New Sampling Perspectives for TODWL

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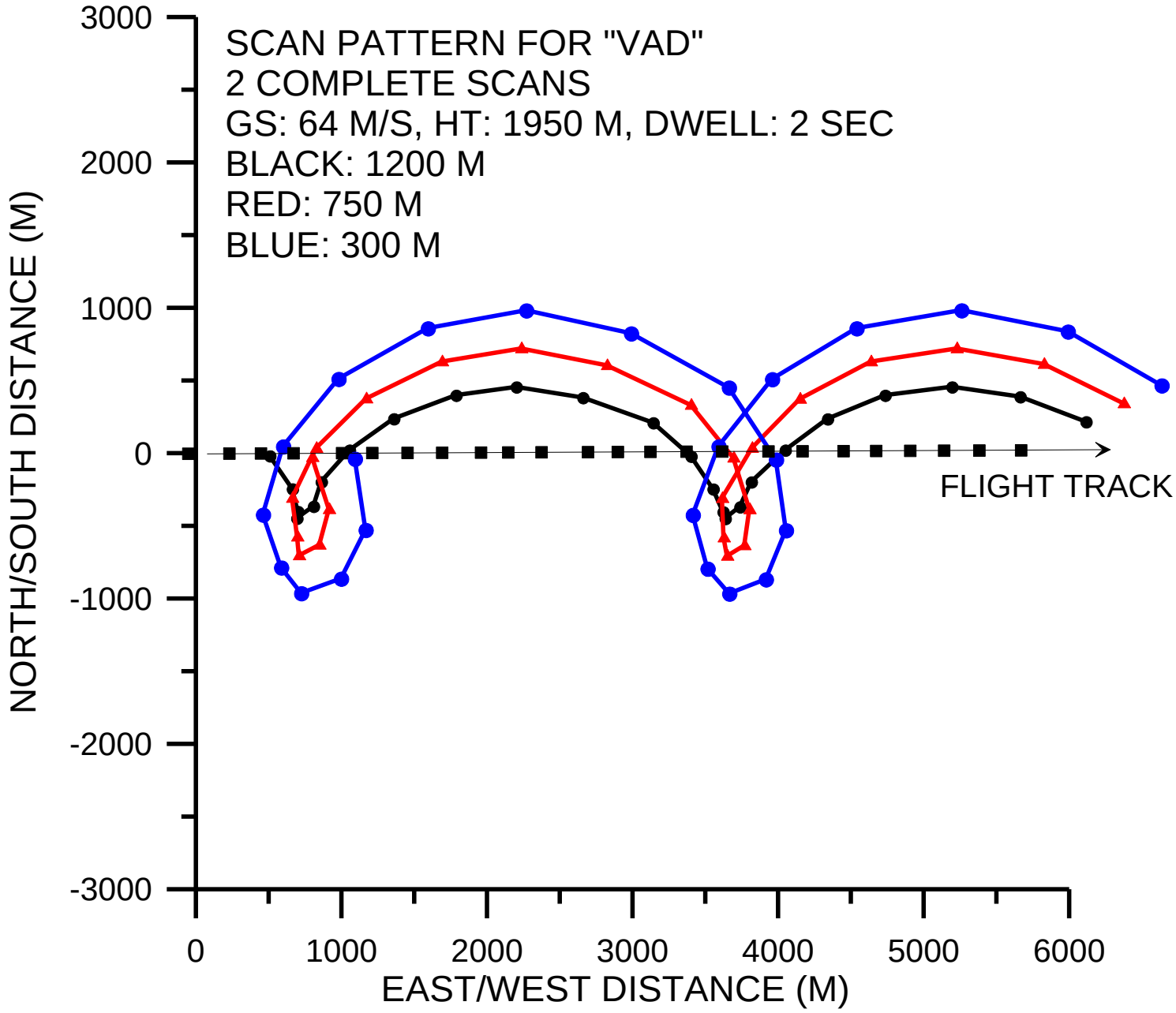
