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Is Paper Safer? The Role of Paper Flight Strips in Air Traffic Control - Wendy E. Mackay

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The air traffic controllers use two key artifacts for their work: Radar to know positions of the aircrafts at any given time and paper flight strips to track and modify flights. While tremendous improvements to radar systems have been readily accepted by the controller community, almost all efforts to replace the flight strips have been resisted strongly and reasonably. The people working to modernize air traffic control systems are thus facing a dilemma: continuing with the strips, which will result in limited air traffic and high cost; or replacing the strips for high efficiency with the unknown risks that follow a radical change.

Mackay et al. observed and analyzed the role of paper flight strips in air traffic control, and provided suggestions to reach a solution for this dilemma. A four-month long ethnographic study of an air traffic controller team was undertaken with a special attention to co-operative activities like two controllers working with a single flight strip. The interpretation of the work was verified with the controllers. Along with the presumable advantages like flexibility and use of tactile memory, the flight strips were also found to provide many intangible safety benefits. This study was followed by a comparative study of multiple air traffic control centers in order to find out the common aspects as well as the cultural differences that affect the work style.

In the design of air traffic control systems, safety remains the highest priority. It is important to identify and measure features of the paper-based system like support for safety and flexibility that is unimaginable with traditional computer-based interfaces. The researchers conclude that the flight strips are extremely safe, efficient, and with a lot of intangible helping factors; mainly because they have evolved over past half-century. Any effort to radically replace this system by a traditional 'keyboard-mouse-monitor' computer system is likely to fail. The researchers propose augmented reality as the optimum approach to modernize current state of the system. It will make full use of existing work practices while gradually accommodating new functionality.