

NPOESS P³I & Follow-on Threshold Operational Mission

Point Design Performance Plots
Using
The Doppler Lidar Simulation Model
(DLSM)

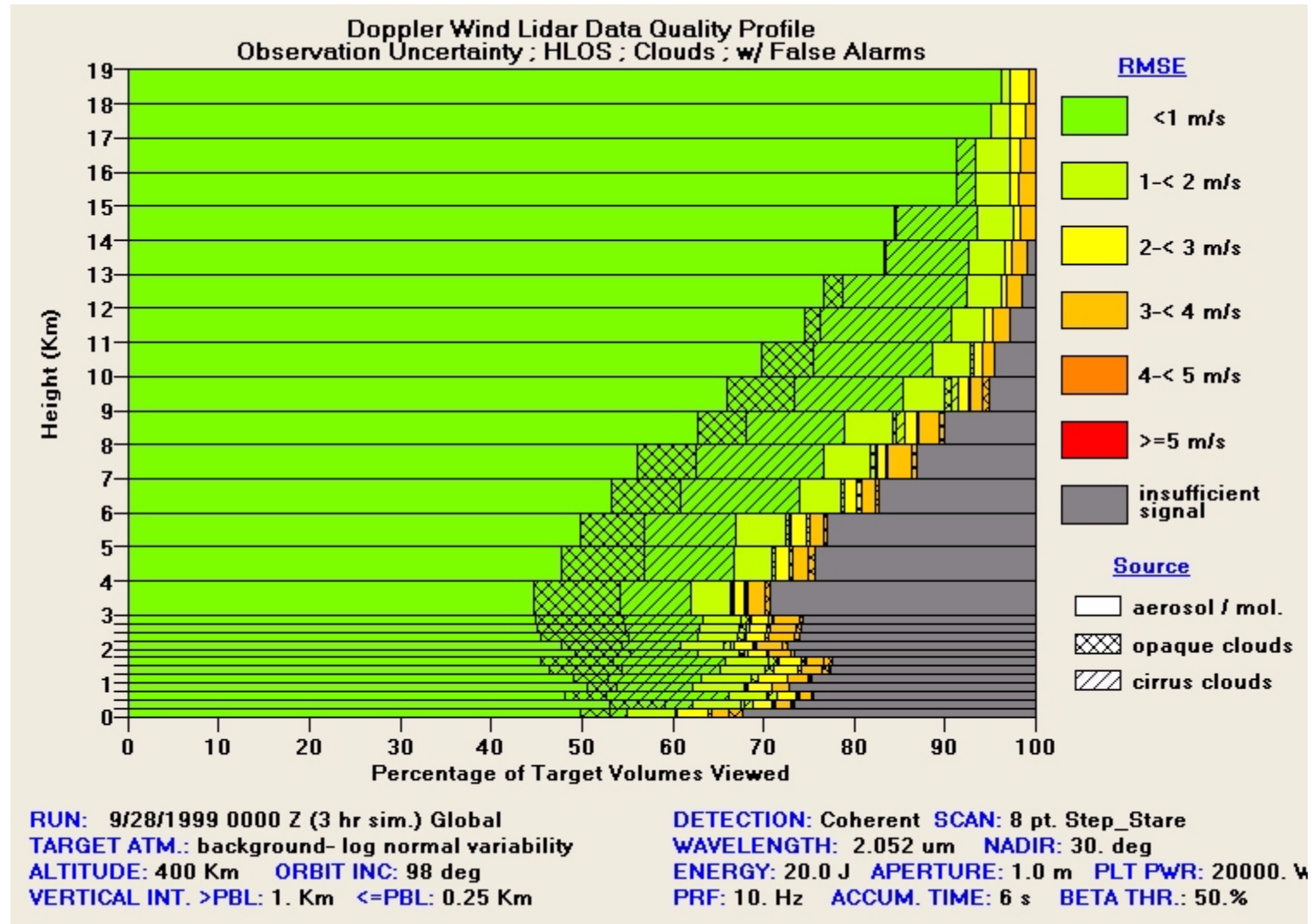
Direct Detection Subsystem

Parameter	Demo	Threshold	Objective
Energy per pulse (at 1.06 microns)	.75J	.75J	
Prf	100Hz	100Hz	
Conversion efficiency	.45	.45	
Wallplug efficeincy	.042	.042	
T/R Optical throughput (pre receiver/detector)	.36	.36	
Detector QE	.6	.6	
Beam split fraction	.4	.4	
Filter through put	.17	.17	
Edge sensitivity	.0075	.0075	
Telescope diameter	.75m	.75m	
Integration time	12s	6s	