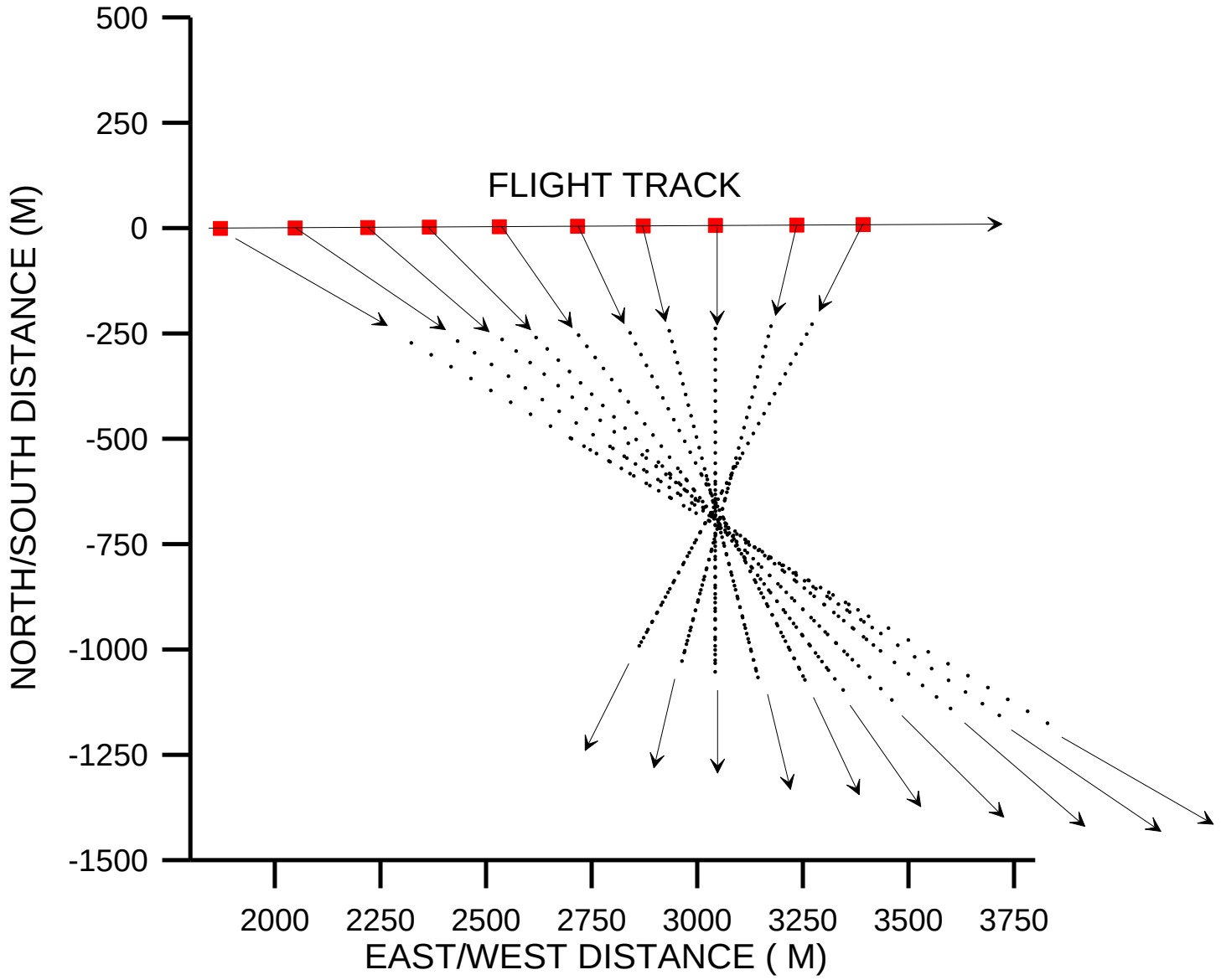
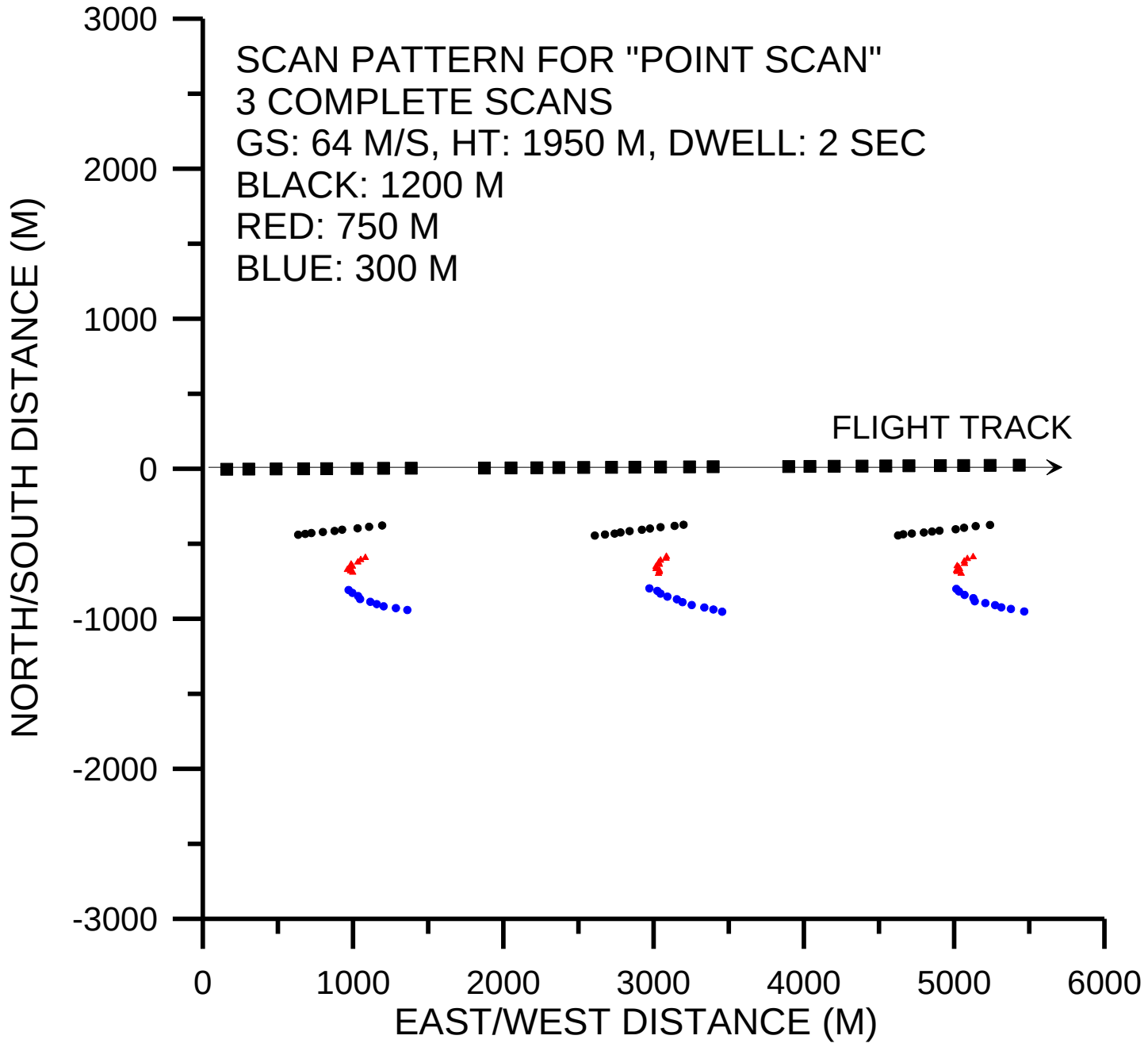
Simpson Weather Associates
WG on Space-base Lidar Winds
Welches, OR
27-30 June 2006

