morrison briefed then-CNR, RADM Matthew Klunder, who understanding the importance provided support for a communication strategy.

LaWS aboard USS Ponce, 2014

The first step was to assemble program information into a message map. Message mapping is a process that collects, organizes and structures data into key messages, supporting facts and proof points.

The next consideration was messenger selection. For different stakeholders, messenger credibility varies, as does the effectiveness of various communication methods.

Among the technical community, Morrison and his team engaged their peers and fellow program officers. They provided classified briefings to flag officers and officials, while RADM Klunder briefed peers and top-level decision-makers. Internal support evolved along with alignment of messaging, both critical for addressing public inquiry. And media were already digging.

It's hard to overlook the movement of a ship; as the USS Dewey returned to San Diego, a reporter published its photograph with a large white dome on the fantail, postulating that it could be a laser system. Rather than letting the rumor mill run amuck, CNR decided to meet with media and get ahead of the story.

At traditional news conferences the spokesperson stands at a podium. To put people more at ease, ONR's media relations lead, Peter Vietti, developed a conversation-based roundtable format with RADM Klunder as chief spokesperson and Morrison attending to provide details. Reporters were invited to participate either in person or by phone.

As defense reporters work hard and are pressed for time, they value clear and accurate information. Resulting headlines announced the Navy's laser canon around the world with remarkable accuracy and consistency of messages. Awareness soared, support followed.

Following the announcement, then-CNO Admiral Jonathan Greenert, ordered the laser "out to the Fleet for operational demonstration." The program accelerated to install an advanced prototype aboard the USS Ponce. Testing in the Persian Gulf allowed Sailors to see its value first-hand, gaining their informed support and credible advocacy. Reporting this success also signaled a new age for the US Navy to potential adversaries.

Today, a new generation of 150kw lasers is being developed for the DDG Arleigh Burke class of destroyers. The FY16 Defense bill "directs the Secretary of the Navy to develop a plan for fielding electric weapon systems," meaning both lasers and railguns.

Laser weapons and railgun are paradigm shifts for DoN, changing the doctrine of naval warfare. While prototypes have shown great promise, neither is a bolt-on solution and both require future ships to be designed from the keel up to support electric weapons. That's an "all in" wager for the Navy. Making the shift from guns and missiles requires long-term vision, communication support and leadership from both military and elected officials.

Conventional Wisdom Traps Avoided:
- Facts speak for themselves
- Silence is golden

Relying on facts alone to resolve misperceptions is unrealistic in high-concern circumstances. Behavior is predicated on perceptions, and misperceptions often lead to behaviors that seem irrational from the perspective of reality. The innovators' challenge is that they may be too close to their ideas to see how others might fail to grasp the importance.

Research shows that *stressed people lose on average 80 percent of their capacity to process information (hear, understand and remember).* To mitigate this loss and optimize the remaining 20 percent, *the communicator must pre-process the information to make it more digestible.* The message map is designed specifically to pre-process information.

People can best process three messages at a time when stressed. Message maps, therefore, arrange data in three levels of three: three key messages, three supporting facts for each message, and three "proof points" for each fact. This structure helps people determine what is important (key messages), and whether the information is believable (supporting facts and proof points). Chart 3.

There are no information voids—something always fills them— usually rumors. There is strong temptation to withhold information until all decisions are made and all questions have answers. The problem with this "silence" is that stakeholders' needs do not remain on hold while leadership deliberates. Silence breeds uncertainty and distrust.

Silence is antithetical to pre-decisional dialogue that could satisfy *people's expectation of having a voice (control) in decisions that affect them*—a prerequisite for support. The alternative is providing interim updates through two-way channels, clarifying what is known and what isn't, steps taken toward clarification, and when the uncertainty will end.

Innovators must know that *uncertainty is a heavy psychological burden* on those their innovation might impact. A steady flow of meaningful communication relieving the anxiety of uncertainty enhances trust and acceptance.