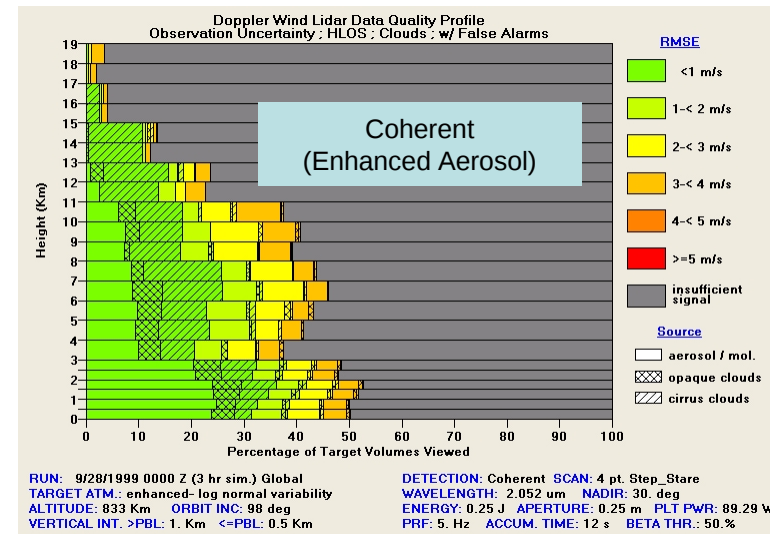
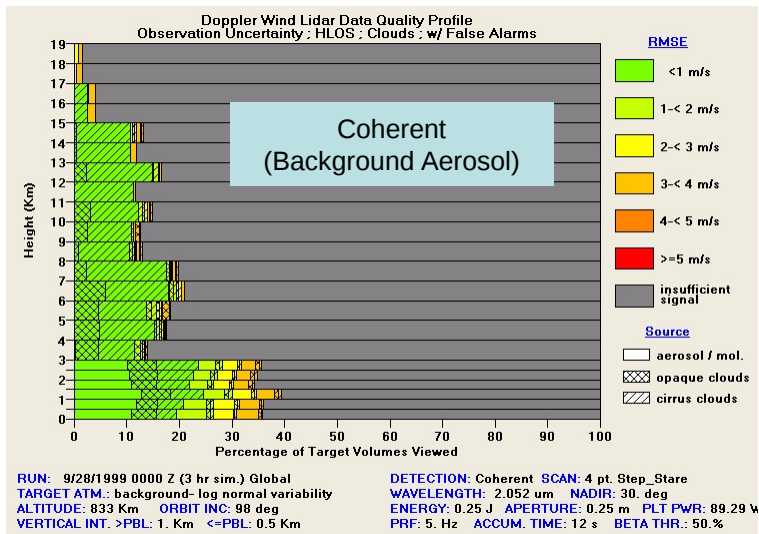
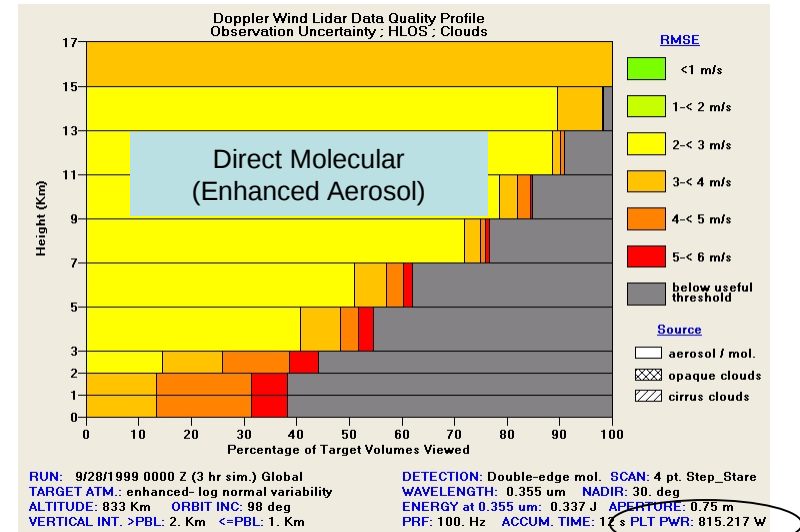
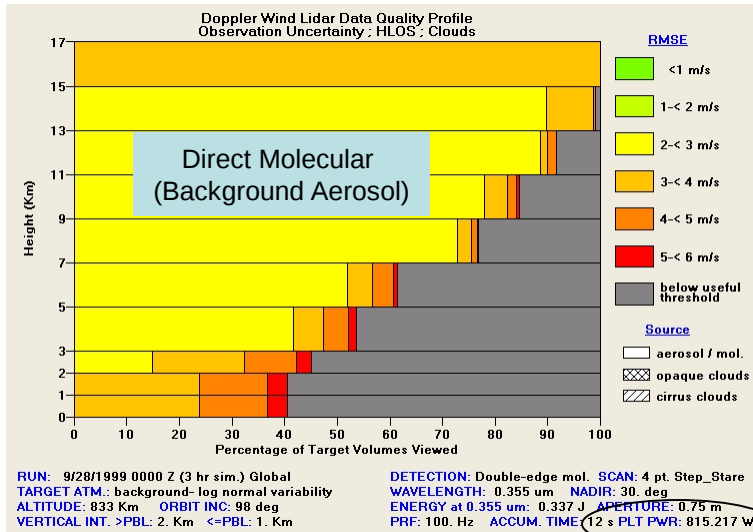
Coherent Detection Subsystem