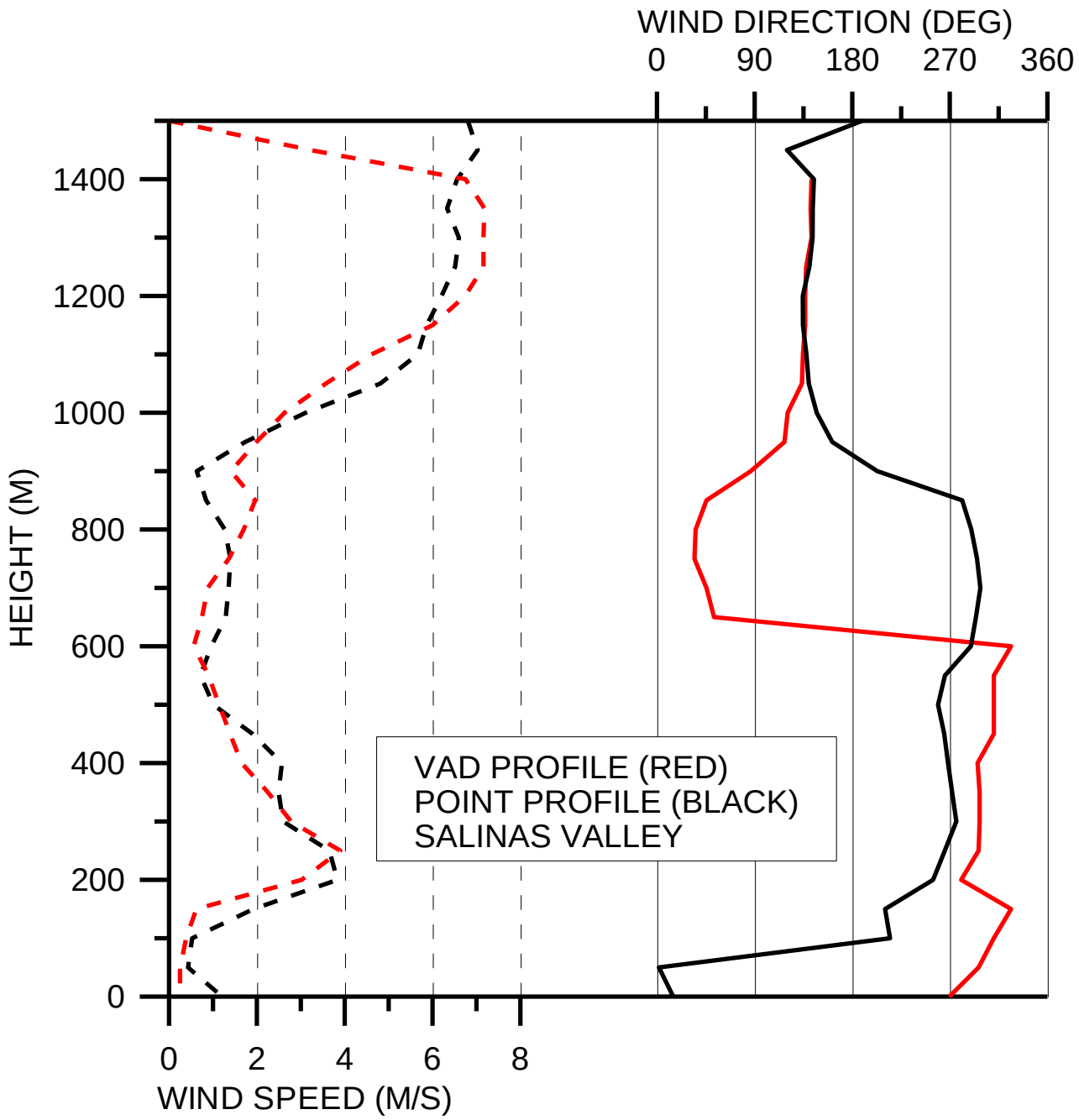
Main Points

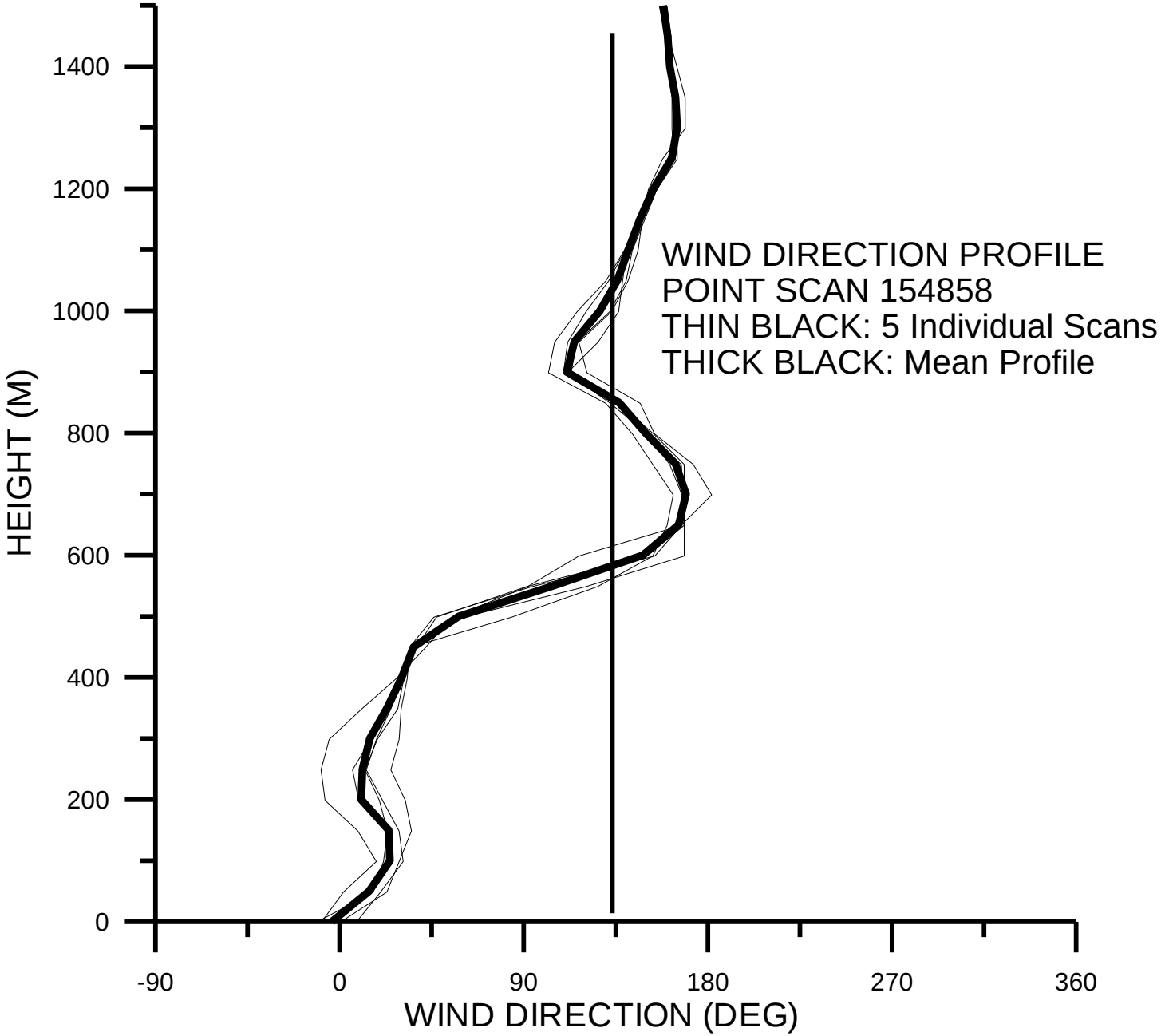
- “point” scans vs. downward VADS
- vertical motion scans
- DARPA
- ARO SBIR
- ONR SBIR
- NESDIS

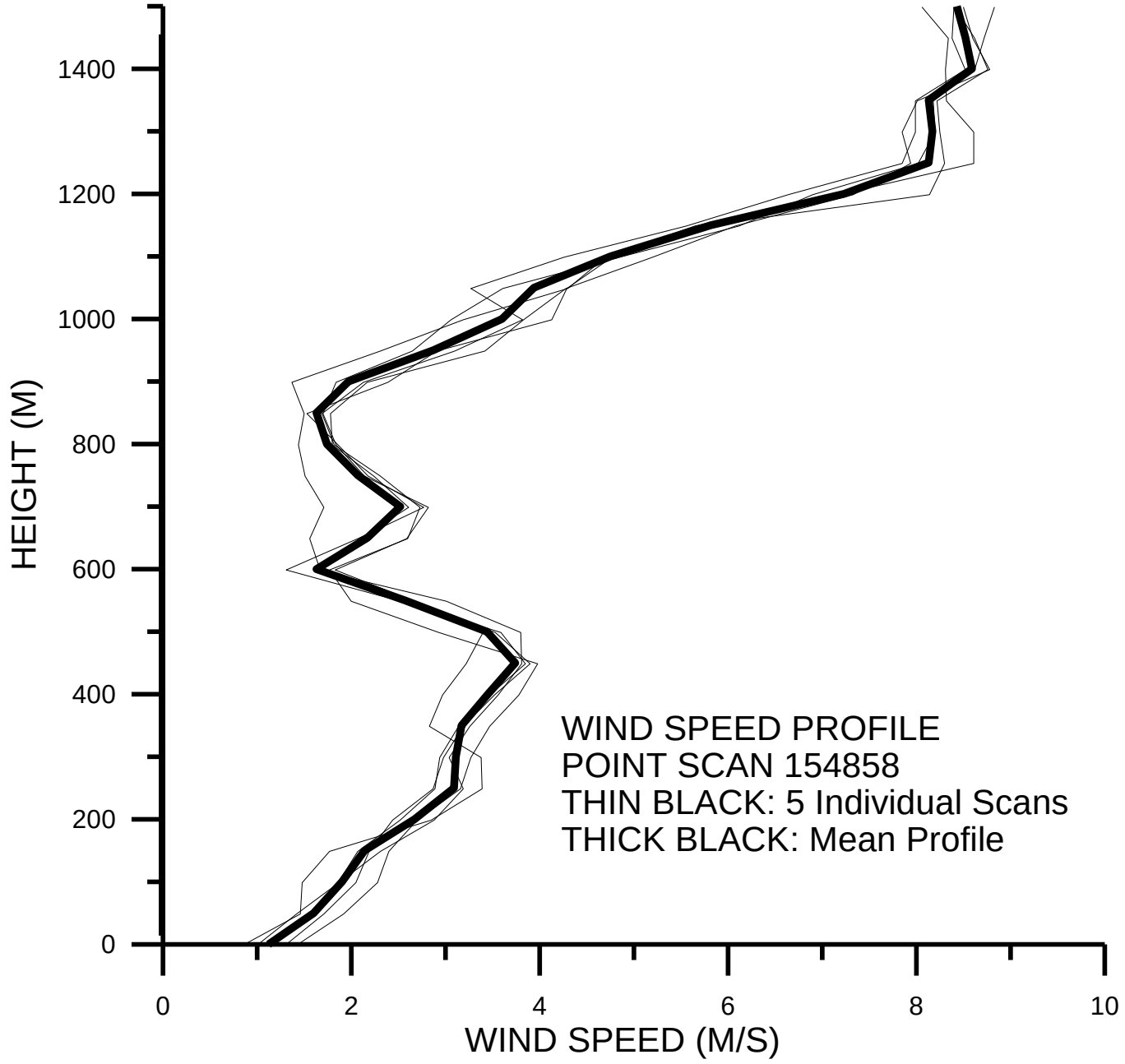

SCAN PATTERN FOR "VAD"
2 COMPLETE SCANS
GS: 64 M/S, HT: 1950 M, DWELL: 2 SEC
BLACK: 1200 M
RED: 750 M
BLUE: 300 M
FLIGHT TRACK
NORTH/SOUTH DISTANCE (M)
EAST/WEST DISTANCE (M)
3000
2000
1000
0
-1000
-2000
-3000
0
1000
2000
3000
4000
5000
6000