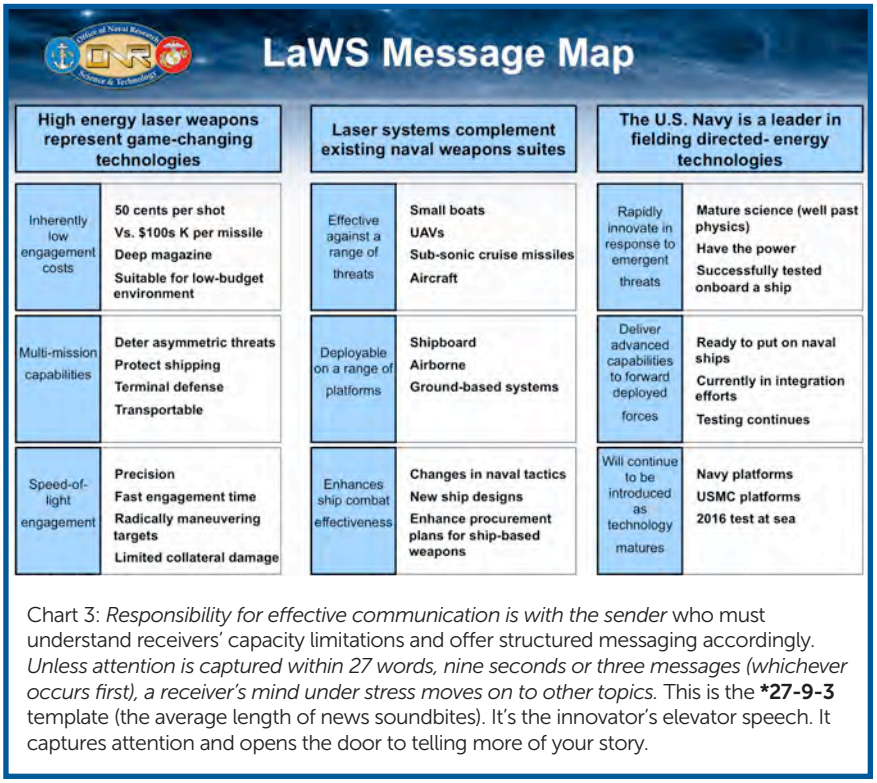


Chart 3: *Responsibility for effective communication is with the sender* who must understand receivers' capacity limitations and offer structured messaging accordingly. *Unless attention is captured within 27 words, nine seconds or three messages (whichever occurs first), a receiver's mind under stress moves on to other topics.* This is the ***27-9-3** template (the average length of news soundbites). It's the innovator's elevator speech. It captures attention and opens the door to telling more of your story.

Swarmboats in action on the James River

Swarmboats:
Managing Perceptions

With autonomous swarm, unmanned Navy vessels can overwhelm an adversary. A first-of-its-kind technology enables swarming capability, which gives our naval warfighters a decisive edge.*

Autonomous vehicles are used widely across the naval service on, under and above the ocean. The next logical step is to connect them in new and meaningful ways. Swarming of autonomous systems opens new thinking about autonomy: improved ability to operate forward; protection of high value assets (e.g. attack on the USS Cole); multiplied combat power and improved distributed lethality at decreased risk.

In 2014, ONR demonstrated autonomous swarming technology in unmanned surface vehicles (USVs) on the James River in Virginia. The swarmboats simulated a "high value unit" transit such as the Strait of Hormuz, where Iran regularly employs swarm tactics (not autonomous) using small speedboats. Thirteen USVs in the test constantly shared sensor data and route information using a software/hardware kit called CARACaS (Control Architecture for Robotic Agent Command and Sensing), derived from NASA's Mars Rover program.

Shutting down the James River and the airspace above it does not go unnoticed. Likewise, boats without people aboard maneuvering around the test range raise obvious questions from onlookers. And, the dominant characteristic of swarmboats—their ability to act autonomously—rekindles dire perceptions about science-fiction scenarios.

Despite their benefits, autonomous swarmboats faced significant technical and emotional hurdles regarding whether a robot should ever make a lethal decision. From engineers to leadership, the answer was unanimous: NO. This was a priority message. Additionally, before Sailors were asked to relinquish control to autonomous boats, the benefits of swarm and trustworthiness of the technology must be made clear.

Bob Brizzolara is the ONR program officer responsible for autonomous swarmboats. He understands the need to earn Sailors' trust with his technology. Sailors from Navy Expeditionary Combat Command (NECC) were an integral part of the test. These "real" Sailors oversaw the swarmboats as supervisors oversee subordinates, giving direction and evaluating performance.

