DAWN YELLOW

Submitted by **mkavaya** on Wed, 08/18/2010 - 13:52

- **DAWN**

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DAWN has a problem that appears to be thermal. Here is our theory: The cargo level bottom metal gets very cold. This cools the bottom of the DAWN optics can. Then the air inside the optics can cools. Meanwhile a a chiller that has no heating capability is cooling the optics bench to some temperature. When the air cools, this increases the temperature difference between the optical bench and the optical components mounted to the bench. The laser begins to lose pulse energy. By trial and error, we found that lowering the temperature of the optical bench restores laser operation. But this step also contributes to cooling the air inside the optics can. So soon the bench temperature must be lowered again. This cycle repeats until the laser bench chiller can go no lower. Then the laser quits.

DAWN has had 3 flights with operators: the test flight, the ferry flight, and the 8/17 flight. The first and third were over water and aerosols were low. This makes it difficult to assess lidar health. During the ferry flight, the laser worked part of the time. But two important software steps were not yet coded. One step is to apply a spectrum noise whitening. The other step is to use the periodogram frequency domain to estimate wind. Without these two steps, we could only look at the time trace of returned power, which is not very helpful to determine good operation in low aerosol conditions.

For the 5-hour 8/17 flight the laser worked well about 2 hours. When the software steps are finished, we can replay the stored data and determine if wind profiles were taken.

We are going to add insulation between DAWN and the cold metal of the DC-8 bottom. Of course, we must leave a clear 15-cm diameter circle for our laser beam. This should extend the operating time of the laser, but whether it extends operation to the full 10 hours of the longest flight is uncertain at this time.

We are also formulating a plan to add a heater and fan to the inside of our optics can while it is in the DC-8. This second fix would also not require deintegration of DAWN from the DC-8.

The various views of the data during the 8/17 flight strongly indicate that our lidar is well aligned.

At this point we do not have any plans to deintegrate.

Michael Kavaya

Status:

Yellow