

## AAFEX Status Report #2 – 21 January 2009

Primary Activities: Electrical hookup; Rake construction/installation; Tech brief

Weather: Calm, 49 F at 7 am with high overcast. High partial cloud cover for most of the day. Afternoon temperatures near 70 F. A few drops of rain around 10 am. Winds calm, near ideal working conditions.

Summary: Work started around 7 am. All groups were on site with the exception of AFRL; their trailer arrived at 2 pm and was chocked in place by 3 pm, completing the equipment trailer formation off the DC-8 right wing. The site was a beehive of activities and a great deal was accomplished during what turned out to be a 12 hour work day:

- A facility electrician reported to the site around 7 am and was able to affect the power panel wiring changes recommended Roy (AEDC). Power was available to all participants by around 8 am.
- AEDC and MST finished assembling the 1-m sampling rakes; working with DAOF personnel, the rakes were maneuvered into their respective positions, 36 inches behind the center vent tubes of the engines (see photos below).
- Despite the absence of their spiritual leader and engineering guru, John, due to a head cold, the EPA completed installing the 30-m inlet probes and sample lines (see second photo below). Using a highly efficient hammer drill, the team secured the inlet tripod legs to the pad with ½” cement anchors.
- Donnie, Mike, Scott, and Joe (DC-8) continued to provide excellent logistical support, moving bottles, racks, and sampling equipment using their fleet of forklifts and trucks. They also moved a container to the site for equipment storage and provided rides to/from the hanger for the growing number of participants.
- A pair of Port-a-potties were finally delivered around 3 pm and were placed near the 1 and 200 m sampling stations. No more hurried, half-mile trips to the hanger—hurray!
- One of the ARI TDL instruments that was to be deployed in the downstream sampling trailer was badly damaged during shipping and its repair was doubtful. Working in phone consultation with experts back home, Scott and his team straighten out the mangled components and had the instrument resurrected and fully functional by late afternoon.
- AFRL was originally slated to derive power from the AEDC equipment trailer. On inspection, the team determined the 30 A available from AEDC was inadequate for their needs. Thus at 5 pm, power was cut-off on the power skid and the AFRL team wired

their trailer directly to a 100 A single-phase 208 VAC breaker on the skid. Power was restored to all participants at 5:30 pm.

- A technical briefing was held at 2 pm, which involved presenting the experiment plan and potential hazards to the Dryden safety review board. Frank led the discussion and was responsible for responding to the concerns and questions of the board members. The primary hazards that were identified included: 1) impact of low aromatic fuel on engine and fuel system components; 2) potential for alt fuels to give erroneous readings on cockpit sensors (fuel flow, etc.); 3) possibility of engine operating outside specs; 4) danger associated with handling of cryogenics and compressed gases; 5) danger of personnel working around running engines; 6) potential damage or loss of sampling equipment positioned in the engine exhaust. All the hazards were judged to be of low risk. More input was requested from engineering on the stress loads that would be placed on the sample rakes during high power runs, although it was agreed that failure of the rakes would not pose a danger to either personnel or aircraft assets. The panel recommended that night-time operation hazards be assessed and that the fire department be briefed on the time and nature of the engine tests. They also recommended that a readiness review be held prior to the first engine runs and emphasized that MSDS sheets be posted for the fuels and all experimenter chemicals. More documentation on run procedures and checklists was also recommended. A walk-through of the site was conducted afterward the meeting to further educate the panel on the scope and nature of AAFEX. Overall, the panel did not identify any “show-stoppers” and the test is still on track for a Monday, January 26<sup>th</sup> commencement.



The “Tinker” rake that will be used for sampling at 1-m behind the #3 engine.



