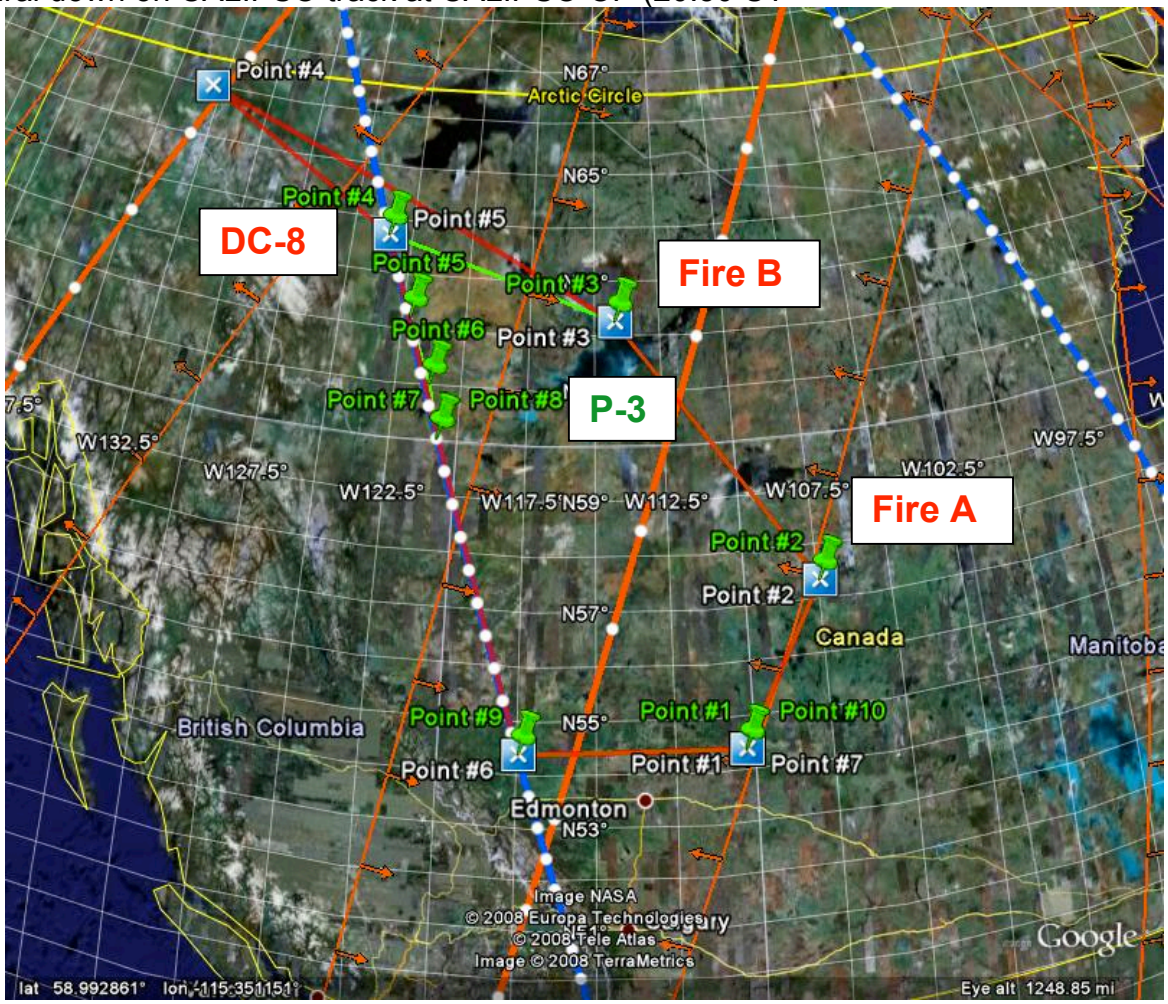
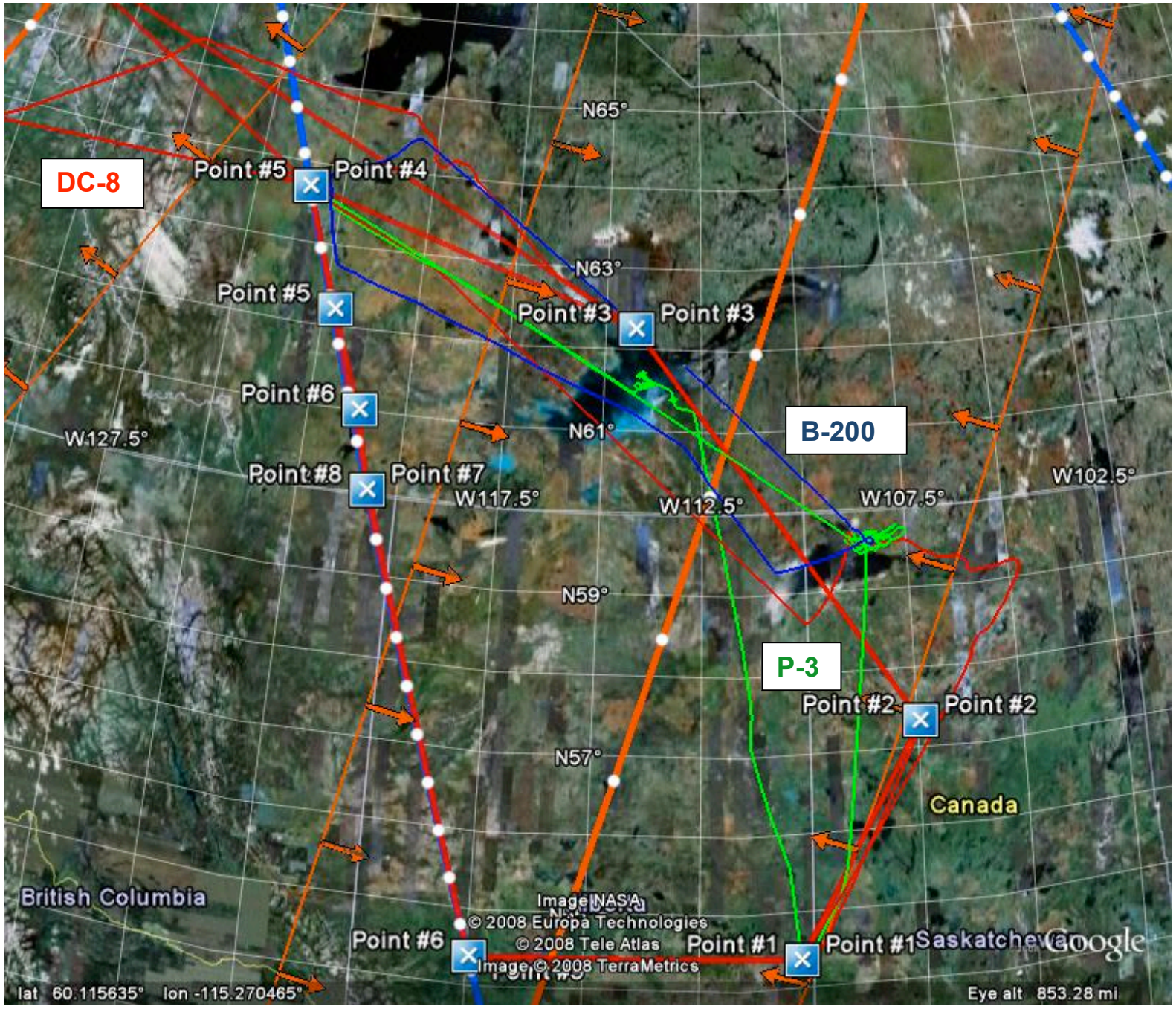
Flight Report
ARCTAS P-3B Data Flight 16, flown 29 Jun 2008 (Local Science)
Submitted by Phil Russell

