

An Investigation into the Use of Novel Conflict Detection and Resolution Automation in Air Traffic Management

Clark Borst, Carl Westin, and Brian Hilburn

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Multidimensional Framework for Advanced SESAR Automation (MUFASA)



HALA! SESAR Research Network



Future air traffic management will have to rely on more, and more sophisticated, automation.



But what would it take for air traffic controllers to accept and trust a machine?



Would you accept and trust a machine to raise your kids?



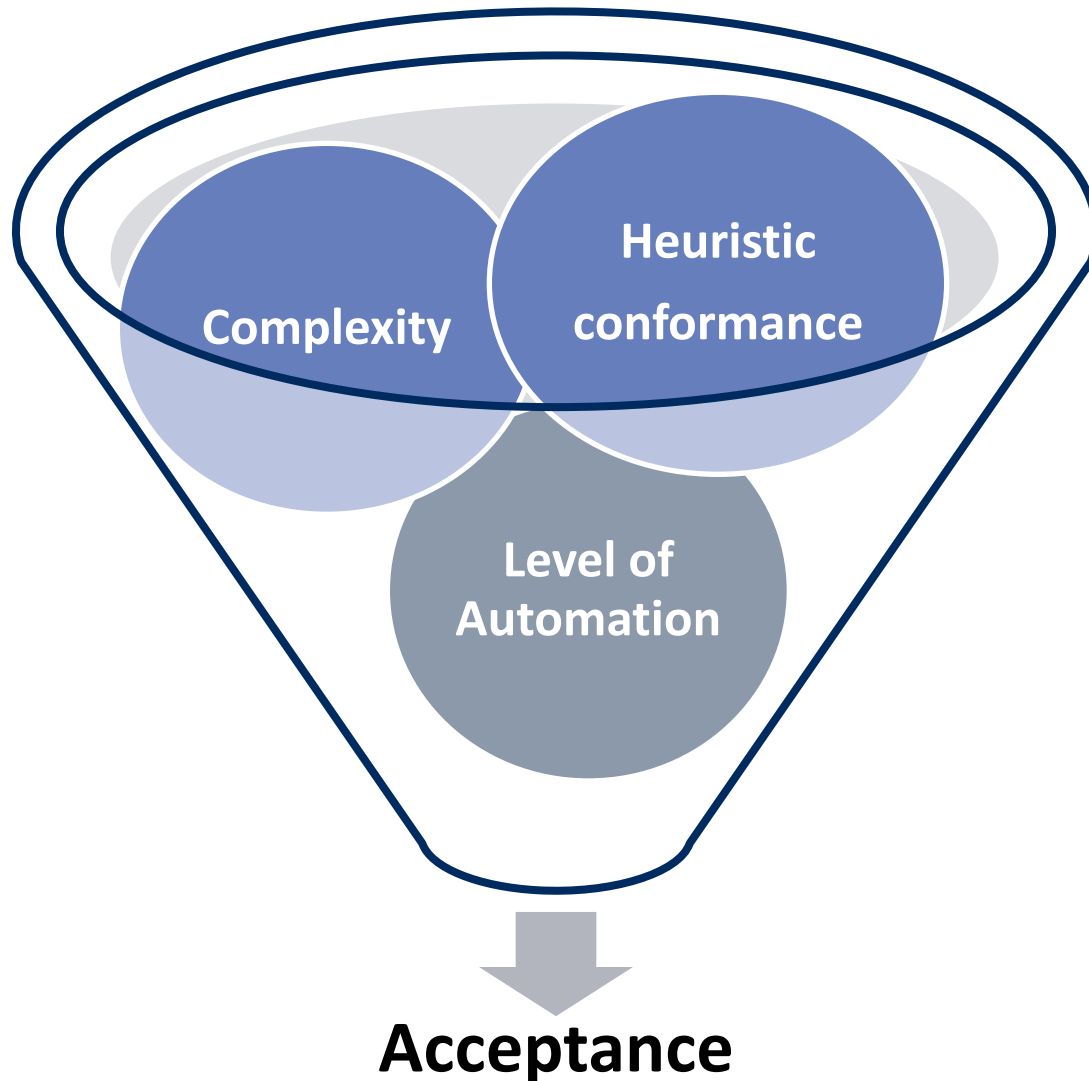
Should the machine act more human-like or *exactly like you* to earn your trust and acceptance?