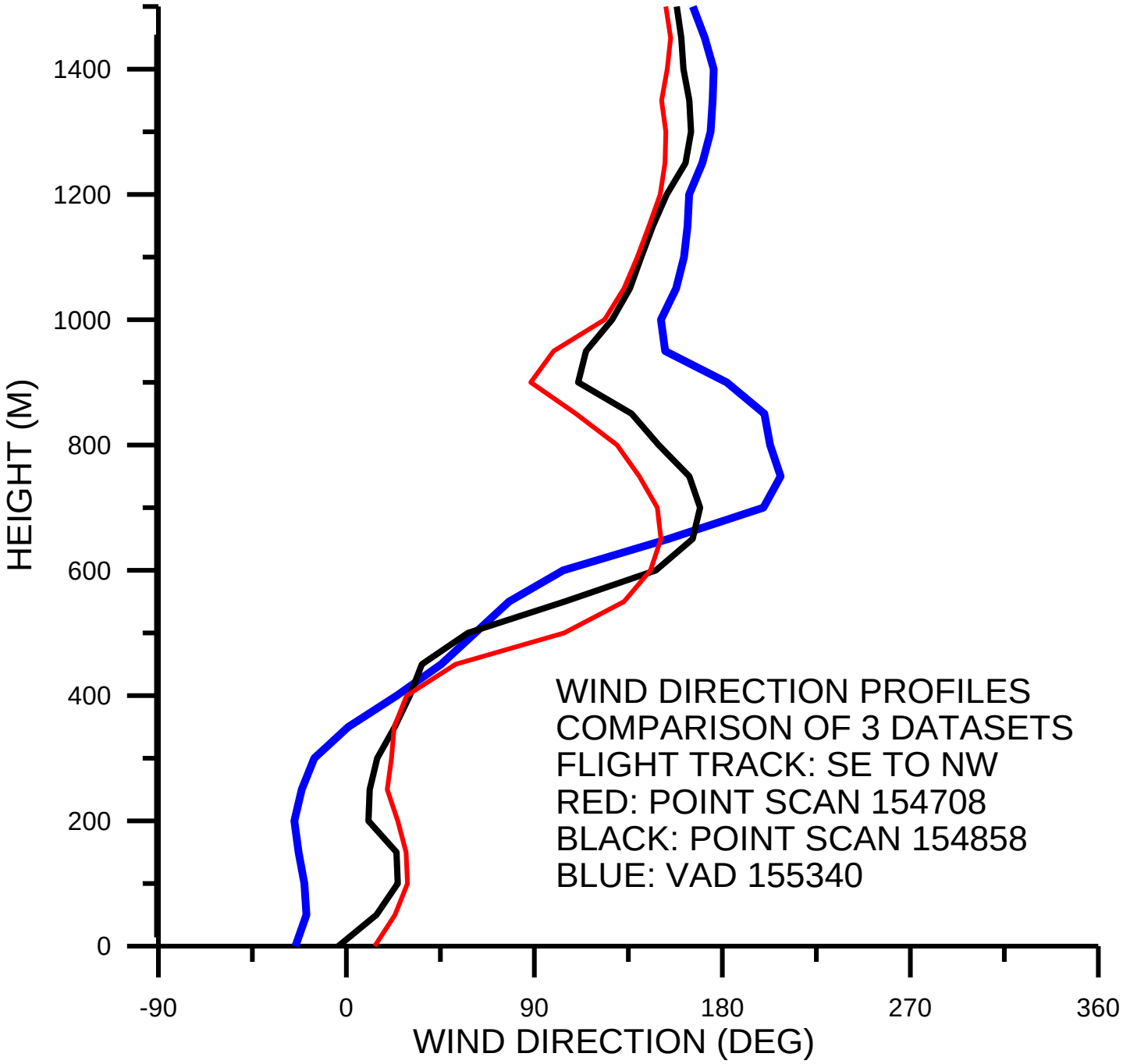

FLIGHT TRACK
500
250
0
-250
-500
-750
-1000
-1250
-1500
NORTH/SOUTH DISTANCE (M)
2000
2250
2500
2750
3000
3250
3500
3750
EAST/WEST DISTANCE (M)

