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Greetings AVweb Readers!

Imagine, sometime in the future, you are rushing to catch an airline flight after a busy, successful out of town meeting. Apparently being the last one through the gate, you hurriedly enter the aircraft, and are greeted as usual by a smiling flight attendant. Glancing into the empty cockpit, you sigh in relief and state, "Well, at least I'm not as late as the pilots!" The flight attendant, now with a cheek-high smile replies, "Oh, we're ready to go…this flight is now totally automated! This should have been mentioned when you booked your ticket..."

Standing in astonishment, and momentarily incapacitated by a flurry of thoughts ranging from amazement to fear, you realize a quick decision is in order. Do you do a one-eighty, refusing to board the aircraft? Do you pause, return the smile, and casually continue to your seat, wondering if a refreshment robot will offer you a coffee?

Hypothetics aside, what factors really would be important to you in making the decision…to fly or not to fly on an unmanned, autonomous airliner?

This question is being studied at Saint Louis University by Matt Vance, a doctoral candidate in Aviation Science, working with his research advisor, Arif Malik.

To try and understand what factors would be important in the decision whether to fly or not aboard an unmanned, autonomous airliner, Vance first reviewed the "psychology of trust" literature for relevant factors that influence human acceptance of technology. He then compiled five trust related factors, two safety of flight factors, and one ticket price factor into a series of hypothetical scenarios set in the future (let's call them "vignettes"). Each of the eight decision-related factors was set at a high and a low level, resulting in 16 unique variations of the vignette. A particular vignette version was then randomly presented to the 1,506 participants in the detailed survey. 355 participants were AVweb readers responding to a posting of the survey link last October. The other participants included aviation and non-aviation related professionals, engineers, pilots, college students, and many frequent flyers with diverse backgrounds.

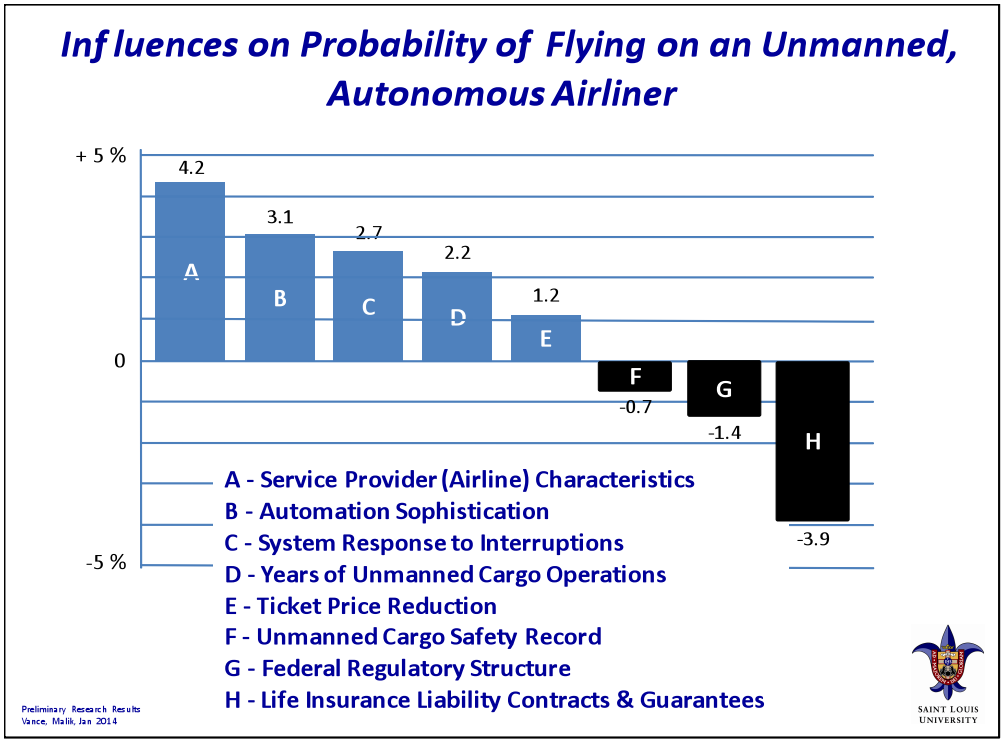
The eight survey factors studied include:

- A - Service Provider (Airline) Characteristics
- B - Automation Sophistication
- C - System Response to Interruptions
- D - Years of Unmanned Cargo Operations
- E - Ticket Price Reduction
- F - Unmanned Cargo Safety Record
- G - Federal Regulatory Structure
- H - Life Insurance Liability Contracts & Guarantees

In an opening question of the survey, before reading their vignettes, 29% of the respondents indicated greater than 50% probability that they would fly aboard an unmanned, autonomous commercial aircraft. This 29% therefore represents the willingness to fly given today's level of trust, knowledge, and acceptance of the idea. This statistic is significantly greater than that from a 2003 research survey by McSween-George, which indicated a 10.5% 'yes' response to the question, "Would you personally fly in an automated (unmanned) aircraft?"

After reading the vignettes in the current survey, respondents indicated a greater willingness to fly, but at very different levels. The researchers found that perceived quality and integrity of service provided by an airline was the largest positive influence on the decision to fly. On the other hand, generous life insurance and financial liability guarantees were universally de-valued by respondents – perhaps because respondents associated the offer of large financial guarantees with high risk.

Both Bayesian Statistical Inference methods and a Design-of-Experiments factorial statistical analysis produced very similar results when applied to analyze the survey data. The figure below shows the main effects of the eight decision factors on the probability that a survey respondent would be willing to fly. For example, factor A - *Service Provider (Airline) Characteristics*, increased the probability by 4.2%. Conversely, factor H - *Life Insurance Liability Contracts & Guarantees* reduced a survey respondent's willingness to fly by 3.9%. Given the large sample size, and the gravity of such a decision, these numbers could be very important.



The demographics of those surveyed showed that younger respondents were more willing to fly than the older respondents. Also, those with less airline travel experience were more willing to

fly. Curiously, four-year college graduates seemed more reluctant to fly than those with either more or less education. The typical AVweb respondent was older than the average respondent, and indicated less frequent airline travel, and was less inclined to fly aboard a fully-automated, unmanned airliner.

An unanticipated and potentially significant result appeared in the comments that survey participants were asked to provide. While the most negative comments regarding fully autonomous airliners came from airline pilots themselves, the most positive comments also came from airline pilots. In effect, airline pilots may see the idea as either a threat to their livelihoods, or as an inevitable and promising technology that could further reduce human error.

These social-science survey results could be an important step in strategic planning for future markets, and in deciding whether to continue pushing the frontiers of automation technology in passenger airline travel. Fully-automated transportation may be coming faster than we can imagine. Indeed, Google has already demonstrated the technology to fully automate cars. Semi-Trucks, trains and ships could be the next logical choice, perhaps with cargo aircraft very close behind.

This article presents preliminary research findings, shared exclusively with AVweb. Later this year, Vance and Malik expect to publish detailed results of their work, including analysis of possible complex interactions between the decision factors.

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