



Figure 3: The number of unaccepted handoff and unresolved collision events compared to total cognitive load.

studies relied on HITL simulations which cannot scale to whole NAS scenarios. This paper also presented the validation process used to evaluate AGENTFLY that utilized common software engineering techniques to derive goal-based metrics and produced results which accurately describe the performance and effectiveness of the system. Through these results we also demonstrated that agents reactions mimic human ATCs when under the same scenario and cognitive load.

In the future, we will compare the quality of the simulation against real human operation on the same sector in cooperation with FAA Human Factors Laboratory. Additionally, the system will be extended with other crucial roles in the current ATM system. For example, the inclusion of D-side controller activities to provide higher fidelity simulations during peak travel periods. It is also planned, to integrate other ATM tools used by controllers like tactical ERAM conflict probe and strategic conflict probe (*e.g.*, User Request Evaluation Tool). The system is able to model precisely en-route ATM control now, but the goal is to extend the coverage of the functionality through Terminal Control Centers to Airport operations. This would allow the system to simulate the gate-to-gate ATM cycle.

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