Parameter	Demo	Threshold	Objective
Energy per pulse	.25J	.25J	
Prf	5 Hz	10 Hz	
Wallplug efficeincy	.014	.014	
T/R Optical throughput (pre receiver/detector)	.55	.55	
Mixing efficiency	.42	.42	
Detector QE	.8	.8	
Telescope diameter	.25m	.25m	
Integration time	12s	6s	

Reference Performance Profile



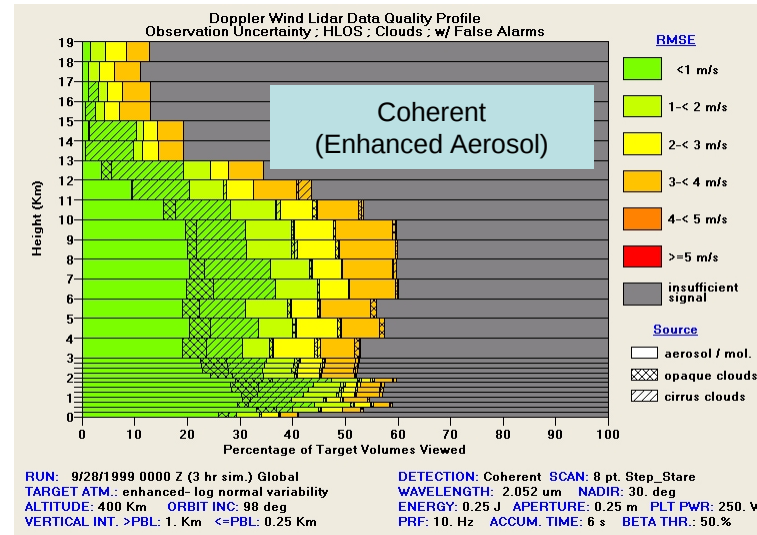
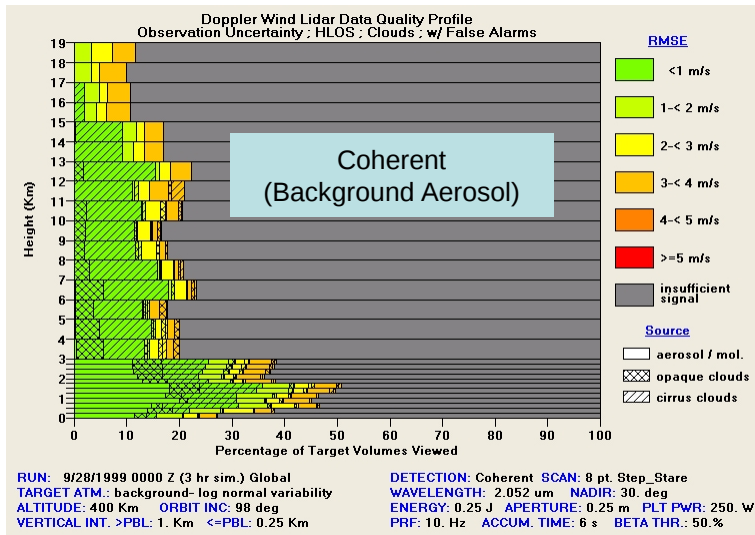
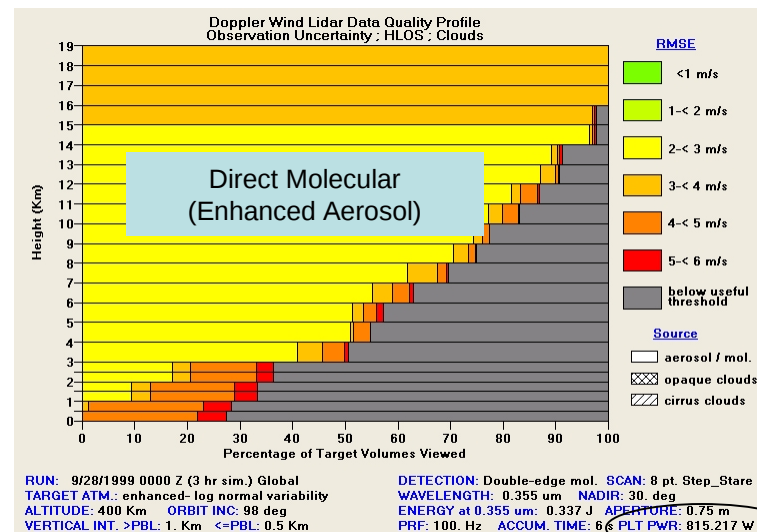
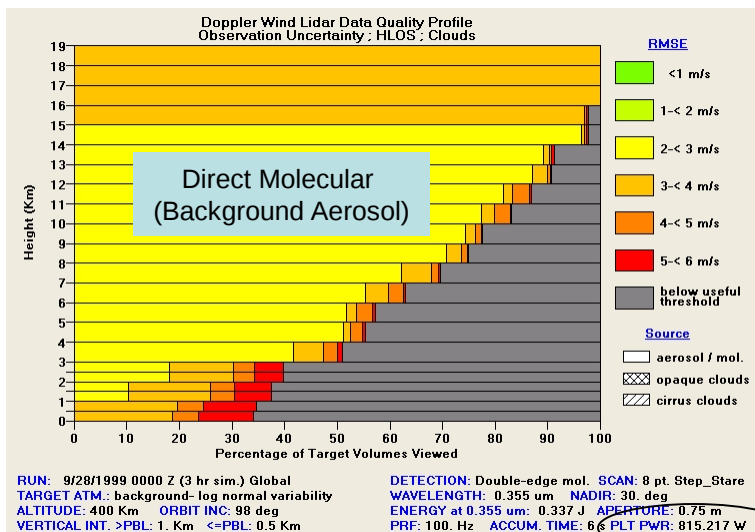
833 km Demo Mission



