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MOVES Software Package Helps LSOs Track Pilot Performance

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MOVES Software Package Helps LSOs Track Pilot Performance

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Article By: *Amanda D. Stein*

Researchers at the Naval Postgraduate School's Modeling, Virtual Environments and Simulation (MOVES) Institute have developed a prototype system to support Landing Signal Officers (LSOs), the men and women responsible for the safe and expeditious landing of aircrafts on the Navy's fleet of carriers.

In a research and development project funded by the Office of Naval Research, the MOVES team of Drs. Michael McCauley and Mathias Kolsch, and Systems Engineering student Lt. Michael Ross, has spent the last year developing the four components of the LSO's pilot performance tracking system, called iPARTS, that will gather data on pilot carrier landing performance into a fleet-wide data collection system. Currently, a manual-entry logbook is used to track that data.

"iPARTS is superior to the current pilot performance tracking system in that it aggregates data from across the fleet to provide top-down visibility to carrier aviation safety across all carrier wings and squadrons in the Navy, enabling resource allocation decisions to be made using quantitative data instead of intuition," explained Ross. "Additionally, we provide enhanced trend analysis tools which help LSOs to identify pilot performance deficiencies earlier than is possible with the current software in use."

The iPARTS system includes a handheld computer, which LSOs can use to collect landing data on the carrier flight deck, a laptop application to analyze pilot trends, a video-recording module to document landings, and an Oracle database to accumulate the pilot performance records from all aircraft carriers and practice landing fields.

Part of the excitement surrounding iPARTS comes from the custom graphic user interface that MOVES Institute has developed for the flight deck handheld device. Especially during high workload evolutions such as Carrier Qualifications for new pilots, LSOs have their hands full providing timely and accurate feedback to pilots in order to prevent catastrophe.

In addition to this critical safety task, in the training environment, the LSOs must also track pilot performance, calculate real-time grade point averages and boarding rates, and make quick decisions as to whether or not to halt a student's progress based on their trends. Currently, all of these tasks are being done by hand.

"The system we developed directly supports Naval Aviation, one of the Navy's core capabilities, in particular, the safe recovery of pilots and aircraft onboard aircraft carriers," explained Kolsch. "It improves the workflow of the LSOs and automates several mundane and repetitive tasks during recovery and debriefing. It also gives LSOs more information at hand and eliminates the need for error-prone calculations by hand. The collected data is the basis for many decisions affecting pilot qualifications and air wing readiness and safety, ultimately helping safer and more expeditious aircraft recovery.

"We carefully selected available technologies to have the flexibility to custom-tailor our solution specifically for the LSOs and for the difficult working environment on the flight deck of an aircraft carrier" Kolsch continued. "These technologies also permitted rapid development and the integration of state-of-the-art methods for video processing."

The iPARTS handheld device streamlines the LSOs tasks by automatically providing them with the information they need to make real-time decisions on the flight deck and then automatically archives the data they collect to a centralized server along with similar data from across the fleet.

"We have developed an innovative tablet-based interface allowing collection of pilot performance data directly from the LSO platform on the flight deck," Ross continued. "Aside from removing the need to transcribe this data from a paper logbook in a separate step, the tablet provides LSOs a real-time tracking and analysis capability that will enhance the safety and success rate of Carrier Qualification operations."

The MOVES team recently spent four days aboard the USS Eisenhower to test their software and accompanying hardware, during Carrier Qualification Operations for Fleet Replacement Squadron pilots. For Ross, this endeavor has been an extracurricular research project, and he noted the value of being able to apply his experience as an LSO and a research student to finding solutions to current challenges.

"I'm extremely grateful for the opportunity to work alongside some exceptional faculty members at NPS to help develop a solution to a problem I saw as a Landing Signal Officer in the fleet," explained Ross. "It has been a tremendous experience to take what I am learning as a Systems Engineering student and apply it in real-time to an ONR-funded development project that has the potential to have a significant impact on the LSO community."

According to McCauley, one of the key elements in this project was the principle of "user-centered design." LSOs from Naval Air Station (NAS) Lemoore, NAS Oceana, NAS Norfolk, and other locations participated in evaluation of prototypes in an iterative design and review process. Ross served not only as a subject matter expert, but also as a point of contact and communication link with the LSO community. The close relationship between the NPS design team and the user community was essential for the success of the MOVES project.

"Lt. Ross exceeded normal expectations in investigating, and more importantly, delivering second and third iterations of the iPARTS program," noted Cmdr. Robert Wedertz, the Officer in Charge of the LSO School. "The capabilities of the program expanded beyond those that were delineated in the Request for Proposal. Lt. Ross and the NPS team accomplished this, not because it was required technically, but because they recognized that those capabilities would benefit the end user – the fleet."



Landing Signal Officers aboard the USS Eisenhower test the pilot performance tracking system developed by researchers in NPS' MOVES Institute.



The MOVES Institute's Dr. Michael McCauley, far left, stands beside Stephanie Everett of the Office of Naval Research, and Dr. Mathias Kolsch, also of MOVES, during their visit to the USS Eisenhower to test the iPARTS software in the fleet.

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