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# Aviation Security: The Human Element in Human Factors

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Abstract. This article describes aspects of social and political human functioning that are germane to security violations discovered by representatives of the Federal Aviation Agency (FAA) in tests at various United States (U.S.) airports. FAA reports on the violations were obtained by The New York Times through the U.S. Freedom of Information Act and discussed in the Times' January 11th Issue.

Human factors research on aviation security seems to most often focus on psychophysical and artificial intelligence-based cognitive aspects of the human-machine interface. Questions are asked and answered such as the following: What are the optimal degrees of brightness for an x-ray screen monitor in various environments to minimize "eye fatigue" and related misperception of and inattention to stimuli through time? What are the optimal values of frequency and amplitude for specific sounds in specific environments to maximize these sounds' detection? How can one best define information overload so that accurate and efficient information processing through heuristics can best occur during detection tasks?

Such psychophysical and cognitive aspects have been and continue to be significant to aviation security. Research on them should continue. However, if The New York Times reporting on FAA tests of security at U.S. airports are to be believed, there is a human element of human factors--the social and political aspects--that needs to be much more frequently and intensively addressed through basic and applied research, in FAA testing, and in airline security management.

For example, airline personnel at ticketing counters and at security checkpoints are required to be courteous to customers, to avoid--if possible-- "bothering" or "hassling" people, and to expedite processing so flights can leave on time. How are inevitable tradeoffs among such requirements made, and how should they be made busy professionals in the heat of their work shifts? How should they be made so that security concerns are given proper and necessary import on the one hand, but do not sabotage the business interests of the airlines and the professional and personal agendas of customers on the other?

According to FAA findings, decisions are sometimes made so that people carrying guns that have been set off detector devices are still allowed to proceed to their gates for boarding. (Of course the security personnel is almost always aware that a detector "goes off" and must determine a plan of action based on heuristics about false alarms set off by detector malfunction and miscalibration, true alarms set off by innocuous objects, and true alarms set off by objects that are anything but innocuous in the context of competing job requirements.) Seemingly irrational questions about when a package to be checked in was given to a passenger by a stranger are used to allow the passenger to proceed. (How can this matter unless a weapon has the half-life of a fleeting moment?) Security personnel are seemingly given great latitude in interpreting the social meaning and import of detected stimuli on x-ray screens--e.g., a grenade is socially perceived as a compact makeup case in a response set that can be exploited in rogue military aid programs wherein grenades may be inventoried as door stops.)

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As another example of more interpersonal concern, a male security officer failed to find a gun concealed under the clothes of a female passenger--actually a tester working with the FAA. In an after-action assessment, it seems to have turned out that the security officer had inadvertently physically touched the woman's chest with his hand wand. Allegedly, this made him very self-conscious about avoiding touching the woman again. To this end, he held the hand wand farther away from the woman's body than prescribed by operating procedure--thereby ensuring the gun would not be detected. Whether it happened this way or not, this would seem to be an example of a litigious, highly-sensitive, anti-sexual harassment environment leading to the threat or employment of criminal lethal force.

The future of human factors research supporting aviation security needs to take two pathways: the psychophysical and artificial intelligence-based cognitive on the one hand, the social and political on the other. Interestingly, these are also the two routes competent criminals take in attempting to violate aviation security. And one final point. The headline of the Times article is "Tests Show Holes in Airline Security." Researchers, policymakers, security personnel, and the general public need to remember that there are always holes in security. These holes should not necessarily be used to attack competent and well-meaning professionals doing their job. Instead, ongoing decisions need to be made about what kinds of holes can be tolerated given existing assets and the security threat. The failure to make this case is a hole in the Times article about aviation security. (See Airport Security and Passenger Profiling: Issues of Substantive, Procedural, and Distributive Justice. (October 16, 1998). IBPP, 5(16); Civil Aviation Security: Federal Aviation Agency. http://cas.faa.gov; Wald, M.L. (January 11, 1999). Tests show holes in airline security. The New York Times, pp. A1; A13; Critiquing Critiques of Profiling in Aviation Security Screening Programs: Why the ACLU Has It Wrong. (January 9, 1998). IBPP, 4(1); How Standards and Accountability Lead to Safety and Security Violations at Nuclear Weapons Plants. (April 3, 1998). IBPP, 4(13).) (Keywords: Aviation Security, Human Factors.)

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