As with railgun and LaWS, the first step was to develop a message map with Brizzolara and his team focused on what the technology does, how it works and why it is important.

The demo required coordination with ONR, NECC, Fleet Forces Command, NSWC-Carderock, Ft. Eustis and the Coast Guard, to work just as a real-world scenario. One hot August day, after years of research, multiple autonomous USVs successfully demonstrated the new swarming capability—both in escorting vessels and engaging hostile craft.

Benchmarking the prior success of the LaWS communication strategy, external outreach was delayed until internal Navy briefings were accomplished and support gauged. The technology was well received, and again Admiral Greenert put his full support behind announcing the breakthrough. Once more RADM Klunder was the spokesperson, lending his credibility to the warfighter benefits and addressing potential negative perceptions about autonomous systems. Brizzolara focused on the technology, publishing about the CARACaS kit.

National media recognized the importance of this breakthrough and accurately reported the story, positioning the capability as a new defense against another USS Cole-like incident, and as a counter to Iranian small boat operations in the Persian Gulf.

"The first USV swarm demo was a key milestone in autonomous control for USVs," said Brizzolara. "We demonstrated autonomous operation of a team of USVs in a higher-fidelity environment than ever before. We are building on that success, adding to the capability and planning more complex demos to further develop the technology." The swarmboat program will conduct additional demonstrations and testing in 2016, and is on track for operational unmanned surface vehicles.

This technology is also revolutionizing unmanned aerial vehicles (UAVs)—part of ONR's Low-Cost UAV Swarming Technology (LOCUST) program. LOCUST can launch dozens of swarming UAVs to autonomously overwhelm an adversary. A ship-based demonstration of 30 rapidly launched autonomous swarming UAVs is planned for later this year.