Objectives

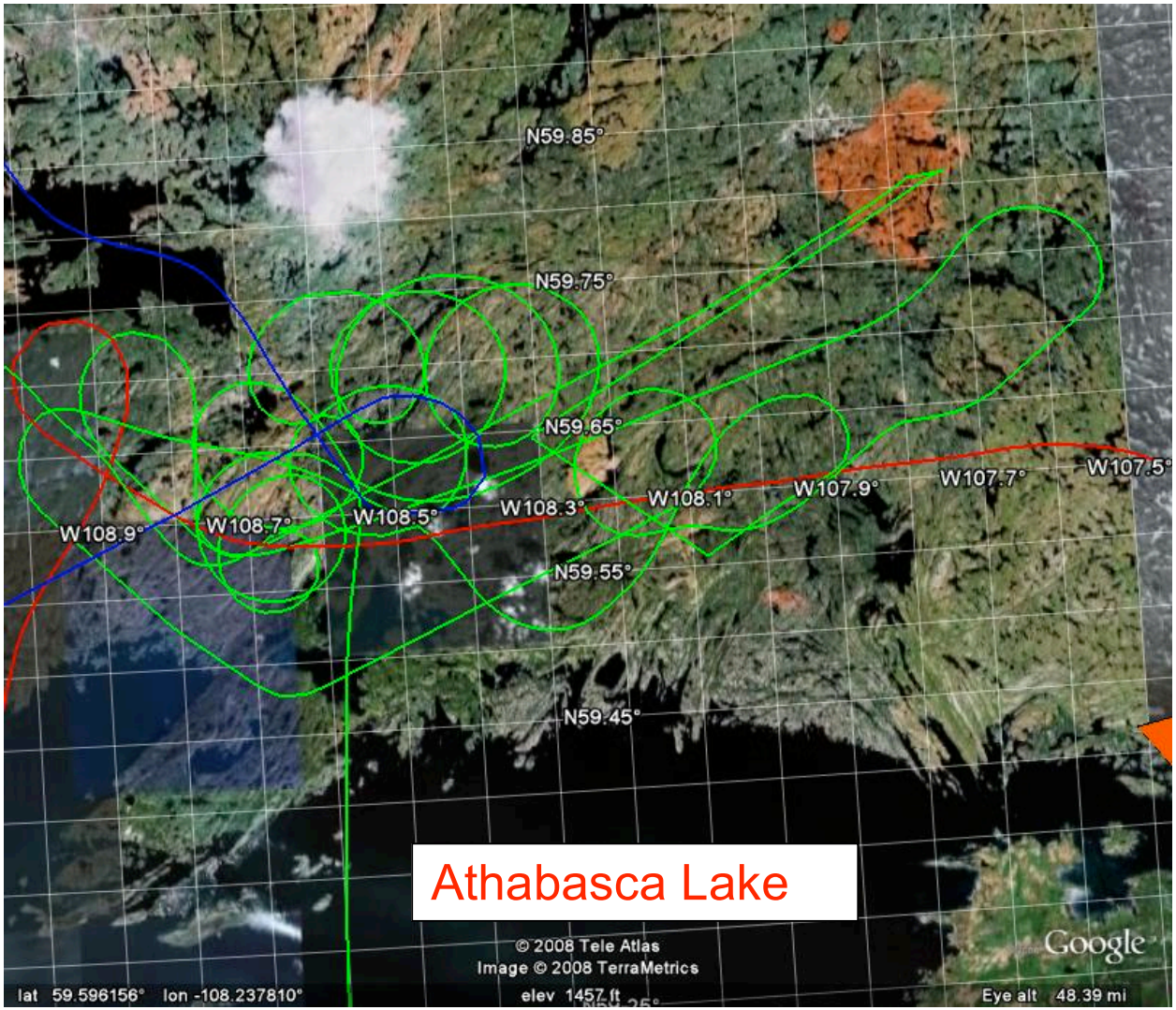
1) Sample/study Fires A & B (if Fire A is good for radiation, stay there & skip B)
2) Terra overpass (18:53 UT) during Fire B sampling
3) DC-8 comparison at 2 altitudes on CALIPSO track
4) Spiral down on CALIPSO track at CALIPSO OP (20:50 UT