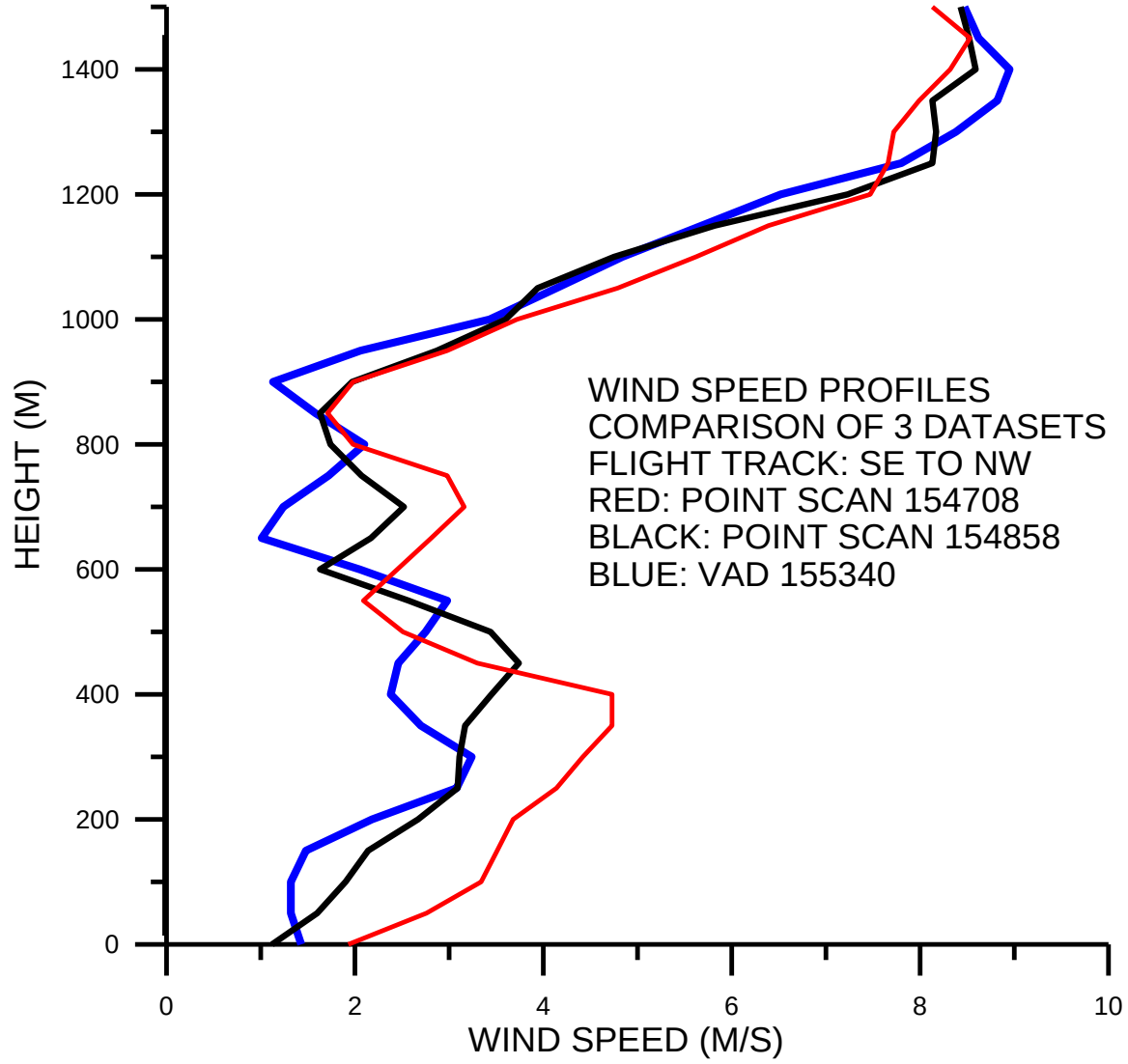

SCAN PATTERN FOR "POINT SCAN"
3 COMPLETE SCANS
GS: 64 M/S, HT: 1950 M, DWELL: 2 SEC
BLACK: 1200 M
RED: 750 M
BLUE: 300 M
FLIGHT TRACK
NORTH/SOUTH DISTANCE (M)
3000
2000
1000
0
-1000
-2000
-3000
0
1000
2000
3000
4000
5000
6000
EAST/WEST DISTANCE (M)

