

The UAS-NAS Project demo will showcase recent research efforts to ensure the interoperability between proposed UAS detect and avoid (DAA) human machine interface requirements (developed within RTCA SC-228) and existing collision avoidance displays. Attendees will be able to view the current state of the art of the DAA pilot traffic, alerting and guidance displays integrated with Traffic advisory and Collision Avoidance (TCAS) II in the UAS-NAS Project's research UAS ground control station (developed in partnership with the Air Force Research Laboratory). In addition, attendees will have the opportunity to interact with the research UAS ground control station and "fly" encounters, using the DAA and TCAS II displays to avoid simulated aircraft. The display of the advisories will be hosted on a laptop with an external 30" monitor, running the Vigilant Spirit system. DAA advisories will be generated by the JADEM software tool, connected to the system via the LVC Gateway. A repeater of the primary flight display will be shown on a 55" monitor mounted on a stand at the back of the booth to show the pilot interaction to the passersby.



➤ Demonstration Features

- Computer and monitor (30”) providing an integrated Primary Flight Display (PFD)
 - Display will be the Vigilant Spirit PFD used in Project simulations and flight tests
 - Overhead repeater of the PFD on large (approx. 55”) monitor planned to show display to passersby
- Scenarios will be run that demonstrate an Unmanned aircraft flying in the Oakland Center airspace with a scripted encounter with a virtual manned aircraft
 - Several one-on-one encounter scenarios will be scripted
- Sense and Avoid algorithms will be run to provide maneuver advisories to the “pilot” to maintain separation of the aircraft
 - Detect and Avoid algorithm: JADEM
 - Collision Avoidance algorithm: TCAS II
- Attendees will be given the opportunity to play the role of the pilot
- See the following two slides for a mock-up of the booth and a graphic of the pilot display

NASA Langley

Booth 625

Booth 627

Subproject
Pop-up

Overhead Monitor on Stand

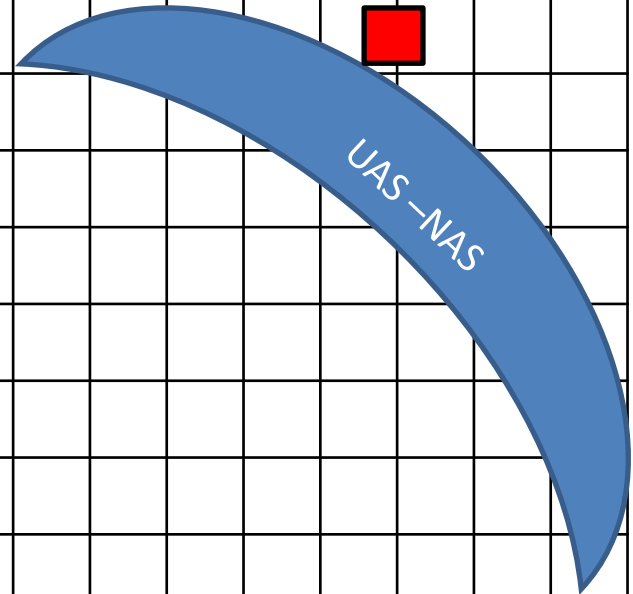
Chair

Chair

Table with display

Handouts

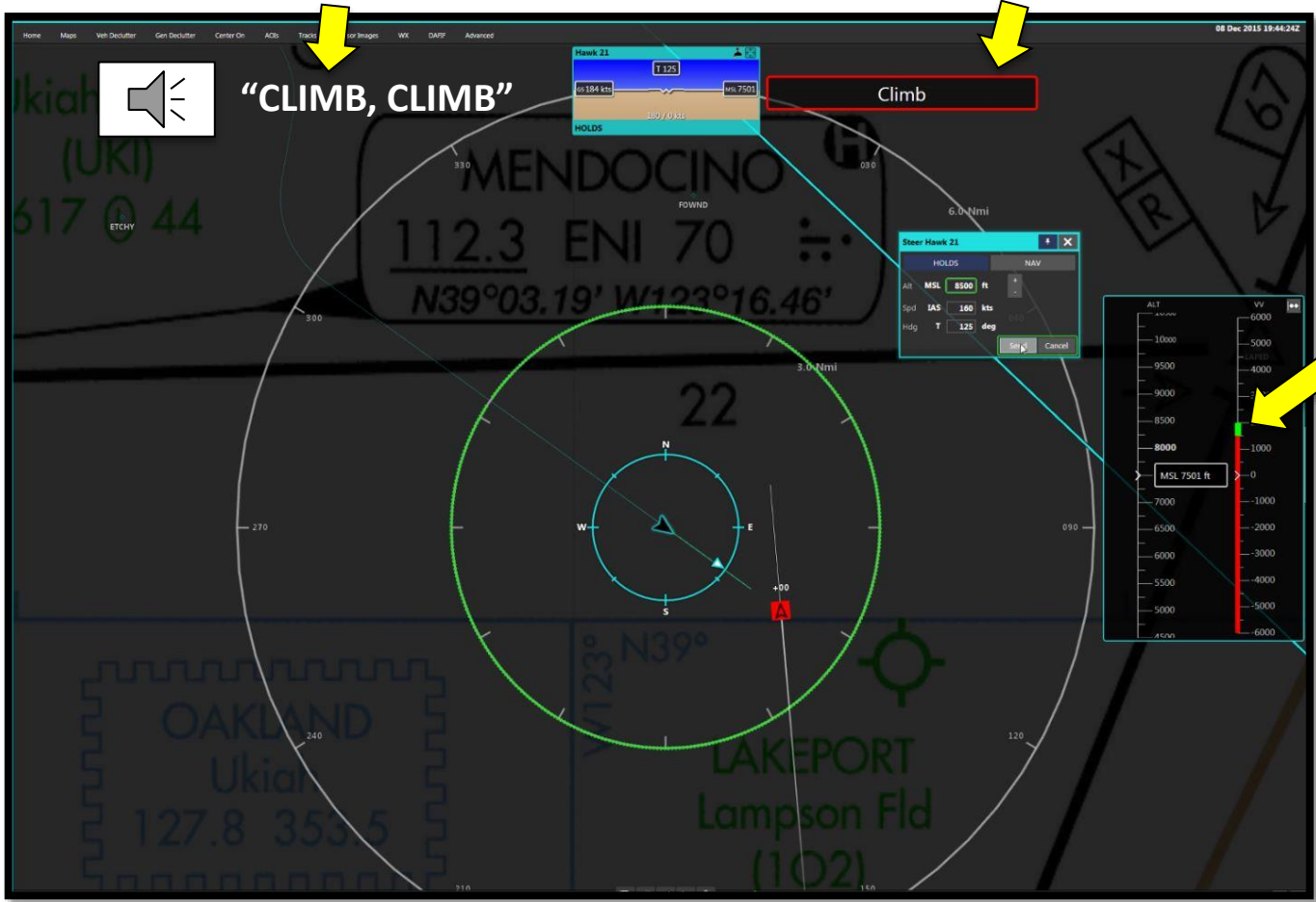
UAS-NAS



Display Graphic



- Auditory Alert
 - RA sense presented aurally (source: TCAS II v7.1)
- Text Based
 - RA sense shown in text box next to Baseball Card



- Vertical Rate Guidance
 - Presented within VVI
 - Green = desired vertical speed
 - Red = vertical speed to avoid