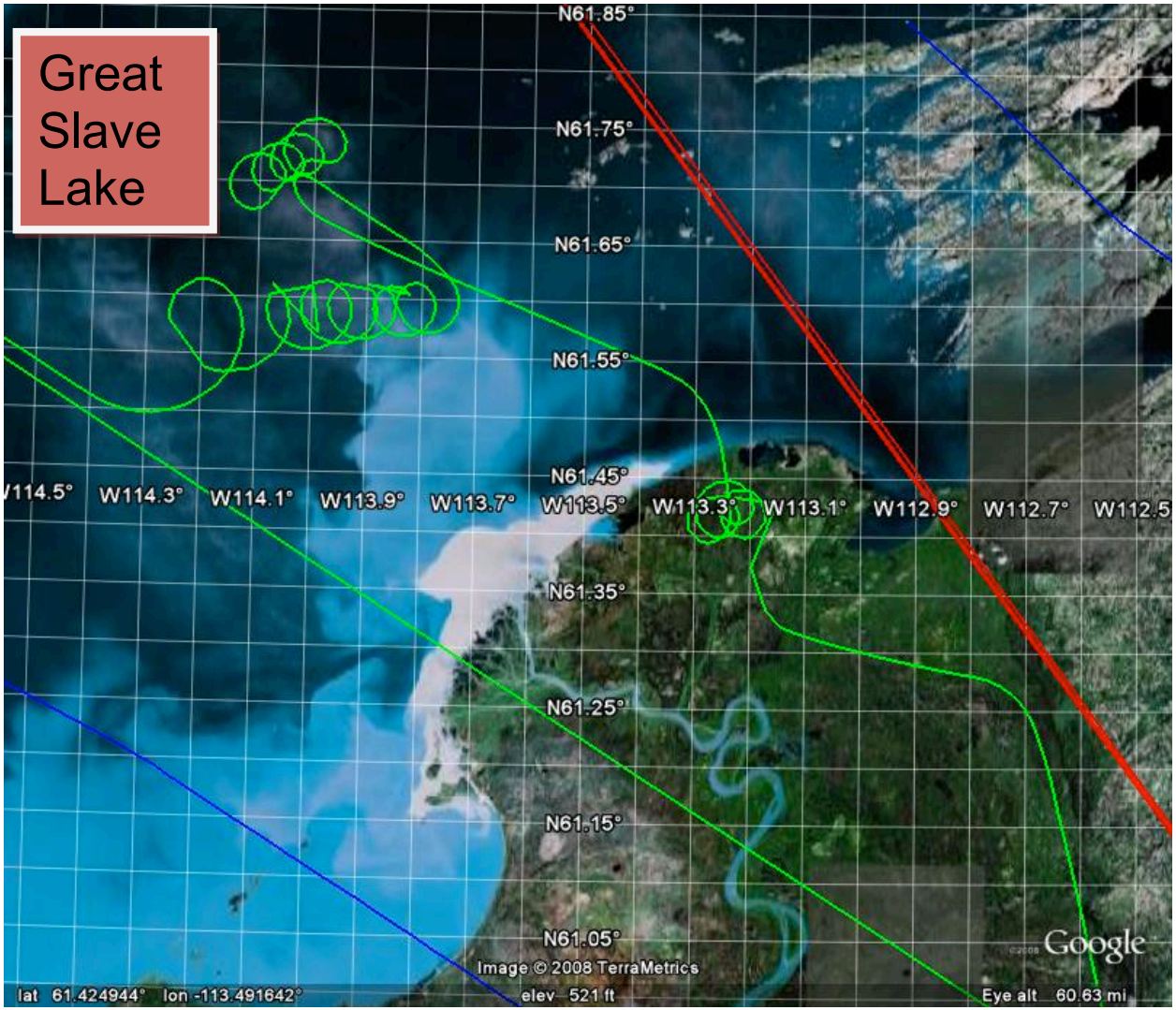


Planned flight tracks



Actual flight tracks


N59.85°
N59.75°
N59.65°
N59.55°
N59.45°
W108.9°
W108.7°
W108.5°
W108.3°
W108.1°
W107.9°
W107.7°
W107.5°
Athabasca Lake
© 2008 Tele Atlas
Image © 2008 TerraMetrics
Google
lat 59.596156° lon -108.237810°
elev 1457 ft
Eye alt 48.39 mi



Summary:

A partially successful flight. We succeeded in sampling smokes from fires near Lake Athabasca in the morning. This included sampling runs across plumes and along plumes from close in (with AOD >1, scattering > 5000 Mm^{-1}, CO ~5.7 ppm) to farther away. It also included an attempt to measure smoke radiative effects by flying flux radiometer legs above and below the plume, linked by a spiral. However, the presence of clouds and the inhomogeneity of the plume are expected to make analysis of these data very difficult and maybe impossible. As we left the Lake Athabasca area en route to WP 4 we observed an impressive building pyro Cb visually, but our schedule did not allow time to sample it. We arrived at WP 4 on the CALIPSO track at the planned (as revised) time for the DC-8 intercomparison, but extensive clouds there would have made the intercomparison unsafe, so it was canceled. Nevertheless, our time