PERCEPTION FACTORS

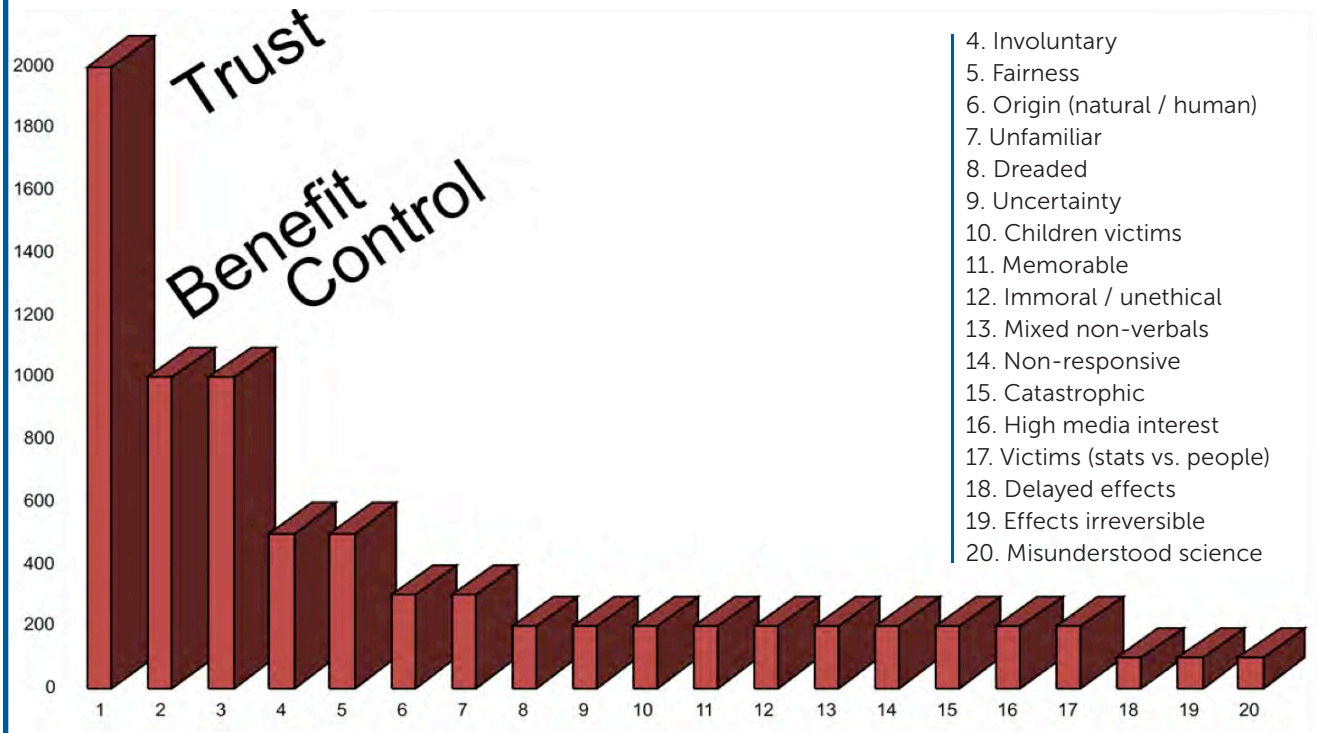
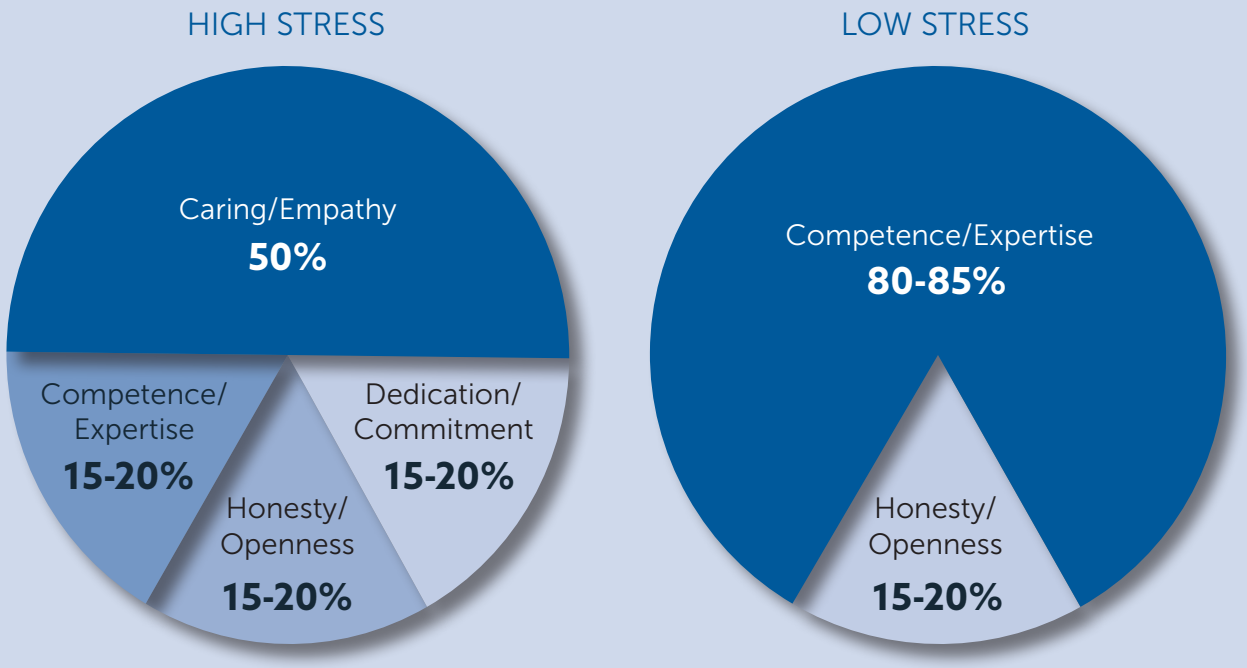


Chart 4: Studies provide insight into key perception factors and help predict their effects (positive and negative) on shaping beliefs and influencing behavior. The most significant factors are: *trust, benefit* and *control* (Covello, 1988). Among these, trust is the strongest. Trust alters perceptions 2,000-fold. If the messenger is trusted, the issue becomes 2,000-fold more acceptable (less threatening); if distrusted, 2,000-fold less acceptable (more threatening). Benefit and control influence perceptions in the same way at 1,000-fold. (Source: CenterforRiskCommunication.org)

MESSENGER CHARACTERISTICS



Source: Center for Risk Communication

Conventional Wisdom-Traps Avoided:
- Perception equals reality
- Experts make the best messengers