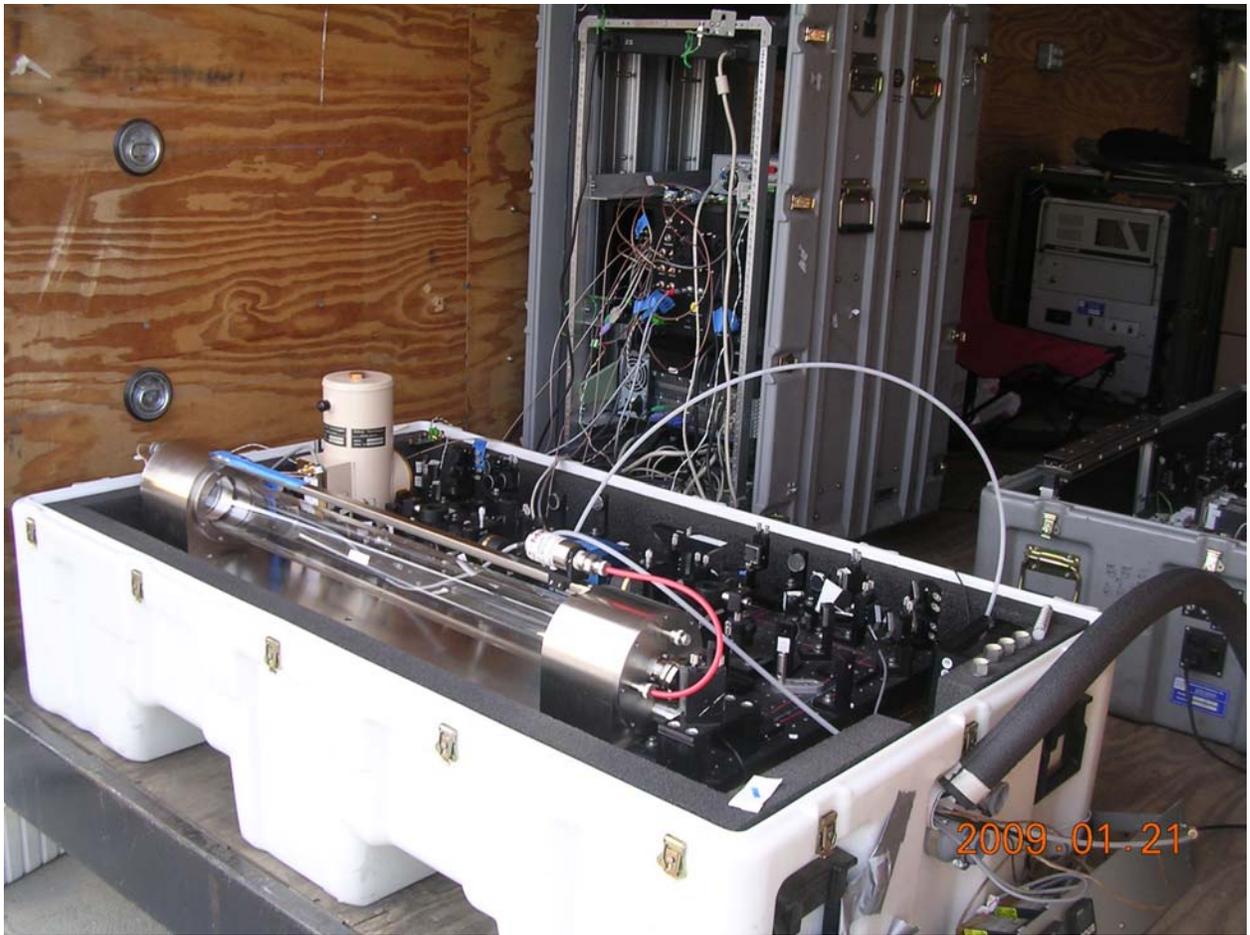
Donny expertly places the Tinker rake behind the DC-8's #3 (right inboard) as Brad provides guidance on positioning.



Steve (MST, holding rake), Robert (AEDC, in ball cap) and Brad (right) assess the 1-m sampling rake position as Dave (UTRC) and Dave (MST) look on.



Russell and Bill of the EPA team complete installing and plumbing the 30-m inlet probes.



ARI TDL system now ready for action in the 200-m sampling trailer.