Note

At a planned 10% duty cycle, the orbit average for the Direct Molecular system is estimated to be 250 watts

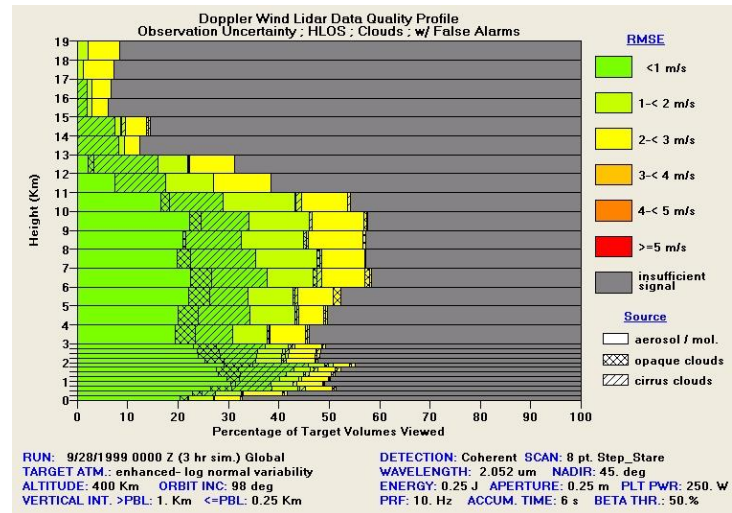
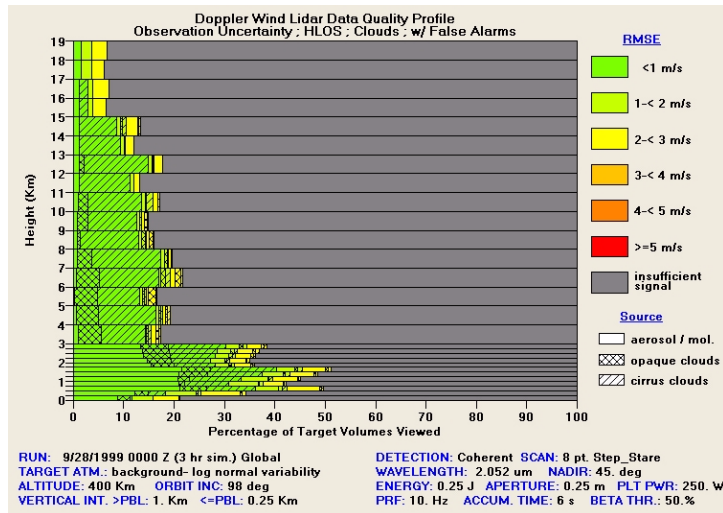
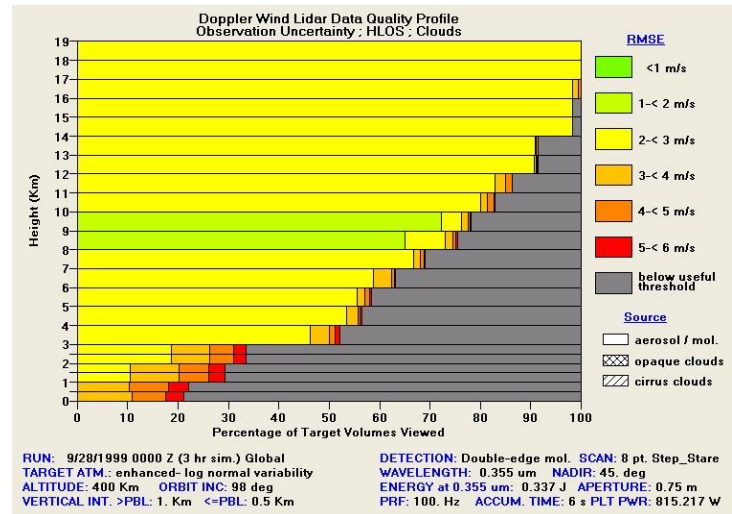
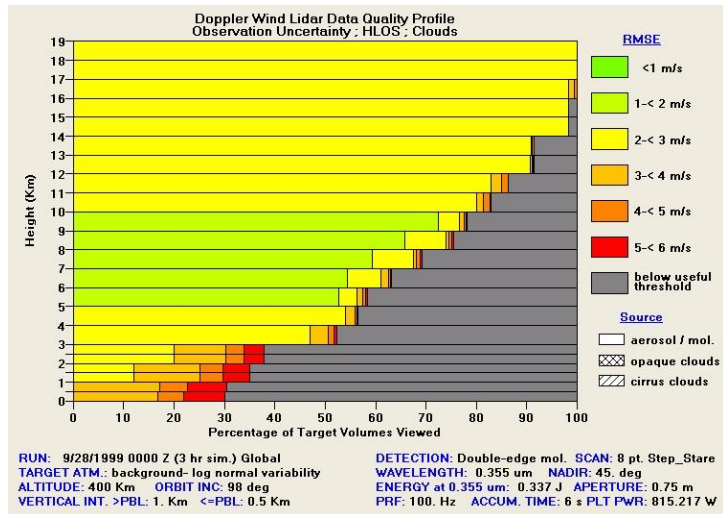
400 km Threshold Mission (30 degree nadir)



Note

At a planned 10% duty cycle, the orbit average for the Direct Molecular system is estimated to be 250 watts

400 km Threshold Mission (45 degree nadir)



Space Wind Measurement Requirements - 1

	Demo	Threshold	Objective	
Vertical depth of regard (DOR)	0-20	0-20	0-30	km
Vertical resolution:				
Tropopause to top of DOR	Not Req.	Not Req.	2	km
Top of BL to tropopause (~12 km)	2	1	0.5	km
Surface to top of BL (~2 km)	1	0.5	0.25	km
Number of collocated LOS wind measurements for horiz ^A wind calculation	2 = pair	2 = pair	2 = pair	-
Horizontal resolution ^A	350	350	100	km
Number of horizontal ^A wind tracks ^B	2	4	12	-
Velocity error ^C				
Above BL	3	3	2	m/s
In BL	3	2	1	m/s
Minimum wind measurement success rate	50	50	50	%
Temporal resolution (N/A for single S/C)	N/A	12	6	hours
Data product latency	N/A	2.75	2.75	hours

A – Horizontal winds are not actually calculated; rather two LOS winds with appropriate angle spacing and collocation are measured for an “effective” horizontal wind measurement. The two LOS winds are reported to the user.

B – The 4 cross-track measurements do not have to occur at the same along-track coordinate; staggering is OK.

C – Error = 1 σ LOS wind random error, projected to a horizontal plane; from all lidar, geometry, pointing, atmosphere, signal processing, and sampling effects. The true wind is defined as the linear average, over a 100 x 100 km box centered on the LOS wind location, of the true 3-D wind projected onto the lidar beam direction provided with the data.

(original errata that have been corrected)

 = meet or exceed

 = TBD

Issues for ISAL/IMDC

- What subsystems can be shared?
- What is the standby power requirement for the DD system?
- What are the scanner power requirements? Peak and average draw?