While it is often said, "perception equals reality," this is seldom true. A more accurate statement is: *"what is perceived as real is real in its consequence."* (Covello, 1997) Obviously gaps occur between reality and perception. But the significance of these gaps might be surprising. *Simply introducing facts into a debate rooted in misperception is unlikely to resolve differences.*

Applying this thinking to the introduction of new technology, like autonomous swarmboats, illustrates how words and actions can promote *trust*, communicate *benefit* and share *control* (chart 4):
- Is the source of information trusted? (appropriate messenger)
- What are the benefits to me and others? (safe and cost effective)
- How do stakeholders exert control? (Sailors supervise the USVs)

People judge the messenger before they listen to the message. Expertise alone does not make a trusted messenger. The critical characteristics for effective messengers are trust and credibility. If the judgment on messenger trustworthiness is not favorable, the message is irrelevant. So, what are the bases for trust?

Asked "What do you look for as you decide to trust someone?" thousands of responses fall into three broad categories:
- Competence and expertise
- Honesty and openness
- Caring and empathy

In low stress, competence and expertise account for approximately 85 percent of trust (who do I trust to perform routine maintenance on my car?). *In high stress, 50 percent of trust is based upon caring and empathy* (who do I trust to guide me in a financial or health crisis?). In other words, people don't care what you know until they know that you care (charts 5 and 6).

With autonomous swarmboats, we did not talk around the issue of human in-the-loop control—it was addressed head-on, acknowledging concerns about lethal decision-making.

Among the most powerful signals of caring and empathy is active listening. Innovators should take time to listen to stakeholder concerns upfront, ensure understanding, actively address them and provide periodic

CREDIBILITY LADDERING

I am going to read you a list of institutions in American society. Please tell me how much confidence you, yourself, have in each one -- a great deal, quite a lot, some or very little?

