Pilot/Controller Coordinated Decision Making in the Next Generation Air Transportation System

Chris Bearman, Ph.D.[1,2], Ronald Miller.[3], and Judith Orasanu, Ph.D.[4]

[1]SJSU/NASA Ames Research Center, [2]UniSA, [3]Dell/NASA Ames Research Center, [4]NASA Ames Research Center,

Introduction:

•NextGen technologies promises to enhance operations and improve safety in the US National Airspace System.

•Five of these NextGen technologies are:
 •ADS-B,
 •System-wide information management (SWIM)
 •Data communications
 •NextGen Network Enabled Weather (NNEW)
 •NAS Voice Switch

•Human factors evaluation in this study focuses on how pilot and controllers share information.

•We are particularly interested in the potential for breakdowns in coordinated decision making (Bearman, Paletz, Orasanu & Thomas, 2009).

Method:

•The five key technologies of NextGen were identified from FAA documents that specified critical components that need to be in place for NextGen to work effectively.

•A technical expert presented key aspects of the technologies to a panel of human factors experts

•The panel consisted of 4 experts in human factors who ranged from 6 to 26 years of experience.

•There were five panel group sessions in total (one technology per session), with each session lasting for approximately one hour.

Results:

Issues that were identified were:

•Decision Making will not necessarily improve just because pilots and controllers possess the same information

•Having a common information source does not mean pilots and controllers are looking at the same information

•High levels of automation may lead to disconnects between the technology and pilots/controllers

•Common information sources may become the definitive source for information

•Overconfidence in the automation may lead to situations where appropriate breakdowns are not initiated

Discussion:

•Pilots and controllers need to be able to communicate information about their current mental model.

•Pilots and controllers should not assume that a common information source will always be the basis for decisions
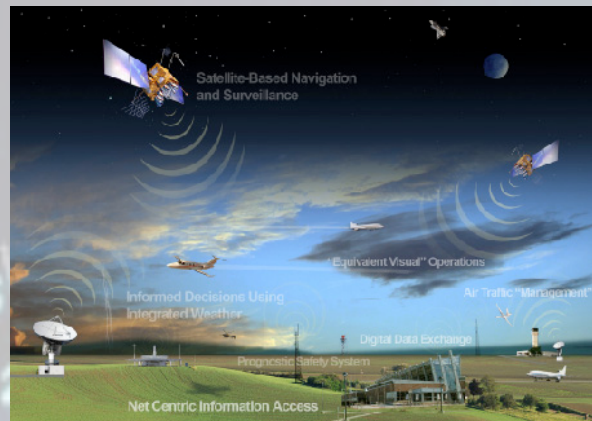
•Pilots and controllers need to access information about the basis for a decision

•Pilots and controllers need to have the tools to appropriately deal with perturbations to the system

•New technology should be considered as a new team member who needs to communicate effectively and be clear about how they are functioning

•More research needs to be conducted as the technologies develop and are integrated into the flight deck and control rooms

•The current state of development of these technologies provides a good opportunity to utilize recommendations at an early stage

Acknowledgements