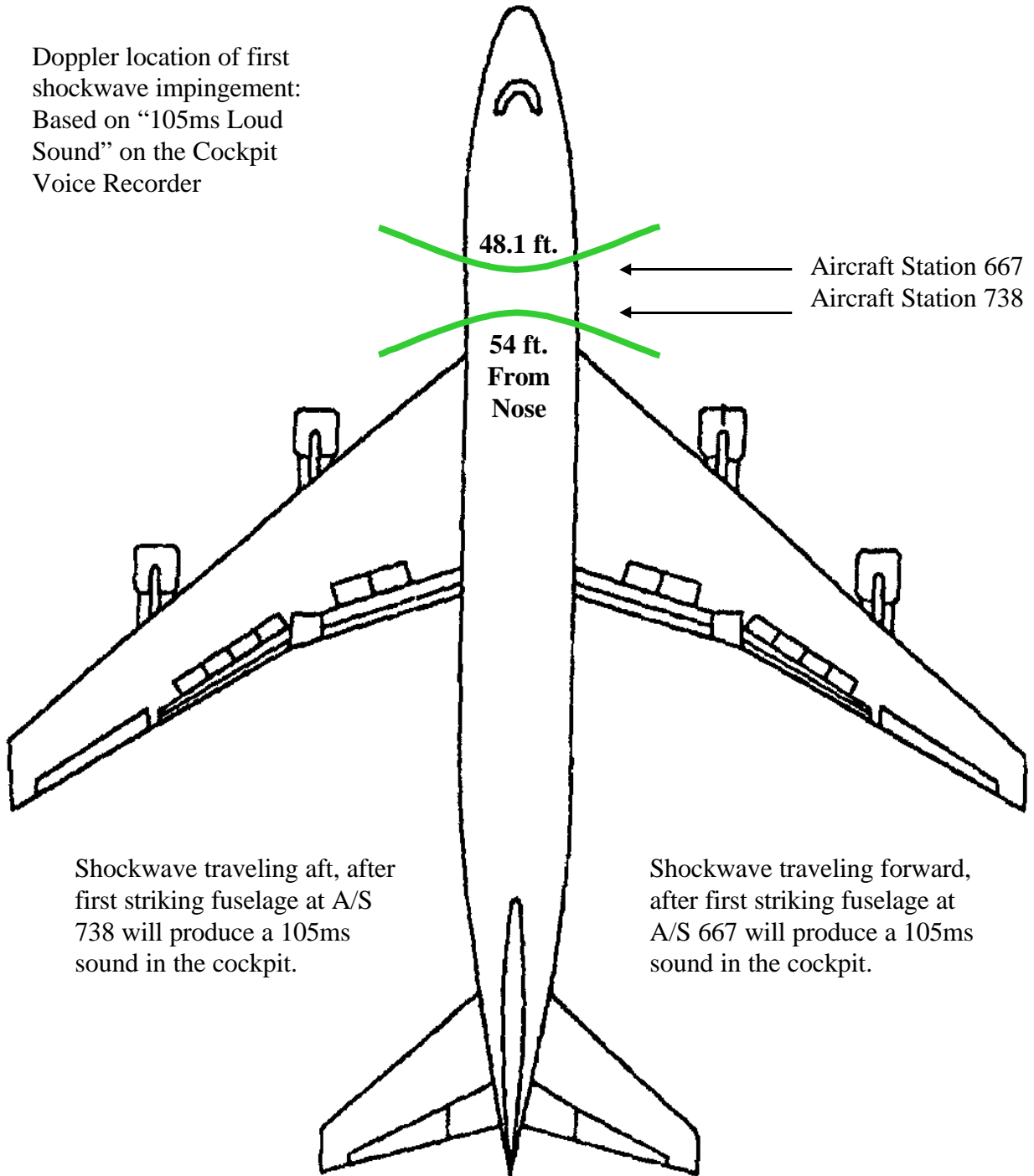


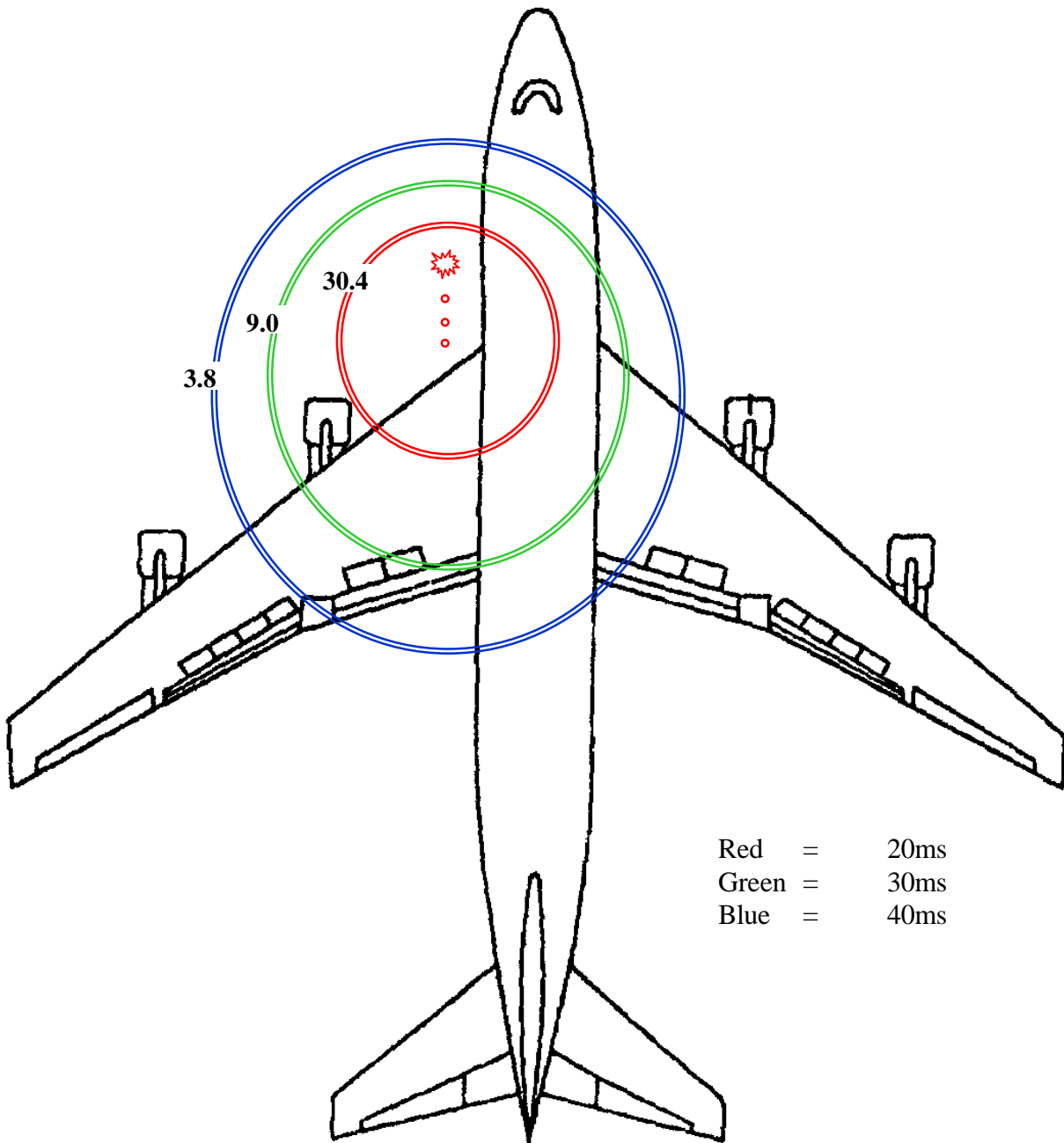
EXHIBIT 19 - DOPPLER LOCATION OF FIRST SHOCKWAVE

By William S. Donaldson Cmdr. USN Ret.