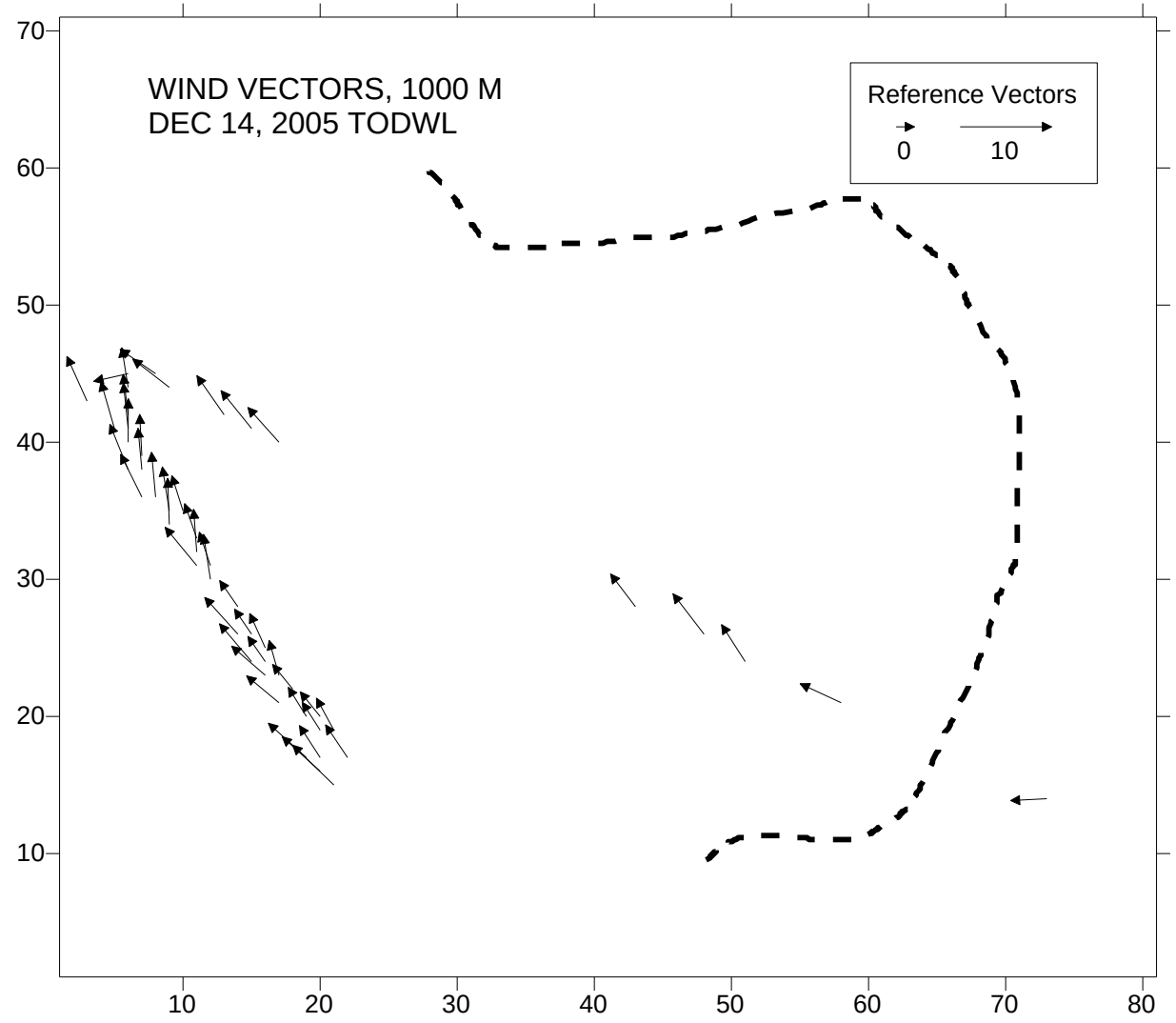

WIND DIRECTION (DEG)
0
90
180
270
360
1400
1200
1000
800
600
400
200
0
HEIGHT (M)
VAD PROFILE (RED)
POINT PROFILE (BLACK)
SALINAS VALLEY
0
2
4
6
8
WIND SPEED (M/S)

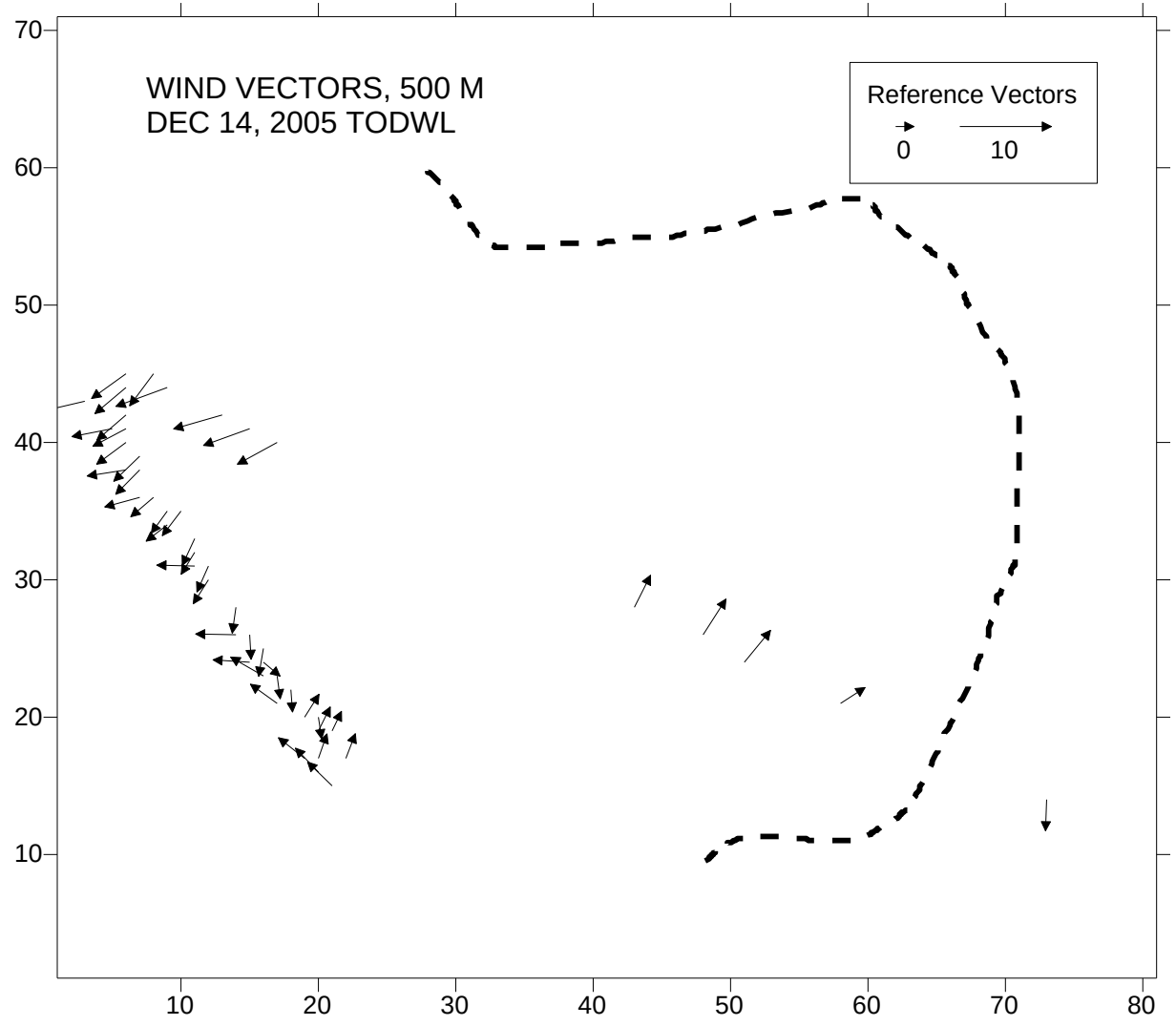

WIND DIRECTION PROFILE
POINT SCAN 154858
THIN BLACK: 5 Individual Scans
THICK BLACK: Mean Profile
HEIGHT (M)
0
200
400
600
800
1000
1200
1400
-90
0
90
180
270
360
WIND DIRECTION (DEG)