June 2-7, 2015

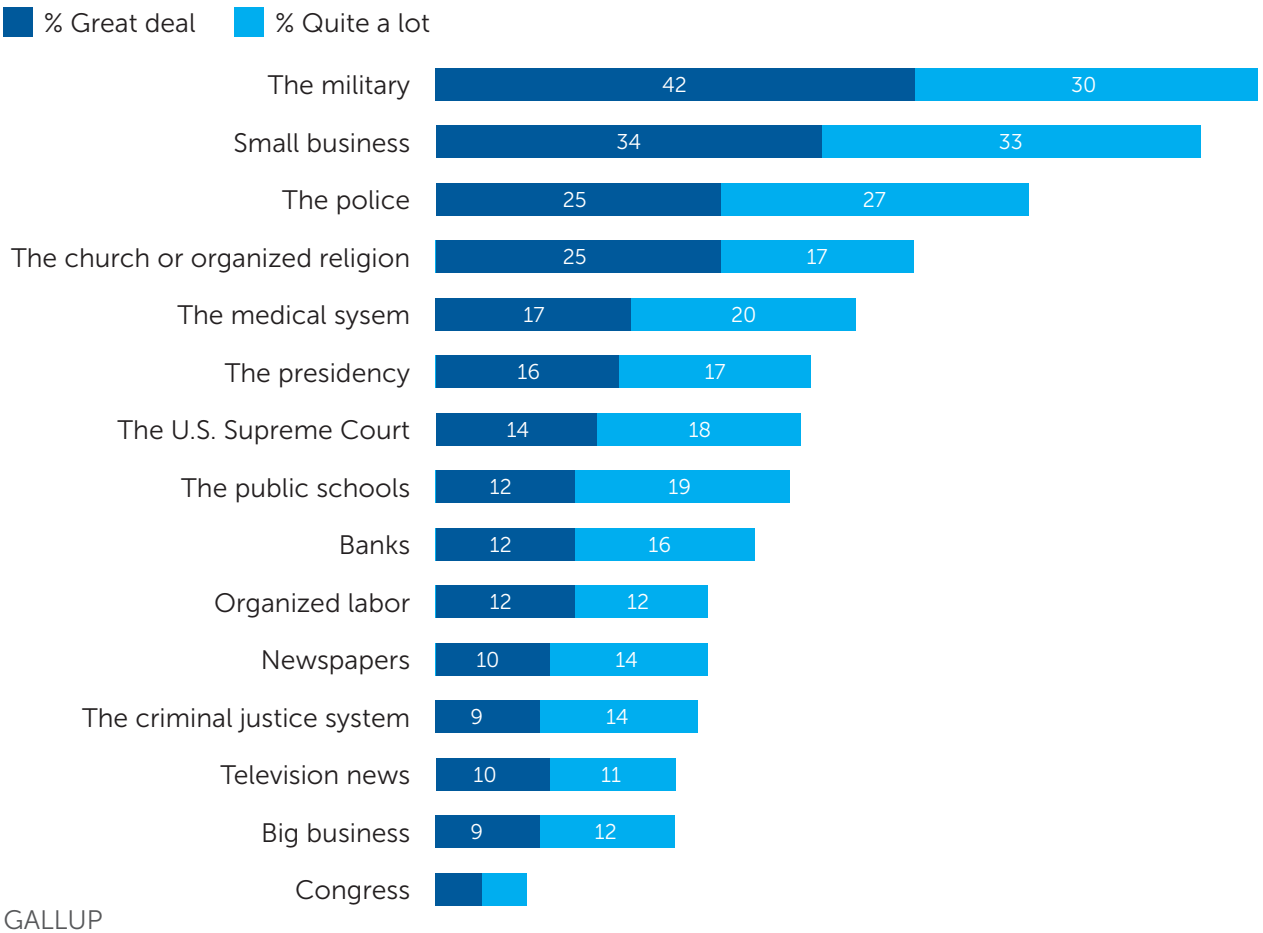


Chart 7: An annual Gallup poll on Confidence in Institutions represents a large-scale credibility ladder. The military consistently ranks highest. The value of a credibility ladder lies in two rules: *Credibility transfer* is intuitive; *a message takes on the credibility of the highest credible voice that agrees with it. Credibility reversal* is less intuitive; *when a lower credible voice challenges a higher credible voice, the lower voice loses further credibility.*

updates. Even though concerns may be unfounded in reality, they are real to those holding them—and therefore legitimate. Words or actions minimizing the importance of stakeholder concerns will setback trust significantly.

Stressed people attribute 75 percent of message content to non-verbal signals: attire, posture, grooming, vocal qualities; and behaviors. Non-verbal signals are processed quickly—usually within 30 seconds for a presenter before an audience. When stressed, the most negative interpretation of any non-verbal signal will apply (folded arms, dry mouth and shifting eyes would signal defensive and unapproachable, nervous and lying, dishonest and deceptive).

Trust is hard won, and easily lost, so selection of credible messengers is critical. Credibility is relative; it varies by person, organization and topic. Ranking the voices on a topic provides a "credibility ladder" that guides us in selecting messengers (chart 7). Since the military enjoys high confidence with the public, the CNR was a logical choice as spokesperson for autonomous swarmboats. CNR, no matter who occupies the position, has the responsibility to lead ONR's command message.

Conclusions and Takeaways

Table 1: SCIENCE-BASED COMMUNICATION FACTORS	
Railgun (Overcame Resistance)	1. Intensity of Resistance: Low, Medium, High 2. Depth of Resistance: Opinions, Beliefs, Values
LaWS (Addressed Barriers)	3. Barriers to Informed Support: (Lack of) Awareness, Knowledge, Understanding 4. Overcoming Barriers: Inform, Involve, Engage
Swarmboats (Managed Perceptions)	5. Perception Factors: Trust, Benefit, Control 6. Interactions Shaping Perception: Dissemination, Interactive, Interpersonal

The ingenuity of the men and women serving DoD is not in doubt—the challenge for innovators is developing informed support for implementation. Science-based communication principles change how we traditionally think about communication: from "get the word out" to careful planning for the concerns, needs and perceptions of stakeholders. Communication informs strategic plans and planning informs communication strategy.

We define communication as: the application of messaging, strategy and tactics to achieve an effect. Effectiveness depends upon how well we resolve the factors that contribute to resistance, barriers and misperceptions. Table 1 above summarizes factors discussed in each of the technology cases.

Combining the "Science-Based Communication Factors" suggests a model uniquely applicable to the diffusion of technology innovation (chart 8).