in the clouds may yield CAR retrievals of cloud absorption, because the CAR-measured radiation field appeared to be in the diffusion domain. We headed back to Great Slave Lake and picked a spot that looked to have significant haze AOD below for a spiral down and CAR circles, with radiation legs above and below. The spiral down revealed max AOD of only ~0.03, but we were able to perform 4 CAR circles for BRDF measurements at 600 ft above the lake and 4 more over the adjacent land, both sets with an albedo leg bisecting the circles. Returning from Great Slave Lake to Cold Lake, our flight path took us over Ft. McMurray. We descended to the minimum allowed altitude there, 3,000 ft, and were able to sample some of the industrial plume.

Xchat was up and running for most of the flight (including on a cockpit laptop), and this provided improved communication for the Flight Scientist and others onboard. However, we are still learning how to best use Xchat, and it is likely that some messages went unseen because of the scrolling feature and frequent lists of participants leaving (e.g., because of their computer going to sleep). Seeing those messages would have provided better coordination with the B-200 and with Cold Lake base re fires to sample on our path home.

Timeline:

1535 UT: Takeoff. DC-8 takeoff was delayed, so target time for WP 4 is slipped 20 minutes, to 20:08.
Report from DC-8: Fires below are small & in rain.
~1744: Working smoke plumes N of Athabaska Lake. Too many clouds & too little AOD to attempt radiation objectives.
~1749: Sampling plumes under Cam McNaughton's direction.
~1755: Passing through really dense smoke. AOD>1, scattering 5,000 Mm^{-1}, CO ~5.7 ppm for <1 minute. Then AOD ~0.06.
~1810: Start 5 minute radiation leg. Too many clouds? Smoke pall below. Best spot in a bad situation.
~1814: Lots of puffy clouds.
~1815: Start descent, AOD 0.044 to 0.05.
~1819: Low altitude leg, AOD 0.085.
~1821: In low leg, fewer clouds now, AOD 0.123. AOD jumping, 0.1 to 1.0. Do we have Cu above smoke?
~1827 Heading for WP 4 & DC-8 rendezvous. Very impressive pyro Cb on right. No time to sample.
~1900: South shore of Great Slave Lake. Looks good for clouds, haze, & BRDF if we return here after other objectives.
~1937: Halfway from GSL to WP 4. Clouds above & below.
~1957: In cloud, AATS parked. 12,500 ft. Dust in cloud. Charles notes that CAR data indicate we are in the radiation diffusion domain, good for measuring cloud absorption.
~2004: Pilots talking to DC-8. Are conditions safe for intercomparison? Intercomparison cancelled. DC-8 plans to head for Athabaska Lake fires. We decide to retrace our path to Athabaska Lake, passing over GSL.
~2030: En route, clear skies above. AATS attempts Field-ofoView measurement, HiGEAR performs zero.
~2055: Passing over GSL, visual appearance of horizon & lake below indicates significant haze AOD below, so we decide to spiral down for AOD & in situ profile w radiation legs above & below.
~2116: Minimum safe altitude over lake. AOD is only 0.032. In situ instruments encountered nothing significant in descent. Why were our eyes fooled into thinking there was sufficient AOD below P-3? Brown, murky water color??
~2119: Conditions are good for CAR BRDF measurement circles above lake & adjacent land, so we start first circle above lake.
~2129: End CAR circle #4 over lake.
~2140: In very bumpy CAR circles over land.

~2148: End CAR circle #3, AOD 0.03.
~2207: Heading home, using Xchat to ask for guidance for fire close to our track that we can sample en route. Ist fire coordinates received were too far off track. After flight we learn 2nd fire's coordinates were sent, but message must have scrolled out of view before any on board saw it.
~2231: Ft. McMurray is on our track home, so we descend to minimum allowed altitude (3,000 ft?) and sample some industrial emissions.
2320: Land at Cold Lake.