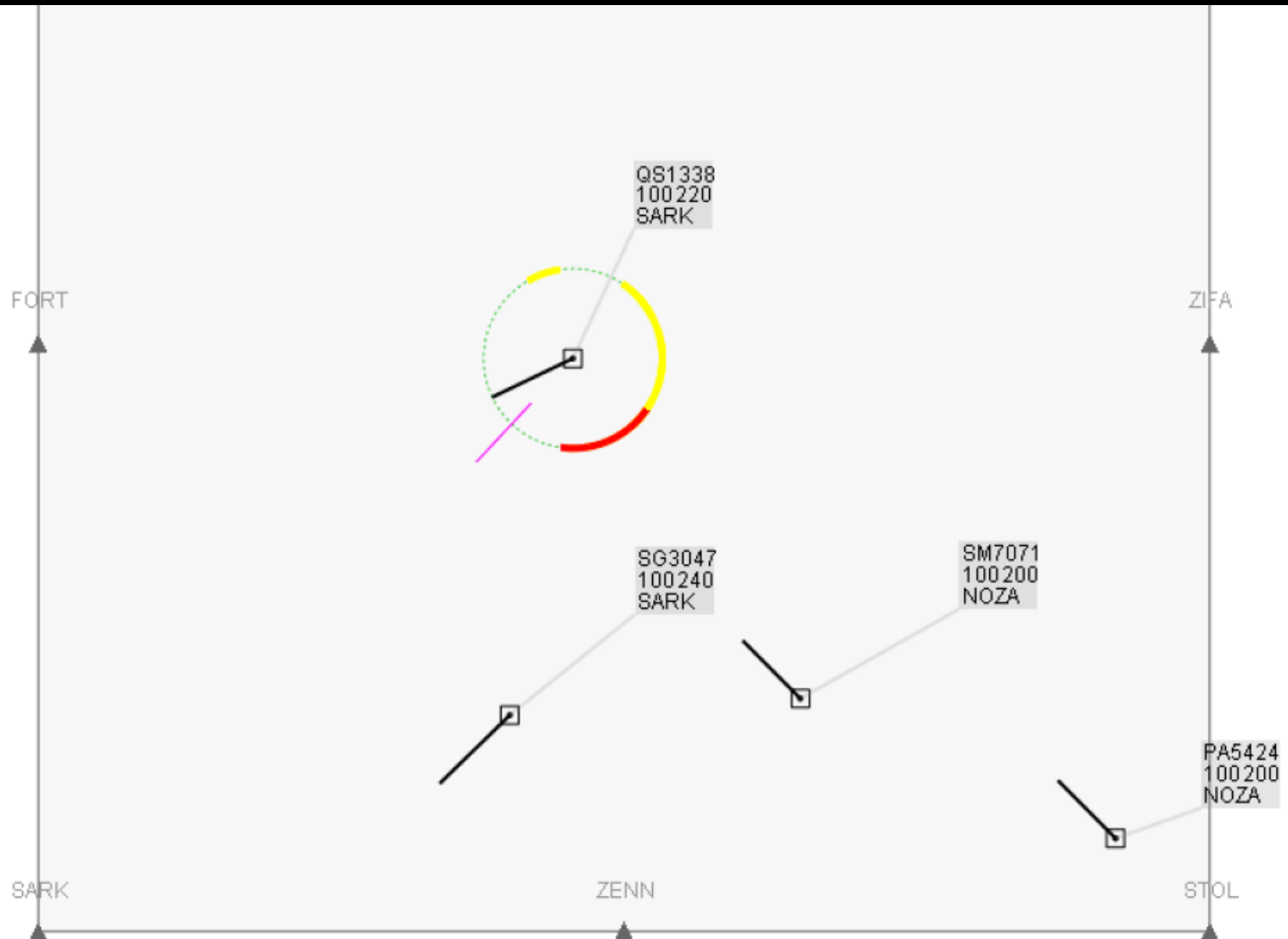
Is heuristic conformance still relevant when work is complex?



