



Update on Video Imaging Data Set Status

HAIC-HIWC Science Meeting – March 9, 2015

Presented by T. Ratvasky, NASA

Update from September 2014 Meetings

- No changes to data set since the September 2014 meeting
- To date, no requests have been made for this data
- Plans for Cayenne Campaign
 - ▶ Go-Pro Hero 3+ for windscreen
 - ▶ Allied Vision camera with improved recording software for flight deck / instrument panel
- Remaining slides provide the status from Sep 2014

Darwin Campaign Video Imaging Data Sets

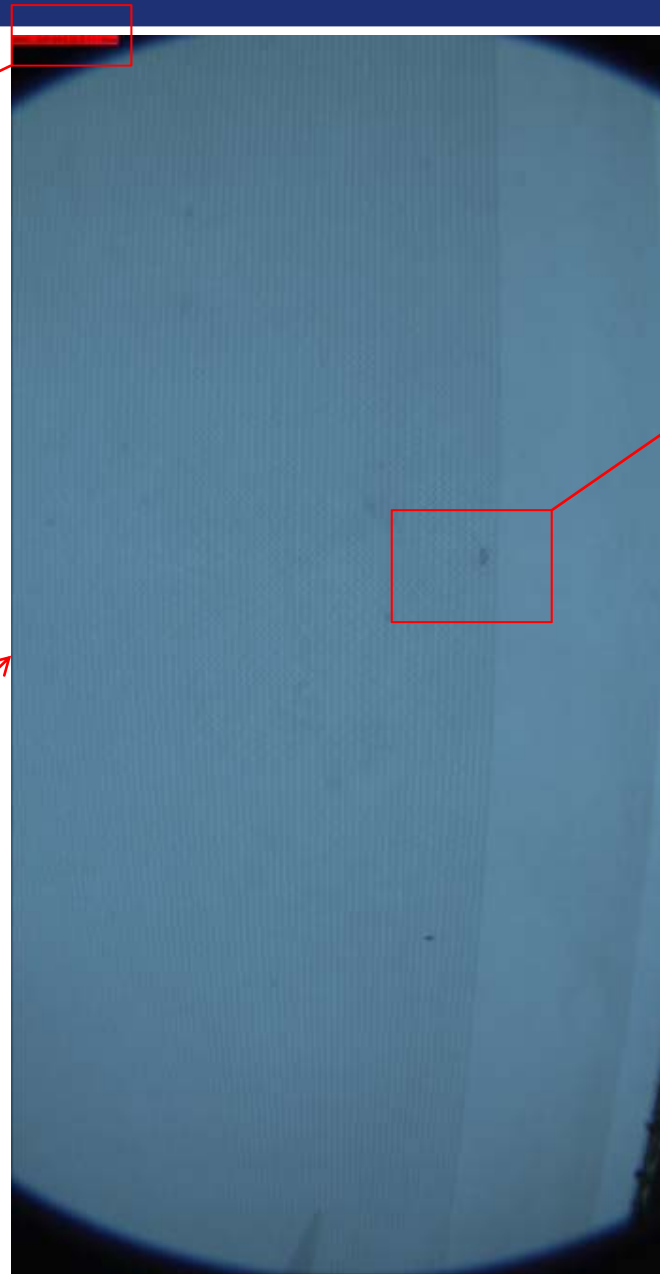
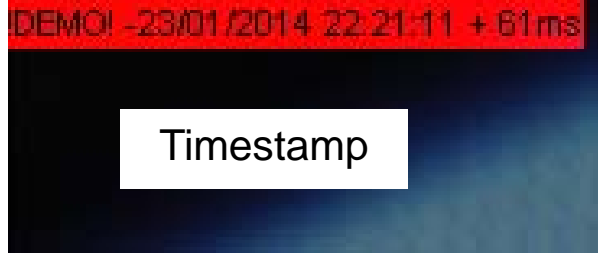
- Onboard video imaging data was recorded for general information on the flights and potentially for pilot education
- Allied Vision Technology Ethernet cameras in the flight deck
 - ▶ Windscreen – to capture water streaming while in HIWC conditions
 - ▶ Instrument panel – to capture flight and engine instrument indications
- GoPro portable cameras
 - ▶ Pilots used to capture windscreen/instrument panel
 - ▶ Researchers used to capture images out the side window and in research screens

Allied Vision Windscreen Camera



- Model: Mako G-223
- Resolution 2048x1088
- Max frame rate: 49.5 fps
- Output: 6Mb bitmap image