Instrument Reports 29 June 2008

AATS-14	**Worked Well -No problems** **Check for 30 Jun 08**
Status during flight (up/down)	Need to check tracking during Turns on A/C
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	
Comments	

Aero 3X	**Aero 3X** **Check for 30 June 08**
Status during flight (up/down)	Good Red and Blue Scattering
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	
Comments	

BBR	**Worked Well – No Problems** **Check for 30 June 08**
Status during flight (up/down)	
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	
Comments	

CAR & CANS	**Worked Well – No Problems** **Check for 30 June 08**
Status during flight (up/down)	
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	
Comments	

CCN	**Worked Well** **Check for 30 June 08**
Status during flight (up/down)	

Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	
Comments	

COBALT	**Excellent**	**Check for 30 June 08**
Status during flight (up/down)		
Accomplishments		
Issues encountered		
Status for next flight		
Postflight requirements		
Comments		

HIGEAR	**Excellent Flight**	**Check for 30 June 08**
Status during flight (up/down)		
Accomplishments		
Issues encountered		
Status for next flight		
Postflight requirements		
Comments		

AMS	**Good Data**	**Check for 30 June 08**
Status during flight (up/down)		
Accomplishments		
Issues encountered		
Status for next flight		
Postflight requirements		
Comments		

PDS	**Fully Operational entire flight**	**Check for 30 June 08**
Status during flight (up/down)		
Accomplishments		
Issues encountered		

Status for next flight	
Postflight requirements	
Comments	

REVEAL & RTMM	**Xchat ran for entire flight Check for 30 June 08**
Status during flight (up/down)	**Data Ops Links running fine**
Accomplishments	**Very Good Day**
Issues encountered	
Status for next flight	
Postflight requirements	
Comments	

SSFR	**Worked entire flight Check for 30 June 08**
Status during flight (up/down)	
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	
Comments	

WFF Flight Report

Aircraft :	NASA P-3B
Operating Site(s) From / To :	KNUQ/CYOD/CYOD
Flight Date :	June 29, 2008
Flight Number / Data Flight # :	592/ ARCTAS Science Flight # 16
Time out:	**0929 (L)**
Time in:	**1724 (L)**
Flight Time :	7.9
Flt Request # / PI:	**8P301/ Phil Russell**
Purpose of Flight :	**Data [X] Ferry [ ] Functional Check [ ] Other [ ]**
Sensor Payload :	ARCTAS (flight)
Comments :	Aircraft is in an up status and ready for the next flight. All science instruments are functioning nominally. Fliight 7.9 hours with a departure time of 0929 (L) and landing 1724 (L). A partially successful flight. We succeeded in sampling smokes from fires near Lake Athabasca in the morning. This included sampling runs across plumes and along plumes from close in (with AOD> 1, scattering > 5000 mM-1, CO ~5.7 ppm) to farther away. It also included an attempt to measure smoke radiative effects by flying flux radiometer legs above and below the plume, linked by a spiral. However, the presence of clouds and the inhomogeneity of the plume are expected to make analysis of these data very difficult and maybe impossible. As we left the Lake Athabasca area en route to WP 4 we observed an impressive building pyro Cb visually, but our schedule did not allow time to sample it. We arrived at WP 4 on the CALIPSO track at the planned (as revised) time for the DC-8 intercomparison, but extensive clouds there would have made the intercomparison unsafe, so it was canceled. Nevertheless, our time in the clouds may yield CAR retrievals of cloud absorption, because the CAR-measured radiation field appeared to be in the diffusion

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SUBMITTED BY: Colleen Kelly 29 June 2008

Flight Hours for ARCTAS Campaign

Flight	Date	Aircraft Flight #	Data Flight#	Duration (hr)	Remaining Hours*
Total Allocated					*90.3*
Reveal Test /Training Flight	6/13/2008	583	PCF 1	2.0	88.3
Transit To NUQ	6/19/2008	582	Trans	7.7**	No charge
PCF/Data	6/22/08	584	#11	3.5	84.8
CARB/Data	6/24/08	585	#12	8.0	76.8
ARCTAS Transit Flt	6/26/08	587	#13/14	6.6/.9	69.3
ARCTAS Science Flt	6/28/08	591	#15	4.0	65.3
ARCTAS Science Flt	6/29/08	592	#16	7.9	57.4

*Allotted flight hours include the following:
ARCTAS – 75 hours
CARB – 8 hours
Hours carried over from Spring ARCTAS – 7.3

** transit flight billed as a maintenance flight

Transit flight allow approx 5.5 hours to include customs clearance at Dover