Globalization, security, and terrorism are words often invoked by experts in newspapers, on television, and in the blogosphere, tweeted via the latest versions of social networking, and even occasionally pronounced in person. As if at the mercy of Humpty Dumpty in *Through the Looking Glass*—whose words meant whatever he chose them to mean—each of these words is applied similarly and differently by the same and different people, so that confusion results.

Before examining how globalization has affected, is affecting, and will affect aviation security—especially in the context of terrorism—the first step is to clear the verbal air.

**Globalization**

What is globalization, and when did it begin? The word appears in dictionaries in the mid-1940s, although some treat the word as newly coined. Most definitions point to the increasing degree by which anyone can be affected by anyone else who is somewhere else in the world. Most definitions also note the increasing interconnectivity among people. Anything and anyone may be involved—from war, politics, and sociocultural matters, to health, wealth, and the pursuit of happiness.

Different groups of scholars have identified different starting points for globalization. Some choose 1989, with the end of the Cold War and the increase of what is termed postindustrial capitalism. Others favor the 1950s, with the decolonization of the European empires in Africa and Asia; some point to 1492, with the rise of European sea exploration and trade; and yet others go back past the expansion of Islam in the 7th through 9th centuries to Alexander the Great in the late 4th century BC.
This brief history indicates that globalization is nothing new, is not as new as some maintain, is new only to people who do not study history, or is new only through the latest technologies interacting with the latest in human nature.

Security

Sometimes security is considered a state of mind, signifying that someone feels safe from intentional harm; safety then becomes freedom from unintentional harm. Security may be an objective consequence—someone is safe from intentional harm—and may imply a meaning not accurate in the real world—that someone can be completely safe from intentional harm. Security may refer as well to what is done to achieve any of those goals—for example, employing behavioral recognition and verbal interrogation, explosives detection, biometrics, profiling, data mining algorithms, and the old standby, door locks.

An immediate conclusion is that experts may be arguing about different kinds of security. Applied research about globalization’s effects on the meanings, perceptions, and expectations of security is all over the board.

Terrorism

“One man’s terrorist is another man’s freedom fighter” is an old canard that must be put to rest. The statement is true to the extent that one man’s cannibal is another man’s gourmand. The behaviors occur regardless of what they are called, but preventing these behaviors requires action.

Some experts state that terrorism involves threatening, injuring, or killing innocent people; some retort that no one is innocent. Other experts state that terrorism is violence to further political or religious beliefs. Yet apprehended and incarcerated terrorists may point to lifestyle choice, group influence and pressure, or sincere mystification. Most experts agree that the victims of terrorism are not only those who are threatened, injured, or killed, but those who are direct survivors or indirect observers—especially through mass media and telecommunications.

If terrorism is successful, these victims are more likely to think, feel, and act in the manner desired by terrorist planners. If no one finds out about terrorism, it does not work. One conclusion may be that counterterrorism should entail less screening of people and things and more prevention or censorship of the news. The main issue then becomes freedom of life versus freedom of speech without life. Global-
Globalization is not only affecting the meanings, perceptions, and expectations of terrorism but is increasing the number and variety of means by which terrorists communicate and engage in acts of violence.

Globalization affects two goals of aviation security in response to terrorism—first, finding terrorists before they attack; and second, finding explosives and other weapons before they can be employed.

**Finding Terrorists**

All methods of finding terrorists include collecting and analyzing information about people, developing a valid link between the information and the probability that a person directly or indirectly will engage in or support terrorism, and then acting to prevent or minimize terrorism in specific cases. The kinds of information collected and analyzed include voice intercepts, relayed discussions, and observations, as well as past travel behaviors, known associates, facial expressions, and choice of clothing.

The biggest problem is developing valid links between information and predicted behavior. Predictions of human behavior—for example, of violence—are extremely difficult. This should not be surprising: human social behavior is unknowable—although this explanation may not fare well after a terrorist event.

