Example of a spot calculation from the weather winds data

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Airplane and jumper data			
Airplane speed at exit	80 kts		
Terminal velocity	120 mph		
Exit altitude	10500 pieds		

Winds Data

Altitude	Speed	Provenance
(feet)	(kts)	
12000	28	350^{0}
9000	21	320^{0}
6000	15	280^{0}
3000	12	260^{0}
0	10	255^{0}

Intervals and elapsed time in freefall

Intervals	from	to	=	El. time (s)
1	10500'	9000'	1500'	12
2	9000'	6000'	3000'	17
3	6000'	3000'	3000'	17
4	3000' *	0'	3000'	180

* 3000' is the opening altitude

The jumper exposure time to the airplane speed (flying against the wind at exit altitude) is known to be about 5 seconds. In other word, after 5 seconds, the forward horizontal speed of the jumper is zero. In this case the jumper exits at 10500' and the airplane ground speed is therefore $80 - \frac{28 + 21}{2} = 55.5$ kts. 55.5 kts = 93.8 feet/s then the average jumper forward speed during those 5 seconds will be $\frac{93.8}{2}$ ft/s : and the corresponding forward drift will be : $\frac{93.8}{2} \times 5 = 234$ feet (to be substracted from the first vector-distance calculated of the 10500' to 9000' interval)

Trefuge vectors distance of the while dupsed times					
Intervals	Average speeds (kts)	Average provenance	Avrage direction	El.time (s)	
1	28 + 21 - 24.5	350 + 320 - 335	335 - 180 = 155	12	
2	$21+15$ _ 18	320 + 280 - 300	300 - 180 = 120	17	
		$\frac{1}{2} = 300$			
3	15 + 12 - 135	280 + 260 - 270	270 - 180 = 90	17	
		$\frac{1}{2} = 270$			
4	12+10	260 + 255 257 5	257.5 - 180 = 77.5	180	
	$\frac{1}{2} = 11$	$\frac{1}{2} = 237.3$			

Average vectors-distance of the wind and elapsed times

Vectors-distance						
Vectors	Speeds	directions	Speeds	El. Times	Distances	directions
	(kts)		(feet/s)	(s)	(pieds)	
V _{d1}	24.5	155^{0}	41.405	12	496.86	155 ⁰
V _{d2}	18	120^{0}	30.42	17	517.14	120^{0}
V _{d3}	13.5	90^{0}	22.815	17	387.855	90 ⁰
V _{d4}	11	77.5°	18.59	180	3346.2	77.5°

We have to substract 234 feet from V_{d1} because of the effect of the airplane speed on the jumper ie : 496.86 - 234 = 262.86 feet which gives the following table :

Vectors-distance with correction for the airplane ground speed

Vectors	Distances (feet)	directions
V _{d1corrected}	262.86	155^{0}
V _{d2}	517.14	120^{0}
V _{d3}	387.855	90^{0}
V_{d4}	3346.2	77.5°

The addition of those 4 vectors-distance gives the following resulting vector-distance:

 $V_{dR} = 4219.82 \, feet \rightarrow 86.91^{\circ}$ (calculated with the HP48GX graphing calculator)



Then the spot is at 4220 feet (a) 267° ($87^{\circ} + 180^{\circ}$)

Note 1 : The resulting vector-distance must be drawn in magnitude and direction on a map with the vector arrow placed on the landing target. The origin of this vector represents the projection of the exit point on the ground.

Note 2 : The graphing calculator HP48GX can get a program to do this calculation in a fraction of a second if we provide it with the data of the winds, of the airplane and of the jumper in an appropriate way.