MUFASA explores the interacting effects of heuristic conformance, complexity, and level of automation.



MUFASA explores these effects through human-in-the-loop simulations with the novel Solution Space Diagram (SSD).



The MUFASA project undertakes a 3-step approach to investigate heuristic conformance.

Prequel:

record manual
SSD interaction

Analysis:

Extract resolution
vectors

Replay:

Replay vectors as
machine advisories

This presentation reveals the *Prequel* results of an exploratory experiment between aerospace students and retired air traffic controllers.


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graph LR; A[Prequel: record manual SSD interaction] --> B[Analysis: Extract resolution vectors]; B --> C[Replay: Replay vectors as machine advisories];
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Prequel:

record manual
SSD interaction

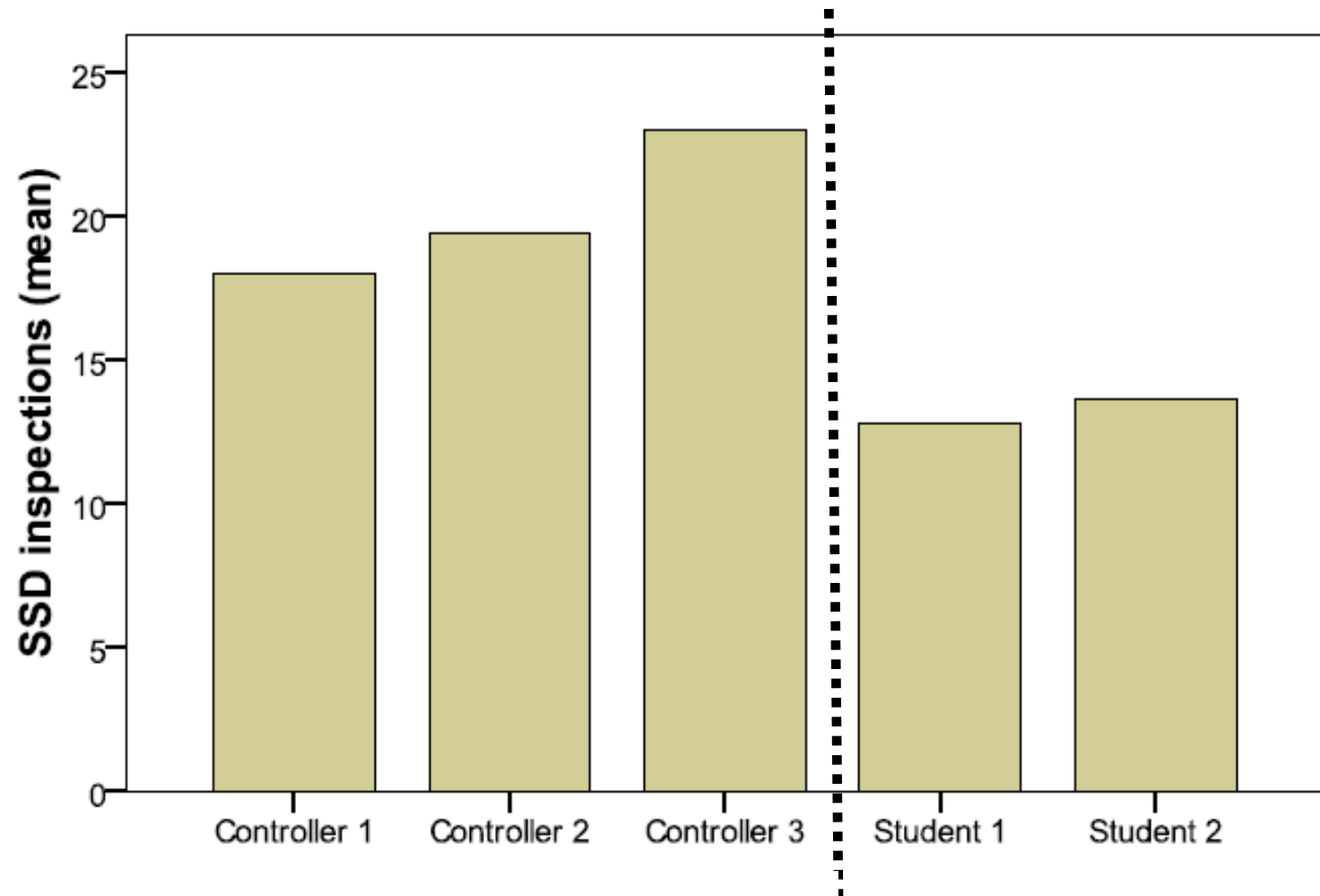
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Extract resolution
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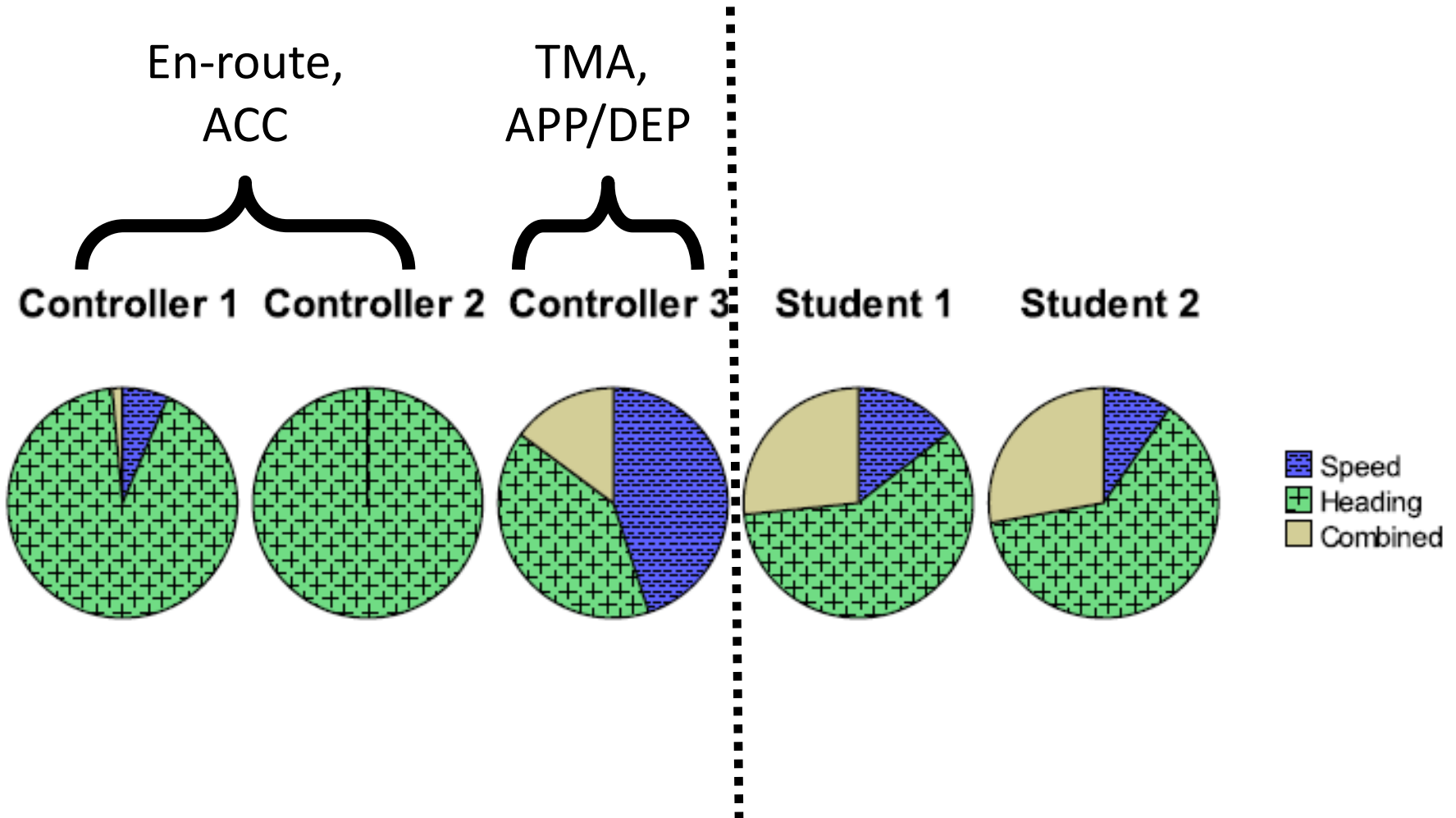
Replay:

Replay vectors as
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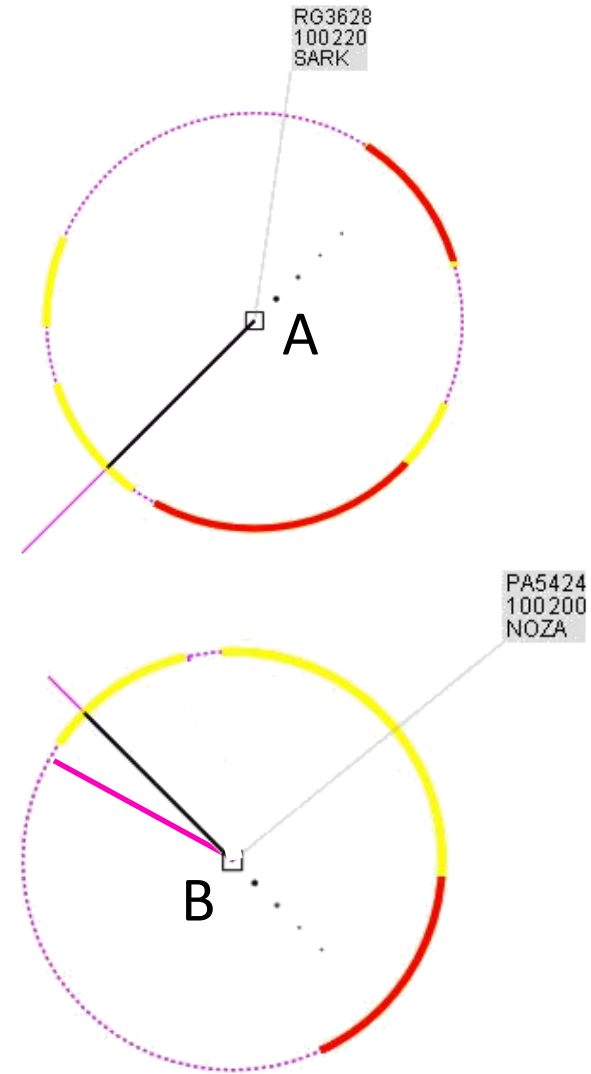
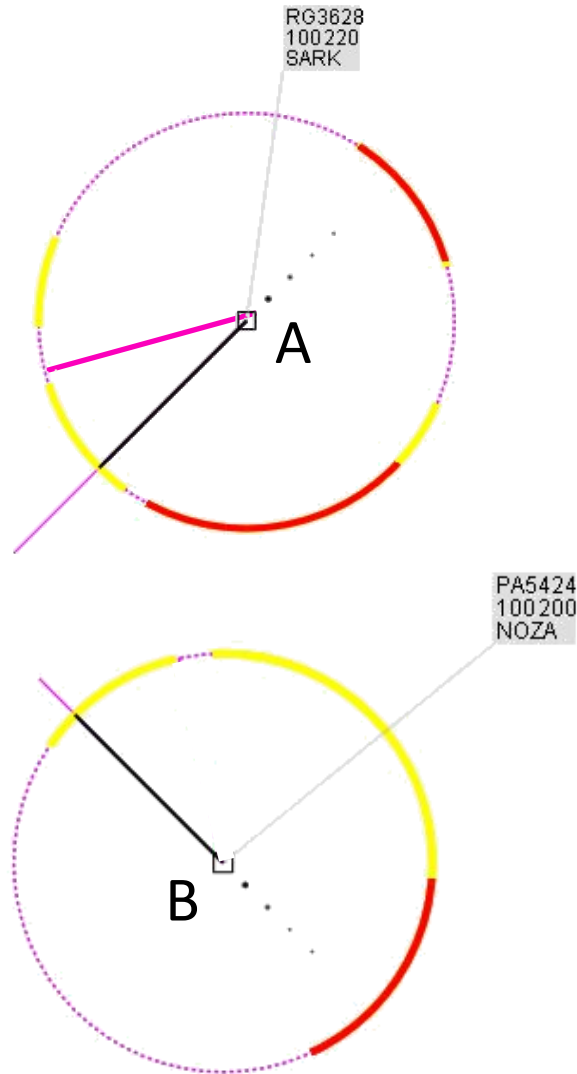