Allied Vision Windscreen Camera



Zoom in view

Full Frame
2048x1088
6 MB/image

Recorded at 5 frames/sec

Allied Vision Instrument Panel Camera



Allied Vision Cameras Image File Catalog

Flight No	Instrument Panel File	Size	Windscreen File	Size
FS140001	21,903 bmp images	136 Gb	N/A	
FS140005	CC20140221_0434_0715.AVI	2.2 Gb	CW20140221_0434_0715.AVI	24.9 Gb
FS140006	17,152 bmp images	106 Gb	65,989 bmp images	413 Gb
FS140009	CC20140129_2108_2345.AVI	20.1 Gb	CW20140129_2108_2345.AVI	75.5 Gb
FS140010	CC20140130_2005_2322.AVI	24.7 Gb	CW20140130_2005_2322.AVI	63.1 Gb
FS140011	CC20140130_0114_0214.AVI	13.4 Gb	CW20140130_0114_0214.AVI	32.8 Gb
FS140012	CC20140203_2035_2340.AVI	23.9 Gb	CW20140203_2035_2340.AVI	84.1 Gb
FS140013	CC20140203_0405_0631.AVI	36.7 Gb	CW20140203_0405_0631.AVI	55.8 Gb
FS140014	CC20140205_2033_2340.AVI	26.9 Gb	CW20140205_2033_2340.AVI	96.9 Gb
FS140015	CC20140206_2327_0226.AVI	7.9 Gb	CW20140206_2327_0226.AVI	10.6 Gb
FS140016	CC20140208_2102_0018.AVI	29.6 Gb	CW20140208_2102_0018.AVI	90.9 Gb
FS140017	CC20140208_0158_0345.AVI	20.0 Gb	CW20140208_0158_0345.AVI	64.9 Gb
FS140018	CC20140209_2048_2359.AVI	24.7 Gb	CW20140209_2048_2359.AVI	78.1 Gb
FS140019	CC20140210_2049_0014.AVI	25.5 Gb	CW20140210_2049_0014.AVI	62.7 Gb
FS140020	CC20140210_0207_0358.AVI	24.0 Gb	CW20140210_0207_0358A.AVI CW20140210_0207_0358B.AVI	30.5 Gb 39.6 Gb
FS140021	CC20140217_0627_0833.AVI	21.7 Gb	N/A	
FS140022	CC20140218_2143_0101.AVI	28.8 Gb	CW20140218_2143_0101.AVI	91.4 Gb
FS140023	N/A		N/A	

Allied Vision Camera Assessment

- Windscreen camera image is often too dark or too bright.
 - ▶ Darkness can be compensated with image processing, but time-intensive effort
- Instrument panel image is also dark before daylight
- Bitmap image size is large and requires large data storage (500 Gb per flight) and required post-processing to make into movies
- After Flight 6, all Allied Vision images were recorded to *.avi files to manage storage issue
- Timestamp:
 - ▶ Small – difficult to read unless zoom in (cannot do with avi files)
 - ▶ Noted that the character “5” in time stamp was shown as a “0”, e.g.
`DEMO1 -23/01/2014 22:24:40 + 624ms` -should be 22:24:45.624
- No audio recording
- Conclusion:
 - ▶ Windscreen images are not useful for pilot education purposes
 - ▶ Instrument panel image are good for general checks with other data sources (e.g. altitude, airspeed, heading, etc)

GoPro Portable Camera

- Model Hero 3+

- ▶ Resolution: 3840 x 2160
- ▶ Frame rate: 15 frame/sec
- ▶ Audio sample rate: 48 kHz
- ▶ Output: Mpeg-4 video



GoPro Cameras Image File Catalog

Flight No	Cabin	Size	Flight Deck	Size
FS140006	GOPR0181-GOPR0193.MP4	3.1 Gb	N/A	
FS140007	GOPR0194-GOPR0199.MP4, GOPR0203-GOPR0206.MP4	2.0 Gb	GOPR0200-GOPR0202.MP4	146 Mb
FS140015	GOPR0006-GP010010.MP4	14.7 Gb	N/A	
FS140016	N/A		GOPR0018-GOPR0024.MP4	4.8 Gb
FS140018	N/A		GOPR0014-GOPR0020.MP4	7.7 Gb
FS140019	N/A		GOPR0025-GP040031.MP4	22.5 Gb

Total = 55 GB

GoPro Camera Assessment

- High-quality images with audio – potential use for pilot education
- Output file sizes manageable and easily viewed
- Remote control for record start/stop

- Negative: No timestamp – need to rely on file creation info to synchronize with other events

- Conclusion:
 - ▶ Good to have for next campaign from the start