ARISTO 2016 Digital Camera Imagery and Movie Notes

During ARISTO 2016, the NSF/NCAR C-130 (N130AR) flew two digital cameras for in-flight video capture: forward- and downward-looking. The forward-looking camera is a Point Grey Research Flea 3 (FL3-FW-14S3C-C) - Color, 1280 x 960 resolution equipped with an Edmund Optics 6mm lens (#67-709). The field of view is 68 x 51 degrees with approximately 6% barrel distortion. This camera is located in the cockpit.

The downward looking camera is a Point Grey Research Grasshopper (GRAS-14S5M) monochrome camera, 1280 x 960 resolution equiped with a Sony zoom lens set at about 15 mm focal length giving a field of view of 30x23 degrees. It is located on the belly of the plane. The top of the image is to the front of the plane.

Images were acquired once per second and stored as JPEG-compressed files, roughly 100 kB each. No image processing was performed beyond converting the raw pixel data to 24 bit color images. Applying a sharpening filter as is ordinarily done by consumer digital cameras will considerably improve the appearance. The UTC date and time are encoded in the filename as YYMMDD-HHMMSS.jpg.

H.264 compressed, half-resolution movies (.mp4) were created. Each 1-second image was processed with the linux ImageMagick toolkit. The image was first cropped to 512x384 pixels. Sharpening was then performed [SHARPEN(0.0x1.0)]. Each image was then annotated in the lower left with the time the image was recorded and in the upper right with the pointing. Finally, the images were combined into a single block. For final movies, data values at the image time for a select set of data parameters chosen by the researchers were appended to the right of each image block. These 1-second annotated images were compiled into a video stream running at 15 frames/s, 1500 kbps data rate.

The movies are playable with Quicktime, Windows media player from Windows 7, mplayer, VLC, and others.

Flight-specific notes:

The forward camera was re-focused between flights 4 and 5.

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