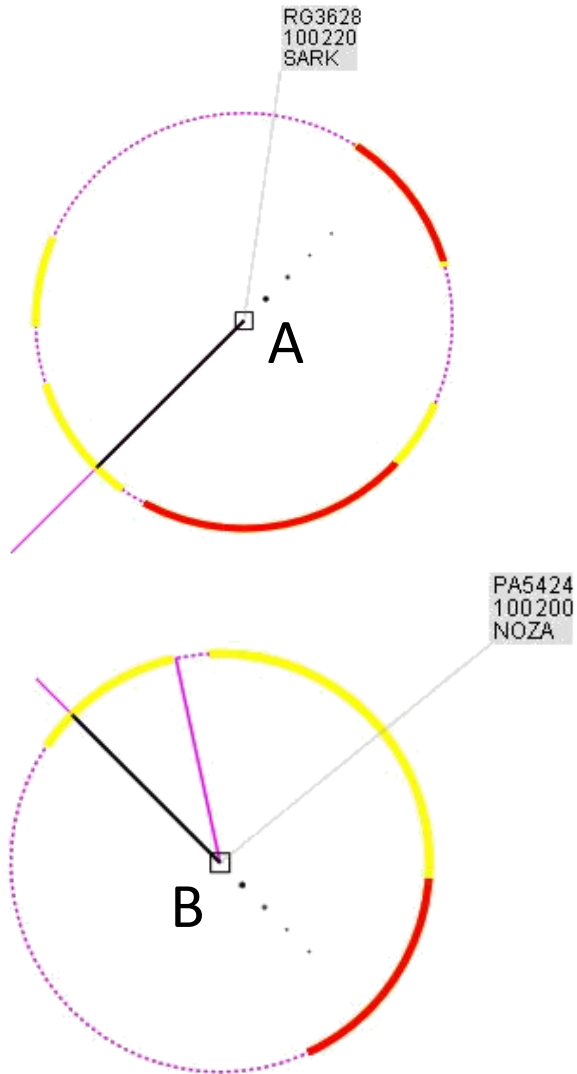
Controllers inspected the SSD of aircraft more frequently than the aerospace students.