**Challenges**

Challenges to linking information to predicted behavior include the following:

1. The same information may mean something different in different contexts, especially when psychological triggers are added or withheld.
2. Depending on the parameters, many people may change from terrorism-inclined to not inclined and back again, and from being inclined or not inclined in different ways.
3. Most people have less than complete awareness about their own behaviors, thoughts, feelings, motivations, and inclinations, even if they desire to be fully aware or to share this awareness during an interview or interrogation.
4. Experts often are confounded by the paradox that the most sophisticated terrorists will not look like terrorists, yet most people do not look like terrorists.
5. The greatest majority of people are extremely unlikely to engage in terrorism, except in the most extreme situations; therefore, a system for finding terrorists must be extremely accurate, or hordes of nonterrorists will be identified and treated as terrorists with noxious, self-induced security, economic, and political consequences for commercial aviation.

6. Without high accuracy in detecting a terrorist, certain nonterrorists may become terrorists because of their treatment by security authorities who wrongly identify them as terrorism-inclined.

7. Some terrorists inevitably will be treated as nonterrorists in a less-than-perfect security system, and successful terrorism will result.

Because of points 4 through 7, some experts support random screening of air passengers—or a modification of random screening—even if those pulled out for secondary screening include a 4-year-old child or a 90-year-old grandmother, who may have something dangerous planted on them.

8. A commonly accepted terrorist indicator, stress, is not all that useful. Stresses arise from many reasons not related to terrorism—such as trying to avoid missing a flight; moreover, someone about to engage in terrorism who believes it is God's will or the key to some other good may not appear stressed, but calm, tranquil, and even blissful.

9. The typical explanations for terrorism—such as ethnic, sectarian, tribal, economic, and personal grievances—may be superficial, offering few insights into the underlying psychology.

10. All experts depend on combinations of faith, intuition, logic, authority, observation, and experimentation to link information to predicted behavior, although all of these approaches have flaws.

11. A contemporary perspective holds that a person's individual identity, mind, nature, personality, and concepts of causality, space, and time may be language fictions that have practical value in describing self and reality but may not actually exist. Yet if this is the case, the foundation for the screening criteria developed by experts is tenuous.
A New Language

In today's era of globalization, developments to improve the identification of terrorists before they strike are unclear. Depending on disparities in technological sophistication, including cybersecurity, the true purpose of a potential threat may or may not be hidden.

As more people use the latest communications technologies, human nature and the best language to describe it may be changing across groups of people and within individuals, impeding the identification of people who pose a threat and of their modus operandi. In addition, the number, structure, permeability, function, and process of terrorist networks and organizations are significantly changing, along with the psychological, social, cultural, and physical boundaries they may need to cross.

Static wiring diagrams of terrorist entities may decrease in value to those charged with protection. Terrorist individuals and organizations are not formal members and formal teams. A new language is needed to describe the dynamics of ever-changing intent, cooperation, support, and social networking by terrorist individuals and organizations—how personnel for a specific terrorist act are mixed and matched; how individuals and organizations appear, disappear, and reappear; how operational and support capabilities are shared among individuals and organizations with radically different ideologies and motives; and how terrorists wittingly and unwittingly self-select and are selected for one-time acts. More and more, individuals can go online and find validation with others, as if in a self-reinforcing echo chamber, losing any doubts that aviation terrorism or other terrorisms are true, good, and right.

Finding Explosives and Weaponry

Experts rely on a variety of technologies to identify the physical characteristics of explosives and other weaponry intended for terrorism. Bulk forms and trace amounts of proscribed materiel can be detected and identified.

An example that highlights the main issues has been in the news as much for prurient interest as for security—the full-body scanner. The technology detects bulk forms of explosives and other weaponry via electromagnetic radiation, usually millimeter waves or X-rays. The radiation reflected from an individual's body is analyzed via computerized algorithms to depict differential densities of the body and objects that may be in or under clothing. Aviation security is supported when some of these objects prove to be explosives or other weaponry, or when the technology deters bringing these items into an airport.

Technology Problems

Several problems arise; accuracy is the first. Technologies are not 100 percent accurate when tested realistically in a laboratory, tested in field conditions, or employed operationally. Accuracy is further affected by human performance factors, such as low motivation, fatigue, distractions, and the application of strategies for interpreting technical data. Many advocates of the technology concede that low-density items of interest—constituted of liquid, powder, or thin plastic, for example—may go undetected, as will items hidden between folds of body fat and within body orifices.

