

## **FCAM: A fly-through of each of the 48 ATom Research Flights**

David Van Gilst, and Michael Prather (March 2021)

The forward camera files from the NASA Atmospheric Tomography mission (ATom) are designated FCAM\_DC8\_YYYYMMDD\_R#.mp4. As the forward camera, it shows the visible atmosphere that ATom is flying through, allowing the in situ measurements to be placed in context of cloud fields, smoke and haze layers, and boundary layers. Each frame is synched to the standard 10-second merged measurements, and the location of each frame can be found on the merged files or the MDS files. These FCAM files enable those analyzing the ATom measurements to do a quick fly-through of each research flight to understand the surrounding mesoscale and micrometeorological environment as well as sunlight conditions.

The forward camera (FCAM) for ATom 1-3 was an Axis P1357 High Definition camera, with a Theia TH138A wide-angle lens. Initially recorded at 24 fps at a resolution of 2592x1944, the video is sampled every 10 seconds (ratio of 1:240). The UCT date (YYYY-MM-DD) and time (HH:MM:SS) of each frame are logged in white-on-black type in the upper left of the frame. The SS is always in 10s of seconds. The forward camera for ATom-4 was a Samsung SNB-9000 4K camera, with the same Theia TH138A wide-angle lens. The original video is recorded at 24 fps but at a 4K resolution of 3840x2160, and is sub-sampled in time as before. All video is encoded using the H264 – MPEG-4 AVC codec.

As an example, FCAM\_DC8\_20160803\_R1.mp4 shows the ATom-1 Research Flight 20160803 from Anchorage to Kona (7.5 hours) from takeoff to landing and contains about 2700 10-s frames. These are replayed at the rate of 10 frames per second for easier viewing. Thus, we have a 4:30 minute video with file size of 200 MB. The FCAM files start with 2016-07-29 (ATom-1, Research Flight #1) and end with 2018-05-21 (ATom-4, RF #13).