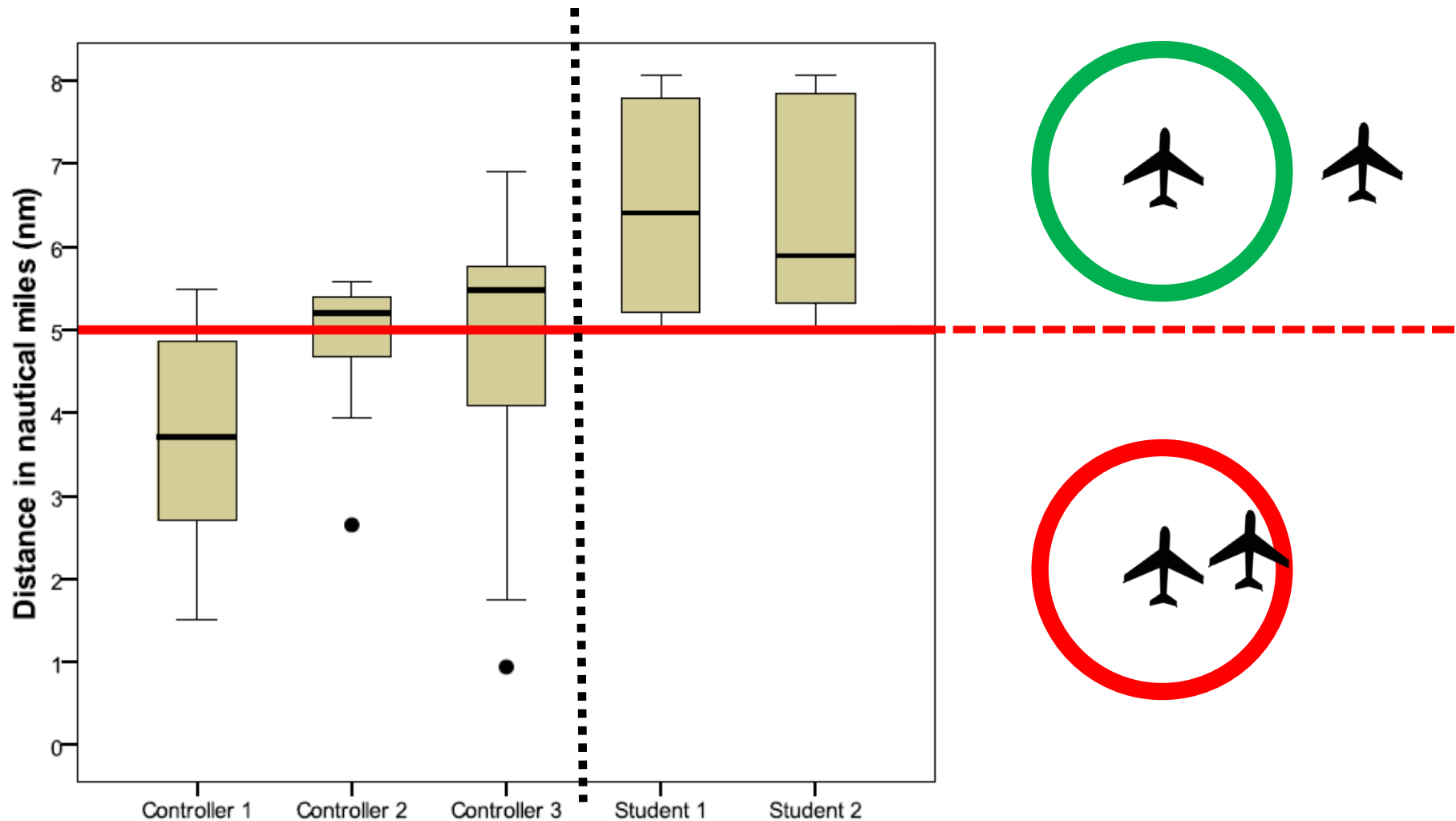
Controllers used much less combined speed and heading clearances than students.