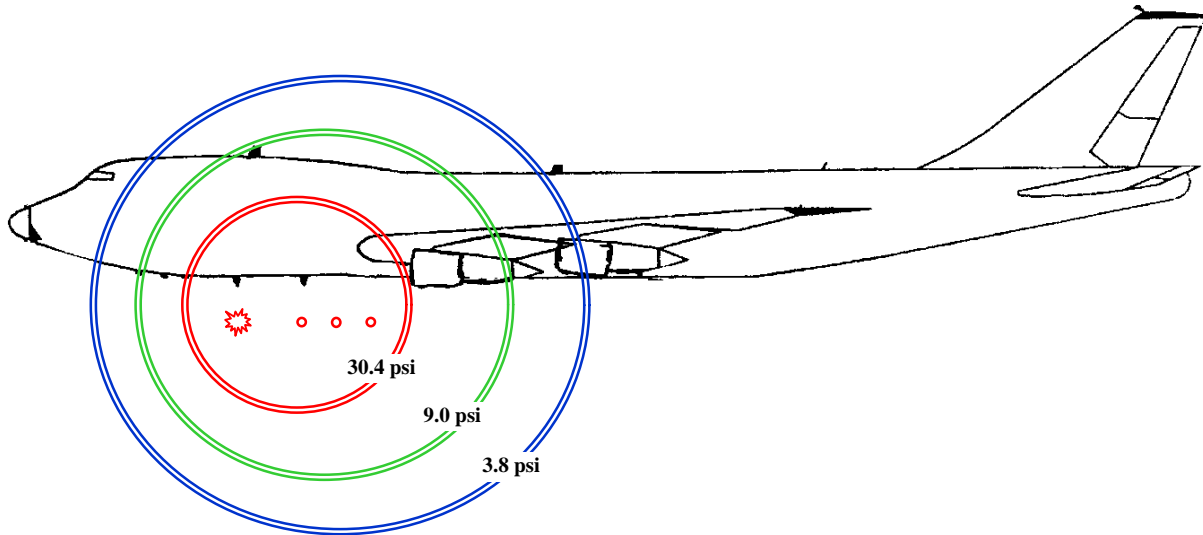
Doppler location of first shockwave impingement:
Based on "105ms Loud Sound" on the Cockpit Voice Recorder