Call to Action: Leaders must set the conditions for innovation. Does the command climate support innovators (*trust*)? Are they recognized (*benefit*)? Are they empowered (*control*)? Military culture fosters the mindset that "what interests my boss fascinates me," so communicate that innovation is a priority, and put collaborative processes in place to engage people on a portfolio of mission-based initiatives. Change policies that inhibit innovation and agility (foster speed and decentralized authority). No matter how compelling a new idea or technology may be, a leader must empathetically understand the people it will impact and then act accordingly.

Recommendations: Based-on lessons learned, we offer seven communication practices:

- "Down-and-In:" Effective communication begins internally like the nervous system of an organization; communicate goals to align your team, build relationships, find support in your chain of command, then attract thought leaders as advocates and early adopters
- Communicate For Effect: Develop communication strategy upfront by mapping stakeholder needs, concerns

SCIENCE-BASED COMMUNICATION MODEL

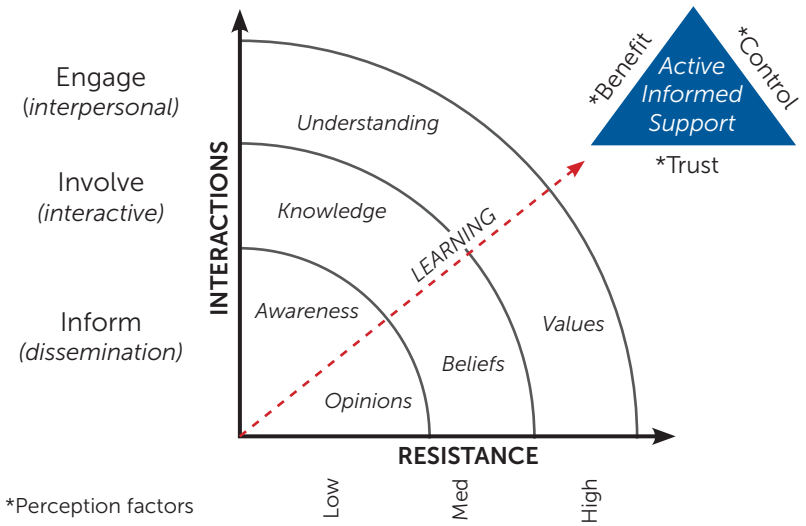


Chart 8: Learning is first a function of effective communication. "Active informed support" results from assessing depth of resistance (*opinions, beliefs, values*) against a range of communication methods (*inform, involve, engage*) to dispel or counter misperceptions. Perception factors are addressed through accurate messages and actions that foster *trust, show benefit* and share *control*. This promotes learning by expanding *awareness, knowledge* and *understanding* toward the goal of being the "signal in the noise."

and perceptions to foresee resistance and how to gain informed support

- Anticipate, Prepare, Practice: Adopt high-stress communication principles to avoid conventional-wisdom traps—common sources of failure in change initiatives
- Signal in the Noise: Use 27-9-3 message maps to drive integrity and a consistent voice. Tell a compelling story with supporting imagery about "what" your innovation is; "how" it works; and "why" it is important
- Find a Champion: Ally a senior-level sponsor in a position commensurate with the change associated with your innovation
- Know Your Audience: Identify credible voices for different stakeholders (hint: it might not be you). Rank these against the relative credibility of opposing voices
- "Up-and-Out:" Communication with media can provide independent validation; this requires strong public affairs support

In summary, innovators are change leaders, which requires much more than a good idea to be successful. Science-based communication accounts for stress from innovation-induced change. Expanding communication beyond "getting the word out" avoids conventional-wisdom traps and focuses on dialogue with stakeholders and decision-makers. Examples of communication at ONR provide a framework to think strategically: "down-and-in" promotes internal alignment, and "up-and-out" to proactively manage perceptions and expectations. "Breaking through with your breakthrough" is ultimately a function of your communication effectiveness to overcome resistance, lower barriers and achieve informed support—an important competency for all leaders.

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**Example 27-9-3 messaging*

Endnotes:

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5) Peters RG, Covello VT, McCallum DB. The Determinants of Trust and Credibility in Environmental Risk Communication: An Empirical Study (Risk Analysis) 1997, 43-54
6) Vincent Covello et al, National Research Council, Improving Risk Communication, National Academies Press, 1989, table 2.1