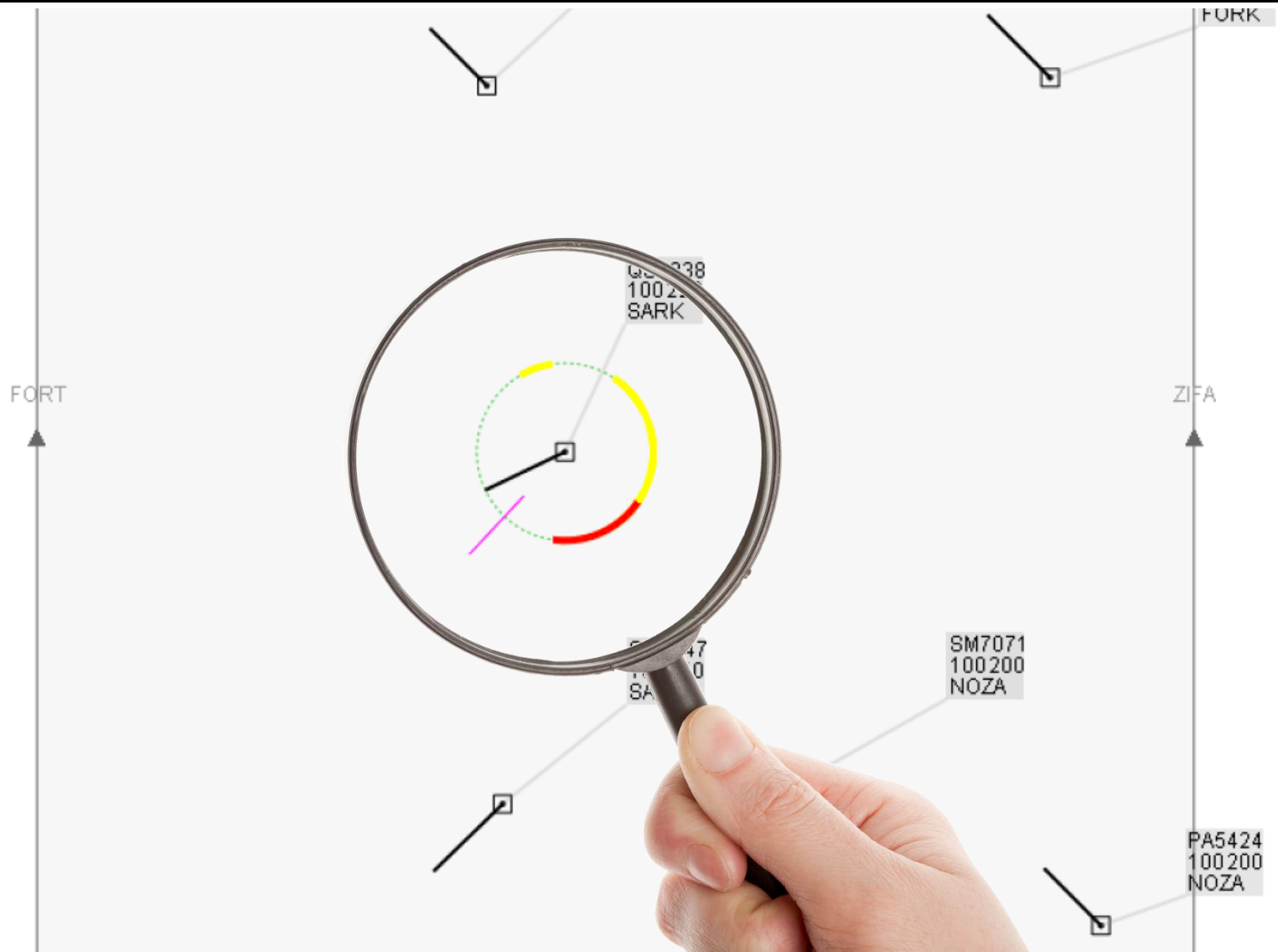
Although controllers issued mostly heading clearances, there was still a variety in those clearances.



Surprisingly, students outperformed the controllers in terms of preventing losses of separation.



The debrief revealed that the controllers were sceptical about the SSD and used their own judgment in conflict management.



The full MUFASA conformance study with (young) professional controllers is scheduled for February 2013 at Shannon ACC.



Need more information about MUFASA?



<http://www.chpr.nl/mufasa.htm>

<http://www.hala-sesar.net/mufasa>



Dr. Brian Hilburn – brian@chpr.nl



Dr. Clark Borst – c.borst@tudelft.nl