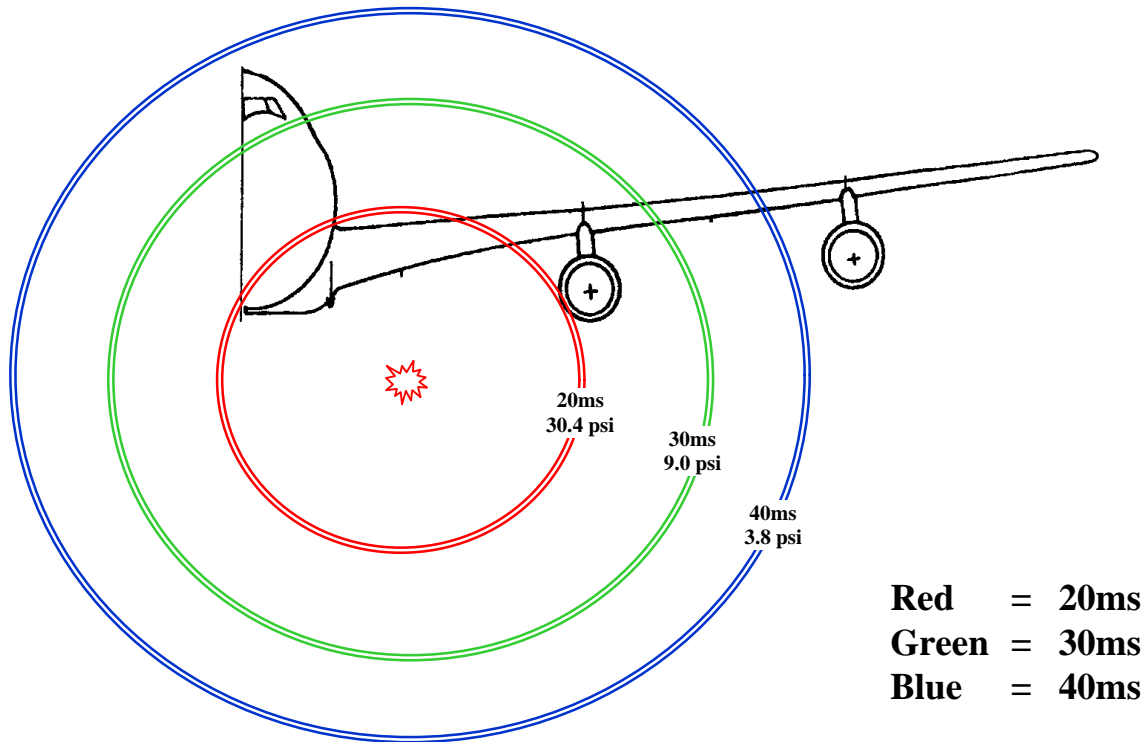
Airburst Top View



Airburst Side View



Airburst Front View



Overpressure vs. Burst Radius

90 lb. High Explosive Warhead Airburst

Feet	Pressure (lbs. /in. ²)
0'	1,500,000
5'	2,613.0
10'	338.0
11'	243.0
12'	187.5
13'	147.5
14'	119.8
15'	96.0
16'	79.0
17'	66.0
18'	55.5
19'	47.2
20'	40.0
21'	35.0
22'	30.4
23'	26.6
24'	23.4
25'	20.7
26'	18.4
27'	16.5
28'	14.7
29'	13.3
30'	12.0
31'	(11.1)* 10.8
32'	9.9
33'	(8.6)* 9.0
34'	8.2
35'	7.5
36'	6.9
37'	(6.1)* 6.4
38'	5.9
39'	5.5
40'	5.0
41'	4.7
42'	4.3
43'	4.0
44'	3.8
45'	(3.5)* 3.55
46'	3.3
47'	3.13
48'	2.92
49'	2.7
50'	2.6
55'	1.9
60'	(3.5)* 1.5
61'	1.4

Note: * indicates multiple pressure possibilities the DFDR altitude Fine line represents. The lowest possible pressure and greatest burst distance possible is 60' and 1.4 psi.