Second, a sophisticated terrorist entity has the intelligence, reconnaissance, and surveillance capabilities to learn what the technology does and how. Planning then can focus on how to beat the system, go around it, target another aspect of the aviation environment, or choose another transportation mode or some other target. Most terrorists do not harbor aviation fetishes or have a burning desire to disregard
the most effective security impediments to achieve explosive, ballistic, or some other more unspeakable satisfaction.

Third, scanners are costly. Many have estimated the cost of fielding full-body scanners at all security checkpoints, both domestically and internationally, at several hundred million dollars. This includes only the purchasing costs, not the costs of operations and maintenance, training, and any necessary structural modifications to the airport. Yet this or any other specific technology would be irrelevant for an infinite number of terrorism operations. The result is an extraordinary sunk cost, as well as the opportunity cost. This works to the advantage of terrorists, who aim to harm the United States economically, as well as physically.

Another cost problem involves the collateral economic damage that occurs when the integration of the technology with other aviation operations is suboptimal. This can cut back the volume of air travel; online opportunities for communication, exploration, and other experiences are burgeoning.

Fourth, the exposure of people’s bodies has led to modifications not in the best interests of security, such as blurring a passenger’s face or lowering the fidelity of the body image. Moreover, full-body technology often is optional, with the alternative of body pat-downs with or without wanding. The alternative, too, can be compromised through cultural and psychological concerns about sexual orientation, gender identity, sexuality, sexism, sexual harassment and discrimination, and their social implications. These concerns can bring out the worst in passengers, security personnel, and security.

Fifth, the cumulative effects of screenings and the possibility of a malfunction projecting higher radiation levels raise potential health issues. Although most experts state that the health risks are no more than those from background radiation in the environment or from a few minutes of flight, the health effects of screening systems have not been well researched.

Sixth, the applied physics of security technology may be poorly understood, or may be given the benefit of the doubt, or may be used as a cover for corruption. All three may depend on a global belief in the magic of technology and result in support for systems that may have failed to detect explosives, weapons, and illicit drugs in Thailand, Iraq, and Mexico, according to news reports.

In the era of globalization, the ease of knowing the parameters of a technology increases a terrorist’s advantage. This also can lead to terrorists developing technology for use against security. Globalization’s increase of social interconnectivity increases the possibilities of the type, timing, and location of a terrorist attack obviating the specific technology at an airport or other venue.

**Layers of Security**
In addition to the goals of finding terrorists, explosives, and weapons, five other important issues affect aviation security and terrorism in an era of globalization.

**Intelligence Operations**
Intelligence operations are necessary to find, apprehend, interrogate, and—under legal and ethical rules of engagement and adjudication—incurcate or terminate terrorists before they can attack. The information from these operations needs to be transmitted continuously and securely to aviation-related authorities, who then must modify policies, plans, programs, and moment-by-moment layers of security. With globalization, layers of security must protect against ever-changing threats interacting with ever-changing vulnerabilities leading to ever-changing risks.

**Psychological Factors**
Industrial and organizational psychology play a role. For example, the morale and performance of aviation security personnel who screen at checkpoints would improve with higher pay, better training, a professional culture bordering on elitism, more positive marketing of security careers, scientifically validated professional training dealing with the detection of low-probability events, and more respect.

Too many leaders throughout the intelligence, security, law enforcement, and political communities, for example, cultivate a can-do attitude that may lead to turf battles and interpersonal conflicts. The dynamics of looking for evil may lead to committing
The volcanic eruptions that began on April 14 from under Iceland's Eyjafjallajökull glacier have exemplified challenges for transportation in a world of globalization. The eruptions immediately became a headline story worldwide, as dense clouds of volcanic ash forced temporary closures of European airspace during April and May, affecting millions of travelers. Governments, companies, and other entities attempted to manage the reports—in some cases, to provide accurate information, to satisfy the requests and needs of travelers and the general public, and to reduce needless panic and distress. Other attempts, however, aimed to hide ignorance, to protect unprepared and poorly briefed decision makers, and to advance other agendas ahead of the public welfare.

