Current status of the T-PARC P3 installation:

RAF state and wind instrumentation:

All systems are installed and flight tested. The performance are in line with normal expectation as determined from the first two test flights. However, both test flights were done in late afternoon during intense heat conditions. The top of the dry-adiabatic mixed layer was higher than 17.5 kft, and as a consequence the aircraft was flying in too turbulent an airmass to do high-quality calibration maneuvers.

Nevertheless, we are confident of the state of the systems, and we plan to do the final calibration flight for the wind system after the aircraft arrives in Guam. In Guam, the mixed layer is only about 1500 ft deep, and by approx. 6 kft we should be above the trade inversion. We desire to the final maneuvers at about 10 kft, to make the measurements most directly comparable to the anticipated flight altitude.

The maneuvers can be completed in about 2-3 hours, and we have adequate test flight hours available. The flight can be done on any non-mission day, but we prefer that this is done shortly after arrival in Guam.

EOL rented a backup inertial system to give attitude angles for the ELDORA radar. The first unit we received was dead on arrival, the second had excessive drift, the third unit was dead on arrival, and we are now testing the fourth unit.

EOL satellite communication:

A new Iridium satellite system, the so-called Reachback modem, has been installed on the P3. This system should provide twice the throughput of the old P3 system, by using both of the EOL satcom antenna. Software has been written to enable data transfer over the system for e.g. chat and selected meteorological parameters. The usual EOL means of data transfer from the aircraft to the ground, the LDM system, was non-functioning because the LDM server on the ground could not connect to the aircraft. Some of this was related to
configurations of our new satcom ISP provider.

The system for download of selected parameters has since been re-written to use UDP packets. This system uses no hand-shaking; the aircraft pushes data to the ground and does not wait for any acknowledgements before pushing the next data to the ground.

The system has been extensively tested on the ground with good results, but we are still to see how well it performs during flight. We plan to test this during the final test flight at JeffCo.

Web-browsing and image transfer, initiated from the aircraft, should also be possible, but bandwidth limitations should keep this to an essential minimum.

The dropsonde data is now being transferred to the ground via an ftp protocol. Once a new file shows up on the dropsonde computer, the main aircraft computer transfers it to the ground. Transfer of a dropsonde file to the ground takes about 3 minutes, while the aircraft is also transferring the above mentioned selected meteorological data from the state and wind sensors.

The Reachback modem will normally be used with both lines in parallel, thus providing maximum bandwidth. When the flight scientists decides to make a voice call to the ground, then one of the data lines is down, thus halving the data transfer rate.

After the voice call has been completed, then both lines are again available for data transfer. However, getting the second data line ready for transfer may take up to 7 minutes. Thus it is HIGHLY RECOMMENDED that voice calls using the EOL system are minimized. Chat provides an excellent means of communication during normal conditions.

Experience from RAINEX and the two T-PARC test flights show that the Iridium system always drops out when the aircraft banks more than 18 degrees. Accordingly, EOL recommends that normal research turns are limited to NO MORE THAN 15 DEGREE BANK ANGLE. After the connection drops, then it takes about 7 minutes to bring the system up again. During this time there is no chat, data transfer, etc.
The satcom system needs additional test flight time to evaluate the robustness of the entire system. The expectation is that flight conditions, as well as attenuation of the signal due to cloud and precipitation, may also affect the performance.

Emmitt wind lidar:

The interior optics plate has been installed with a significant improvement in the signal. The external optical plate is expected to arrive tomorrow, Tuesday 29 July. After installation, it is expected that Lockheed-Martin will do testing with the aircraft outside on, possibly on Wednesday 30 July.

The lidar has a small nitrogen leak, and this will be worked on after the external window is installed.

ELDORA:

Work is continuing on two avenues. The signal processor is being checked through numerical simulation using commercial DSP (digital signal processor) software.

The radar receivers are being re-built as 3-frequency systems; this involves using some spare parts from other radar units.

It is too early to say how this work will go, but we plan for a P3 test flight on Sunday 3 August, and for the P3 to depart on Monday 4 August directly for Guam.

EOL STATUS HOTLINE:

Each afternoon at 4 PM Mountain time, the EOL status hotline for T-PARC will be updated. Dial 303-497-1040 to hear the daily message. Do not leave messages on the hotline, but contact me using the details below.

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Tomorrow, Tuesday 29 July, work on the P3 installation of ELDORA will continue.

Tuesday 29 July:
RAF open from 7:30 Noon to 6 PM.

ELDORA staff expect access from the aircraft from 10:00 AM to 6 PM; more if necessary.

Thanks, Jorgen Jensen

303-497-1028 (office)
303-859-1490 (cell)
303-444-0469 (home - anytime)

jbj@ucar.edu

This is a summary of the current Eldora system status:

1. Signal Processor -- On Saturday, we collected both time series and auto-covariance data and processed them using IDL. The time series produced good quality velocity estimates, while the auto-covariance data out of the processor produced noisy velocity estimates. This means that the digital downconversion and filtering are working correctly, but the pulse-pair computation seems to have an error. Mike Spowart and I are in the process of verifying the FPGA implementation of the pulse-pair processing. This is very time consuming, but we are making progress in understanding Tom's design. We shall continue on this track tomorrow.

2. Receiver/Exciter -- We have devised a two chassis solution: one power supply chassis and one receiver/exciter chassis. Power supplies are on order and construction on the power supply chassis should be completed Wednesday. The design for the receiver/exciter chassis is complete and fabrication has begun. We are still awaiting parts Fedex'd from Guam and possibly some X-band power amps to complete the design. We are on track for a tested receiver/exciter by COB Thursday.

-Eric