HEIGHT (M)
1400
1200
1000
800
600
400
200
0
0
2
4
6
8
10
WIND SPEED (M/S)
WIND SPEED PROFILE
POINT SCAN 154858
THIN BLACK: 5 Individual Scans
THICK BLACK: Mean Profile

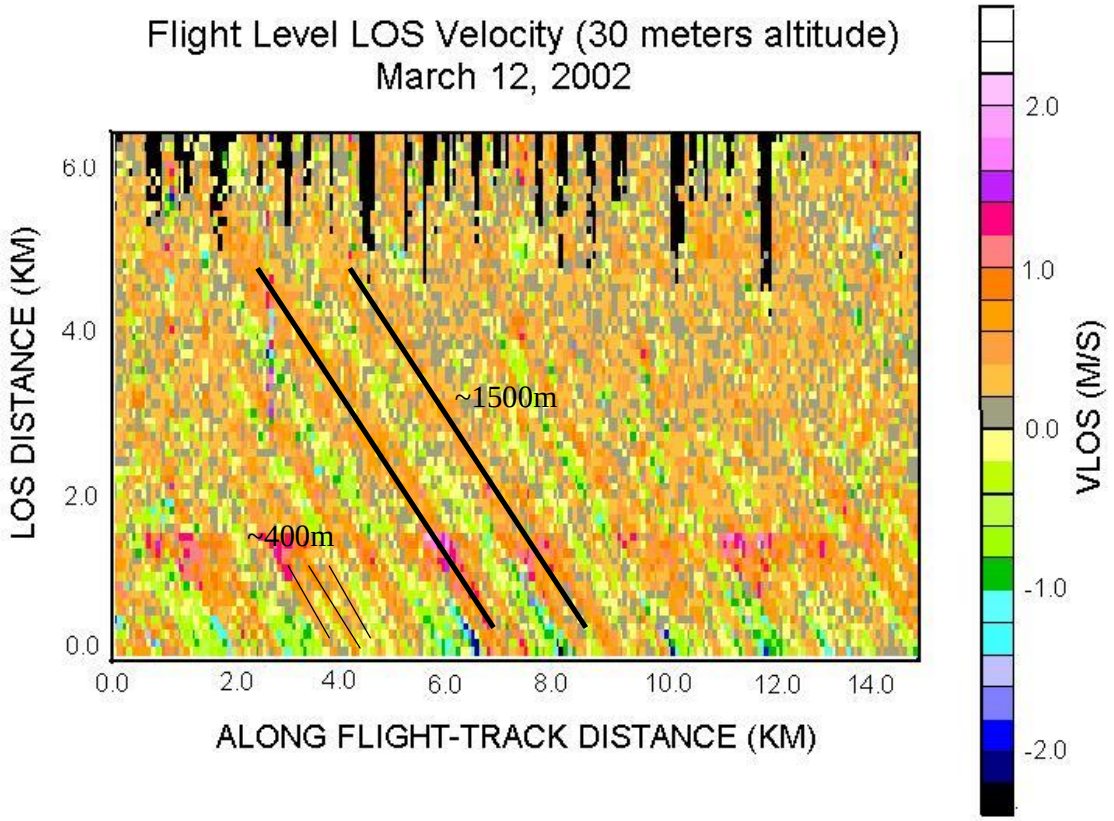

HEIGHT (M)
1400
1200
1000
800
600
400
200
0
-90
0
90
180
270
360
WIND DIRECTION (DEG)
WIND DIRECTION PROFILES
COMPARISON OF 3 DATASETS
FLIGHT TRACK: SE TO NW
RED: POINT SCAN 154708
BLACK: POINT SCAN 154858
BLUE: VAD 155340


WIND SPEED PROFILES
COMPARISON OF 3 DATASETS
FLIGHT TRACK: SE TO NW
RED: POINT SCAN 154708
BLACK: POINT SCAN 154858
BLUE: VAD 155340
HEIGHT (M)
0
200
400
600
800
1000
1200
1400
0
2
4
6
8
10
WIND SPEED (M/S)


WIND VECTORS, 1000 M
DEC 14, 2005 TODWL
Reference Vectors
0
10
70
60
50
40
30
20
10
10
20
30
40
50
60
70
80


WIND VECTORS, 500 M
DEC 14, 2005 TODWL
Reference Vectors
0
10
70
60
50
40
30
20
10
10
20
30
40
50
60
70
80

Vertical motions detected by organized horizontal speed structures



DARPA Funded Flights

- Project managed out of NIA at LaRC
- Interested in vertical motions ahead of UAVs
- Review previous TODWL data for cases where vertical component of the winds above 500 meters is detected
- Design series of TODWL flights for Fall ’06 to map vertical motion ahead of aircraft; urban, coastal, valley and ridge.

ARO SBIR

- Phase II project (begins this summer)
- ADLAATS (Airborne Doppler Lidar Analyses and Adaptive Targeting System)
  - SWA concept for using onboard execution of 3 D flow models along with DWL
  - TODWL to be used to develop and refine techniques
- Flights scheduled for late 2007.

ONR SBIR

- Phase I
- Develop onboard system for integrating DWL into system that integrates lidar, radar, in situ instruments and model data into single “mission focus” display
- Redesigning the DWL physical layout in the Twin Otter.

NESDIS Funded TODWL/GWOLF

- Conduct TODWL flights to investigate synergisms between DWL and WindSat, QuikScat and CMV over the coastal waters of California.
- Conduct both ground and airborne observations that can be used in evaluating space based performance models