All of the attempts at managing the reports proved difficult, because of the global, 24-hour news cycle. The best informed and most effective managers of the story seemed to be not those with formal authority over aviation and intermodal transportation, nor credentialed reporters, but the proverbial men and women on the street—now the cyberstreet—sending information via cell phone chatter and photos, by texting, Twitter, blogs, Internet chat rooms, Facebook, and YouTube—with some of the videos going viral, that is, gaining rapid and vast worldwide distribution.

Emergency Planning

One lesson for all transportation decision makers is that these and other ever-emerging social networking media need to be integrated into emergency planning and operations. The perceptions of travelers and the general public will continue to influence behavior and other reactions, for good or for ill. Managing the story of a transportation emergency is as important as any other emergency task—not just spinning the challenge but helping to understand and meet it.

In an increasingly interdependent world, the eruptions immediately demonstrated the expanding role of politics in emergency response. The question of who owns the skies was difficult, and perhaps impossible, to answer to everyone's satisfaction. National sovereignty; professional, sociocultural, and personal turf battles; and electoral campaigns were exposed as impediments to daily commercial aviation operations, planning for emergencies, and the implementation and evaluation of emergency plans.
exposing people to disinhibiting stimuli, rendering terrorism and inappropriate counterterrorism more likely.

**Public Relations**

All foreign policy tools—military, diplomatic, economic, social, cultural, and humanitarian—should be used to improve international perceptions of the United States, so that fewer people engage in or support terrorism. With globalization, an increasing number of information sources compete for attention, so that actual threats may be ignored or discounted.

Many people, at least within the United States, expect 100 percent safety and security. Many will not tolerate casualties or terrorist attempts and seem to expect a perfect imperviousness to threats. Despite the low frequency and small objective consequences of previous terrorism, the subjective psychological consequences have been much larger and longer-lasting. This psychology makes the United States a lucrative target and increases the probability of terrorist success—because objective success and objective failure both qualify as subjective success.

A more mature perspective on reality, the meaning of life, and the nature of risk is needed. Globalization may help by facilitating an understanding that significant risk is omnipresent, even as it varies from place to place and moment to moment.

**Psychological Warfare**

Terrorism is ultimately psychological, and the war against terrorism, a specific warfare technique, is actually a global psychological war. The conflict is with ever-changing groupings of people who have used and are willing to use extraordinary violence to create a world that tolerates certain ways of living but not others.

Antiterrorism and counterterrorism may identify, apprehend, incarcerate, and terminate many terrorists but may create as many—if not more—terrorists, because of the way these actions are communicated. Aviation security is only a part of the global psychological war, in which the victors and vanquished may not be people, but the ideas they carry.

The same applies to the short- to long-term health effects of contact with volcanic debris and its sequelae—although this knowledge has advanced further than attempts to identify the health effects of the inhalation of, or physical exposure to, debris during the 1989–1990 Persian Gulf War, the 2003 invasion of Iraq, or the September 11, 2001, attacks on the World Trade Center.

In addition, more work is needed in operations research for aircraft, intermodal transport, passenger, cargo, and support logistics, particularly the development of mathematical models. More adaptive, quantitative approaches are needed for modeling revenue and cost projections, including insurance risk.

The more that globalization fosters a global village—even one with variations in the permeability of boundaries—the more applied mathematics can inform subjective judgment.

**Security Implications**

In a world of globalization, nearly every transportation event and the response to it have security implications. In effect, the world has become a research laboratory for criminals, including those who practice terrorism. Like daily security violations, a natural disaster precipitates a response that those who seek to harm the transportation system can easily study. Not only can the response to an event be studied to help predict and exploit a countercriminal response, but the event itself and the response can serve as an ideal time for criminal behavior. An example is the terrorist tactic of causing one explosion and then timing another to hit the first responders and any gathered observers. Another is the worldwide sharing of suicide terrorist tactics against transportation on land, sea, and in the air.

The increasingly sophisticated cybersecurity challenge exacerbates the challenge to live, work, plan, and respond as if always being observed and analyzed for the next attack.